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Environmental Impact Statement for Combined Licenses (COLs) for Turkey Point Nuclear Plant Units 6 and 7

Final Report

Chapters 1 to 6

U.S. Nuclear Regulatory Commission
Office of New Reactors
Washington, DC 20555-0001

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U.S. Nuclear Regulatory Commission
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Regulatory Division
Jacksonville District
U.S. Army Corps of Engineers
Jacksonville, Florida 32232-0019

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Final Environmental Impact Statement for the Combined License (COL)
FOR THE TURKEY POINT NUCLEAR PLANT

Lead Agency: U.S. Nuclear Regulatory Commission
Cooperating Agency: U.S. Army Corps of Engineers, Jacksonville District
Contact: Alicia Williamson, Environmental Project Manager
Environmental Projects Branch
Division of New Reactor Licensing
Office of New Reactors
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
Telephone: 301-415-1878
e-mail: Alicia.Williamson@nrc.gov

ABSTRACT

This environmental impact statement (EIS) has been prepared in response to an application submitted to the U.S. Nuclear Regulatory Commission (NRC) by Florida Power & Light Company (FPL) for two combined construction permits and operating licenses (combined licenses or COLs). The proposed actions related to the FPL application are (1) NRC issuance of COLs for two new power reactor units (Units 6 and 7) at the Turkey Point Nuclear Power Plant site in Miami-Dade County, Florida, and (2) U.S. Army Corps of Engineers (USACE) decision to issue, deny, or issue with modifications a Department of the Army (DA) permit to perform certain dredge and fill activities in waters of the United States and to construct structures in navigable waters of the United States related to the project. The NRC, its contractors, and USACE make up the review team. The National Park Service (NPS) is also a cooperating agency on this EIS but does not now have a request to take any specific regulatory action before it. Due to this unique set of circumstances, impact determinations made in this EIS should only be attributed to the review team. This EIS documents the review team's analysis, which considers and weighs the environmental impacts of constructing and operating two new nuclear units at the Turkey Point site and at alternative sites, including measures potentially available for reducing or avoiding adverse impacts.

The EIS includes an evaluation of the impacts of construction and operation of Turkey Point Units 6 and 7 on waters of the United States pursuant to Section 404 of the Clean Water Act and on navigable waters of the United States pursuant to Section 10 of the Rivers and Harbors Act of 1899. The USACE will base its evaluation of FPL's DA permit application, on the requirements of USACE regulations, the Clean Water Act Section 404(b)(1) Guidelines, and the USACE public interest review process.

After considering the environmental aspects of the proposed action before the NRC, the NRC staff's recommendation to the Commission is that the COLs be issued as proposed. This recommendation is based on (1) the application, including the Environmental Report (ER), submitted by FPL; (2) consultation with Federal, State, Tribal, and local agencies; (3) the review

team's independent review; (4) the consideration of public comments received on the environmental review; and (5) the assessments summarized in this EIS, including the potential mitigation measures identified in the ER and this EIS.

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EXECUTIVE SUMMARY

This environmental impact statement (EIS) presents the results of a U.S. Nuclear Regulatory Commission (NRC) environmental review of an application for a combined construction permit and operating license (combined license or COL) for two new nuclear reactor units at a proposed Turkey Point site in Miami-Dade County, Florida. The U.S. Army Corps of Engineers (USACE) participated in the preparation of the EIS as a cooperating agency and as a member of the review team, which consisted of the NRC staff, its contractor staff, and the USACE staff. The National Park Service (NPS) participated in the environmental review as a cooperating agency by providing special expertise for the areas in and around the adjacent national parks (Biscayne and Everglades National Parks). The NPS does not have a request to take any specific regulatory actions related to the proposed COLs before it. Due to this unique set of circumstances, all impact determinations made in this EIS should not be attributed to NPS, but only to the NRC and USACE (also referred to as the review team). The NPS's participation in connection with this EIS does not imply NPS concurrence.

Background

On June 30, 2009, the Florida Power & Light Company (FPL) submitted an application to the NRC for a combined construction permit and operating license (combined license or COL) for Turkey Point Units 6 and 7.

Upon acceptance of FPL's application, the NRC review team began the environmental review process by publishing a Notice of Intent to prepare an EIS and conduct scoping in the *Federal Register* on June 15, 2010. As part of this environmental review, the review team did the following:

- conducted public scoping meetings on July 15, 2010 in Homestead, Florida
- conducted a site visit of the proposed Units 6 and 7 plant area on the Turkey Point site in June 2010
- conducted visits to alternative sites in July 2010
- reviewed FPL's Environmental Report (ER)
- consulted with Tribal Nations and other agencies such as the U.S. Fish and Wildlife Service (FWS), Advisory Council on Historic Preservation, Florida Fish and Wildlife Conservation Commission, National Marine Fisheries Service, Miami-Dade Office of Historic and Archaeological Resources, and Florida Division of Historical Resources
- conducted the review following guidance set forth in NUREG-1555:
  - "Standard Review Plans for Environmental Reviews for Nuclear Power Plants
  - Supplement 1: Operating License Renewal"
- considered public comments received during the 60-day scoping process from June 15, 2010 to August 16, 2010

- conducted public meetings on the draft EIS on April 22, 2015, in Miami, Florida, and on April 23, 2015, in Homestead, Florida
- considered public comments received during the comment periods for the draft EIS, which extended from March 5 to May 22 and from May 28 to July 17, 2016.

Proposed Action

FPL initiated the proposed Federal action by submitting an application for Turkey Point Units 6 and 7 to the NRC. The NRC's Federal action is issuance of COLs for two Westinghouse AP1000 reactors at the Turkey Point site near Homestead, Florida.

The USACE is a cooperating agency in preparation of this EIS. The USACE's Federal action is its decision of whether to issue, deny, or issue with modifications a Department of Army (DA) permit pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899 to authorize certain construction activities potentially affecting waters of the United States.(1)

Purpose and Need for Action

The purpose of the proposed NRC action, issuance of the COL, is to provide for additional baseload electric generating capacity for use in the FPL service territory.

The USACE determines both a basic and an overall project purpose pursuant to the Clean Water Act Section 404(b)(1) Guidelines, 33 CFR § 230.10. The basic purpose is to meet the public's need for electric energy. The overall purpose is to meet the public's need for reliable increased electrical baseload generating capacity in FPL's service territory.

Affected Environment

The Turkey Point site is located in southeast Miami-Dade County, Florida, near Homestead (Figure ES-1). Turkey Point Units 6 and 7 would be located on the same site as the existing Turkey Point site, which has five other power plants, including two nuclear power reactors. Turkey Point would be located 25 mi south of Miami and 4.5 and 8 mi east of Homestead and Florida City, respectively. The primary source of cooling water would be reclaimed wastewater and the alternative source would be saltwater supplied from radial collector wells beneath Biscayne Bay. The ultimate heat sink for Turkey Point Units 6 and 7 would be the atmosphere, using three mechanical draft cooling towers per reactor.

(1) Waters of the United States" is used to include both "waters of the United States" as defined by 33 CFR Part 328 (TN1683) defining the extent of USACE geographic jurisdiction pursuant to Section 404 of the Clean Water Act and "navigable waters of the United States" as defined by 33 CFR Part 329 (TN4770) defining the extent of USACE geographic jurisdiction pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403) (TN4768).

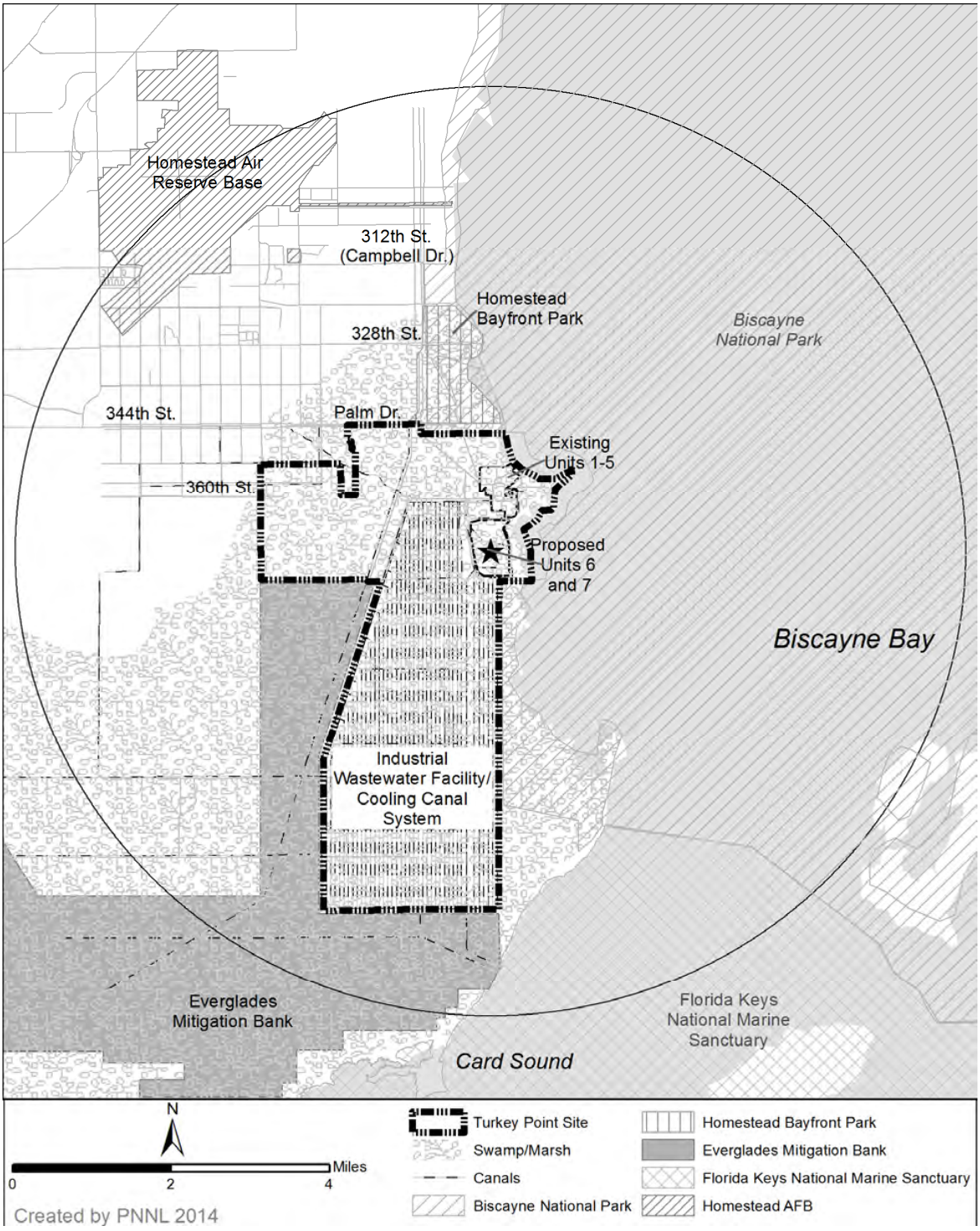


Figure ES-1. The Turkey Point Site and Affected Environment

Evaluation of Environmental Impacts

SMALL: Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.

MODERATE: Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.

LARGE: Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

This EIS evaluates the potential environmental impacts of the construction and operation of the two new nuclear plants proposed for the Turkey Point site related to the following resource areas:

- land use
- air quality
- aquatic ecology
- terrestrial ecology
- surface and groundwater
- waste (radiological and nonradiological)
- human health (radiological and nonradiological)
- socioeconomics
- environmental justice
- cultural resources
- fuel cycle, decommissioning, and transportation

The impacts are designated as SMALL, MODERATE, or LARGE. The incremental impacts related to the construction and operations activities requiring NRC authorization are described and characterized, as are the cumulative impacts resulting from the proposed action when the effects are added to, or interact with, other past, present, and reasonably foreseeable future effects on the same resources. A summary of the construction and operation impacts are outlined in Table ES-1. Table ES-2 summarizes the review team's assessment of cumulative impacts. The review team's detailed analysis which supports the impact assessment of the proposed new units can be found in Chapters 4, 5, and 7, respectively.

Table ES-1. Environmental Impact Levels of the Proposed Turkey Point Units 6 and 7

Resource Category	Preconstruction and Construction	Operation
Land Use	MODERATE (NRC authorized construction impact level is SMALL)	MODERATE
Water-Related		
Water Use – Surface Water	SMALL	SMALL
Water Use – Groundwater Use	SMALL	SMALL
Water Quality – Surface Water	SMALL	SMALL
Water Quality – Groundwater	SMALL	SMALL
Ecology		
Terrestrial Ecosystems	MODERATE (NRC authorized construction impact level is SMALL)	MODERATE
Aquatic Ecosystems	SMALL to MODERATE	SMALL
Socioeconomic		
Physical Impacts	SMALL (adverse) to MODERATE (beneficial)	SMALL (adverse) to MODERATE (beneficial)
Demography	SMALL	SMALL
Economic Impacts on the Community	SMALL	SMALL and beneficial
Infrastructure and Community Services	SMALL to MODERATE	SMALL to MODERATE
Environmental Justice	NONE[(a)]	NONE[(a)]
Historic and Cultural Resources	MODERATE (NRC authorized construction impact level is SMALL)	SMALL
Air Quality	SMALL	SMALL
Nonradiological Health	SMALL	SMALL
Nonradiological Waste	SMALL	SMALL
Radiological Health	SMALL	SMALL
Postulated Accidents	n/a	SMALL
Fuel Cycle, Transportation, and Decommissioning	n/a	SMALL

(a) A determination of "NONE" for Environmental Justice analyses does not mean there are no adverse impacts to minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

Table ES-2. Cumulative Impacts on Environmental Resources, Including the Impacts of Proposed Turkey Point Units 6 and 7

Resource Category	Impact Level
Land Use	MODERATE
Water-Related	
Water Use – Surface Water	SMALL
Water Use – Groundwater Use	SMALL
Water Quality – Surface Water	MODERATE
Water Quality – Groundwater	SMALL
Ecology	
Terrestrial Ecosystems	MODERATE to LARGE
Aquatic Ecosystems	MODERATE
Socioeconomic	
Physical Impacts	SMALL adverse to MODERATE beneficial
Demography	SMALL
Economic Impacts on the Community	SMALL and beneficial
Infrastructure and Community Services	SMALL to MODERATE
Environmental Justice	NONE[(a)]
Historic and Cultural Resources	MODERATE
Air Quality	SMALL to MODERATE for criteria pollutants and MODERATE for GHGs
Nonradiological Health	SMALL
Nonradiological Waste	SMALL
Radiological Health	SMALL
Postulated Accidents	SMALL
Fuel Cycle, Transportation, and Decommissioning	SMALL

(a) A determination of "NONE" for Environmental Justice analyses does not mean there are no adverse impacts to minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

Alternatives

The review team considered the environmental impacts associated with alternatives to issuing a COL for the two new nuclear units proposed by FPL for the Turkey Point site. These alternatives included a no-action alternative (i.e., not issuing the COL) and alternative energy sources, siting locations, and system designs.

The no-action alternative would result in the COL not being granted or the USACE not issuing its permit. Upon such a denial, construction and operation of new units at the Turkey Point site would not occur and the predicted environmental impacts would not take place. If no other facility would be built or strategy implemented to take its place, the benefits of the additional electrical capacity and electricity generation to be provided would also not occur and the need for baseload power would not be met.

Based on the NRC staff's review of energy alternatives, the NRC staff concluded that, from an environmental perspective, none of the viable alternatives is environmentally preferable to building a new baseload nuclear power generation plant at the Turkey Point site. The NRC staff eliminated several energy sources (e.g., wind, solar, geothermal, and biomass) from full

consideration because they are not currently capable of meeting the need of this project. None of the viable baseload alternatives (natural gas, coal, or a combination of alternatives) was environmentally preferable to the proposed Turkey Point units.

After comparing the cumulative effects of a new nuclear power plant at the proposed site against those at the alternative sites, the NRC staff concluded that none of the alternative sites would be environmentally preferable to the proposed site for building and operating a new nuclear power plant (Table ES-3). The four alternatives sites selected were as follows (Figure ES-2):

- Glades
- Martin
- Okeechobee 2
- St. Lucie.

Table ES-3. Comparison of Cumulative Impacts at the Turkey Point and Alternative Sites

Resource Category	Turkey Point Site[a]	Glades[b]	Martin[b]	Okeechobee 2[b]	St. Lucie[b]
Land Use	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
Water-Related					
Surface-water use	SMALL	MODERATE	MODERATE	MODERATE	SMALL
Groundwater use	SMALL	SMALL	SMALL	SMALL	SMALL
Surface-water quality	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
Groundwater quality	SMALL	SMALL	SMALL	SMALL	SMALL
Ecology					
Terrestrial and wetland ecosystems	MODERATE to LARGE	MODERATE	MODERATE	MODERATE	MODERATE
Aquatic ecosystems	MODERATE	MODERATE	MODERATE	MODERATE	SMALL to MODERATE
Socioeconomics					
Physical impacts	SMALL adverse except for MODERATE beneficial impacts on road quality	MODERATE adverse to SMALL beneficial impacts on road quality	MODERATE adverse to MODERATE beneficial impacts on road quality	MODERATE adverse to SMALL beneficial impacts on road quality	LARGE adverse to MODERATE beneficial impacts on road quality
Demography	SMALL	SMALL	SMALL	SMALL	SMALL, except for LARGE residential displacement impacts
Economic impacts on the community	SMALL and beneficial	SMALL and beneficial, except for LARGE and beneficial property tax revenues for Glades County and School District	SMALL and beneficial, except for MODERATE and beneficial property tax revenues for Martin County and School District	SMALL and beneficial, except for LARGE and beneficial property tax revenues for Okeechobee County and School District	SMALL and beneficial

Table ES-3. (contd)

Resource Category	Turkey Point Site[a]	Glades[b]	Martin[b]	Okeechobee 2[b]	St. Lucie[b]
Infrastructure and community services	SMALL except for MODERATE adverse impacts on traffic	SMALL except for MODERATE adverse impacts on traffic	SMALL except for MODERATE adverse impacts on traffic	SMALL except for MODERATE adverse impacts on traffic	SMALL except for MODERATE adverse impacts on traffic
Environmental Justice	None[c]	None[c]	None[c]	None[c]	None[c]
Historic and Cultural Resources	MODERATE	MODERATE	SMALL	MODERATE	SMALL
Air Quality					
Criteria pollutants	SMALL to MODERATE	SMALL	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE
Greenhouse gas emissions	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
Nonradiological Health	SMALL	SMALL	SMALL	SMALL	SMALL
Radiological Health	SMALL	SMALL	SMALL	SMALL	SMALL
Postulated Accidents	SMALL	SMALL	SMALL	SMALL	SMALL

(a) Cumulative impact determinations taken from EIS Table 7-3.
(b) Cumulative impact determinations taken from EIS Table 9-28.
(c) A determination of "NONE" for Environmental Justice analyses does not mean there are no adverse impacts on minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

Table ES-3 provides a summary of the cumulative impacts for the proposed and alternative sites. The NRC staff concluded that all of the sites were generally comparable, and it would be difficult to state that one site is preferable to another from an environmental perspective. In such a case, the proposed site prevails because none of the alternatives is environmentally preferable to the proposed site.

Table ES-4 provides a summary of the EIS-derived impacts for a new nuclear power plant in comparison with the energy alternatives. The NRC staff concluded that none of the viable energy alternatives is preferable to construction of a new baseload nuclear power-generating plant located within FPL's region of interest.

The NRC staff considered various alternative systems designs, including seven alternative heat-dissipation systems and multiple alternative intake, discharge, and water-supply systems. The review team identified no alternatives that were environmentally preferable to the proposed Turkey Point Units 6 and 7 systems design.

Figure ES-2. Location of Sites Considered as Alternatives to the Turkey Point Site

Table ES-4. Summary of Environmental Impacts[a] of Construction and Operation of New Nuclear, Coal-Fired, and Natural-Gas–Fired Generating Units and a Combination of Alternatives

Impact Category	Nuclear	Coal[b]	Natural Gas[b]	Combination of Alternatives[b]
Land Use	MODERATE	MODERATE	MODERATE	MODERATE
Air Quality	SMALL	MODERATE	SMALL to MODERATE	SMALL to MODERATE
Water Use and Quality	SMALL	SMALL	SMALL	SMALL
Ecology	MODERATE	MODERATE	MODERATE	MODERATE
Waste Management	SMALL	MODERATE	SMALL	SMALL
Socioeconomics	MODERATE Beneficial to MODERATE Adverse	MODERATE Beneficial to MODERATE Adverse	MODERATE Beneficial to SMALL Adverse	MODERATE Beneficial to MODERATE Adverse
Human Health	SMALL	SMALL	SMALL	SMALL
Historic and Cultural Resources	MODERATE	MODERATE	MODERATE	MODERATE
Environmental Justice	NONE[b]	NONE[b]	NONE[b]	NONE[b]

(a) Impact levels for all alternatives are for construction and operation but do not reflect cumulative impacts. Thus, the nuclear impacts identified here may differ from those used to compare the proposed site to the alternative sites, which reflect cumulative impacts.
(b) Impacts taken from EIS Table 9-4. These conclusions for energy alternatives should be compared to NRC-authorized activities reflected in Chapters 4, 5, and Sections 6.1, and 6.2.
(c) A determination of "NONE" for Environmental Justice analyses does not mean there are no adverse impacts to minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

Benefits and Costs

The NRC staff compiled and compared the pertinent analytical conclusions reached in the EIS. It gathered all of the expected impacts from building and operating proposed Turkey Point Units 6 and 7 and aggregated them into two final categories: (1) expected environmental costs and (2) expected benefits to be derived from approval of the proposed action. Although the analysis in Section 10.6 is conceptually similar to a purely economic benefit-cost analysis, which determines the net present dollar value of a given project, the purpose of the section is to identify potential societal benefits of the proposed activities and compare them to the potential internal (i.e., private) and external (i.e., societal) costs of the proposed activities. In general, the purpose is to inform the COL process by gathering and reviewing information that demonstrates the likelihood that the benefits of the proposed activities outweigh the aggregate costs.

On the basis of the assessments in this EIS, the building and operation of proposed Turkey Point Units 6 and 7, with mitigation measures identified by the review team, would accrue benefits that most likely would outweigh the economic, environmental, and social costs. For the NRC-proposed action (i.e., NRC-authorized construction and operation), the accrued benefits would also outweigh the costs of preconstruction, construction, and operation of proposed Turkey Point Units 6 and 7.

Public Involvement

A 60-day scoping period was held from June 15, 2010, to August 16, 2010. On July 15, 2010, the NRC held two public scoping meetings in Homestead, Florida. The review team received many oral comments during the public meetings and 32 e-mails and 10 letters throughout the rest of the scoping period on numerous topics including energy alternatives, terrestrial ecology, ground and surface water, and socioeconomics. The review team's response to the in-scope public comments can be found in Appendix D. The Scoping Summary Report (Agencywide Documents Access and Management System (ADAMS) Accession No. ML103130609) contains all of the comments, even those considered out-of-scope (e.g., security, safety issues).

During the initial 75-day comment period on the draft EIS, which began on March 6, 2015, the review team held public meetings in Miami, Florida, on April 22, 2015, and in Homestead, Florida, on April 23, 2015. During the course of the comment period, the NRC received requests from members of the public, a Tribal government, and Federal agencies to extend the comment period. In response to these requests, the NRC reopened the comment period on the draft EIS on May 28, 2015, until July 17, 2015, allowing additional time for public comments. In total, approximately 68 people provided oral comments at the public meetings held in April, and the NRC received approximately 11,300 pieces of correspondence during the original and reopened comment period.

Recommendation

The NRC's recommendation to the Commission related to the environmental aspects of the proposed action is that the COL should be issued.

This recommendation is based on the following:

- the application, including the ER, submitted by FPL
- consultation with Federal, State, Tribes, and local agencies
- site audits and alternative sites audits
- consideration of public comments received during the environmental review
- the review team's independent review and assessment summarized in this EIS.

The NRC's determination is independent of the USACE's determination of whether to issue, deny, or issue with modifications the DA permit application for the Turkey Point Units 6 and 7. The USACE will conclude its Clean Water Act Section 404(b)(1) Guidelines and public interest analyses in its Record of Decision.

ABBREVIATIONS/ACRONYMS

AADT	annual average daily traffic
ac	acre(s)
ACC	averted cleanup and decontamination costs
ac-ft	acre (foot) feet
ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
AD	Anno Domini
ADAMS	Agencywide Documents Access and Management System
AERMOD	American Meteorological Society/U.S. Environmental Protection Agency (AMS/EPA) Regulatory Model
AICUZ	Air Installation Compatible Use Zone
ALARA	as low as reasonably achievable
a.m.	ante meridian
AO	Administrative Order
AP-42	EPA's Compilation of Air Pollutant Emission Factors document
APE	Area of Potential Effect
APPZ	Avon Park Permeable (or Producing) Zone
AQCR	Air Quality Control Region
ARNI	Aquatic Resources of National Importance
ARRA	American Recovery and Reinvestment Act of 2009
ASE	advanced safety evaluation
ASR	aquifer storage and recovery (system)
ATC	Atlantic Coastal Ridge
BA	Biological Assessment
BACT	Best Available Control Technologies
BBCW	Biscayne Bay Coastal Wetlands
BC	Before Christ
BEBR	University of Florida's Bureau of Economic and Business Research
BEA	U.S. Bureau of Economic Analysis
BEIR VII	Biological Effects of Ionizing Radiation VII
bgs	below ground surface
BISC	Biscayne Bay
BLS	U.S. Bureau of Labor Statistics
BMP	Best Management Practice
Btu	British thermal unit
°C	degree(s) Celsius
μCi	microcurie(s)

μCi/mL	microcuries per milliliter
CA	Consent Agreement
CAA	Clean Air Act
CAIR	Clean Air Interstate Rule
CCD	Colony Collapse Disorder
CCR	coal combustion residuals
CCS	cooling-canal system (also known as IWF)
CDF	core damage frequency
CDMP	Comprehensive Development Master Plan
CDNFRM	cost for decontamination of non-farmland
CEC	chemical/contaminant of emerging concern
CEQ	Council on Environmental Quality
CERP	Comprehensive Everglades Restoration Program (also Project, Plan)
CFR	*Code of Federal Regulations*
cfs	cubic foot/feet per second
cm	centimeter(s)
cm^2	square centimeter(s)
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COL	combined construction permit and operating license
CPI	Consumer Price Index
CPUE	catch per unit effort
CSAPR	Cross-State Air Pollution Rule
CTEMISS	cooling-tower emissions processor
CWA	Clean Water Act (aka Federal Water Pollution Control Act)
CWS	circulating-water system
CZMP	Coastal Zone Management Plan
d	day(s)
D	Directional Distribution Factor
DA	Department of the Army
dB	decibel(s)
dBA	decibel(s) on the A-weighted scale
DBA	design basis accident
DCD	Design Control Document
DEET	*N*,*N*-Diethyl-*meta*-toluamide
DEIS	draft environmental impact statement
DERM	Miami-Dade County Department of Environmental Resources Management
DHS	Department of Homeland Security

DNL	day-night average sound level
DOE	U.S. Department of Energy
DOI	U.S. Department of Interior
DOT	U.S. Department of Transportation
DPS	distinct population segment
DSM	demand-side management
DZMW	dual-zone monitoring well
EAB	exclusion area boundary
EAI	Ecological Associates, Inc.
EC10	effective concentration required to induce a 10% effect
EC50	effective concentration required to induce a 50% effect
ECOTOX	EPA Ecotoxicology
EDR	Florida Legislature's Office of Economic and Demographic Research
EEEA	East Everglades Expansion Area
EEL	Environmentally Endangered Lands (Program)
EFH	essential fish habitat
EIA	Energy Information Administration
EIS	environmental impact statement
EJ	environmental justice
ELF	extremely low frequency
ELF-EMF	extremely low frequency-electromagnetic field
EMB	Everglades Mitigation Bank
EMF	electromagnetic field
ENP	Everglades National Park
EPA	U.S. Environmental Protection Agency
EPOC	emerging pollutant of concern
EPRI	Electric Power Research Institute
ER	Environmental Report
ESA	Endangered Species Act of 1973, as amended
ESOC	emerging substance of concern
ESRP	Environmental Standard Review Plan (NUREG-1555, Supplement 1, Operating License Renewal)
EW	exploratory well
°F	degree(s) Fahrenheit
FAA	Federal Aviation Administration
FAC	Florida Administrative Code or Fla. Admin. Code
FDEP	Florida Department of Environmental Protection
FDHR	Florida Division of Historic Resources
FDOH	Florida Department of Health

FDOT	Florida Department of Transportation
FEC	Florida East Coast (Railway)
FEFP	Florida Education Finance Program
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FFWCC	Florida Fish and Wildlife Conservation Commission
FIRM	Flood Insurance Rate Map
FKNMS	Florida Keys National Marine Sanctuary
FLUCFCS	Florida Land Use, Cover, and Forms Classification System
FLUM	Future Land Use Map
FMNH	Florida Museum of Natural History
FMP	fishery management plan
FMSF	Florida Master Site File (form)
FNAI	Florida Natural Areas Inventory
FONSI	Findings of No Significant Impact
FPL	Florida Power & Light Company
fps	foot (feet) per second
FPSC	Florida Public Service Commission
FR	*Federal Register*
FRCC	Florida Reliability Coordinating Council
FSAR	Final Safety Analysis Report
FSER	Final Safety Evaluation Report
ft	foot/feet
ft^2	square foot/feet
ft/d	foot (feet) per day
ft^2/d	square foot (feet) per day
ft^3	cubic foot (feet)
ft^3/d	cubic foot (feet) per day
ft^3/yr	cubic foot (feet) per year
FTE	full-time equivalent
FWPCA	Federal Water Pollution Control Act (also known as the Clean Water Act of 1977)
FWS	U.S. Fish and Wildlife Service
FY	fiscal year
µg	microgram(s)
µg/L	microgram(s) per liter
µGy	microgray(s)
g	gram(s) or gravity of Earth (g-force)
gal	gallon(s)
gal/yr	gallon(s) per year

GC	gas centrifuge
g/cm^3	gram(s) per cubic centimeter
GCRP	U.S. Global Change Research Program
GEIS	Generic Environmental Impact Statement (for License Renewal of Nuclear Plants, NUREG-1437)
GHG	greenhouse gas
GIS	geographic information system
gpd	gallon per day
gpm	gallon per minute
gpm/ft	gallon(s) per minute per foot
g/s	gram(s) per second
GU	Interim District (zone)
GW	gigawatt(s)
GWh	gigawatt hour(s)
ha	hectare(s)
HAP	hazardous air pollutant
HAPC	habitat area of particular concern
HBB	health-based benchmark
HDR	HDR Engineering, Inc.
HEC-RAS	Hydrologic Engineering Centers River Analysis System
hr	hour
HUD	U.S. Department of Housing and Urban Development
Hz	hertz
I	Interstate
IAEA	International Atomic Energy Agency
ICRP	International Commission on Radiological Protection
ID	identification
IGCC	integrated gasification combined-cycle
in.	inch(es)
IRWST	in-containment refueling water storage tank
ISFSI	independent spent fuel storage installation
IUCN	World Conservation Union
IWF	industrial wastewater facility (also known as CCS)
K	Standard Peak Hour Factor
kg	kilogram(s)
kg/d	kilogram(s) per day
kg/L	kilogram(s) per liter
kg/yr	kilogram(s) per year

kg/ha/mo	kilogram(s)/hectare/month
kHz	kilohertz
km	kilometer(s)
km^2	square kilometer(s)
km/hr	kilometer(s) per hour
kt	knot(s)
kV	kilovolt(s)
kV/m	kilovolt(s) per meter
kW	kilowatt(s)
kWh	kilowatt-hour(s)
L	liter(s)
lb	pound(s)
lb/yr	pound(s) per year
L_{dn}	day-night average sound level
LEDPA	least environmentally damaging practicable alternative
L_{eq}	noise level equivalent
LFA	Lower Floridan Aquifer
LLC	Limited Liability Company
LLW	low-level waste
LOEC	lowest-observed effect concentration
LOS	level of service
LPZ	low-population zone
LST	local standard time
LWA	Limited Work Authorization
LWR	light water reactor
µmhos/cm	micromhos per centimeter
m	meter(s)
m/s	meter(s) per second
m^2	square meter(s)
m^3	cubic meter(s)
m^3/d	cubic meters per day
m^3/s	cubic meter(s) per second
mA	milliampere(s)
MACCS	MELCOR Accident Consequence Code System
MCU	Middle Confining Unit
MDC	Miami-Dade County
M-DCPS	Miami-Dade County Public School District
MDWASD	Miami-Dade Water and Sewer Department
MEI	maximally exposed individual

mg	milligram(s)
mG	milliGauss
Mgd	million gallon(s) per day
Mgd/yr	million gallon(s) per day per year
Mgm	million gallons per month
Mg/L	milligram(s) per liter
Mg/m^3	milligram(s) per cubic meter
mg N/L	milligrams of nitrate per liter
mg P/L	milligrams of phosphate per liter
mGy	milligray(s)
mGy/d	milligray(s) per day
MFCMA	Magnuson–Stevens Fishery Conservation and Management Act (or Magnuson–Stevens Act)
MHz	megahertz
mi	mile(s)
mi^2	square mile(s)
min	minute(s)
MIT	Massachusetts Institute of Technology
mL	milliliter(s)
MMBtu	one million British thermal units
MMBtu/hr	one million British thermal units per hour
MMBtu/yr	one million British thermal units per year
mo	month(s)
MOU	Memorandum of Understanding
mph	mile(s) per hour
mrad	millirad
mrem	millirem
msl or MSL	mean sea level
mSv	millisievert(s)
MSW	municipal solid waste
MT	metric ton(nes)
MTU	metric ton uranium
MW	megawatt(s)
MWd/MTU	megawatt-days per metric ton of uranium
MW(e)	megawatt(s) electric
MW(t)	megawatt(s) thermal
MWh	megawatt hour(s)
MWh/yr	megawatt hour(s) per year
N	north or nitrogen
NA	not applicable

NAAQS	National Ambient Air Quality Standard
NAD83	North American Datum of 1983
NARUC	National Association of Regulatory Utility Commissioners
NASCAR	National Association for Stock Car Auto Racing
NAVD88	North American Vertical Datum of 1988
NCI	National Cancer Institute
NCRP	National Council on Radiation Protection and Measurements
NEPA	National Environmental Policy Act of 1969, as amended
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NFC	Natural Forest Community
NGCC	natural-gas combined-cycle
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
NIEHS	National Institute of Environmental Health Sciences
NMFS	National Marine Fisheries Service
NNC	Numerical Nutrient Criteria
NO_2	nitrogen dioxide
NO_3+NO_2	nitrate+nitrite
NO_x	nitrogen oxides
NOAA	National Oceanic and Atmospheric Administration
NOEC	no-observed effect concentration
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRC	U.S. Nuclear Regulatory Commission
NRHP	National Register of Historic Places
NSR	new source review
NUREG	U.S. Nuclear Regulatory Commission technical document
NW	northwest
NWS	National Weather Service
O_2	oxygen
O_3	ozone
ODCM	Offsite Dose Calculation Manual
OFW	Outstanding Florida Water
OIG	Office of the Inspector General
ORV	off-road vehicle
OSHA	Occupational Safety and Health Administration
P	phosphorus
PAH	polycyclic aromatic hydrocarbon

PC	personal computer
PCB	polychlorinated biphenyl
pCi/L	picocurie(s) per Liter
pH	measure of acidity or basicity in solution
PHU	panther habitat units
PHU	panther habitat unit
PFA	Panther Focus Area
P/L	phosphorus per liter
PIR	Public Interest Review or Project Implementation Report
PIRF	Public Interest Review Factor
PK-12	preschool through 12th grade
p.m.	post meridian
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter of 10 microns or less
$PM_{2.5}$	particulate matter with an aerodynamic diameter of 2.5 microns or less
PPSA	Power Plant Siting Act
ppm	part(s) per million
ppt	parts per thousand
PRA	probabilistic risk assessment
PSA	probabilistic safety assessment
PSD	Prevention of Significant Deterioration (Permit)
psu	practical salinity unit
PWR	pressurized water reactor
rad	radiation absorbed dose
RAI	Request for Additional Information
RCRA	Resource Conservation and Recovery Act of 1976, as amended
RCW	radial collector well
rem	roentgen equivalent man
REMP	radiological environmental monitoring program
RfC	reference concentration
RFI	Request for Information
RHA	Rivers and Harbors Act of 1899
RIMS II	Regional Input-Output Modeling System
RMS	root mean square
Rn-222	radon-222
ROD	Record of Decision
ROI	region of interest
RPHP	Radiation Public Health Project
RRY	reference reactor year
RSICC	(Oak Ridge) Radiation Safety Information Computational Center

RV	recreational vehicle
RWTF	reclaimed water-treatment facility
Ryr	reactor year
s or sec	second(s)
SAFMC	South Atlantic Fisheries Management Council
SAMA	severe accident mitigation alternative
SAMDA	severe accident mitigation design alternative
SAV	submerged aquatic vegetation
SBO	Station Blackout
SCA	Site Certification Application
scf	standard cubic feet
SCR	selective catalytic reduction
SDWWTP	South District Wastewater Treatment Plant
sec	second(s)
SECA	State Energy Conversion Alliance
SER	Safety Evaluation Report
SFRPC	South Florida Regional Planning Council
SFWMD	South Florida Water Management District
SGWEA	Southern Glades Wildlife Environmental Area
SHA	seismic hazard analysis
SHPO	State Historic Preservation Office (or Officer)
s/m^3	seconds per cubic meter
SO_2	sulfur dioxide
SO_x	oxides of sulfur
SOR	Save Our Rivers (Program)
SPCC	Spill Prevention, Control, and Countermeasure (Plan)
SR	State Route
SRP	Standard Review Plan
SSC	Species of Concern
SU	Standard Unit(s)
Sv	sievert(s)
SW	southwest
SWPPP	stormwater pollution prevention plan
SWS	service-water system
T	ton(s) or tonne(s)
T/B	Tug/Barge
TB_q	terrabequerel
TCP	traditional cultural property
T&E	threatened and endangered

TDS	total dissolved solids
TEDE	total effective dose equivalent
THPO	Tribal Historic Preservation Officer
TIMDEC	decontamination time
TKN	total Kjeldahl nitrogen
TLD	thermoluminescent dosimeter
TLF	Treasured Lands Foundation
TN	total nitrogen
TOC	total organic carbon
TP	total phosphorus
TRC	total reportable cases
TVA	Tennessee Valley Authority
UDB	urban development boundary
UF_6	uranium hexafluoride
UIC	underground injection control
UMAM	Uniform Mitigation Assessment Method
UMTRI	University of Michigan Transportation Research Institute
UNESCO	United National Educational, Scientific and Cultural Organization
UO_2	uranium dioxide
US	U.S. (State Highway)
U.S.	United States
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USCB	U.S. Census Bureau
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USDW	underground source of drinking water
USGS	U.S. Geological Survey
VOC	volatile organic compound
W	west
W.A.T.E.R.	Wetland Assessment Technique for Environmental Review
WCA	water conservation area
Westinghouse	Westinghouse Electric Company, LLC
WHO	World Health Organization
wk	week(s)
WOTUS	waters of the United States
WRDA	Water Resources Development Act
WTP	water treatment plant
WWTP	wastewater treatment plant

χ/Q	atmospheric dispersion factor(s); annual average normalized air concentration value(s)
yd^3	cubic yards
yr	year(s)

1.0 INTRODUCTION

By letter dated June 30, 2009 (FPL 2009-TN1229), as supplemented by a letter dated August 7, 2009 (FPL 2009-TN1230), the Florida Power & Light Company (FPL) applied to the U.S. Nuclear Regulatory Commission (NRC or the Commission) for two combined construction permits and operating licenses (combined licenses or COLs) for the proposed Turkey Point Units 6 and 7 (COL application). The NRC review team's evaluation of the environmental impacts of the proposed action is based on the October 29, 2014 revision of the COL application (FPL 2014-TN4102), including the Environmental Report (ER) (FPL 2014-TN4058), responses to requests for additional information, and supplemental information. Documents supporting the review team's evaluation are listed as references where appropriate.

The site proposed by FPL for the two new nuclear units is the Turkey Point site in southeastern Miami-Dade County, Florida. The Turkey Point site is an approximately 9,460 ac site that includes five existing power plants. Units 1 and 2 have been operated as natural-gas/oil steam-generating units. Unit 2 has been converted to operate in synchronous condenser mode. Unit 1 will be converted to operate in synchronous condenser mode in late 2016 (FPL 2016-TN4579). In the synchronous condenser mode, the generators help stabilize and optimize grid performance but do not generate power. Units 3 and 4 are nuclear pressurized water reactors (PWRs), and Unit 5 is a natural-gas combined-cycle steam-generating unit. The proposed plant area is south of Turkey Point Units 3 and 4 on approximately 218 ac of the Turkey Point site property (FPL 2014-TN4058). The proposed Turkey Point Units 6 and 7 would be owned by FPL (2014-TN4058). With the exception of the transmission systems needed to route power from the proposed units, and the pipelines needed to bring reclaimed water to the Turkey Point site, all of the construction and operation related to proposed Turkey Point Units 6 and 7 would be completely within the confines of the Turkey Point site (FPL 2014-TN4058).

On June 30, 2009, the U.S. Army Corps of Engineers (USACE or Corps) received a Department of the Army (DA) permit application number SAJ-2009-02417 (SP-MLC) from FPL in connection with the proposed Turkey Point Units 6 and 7 and associated structures, including a reclaimed water facility, access roads, radial collector wells, pipelines, transmission lines, and other related infrastructure. The proposed work would result in the alteration of waters of the United States,[(1)] including wetlands. The USACE is participating as a cooperating agency with the NRC in preparing this environmental impact statement (EIS). As part of the USACE public comment process, USACE published a public notice on March 13, 2015, to solicit comments from the public regarding FPL's DA permit application for proposed work at the Turkey Point site. The Corps' consideration of public comments received in response to this public notice will be reflected in the public interest review and CWA Section 404(b)(1) analysis in the Corps' Record of Decision.

(1) "Waters of the United States" is used to include both "waters of the United States" as defined by 33 CFR Part 328 (TN1683) defining the extent of USACE geographic jurisdiction pursuant to Section 404 of the Clean Water Act and "navigable waters of the United States" as defined by 33 CFR Part 329 (TN4770) defining the extent of USACE geographic jurisdiction pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403) (TN4768).

On June 30, 2009, FPL submitted a Site Certification Application (SCA) to the State of Florida Department of Environmental Protection for the proposed Turkey Point Units 6 and 7 and ancillary facilities (FPL 2010-TN1231). The SCA process provides a Certification that encompasses all licenses and permits needed for affected Florida State, regional, and local agencies. It also includes any regulatory activity that would be applicable under these agencies' regulations for proposed Turkey Point Units 6 and 7 (FDEP 2013-TN2629). On May 19, 2014, the State of Florida issued final Conditions of Certification to FPL authorizing construction, operation, and maintenance of proposed Turkey Point Units 6 and 7 and associated facilities (State of Florida 2014-TN3637). The final Conditions of Certification issued are binding and subject to the requirements listed in State of Florida 2014(TN3637). The NRC staff is aware that on April 20, 2016, a Florida court issued an opinion in which it ruled that the Florida Siting Board should have considered whether to require FPL to bury a portion of the transmission lines, and that the record was inadequate to support certain mitigation measures associated with transmission lines in the East Everglades. [State of Florida 2016-TN4781] Although the opinion remands the Conditions of Certification to the Florida Siting Board for consideration of the possibility of burying a portion of the transmission lines and reconsideration of the specified mitigation measures, the NRC staff understands that the court's opinion is not yet final as of this writing (October 3, 2016). Accordingly, for the purposes of the FEIS evaluation of impacts, the NRC staff considers the transmission line route and conditions reviewed and approved by the Florida Siting Board as the most current information regarding the transmission line and associated potential mitigation measures. Even if the Conditions of Certification are revisited, the NRC staff considers it reasonable to expect that Conditions of Certification similar to or no less effective than those originally issued will be in place before construction and operation of the proposed units begins.

FPL's applications for proposed Turkey Point Units 6 and 7 seek (1) NRC issuance of COLs for constructing and operating two new nuclear units at the Turkey Point site, and (2) DA authorization pursuant to Section 404 of the Federal Water Pollution Control Act (Clean Water Act), as amended (33 U.S.C. § 1344 et seq.) (TN1019), Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403 (TN4768), and Section 14 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 408 (TN4769). The DA permit application requests authorization to discharge fill into approximately 1,000 ac of jurisdictional wetlands (USACE 2015-TN4627), to construct structures under navigable waters of the United States such as radial collector wells, and to expand the existing barge unloading area in navigable waters of the United States.

1.1 Background

The granting of a COL is Commission approval of the construction and operation of a nuclear power facility. NRC regulations related to COLs are found primarily in Title 10 of the *Code of Federal Regulations* (CFR) Part 52, Subpart C.

Section 102 of the National Environmental Policy Act of 1969, as amended (NEPA) (42 U.S.C. § 4321 et seq.) (TN661) requires the preparation of an EIS for a major Federal action that significantly affects the quality of the human environment. The NRC has implemented Section 102 of NEPA in 10 CFR Part 51 (TN250). Further, in 10 CFR 51.20 (TN250), the NRC has determined that the issuance of a COL under 10 CFR Part 52 (TN251) is an action that requires an EIS.

According to 10 CFR 52.80(b) (TN251), a COL application must contain an ER. The ER provides the applicant's input to the NRC's EIS. NRC regulations related to ERs and EISs are found in 10 CFR Part 51 (TN250). FPL's ER, which was included as Part 3 of the application, provides a description of the proposed actions related to the application and FPL's analysis of the potential environmental impacts of construction and operation of proposed Units 6 and 7.

1.1.1 Application and Review

The purpose of the FPL COL application is to obtain COLs to construct and operate two baseload nuclear power reactors. In addition to the COLs, FPL must obtain and maintain permits from other Federal, State, and local agencies and permitting authorities. The purpose of FPL's DA application is to meet the public's need for reliable increased electrical baseload generating capacity in FPL's service territory. Pursuant to the Clean Water Act (33 U.S.C. § 1251 et seq.) (TN662), the Corps has jurisdiction over navigable waters, which are defined as waters of the United States (WOTUS) and the territorial seas. Pursuant to the Rivers and Harbors Act of 1899 (33 U.S.C. § 401 et seq.) (TN660), the Corps has jurisdiction over navigable WOTUS. Throughout the rest of the document, WOTUS will be used to refer to both navigable waters, including certain wetlands, as defined by the Clean Water Act (33 U.S.C. § 1251 et seq.) (TN662) and navigable WOTUS as defined by the Rivers and Harbors Act of 1899 (33 U.S.C. § 401 et seq.) (TN660).

Collectively, the NRC staff (including its contractor staff at Pacific Northwest National Laboratory and Information Systems Laboratory) and the USACE staff who reviewed the environmental aspects of the applications and supporting documentation and decided on impact levels are referred to as the "review team" throughout this EIS. The National Park Service participated in the environmental review as a cooperating agency by providing special expertise for the areas in and around the national parks (Biscayne and Everglades National Parks). Impact determinations made in this EIS should not be attributed to NPS, but only to the NRC and USACE (also referred to as the review team). The NPS's participation in preparing this EIS does not imply NPS concurrence. Individual contributors to this EIS are listed in Appendix A.

1.1.1.1 NRC COL Application Review

FPL's ER focuses on the environmental effects of construction and operation of two Westinghouse AP1000 PWRs (FPL 2014-TN4058) at the proposed site. The NRC regulations setting standards for review of a COL application are listed in 10 CFR 52.81 (TN251). Detailed procedures for conducting the environmental portion of the review are listed in NUREG-1555, *Standard Review Plans for Environmental Reviews for Nuclear Power Plants: Environmental Standard Review Plan* (NRC 2000-TN614) and recent updates. Additional guidance on conducting environmental reviews is provided in NRC Interim Staff Guidance COL/ESP-ISG-026 *Environmental Issues Associated with New Reactors* (NRC 2014-TN3767).

The FPL COL application references Revision 19 of the Westinghouse AP1000 reactor certified design (Westinghouse 2011-TN261), which is incorporated by reference into 10 CFR Part 52, Appendix D. Subpart B of 10 CFR Part 52 (TN251) states NRC regulations related to standard design certification. Revision 19 of the AP1000 design was published on December 30, 2011 (76 FR 82079) (TN248). The NRC staff reviews severe accident mitigation design alternatives

in its review of an application for certification of a standard reactor design. Where appropriate, this EIS incorporates results of the review of Revision 19. (Additional information about design certification is discussed in Section 3.2.1).

In this EIS, the review team evaluates the environmental effects of the construction and operation of two Westinghouse AP1000 PWRs at the Turkey Point site, each with thermal power ratings of 3,415 MW(t). In addition to considering the environmental effects of the proposed action, this EIS addresses alternatives to the proposed action, including the no-action alternative and the building and operation of new reactors at alternative sites. The benefits of the proposed action (e.g., meeting an identified need for power) and measures and controls to limit adverse impacts are also evaluated. FPL's proposed action to construct and operate two new nuclear units includes requests for departures (FPL 2013-TN3083) from the AP1000 design certification under 10 CFR 52.93 (TN251). The environmental impacts of the requested departures are addressed in this EIS. The technical analysis for each design certification departure will be included in the NRC's Final Safety Evaluation Report, including a recommendation for approval or denial of each departure.

By letter dated September 4, 2009 (NRC 2009-TN1667), the NRC notified FPL that its application was accepted for docketing. Docket numbers 52-040 and 52-041 were established for proposed Units 6 and 7, respectively. After acceptance of FPL's application, the NRC began the environmental review process by publishing in the *Federal Register* on June 15, 2010 a Notice of Intent to prepare an EIS and conduct scoping (75 FR 33851) (TN511). On July 15, 2010, the NRC held two public scoping meetings in Homestead, Florida, to obtain public input on the scope of the environmental review. The NRC staff also contacted Federal, State, Tribal, regional, and local agencies to solicit comments. A list of the agencies and organizations contacted is provided in Appendix B. Correspondence between NRC and the Federal, State, Tribal, regional, and local agencies is included in Appendix C. The NRC staff reviewed the comments received during scoping and responses were written for each comment. Comments within the scope of the NRC environmental review and their associated responses are included in Appendix D. A complete list of the scoping comments and responses is documented in the *Turkey Point Nuclear Plant Combined License Scoping Summary Report* (NRC 2010-TN515).

To gather information and to become familiar with the Turkey Point site, the entire review team visited the site in June 2010. During the June 2010 visit, the review team also conducted a site audit and met with FPL staff, Federal, Tribal, State and local officials, and members of the public. Members of the review team visited the Martin, Glades, Okeechobee 2, and St. Lucie alternative sites in July 2010. Documents related to the Turkey Point site and alternative sites were reviewed and are listed as references where appropriate.

To guide its assessment of the environmental impacts of the proposed action or alternative actions, the NRC has established a standard of significance for impacts based on Council on Environmental Quality guidance (40 CFR 1508.27) (TN428). Table B-1 of 10 CFR Part 51 (TN250), Subpart A, Appendix B, provides the following definitions of the three significance levels established by the NRC—SMALL, MODERATE, and LARGE:

> SMALL – Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.

MODERATE – Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.

LARGE – Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

This EIS presents the review team's analysis, which considers and weighs the environmental impacts of the proposed action at the Turkey Point site, including the environmental impacts associated with constructing and operating proposed Units 6 and 7 at the site, the impacts of constructing and operating reactors at alternative sites, the environmental impacts of alternatives to granting the COLs, and the mitigation measures available for reducing or avoiding adverse environmental effects. This EIS also provides the NRC staff's recommendation to the Commission regarding the issuance of the COLs for proposed Units 6 and 7 at the Turkey Point site.

On March 5, 2015, the NRC and the Corps issued a *Federal Register* notice in which the NRC solicited comments on the draft EIS to support the environmental review of the application. The public comment period closed on May 22, 2015 (80 FR 12043). During the course of the comment period, the NRC received requests from members of the public, a Tribal government, and Federal agencies to extend the comment period. In response to these requests, the NRC reopened the comment period on the draft EIS from May 28, 2015, until July 17, 2015, allowing for additional time for public comments (80 FR 30501) (TN4614). During the public comment period, three public meetings were held, one in Miami, Florida on April 22, 2015 and two in Homestead, Florida on April 23, 2015. These meetings also provided an opportunity for the public to provide comments that may be considered in evaluating a proposed DA permit. Members of the review team described the results of the environmental review, provided members of the public with information to assist them in formulating comments about the EIS, and accepted comments about the EIS. Approximately 350 people attended the three public comment meetings, and sixty-eight attendees provided oral comments, which were transcribed by a court reporter. In addition to comments received at the public meetings, the NRC received a total of approximately 11,300 additional pieces of correspondence. Appendix E outlines the comments received and states the review team's responses to the comments on the draft EIS.

1.1.1.2 USACE Permit Application Review

The USACE is a cooperating agency with the NRC, which is serving as the lead agency in the development of this EIS. The USACE has participated as a member of the review team. In carrying out its regulatory responsibilities, the USACE will complete an independent evaluation of the applicant's DA permit application to determine whether to issue, deny, or issue with modifications a DA permit for this project. This decision will be documented in the USACE's Record of Decision (ROD). The decision whether to issue a DA permit will be based on an evaluation of the probable impacts, including cumulative impacts, of the proposed activity and its intended effect on the public interest. Evaluation of the probable impacts that the proposed activity may have on the public interest requires a careful weighing of all of the factors relevant in each particular case. A decision by the USACE to authorize this proposal, and if so, the conditions under which it will be allowed to occur, are therefore determined by the outcome of this general balancing process.

By acting as a cooperating agency on the development of the EIS, USACE plans to adopt the EIS in its ROD. USACE will also include any additional information and analyses required to support its decision to issue the DA permit, deny the DA permit, or issue the DA permit with modifications. The USACE's role as a cooperating agency in the preparation of this EIS is to ensure to the maximum extent practicable that the information presented is adequate to fulfill the requirements of USACE regulations. The Clean Water Act, Section 404(b)(1) "Guidelines for Specification of Disposal Sites for Dredged or Fill Material" (40 CFR Part 230) (TN427); hereafter § 404(b)(1) Guidelines, contains the substantive environmental criteria used by the USACE in evaluating discharges of dredged or fill material into WOTUS. The USACE's Public Interest Review (PIR) (33 CFR § 320.4) (TN424) directs the USACE to consider a number of factors as part of a balanced evaluation process in order to determine whether the proposed project is contrary to the public interest. The USACE's PIR will be part of its ROD and will not be addressed in this EIS. The following general criteria are considered in the evaluation of every application:

- the relative extent of the public and private need for the proposed structure or work;
- where there are unresolved conflicts about resource use, the practicability of using practicable and reasonable alternative locations and methods to accomplish the objective of the proposed structure or work; and
- the extent and permanence of the beneficial and/or detrimental effects that the proposed structure or work is likely to have on the public and private uses to which the area is suited.

As part of the USACE public comment process, USACE published a public notice on March 13, 2015, to solicit comments from the public regarding FPL's DA permit application for proposed work at the Turkey Point site (USACE 2015-TN4627). The Corps' consideration of public comments received in response to this public notice will be reflected in the PIR and CWA Section 404(b)(1) analysis in the Corps' ROD.

1.1.2 Preconstruction Activities

In a final rule dated October 9, 2007, "Limited Work Authorizations for Nuclear Power Plants" (72 FR 57416) (TN260), the Commission limited the definition of "construction" to those activities within its regulatory purview in 10 CFR 51.4 (TN250). Many of the activities required to construct a nuclear power plant are not part of the NRC action to license the plant. Activities associated with building the plant that are not within the purview of the NRC action are grouped under the term "preconstruction." Preconstruction activities include clearing and grading, excavating, erecting support buildings and transmission lines, and other associated activities. These preconstruction activities may take place before the application for a COL is submitted, during the review of a COL application, or after a COL is granted, or in some cases, concurrently with NRC-regulated construction. Although preconstruction activities are outside the NRC's regulatory authority, many of them are within the regulatory authority of local, State, or other Federal agencies.

Because the preconstruction activities are not part of the NRC action, their impacts are not reviewed as a direct effect of the NRC action. Rather, the impacts of the preconstruction activities are considered in the context of cumulative impacts. In addition, certain

preconstruction activities that require permits from the USACE are considered to have direct effects related to its Federal permitting decision. Chapter 4 describes the relative magnitude of impacts related to construction and preconstruction activities.

1.1.3 Cooperating Agencies

NEPA (42 U.S.C. § 4321 et seq.) (TN661) lays the groundwork for coordination between the lead agency preparing an EIS and other Federal agencies that may provide special expertise regarding an environmental issue or jurisdiction by law. These other agencies, referred to as "cooperating agencies," are responsible for assisting the lead agency through early participation in the NEPA process, including scoping, by providing technical input to the environmental analysis and by making staff support available as needed by the lead agency. In addition to a license from the NRC, most proposed nuclear power plants require a permit from the USACE when impacts on WOTUS are proposed. Therefore, the NRC and the USACE concluded that the most effective and efficient use of Federal resources in the review of nuclear power projects would be achieved by a cooperative agreement. On September 12, 2008, the NRC and the USACE signed a Memorandum of Understanding (MOU) regarding the review of nuclear power plant license applications (USACE and NRC 2008-TN637). On November 25, 2009 the NRC formally requested that the USACE become a cooperating agency during the review of the combined license application at Turkey Point to construct proposed Units 6 and 7. Via letter correspondence dated December 10, 2009, the Corps agreed. Therefore, the Jacksonville District of the USACE is a cooperating agency as defined in 10 CFR 51.14 (TN250).

As described in the MOU, the NRC is the lead Federal agency, and the USACE is a cooperating agency in the development of the EIS for proposed Turkey Point Units 6 and 7. Under Federal law, each agency has jurisdiction related to portions of the proposed project as major Federal actions that could significantly affect the quality of the human environment. The goal of this cooperative agreement is to develop one EIS that serves the needs of the NRC environmental review process and the USACE permit decision process. While both agencies must meet the requirements of NEPA, the NRC and the USACE have additional mission requirements that must be met. The NRC makes license decisions under the Atomic Energy Act of 1954, as amended (42 U.S.C. § 2011 et seq.) (TN663), and the USACE makes permit decisions under Section 404 of the Clean Water Act (33 U.S.C. § 1344) (TN427), and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403) (TN4768). The project will also require an engineering review and approval pursuant to Section 14 of the Rivers and Harbors Act 1899 (33 U.S.C. § 408) (TN4769). The USACE is cooperating with the NRC to ensure that the information presented in the NEPA documentation is adequate to fulfill the requirements of USACE regulations (33 CFR Parts 320–332) (TN4127), the PIR process (33 CFR § 320.4) (TN424), and the § 404(b)(1) Guidelines (40 CFR Part 230) (TN427), which contain the substantive environmental criteria used by the USACE in evaluating discharges of dredged or fill material into WOTUS.

As a cooperating agency, the USACE is part of the NRC review team and is involved in all aspects of the environmental review, including scoping, public meetings, public comment resolution, and EIS preparation. Environmental issues are evaluated using the three-level standard of significance—SMALL, MODERATE, or LARGE—developed by the NRC using guidelines from the Council on Environmental Quality (CEQ) (40 CFR 1508.27) (TN428).

However, for permit decisions under Section 404 of the Clean Water Act (33 U.S.C. § 1344) (TN427), the USACE can only permit the least environmentally damaging practicable alternative, which must also and a project that is not contrary to the public interest. This EIS is intended to provide information to support the USACE permitting decision, as will be documented in the USACE's ROD. However, it is possible that the USACE will need additional information from the applicant to complete the permit review; for example, information that the applicant could not make available by the time the final EIS is issued. Also, any conditions required by USACE, such as implementation of additional mitigative measures, would be required by a DA permit if issued by the USACE.

On July 1, 2013 the National Park Service (NPS) signed the Memorandum of Agreement and became a cooperating agency for the proposed Turkey Point Units 6 and 7 COL application environmental review (NRC 2013-TN2518). According to the Memorandum of Agreement, the NPS has "special expertise regarding the environment in and around its national parks." Specifically, the NPS has special expertise regarding impacts to park resources and the experience of park visitors at Biscayne National Park, which is located adjacent to the Turkey Point facility. In addition, the NPS has special expertise regarding impacts to park resources and the experience of park visitors from cumulative impacts associated with FPL's proposed western power line corridor near, or potentially through, Everglades National Park. The NPS prepared a separate EIS to evaluate options and potential impacts for acquiring lands owned by FPL within the East Everglades Expansion Area of Everglades National Park (NPS 2015-TN4437). On March 16, 2016, the NPS approved a ROD based on this EIS (NPS 2016-TN4532). The decision resulted in the acquisition of 320 ac of FPL lands in the East Everglades expansion area by the NPS in exchange for 260 ac along the eastern boundary of the Park. The NPS will also provide a 90-foot-wide easement to FPL adjacent to the entire length of the exchange corridor (NPS 2016-TN4532) for use as a portion of FPL's proposed western power line corridor.

The NPS has firm and clear mandates from Congress regarding its mission. The NPS Organic Act of 1916 requires the NPS "…to conserve the scenery and the natural and historic objects and wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." Congress reaffirmed the NPS's conservation mandate by amending the Organic Act in 1978. That amendment, known as the "Redwood Amendment," states that the "authorization of activities…shall not be exercised in derogation of the values and purposes for which these various areas have been established."

On March 11, 2011, the NRC formally requested the NPS become a cooperating agency for the proposed Turkey Point Units 6 and 7 COL application environmental review. Via letter correspondence dated April 22, 2011, the NPS agreed. Therefore, the NPS's Southeastern Regional Office, which includes Biscayne National Park and Everglades National Park, is a cooperating agency as defined in 10 CFR 51.14 (TN250). The NPS does not have any specific regulatory actions pending before it in regard to the proposed Units 6 and 7 at this time. However, as a cooperating agency, the NPS did provide input into the NRC impact analysis based on the special expertise described previously. Due to this unique set of circumstances, impact determinations made in this EIS should not be attributed to NPS, but only to the NRC and USACE (also referred to as the review team). The NPS's participation in preparing this EIS

does not imply NPS concurrence and was primarily centered on data gathering and information sharing regarding the environment in and around the applicable national parks. The NPS role in regard to this EIS is described in a Memorandum of Agreement between the NRC, USACE, and NPS (NRC 2013-TN2518).

1.1.4 Concurrent NRC Reviews

In a review that is separate but parallel to the EIS process, the NRC staff analyzes the safety aspects of the COL application, including, among other things, the characteristics of the proposed site and emergency planning information. These analyses are documented in a Safety Evaluation Report (SER) issued by NRC. The SER presents the conclusions reached by NRC regarding (1) whether the COL application for Turkey Point meets the applicable requirements in NRC regulations, including among others 10 CFR Part 50 (TN249), 10 CFR Part 52 (TN251), 10 CFR Part 73 (TN423), and 10 CFR Part 100 (TN282); and (2) whether there is reasonable assurance that two AP1000 reactors can be constructed and operated at the Turkey Point site without undue risk to the health and safety of the public. The final SER for the Turkey Point COL application is expected to be published in November 2016 (NRC 2016-TN4619).

The reactor design referenced in FPL's COL application for Turkey Point Units 6 and 7 is Revision 19 of the AP1000 certified design (Westinghouse 2011-TN261), which is incorporated by reference into 10 CFR Part 52, Appendix D. Subpart B of 10 CFR Part 52 (TN251) states NRC regulations related to standard design certification. The final rulemaking certifying the AP1000 standard design, as described in Revision 19 of the AP1000 FSAR was published on December 30, 2011 (76 FR 82079) (TN248). The NRC staff reviewed AP1000 severe accident mitigation design alternatives (SAMDAs) in its review of the application for certification of the AP1000 standard reactor design, and published an Environmental Assessment on those SAMDAs in connection with the final rulemaking certifying the design [(76 FR 82079) (TN248), (71 FR 4464) (TN258)]; where appropriate, this EIS incorporates results of the review of Revision 19.

This EIS provides the NRC and USACE analyses of the environmental impacts that could result from building and operating the two proposed units at the Turkey Point site or at one of the four alternative sites. These impacts are analyzed by the review team to determine whether the proposed site is suitable for the two units and whether any of the alternative sites are considered to be obviously superior to the proposed site.

1.2 The Proposed Federal Actions

The proposed NRC Federal action is issuance, under the provisions of 10 CFR Part 52 (TN251), of COLs that would authorize the construction and operation of two new Westinghouse AP1000 reactors at the Turkey Point site. This EIS provides the NRC staff's analyses of the environmental impacts that could result from building and operating the two proposed units at the Turkey Point site or at one of the four alternative sites. These impacts are analyzed by the NRC to determine whether the proposed site is suitable for the two units and whether any of the alternative sites are considered to be obviously superior to the proposed site. The proposed USACE Federal action is the decision whether to issue, issue with modifications, or deny a DA

permit pursuant to the requirements in Section 404 of the Clean Water Act (33 U.S.C. § 1344) (TN427) and Sections 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403 and 408) (TN4768) to authorize certain activities potentially affecting WOTUS based on an evaluation of the probable impacts, including cumulative impacts, of the proposed activities on the public interest. If issued, the USACE permit would authorize the impact on WOTUS, including wetlands, for the construction of the Turkey Point electrical generation facility, and various associated, integral project components, including electrical transmission lines and substations, access roads, expansion of an existing barge slip, a pretreatment facility, and reclaimed wastewater and potable water pipelines. The barge slip, radial collector well makeup-water−intake structures, and some portions of the pipelines or transmission lines would be located in, over, or under navigable WOTUS. The proposed project would also require engineering reviews and approvals pursuant to Section 14 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 408) (TN4769) for proposed modifications of federally authorized projects.

1.3 The Purpose of and Need for the Proposed Actions

The continued growth of residential and commercial development in Florida has created an increased demand for electrical power. The purpose and need of the NRC proposed action—NRC authorization of the construction and operation of two AP1000 units at the Turkey Point site—is to provide additional baseload electrical generation capacity for use in the FPL service territory. The need for additional baseload power is discussed in Chapter 8 of this EIS.

The Atomic Energy Act of 1954, as amended (Act), prohibits construction and operation of proposed Units 6 and 7 without licenses from the NRC, which, in this case would be two COLs. Preconstruction and certain long lead-time activities, such as ordering and procuring certain components and materials necessary to construct the plant, however, may begin before the COLs are granted. FPL must obtain and maintain permits or authorizations from other Federal, State, and local agencies and permitting authorities prior to undertaking some of these activities. The ultimate decision whether or not to build the new units and the schedule for building are not within the purview of the NRC or the USACE and would be determined by the license holder if the authorizations are granted.

Pursuant to the 404(b)(1) Guidelines (40 CFR Part 230) (TN427), the USACE determines both a basic and an overall project purpose. Defining the basic project purpose enables the USACE to determine whether the activity is water-dependent (40 CFR 230.10(a)(3)) (TN427). The overall project purpose is used to identify and evaluate practicable alternatives (40 CFR 230.10(a)(2)) (TN427).

For this project, the USACE has determined the following purpose and need statements:

- Basic Purpose – To meet the public's need for electric energy.
- Overall Purpose – To meet the public's need for reliable increased electrical baseload generating capacity in FPL's service territory.

For the USACE's NEPA review, the overall project purpose is consistent with that stated above in this section for the purpose and need for the proposed NRC action.

1.4 Alternatives to the Proposed Actions

Section 102(2)(C)(iii) of NEPA (42 U.S.C. § 4321 et seq.) (TN661) states that EISs are to include a detailed statement analyzing alternatives to the proposed action. The NRC regulations for implementing Section 102(2) of NEPA provide for including in an EIS a chapter that discusses the environmental impacts of the proposed action and the alternatives [(10 CFR Part 51) (TN250), Subpart A, Appendix A]. Chapter 9 of this EIS addresses the following five categories of alternatives to the proposed action: (1) the no-action alternative, (2) energy source alternatives, (3) alternative sites, and (4) system design alternatives. Appendix K addresses Potential USACE Alternative Transmission Line Routes.

In the no-action alternative, the proposed action would not proceed. The NRC could deny FPL's request for the COLs. If the request was denied, construction and operation of two new units at the Turkey Point site would not occur and any benefits intended by the approved COLs would not be realized. Energy source alternatives focus on alternatives that could generate baseload power. The alternative site selection process to determine alternate site locations for comparison with the Turkey Point site is addressed below. System design alternatives include heat-dissipation and circulating-water systems, intake and discharge structures, and water-use and water-treatment systems.

In its ER (FPL 2014-TN4058), FPL defines a region of interest for use in identifying and evaluating potential sites for power generation. Using this process, FPL reviewed multiple sites and identified 21 potential sites for this project from which the alternative sites were selected (FPL 2011-TN36). The review team evaluated the region of interest, the process by which alternative sites were selected, and the environmental impacts of construction and operation of new power reactors at those sites using reconnaissance-level information in accordance with ESRP 9.3 (NRC 2000-TN614). Reconnaissance-level information is data that are readily available from agencies and other public sources and also can include information obtained through visits to the site area. The alternative sites include two owned by FPL and two others. The FPL-owned sites are the Martin site, on which five fossil-fired power plants currently exist and which is located in Martin County, Florida, and the St. Lucie site, on which a nuclear power-generating station currently exists and which is located on Hutchinson Island in St. Lucie County, Florida. The other sites include the Glades site, an agricultural site in the southwestern region of Glades County, Florida, and the Okeechobee 2 site, an undeveloped site in Okeechobee County, Florida (FPL 2014-TN4058). The objective of the comparison of environmental impacts is to determine whether any alternative site is obviously superior to the preferred the Turkey Point site.

In evaluating permit applications pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403) (TN4768) and Section 404 of the Clean Water Act (33 U.S.C. § 1344) (TN427), the USACE is required to consider alternatives in the context of the applicant's purpose and need for the project, as well as the purpose and need from a public interest perspective. The USACE is required by regulation to apply the criteria set forth in the § 404(b)(1) Guidelines (40 CFR Part 230) (TN427). These guidelines establish criteria that must be met for the proposed activities to be permitted pursuant to Section 404. These guidelines state, in part, that no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge that would have a less adverse impact on the

aquatic ecosystem provided the alternative does not have other significant adverse consequences (40 CFR § 230.10(a)) (TN427).

In evaluating permit applications under Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403) (TN4768), the USACE is primarily concerned with obstructions to navigation in navigable WOTUS. USACE must also determine whether the proposed project is contrary to the public interest (33 CFR § Section 320.4).

The USACE must also determine whether to grant approval pursuant to Section 14 of the Rivers and Harbors Act (33 U.S.C. § 408) (TN4769). Any proposed action that modifies, alters, or is built upon or adjacent to a Federal project may require authorization pursuant to Section 408, including any proposed action that modifies, alters, or is constructed within a Federal project right-of-way; any proposed structures within 62.5 of a Federal navigation project; any proposed degradation, relocation, penetration, or work under a Corps levee, dike, dam, or water retaining structure; and any proposed work within 15 ft of the toe of a Corps levee, 15 ft of a Federal canal top of bank, or within 50 ft of a Corps dam. The portions of the proposed project that may fall under this coordination process include potential impacts to the L-31N and L-31E levees, and transmission lines crossing under the Miami River and/or canals in Miami-Dade County.

1.5 Compliance and Consultations

Before building and operating new units, FPL is required to obtain certain Federal, State, and local environmental permits, as well as meet applicable statutory and regulatory requirements. In its ER (FPL 2014-TN4058), FPL provided a list of environmental approvals and consultations associated with proposed Turkey Point Units 6 and 7. Potential authorizations, permits, and certifications relevant to the proposed COLs are included in Appendix H. In the development of this EIS, the NRC contacted the appropriate Federal, State, Tribal, and local agencies to identify any consultation, compliance, permit, or significant environmental issues of concern to the reviewing agencies that may affect the acceptability of the Turkey Point site for building and operating the two proposed AP1000 units. A chronology of the correspondence is provided in Appendix C. A list of the key consultation correspondence is provided in Appendix F, which also contains biological assessments and an essential fish habitat assessment.

1.6 Report Contents

Subsequent chapters of this EIS are organized as follows: Chapter 2 describes the proposed site and discusses the environment that would be affected by building and operating the proposed nuclear reactor units. Chapter 3 describes the power plant layout, structures, and activities related to building and operation that are used as the basis for evaluating the environmental impacts. Chapters 4 and 5 separately examine the respective environmental impacts of building and operating the proposed nuclear reactor units. Chapter 6 analyzes the environmental impacts of the uranium fuel cycle, transportation of radioactive materials, and decommissioning. Chapter 7 examines the cumulative impacts of the proposed action as defined in 40 CFR Part 1508 (TN428). Chapter 8 addresses the need for power. Chapter 9 discusses alternatives to the proposed action; analyzes alternative energy sources, sites and system designs; and compares the proposed action with these alternatives. Chapter 10 summarizes the findings of the preceding chapters and provides a benefit-cost evaluation; it

also presents the NRC staff's recommendation with respect to the Commission's decision regarding the proposed site for COLs based on the evaluation of environmental impacts. References for sources cited in the narrative are listed in Chapter 11; Chapter 12 is the index.

The appendices to the EIS provide the following additional information:

- Appendix A – Contributors to the Environmental Impact Statement
- Appendix B – Organizations Contacted
- Appendix C – NRC and USACE Environmental Review Correspondence
- Appendix D – Scoping Comments and Responses
- Appendix E – Draft Environmental Impact Statement Comments and Responses (Reserved)
- Appendix F – Key Consultation Correspondence
- Appendix G – Supporting Documentation
- Appendix H – Authorizations, Permits, and Certifications
- Appendix I – The Effect of Climate Change on the Evaluation of Environmental Impacts
- Appendix J – Greenhouse Gas Footprint Estimates for a Reference 1,000 MW(E) Light-Water Reactor
- Appendix K – Potential USACE Alternative Transmission Line Routes

Appendix references are found in the final sections of the applicable appendices.

2.0 AFFECTED ENVIRONMENT

The site proposed by Florida Power & Light Company (FPL) for two combined construction permits and operating licenses (combined licenses or COLs) and a Department of the Army permit is located in southeast Miami-Dade County, Florida. The proposed Turkey Point Nuclear Power Plant (Turkey Point) site is owned by FPL, and currently includes five other power plants on the site. Units 1 and 2 operated as natural-gas/oil steam-generating units. Unit 2 was converted to operate in synchronous condenser mode. Unit 1 will be converted to operate in synchronous condenser mode in December 2016 (FPL 2016-TN4579). In the synchronous condenser mode, the generators help stabilize and optimize grid performance but do not generate power. Units 3 and 4 are nuclear pressurized water reactors, and Unit 5 is a natural-gas combined-cycle steam-generating unit (FPL 2014-TN4058). The location of proposed Turkey Point Units 6 and 7 is described in Section 2.1 followed by descriptions of the land, water, ecology, socioeconomics, environmental justice, historic and cultural resources, geology, meteorology and air quality, nonradiological health, and the radiological environment of the site presented in Sections 2.2 through 2.11, respectively. Section 2.12 examines related Federal projects and consultations.

2.1 Site Location

The geographic position of proposed Turkey Point Units 6 and 7 in relationship to the counties, cities, and towns within a 50 mi radius is shown in Figure 2-1. Figure 2-2 shows additional details within a 6 mi radius of the proposed units. The power blocks and most support facilities for proposed Units 6 and 7 would be built on a 218 ac plant area surrounded by man-made cooling canals (referred to from here on as the plant area) situated within the approximately 9,460 ac Turkey Point site (FPL 2014-TN4058). Other project-related facilities would be built on the Turkey Point site. The total area of these facilities, with the exception of the portions of the transmission lines located on the Turkey Point site, is referred to as the project area. The location of proposed Units 6 and 7 within the Turkey Point site and in relation to the existing units is shown in Figure 2-2.

The Turkey Point site is located on the southeastern coast of Florida in unincorporated southeast Miami-Dade County. The site borders Biscayne Bay and Card Sound and is approximately 25 mi south of Miami (as measured from the center point between the proposed Units 6 and 7 power blocks). Homestead and Florida City are the closest incorporated communities. Florida City is 8 mi west of the site and the municipal limits of Homestead are 4.5 mi west of the site. Homestead is also the location of the Homestead Bayfront Park and the Homestead Air Reserve Base.

The location for the proposed Units 6 and 7 is within portions of Sections 33 and 34 of Township 57S Range 40E (FPL 2014-TN4058). The coordinates for the proposed Units 6 and 7 containment buildings are listed in Table 2-1.

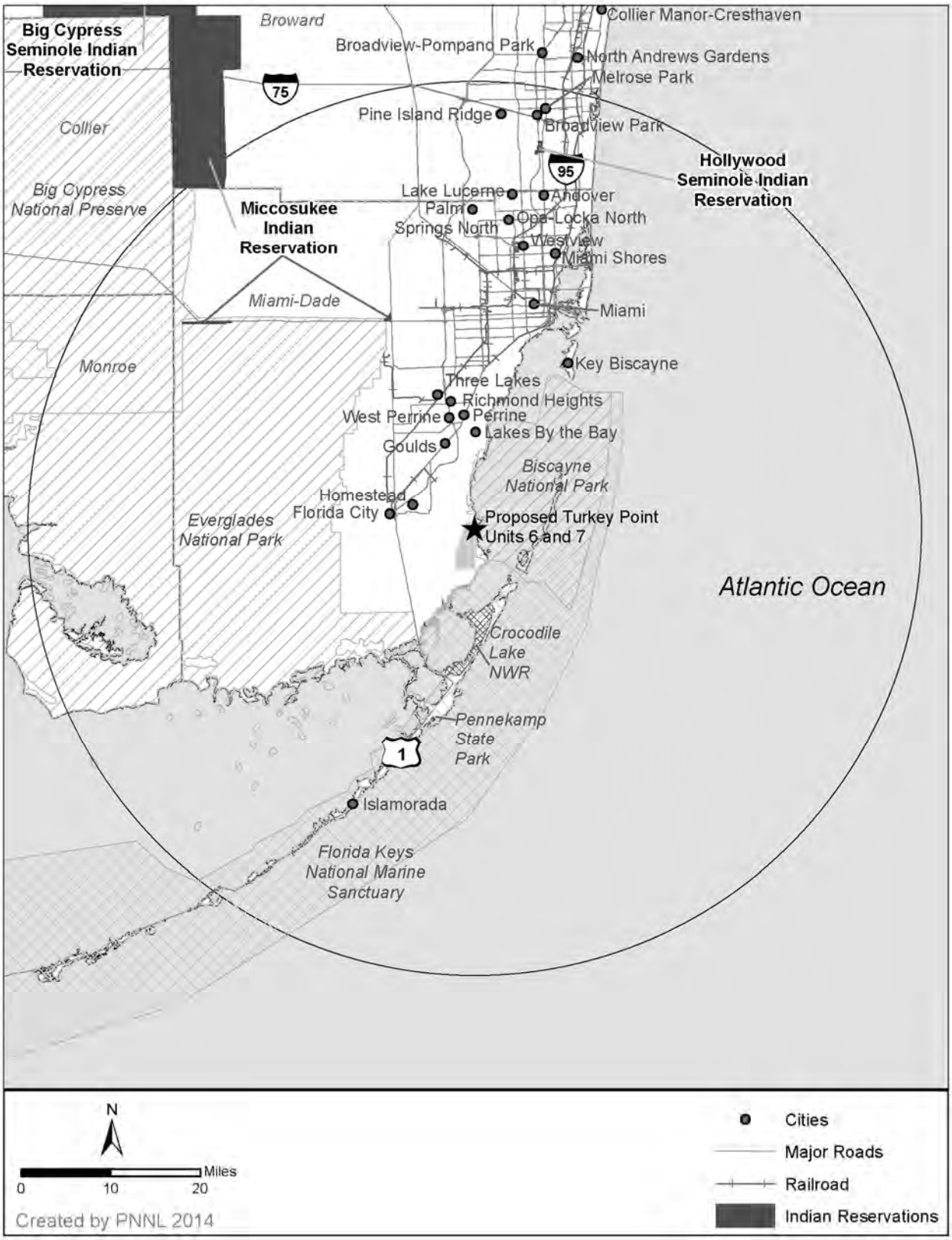


Figure 2-1. Proposed Units 6 and 7 Plant Area and 50-Mile Region

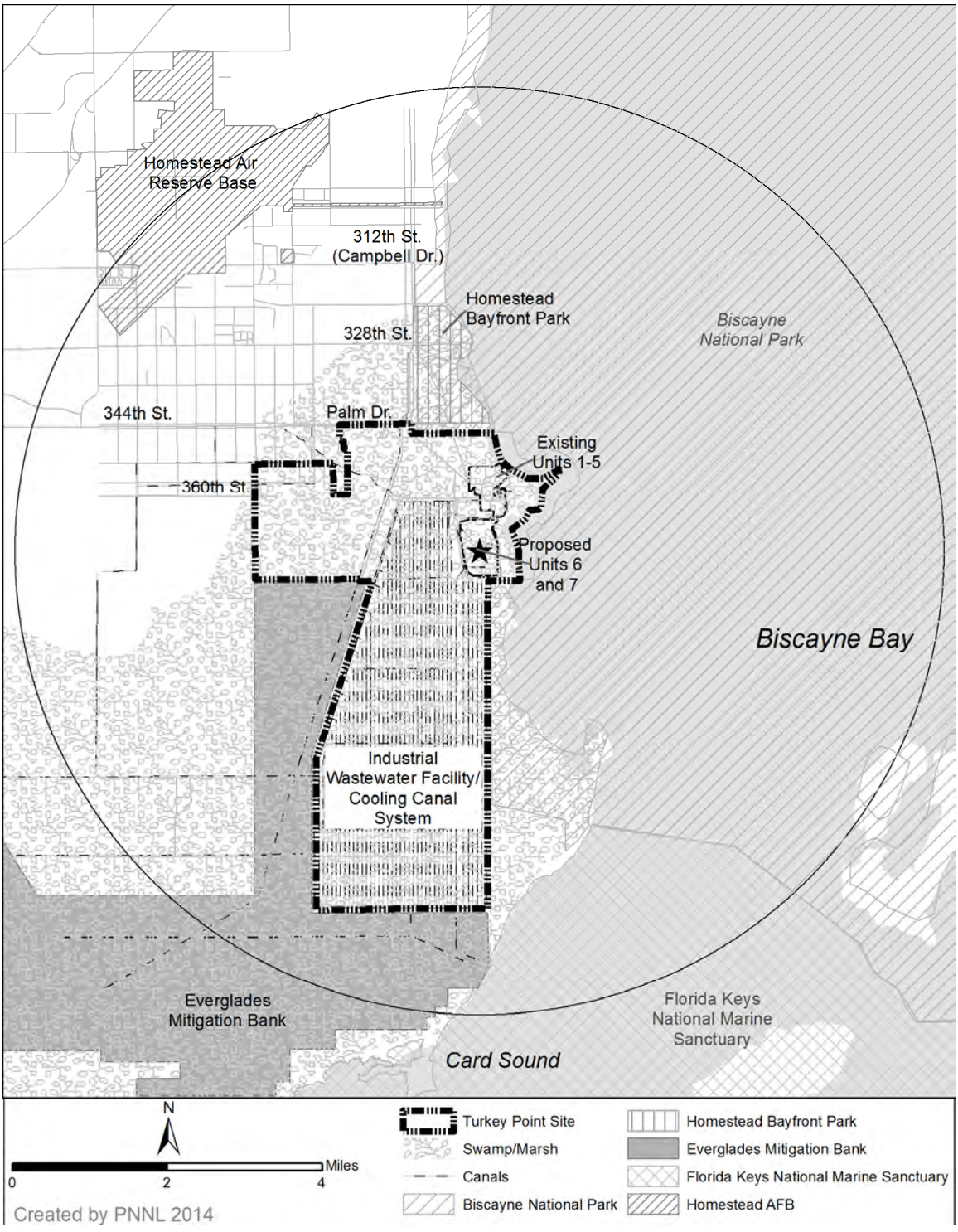


Figure 2-2. Proposed Units 6 and 7 Plant Area and 6-Mile Vicinity

Table 2-1. Proposed Coordinates for the Units 6 and 7 Containment Buildings

Coordinate System	Unit	Coordinates	
Geographic, Decimal Degrees, North American Datum of 1983 (NAD83) (NOAA 1986-TN1163)	Unit 6	25.424186 N	-80.331961 W
	Unit 7	25.424186 N	-80.334536 W
Universal Transverse Mercator Zone 17, Meters, NAD83	Unit 6	2812086.79	N 567179.31 E
	Unit 7	2812086.79	N 566920.31 E
Florida State Plane East, U.S. Feet, NAD83	Unit 6	396968	N 876646 E
	Unit 7	396968	N 875796 E

Source: FPL 2014-TN4058

2.2 Land Use

This section discusses existing land uses on and in the vicinity of the Turkey Point site, as well as in the region. Section 2.2.1 describes the site and vicinity (i.e., the area encompassed within a radius of 6 mi of the plant area, measured from the center point between proposed Units 6 and 7). Section 2.2.2 discusses land use within the existing and proposed transmission line corridors. Section 2.2.3 discusses land use in the region, defined as the area within 50 mi of the plant area, also as measured from the center point between proposed Units 6 and 7.

2.2.1 The Site and Vicinity

As shown in Figure 2-2 and Figure 2-3, the proposed Units 6 and 7 plant area would be located on an island of land surrounded by existing canals. The plant area is adjacent to waters that are part of Biscayne National Park and approximately 2 mi south of the Biscayne National Park Visitors Center. The site is within 3 mi of the Model Lands Basin, a South Florida Water Management District (SFWMD) conservation area. A portion of the Biscayne Bay Aquatic Preserve is located adjacent to the coastal boundary of the Turkey Point site. The Homestead Bayfront Park, a city park, is approximately 1.5 mi north of the proposed Units 6 and 7 plant area. The SFWMD L-31E Canal runs along Biscayne Bay past the Turkey Point site. The site is also located just east of the 13,000 ac Everglades Mitigation Bank (EMB)—an FPL-owned and operated wetland restoration project.

2.2.1.1 Mineral Resources

No oil or gas wells or mines are located within the Turkey Point site boundaries. The most important mineral resource in the vicinity is limestone (USGS 2004-TN678). Limestone is found at or near the land surface throughout the vicinity and is used as a base material for roads and airport runways, as construction aggregate, and in the manufacture of cement (USGS 2004-TN678). Other minerals are not commercially mined in the area (USGS 2004-TN680).

FPL states that it owns the land contained within the Turkey Point site, subject to certain encumbrances (FPL 2014-TN4058). Specifically, the Trustees of the Internal Improvement Fund of the State of Florida hold canal, drainage, reclamation, oil, gas, and mineral rights reservations, and Miami-Dade County holds a canal reservation (FPL 2014-TN4058).

Figure 2-3. Oblique Aerial Photograph of the Proposed Units 6 and 7 Plant Area and Surrounding Area (Adapted from FPL 2014-TN4058)

2.2.1.2 Nearby Population Centers, Schools, and Hospitals

Figure 2-2 provides a map of the vicinity within 6 mi of the plant area. The City of Homestead, in Miami-Dade County, is the nearest population center to the proposed plant site. Other land uses nearby that attract substantial numbers of people include the Homestead/Miami Speedway 5 mi to the northwest and Homestead Air Reserve Base, which contains both civilian and military operations, 4.5 mi northwest. The nearest public school is the Keys Gate Charter School, which is approximately 6 mi away. No hospitals or prisons are located within 6 mi of the proposed Units 6 and 7 project area.

2.2.1.3 Rail and Ports

There are no ports or rail systems located within 6 mi of the Turkey Point site. Biscayne Bay, which lies directly east of the site, is the nearest navigable waterway.

2.2.1.4 Comprehensive Plans and Zoning

Florida's growth management system includes an adopted State Comprehensive Plan (Fla. Stat. 8-187 2011-TN1503) and requirements for regional planning councils to prepare and adopt comprehensive regional policy plans consistent with that plan. The South Florida Regional Planning Council (SFRPC), which includes Miami-Dade, Broward, and Monroe Counties, has adopted the Strategic Regional Policy Plan for South Florida (SFRPC 2004-TN1151), the policy

document that guides all of the SFRPC's activities (Local Government Comprehensive Planning and Land Development Regulation Act) (Fla. Stat. 11-163.3164-TN1240).

Florida also requires counties and municipalities to adopt local government comprehensive plans that guide future growth and development. The comprehensive plans must contain chapters or “elements” that address future land use, housing, transportation, infrastructure, coastal management, conservation, recreation and open space, intergovernmental coordination, and capital improvements. State law (Fla. Stat. 8-187 2011-TN1503) requires that facilities be constructed and services be provided so as to be available concurrent with demand and the impacts of development. Local comprehensive plans must identify specific level-of-service standards for traffic, mass transit, parks, water, sewer, solid waste, and drainage. No development orders can be issued in accordance with State law, if they would cause adopted levels of service to not be met. Local plans, the applicable regional plan, and the State Comprehensive Plan are required by State law to be mutually consistent, and all development regulations and orders must be consistent with the adopted local comprehensive plan.

The Turkey Point site is within the area covered by the Miami-Dade County Comprehensive Development Master Plan (CDMP; Miami-Dade County 2013-TN4563). The CDMP addresses both incorporated and unincorporated areas but focuses land-use regulation on unincorporated areas. Local municipalities’ own comprehensive plans address land use in the incorporated areas. According to the CDMP, nearly 500 mi^2 of the more than 2,000 mi^2 of land in Miami-Dade County have already been developed for urban uses. The land-use diagram in the CDMP identifies recommended future land uses by major categories, each of which is interpreted locally through compatible zoning designations.

The Miami-Dade County CDMP designates the Turkey Point site as Environmental Protection Subarea F (Coastal Wetlands and Hammocks). These areas are low-lying, flood-prone, and characterized predominantly by coastal wetland communities. Electrical generation and transmission facilities are permitted uses under this designation.

The Miami-Dade County zoning for the location of existing Units 1−5, I U-3, Industrial District, Unlimited Manufacturing, allows a full range of institutions, communications, and utilities. The proposed Units 6 and 7 plant area is zoned as Interim Use District (GU) (Miami-Dade Code of Ordinances 33-196-TN1241). The Interim Use District (GU) is applied countywide and used for areas where there is predominately one classification of use (Miami-Dade Code of Ordinances 33-196-TN1241). Nuclear reactors are a permitted use in this district with the approval of an Unusual Use application by Miami-Dade County, as described below (Miami-Dade County 2012-TN1150).

In 2007, Miami-Dade County approved an Unusual Use application submitted by FPL to build two new nuclear power plants and associated facilities. The approval was issued by the Miami-Dade County Board of County Commissioners as Resolution Z-56-07 (Miami-Dade County 2007-TN1085) and included specific conditions of approval for environmental protection.

The Turkey Point site is within the Florida coastal zone (Fla. Stat. 28-380-TN1147). The U.S. Nuclear Regulatory Commission (NRC) has issued guidance (NRC 2009-TN1242) regarding compliance with the Federal Coastal Zone Management Act (16 U.S.C. § 1451 et seq.)

(TN1243). This guidance acknowledges that Florida has an approved Coastal Management Program (Fla. Stat. 28-380-TN1147). Activities of Federal agencies, including issuing licenses or permits, that are reasonably likely to affect coastal zones are required to be consistent with the approved Coastal Zone Management Plan (CZMP) of the State or territory to the maximum extent practical (16 U.S.C. § 1451 et seq.) (TN1243). Applicants for Federal licenses that are likely to affect a State's coastal zone must document the consistency of planned Federal agency activities with the State's or territory's CZMP in a Federal consistency certification, which must be submitted to the State or Federal licensing agency. Pursuant to Sections 373.428 and 403.511, F.S., State certification of power-generation facilities constitutes the State's concurrence that the facilities are consistent with the Federally approved program under the Florida Coastal Management Act.

2.2.1.5 Site Access

Existing public access to the Turkey Point site is provided via SW 344th Street/Palm Drive. Existing barge access to the site is provided by a channel across Biscayne Bay for the delivery of heavy equipment and fuel oil (FPL 2014-TN4058).

2.2.1.6 Existing Land Uses on the Turkey Point Site and in the Vicinity

This section describes the existing land uses on the site, focusing on areas that would be occupied by the proposed new Units 6 and 7 facilities (i.e., the project area, including the plant area), and in the vicinity of the site.

Land-Use/Land-Cover Data

Table 2-2 and Table 2-3 identify the current Florida Land Use, Cover, and Forms Classification System (FLUCFCS) land-use/land-cover classifications within the Turkey Point site and vicinity as provided by FPL (2014-TN4058). The classification data were generated as part of the Land Cover/Land Use 2004/5 Mapping Update Project by the SFWMD (FPL 2014-TN4058).

Developed land on the Turkey Point site is used for power-generation and supporting facilities and activities, including environmental mitigation and compensation activities required as conditions of ongoing permits associated with existing power-generation facilities. The Turkey Point site presently includes two natural-gas/oil steam electric generating units (Units 1 and 2), two pressurized water reactor nuclear units (Units 3 and 4), and one natural-gas combined-cycle steam electric generating unit (Unit 5). As proposed, Units 6 and 7 would be built in an area south of Units 1 through 5 (Figure 2-2) that is previously undeveloped (Figure 2-4). The 5,900 ac industrial wastewater facility (IWF), located south and southwest of the existing power-generation units, includes approximately 4,370 ac of cooling canals (Table 2-2 and Figure 2-2).

Land surrounding the Turkey Point site consists mostly of undeveloped land and protected natural areas; some agricultural lands lie to the west and northwest (Figure 2-4) (FPL 2014-TN4058). Most nearby land in the area outside of Turkey Point site is undeveloped or in agriculture. On the Turkey Point site, most areas adjacent to the proposed Units 6 and 7 plant area are currently undeveloped land. Other land near the plant area is used for the existing generating units and associated infrastructure.

Table 2-2. Major Land-Use Acreages on the Turkey Point Site (FPL 2014-TN4058)

Level 3	FLUCFCS Land-Use Category	Acres
100	Urban and Built-Up	13.8
400	Upland Forest	28.6
500	Water[(b)]	512.2
600	Wetlands	2,706.5
700	Barren Land	492.8
800	Transportation, Communications, and Utilities[(b)]	5,706.0
	Total[(a)]	**9,460.0**

(a) Due to rounding, table values may not exactly sum to the total acres and percentages.
(b) A portion of the IWF was characterized as electrical power facilities and a portion was characterized as streams/waterways/canals (Figure 2.2-2 of FPL 2014-TN4058).

Source: Adapted from FPL 2014-TN4058, Table 2.2-1.

Table 2-3. Major Land-Use Acreages within the 6-Mile Vicinity

Level 3	FLUCFCS Land-Use Category	Acres	% of Total
100	Urban and Built-Up	747.9	1.2
200	Agriculture	2,857.5	4.5
300	Rangeland	1,100.4	1.8
400	Upland Forest	2,248.9	3.6
500	Water	26,044.9	41.4
600	Wetlands	22,336.5	35.5
700	Barren Land	708.9	1.1
800	Transportation, Communications, and Utilities	6,896.2	11.0
	Total[(a)]	**62,941.1**	**100.0**

(a) Due to rounding, table values may not exactly sum to the total acres and percentages.

Source: Adapted from FPL 2014-TN4058, Table 2.2-2.

The FPL Turkey Point site is adjacent to Biscayne Bay and the Intracoastal Waterway, a 3,000 mi waterway along the Atlantic and Gulf Coasts of the United States. Portions of the coastline consist of natural inlets, saltwater rivers, bays, and sounds. Other portions include man-made canals. The City of Homestead is located 4.5 mi west of Turkey Point site (Figure 2-1).

Residential Uses

No residences are located adjacent to the Turkey Point site. The closest residence is approximately 2.7 mi from the proposed Units 6 and 7 plant area (FPL 2014-TN4058).

Parks and Preserves

Parks and preserves in the vicinity include a State-managed aquatic preserve, a wetlands habitat preserve, two national parks, and a national wildlife refuge, as described below.

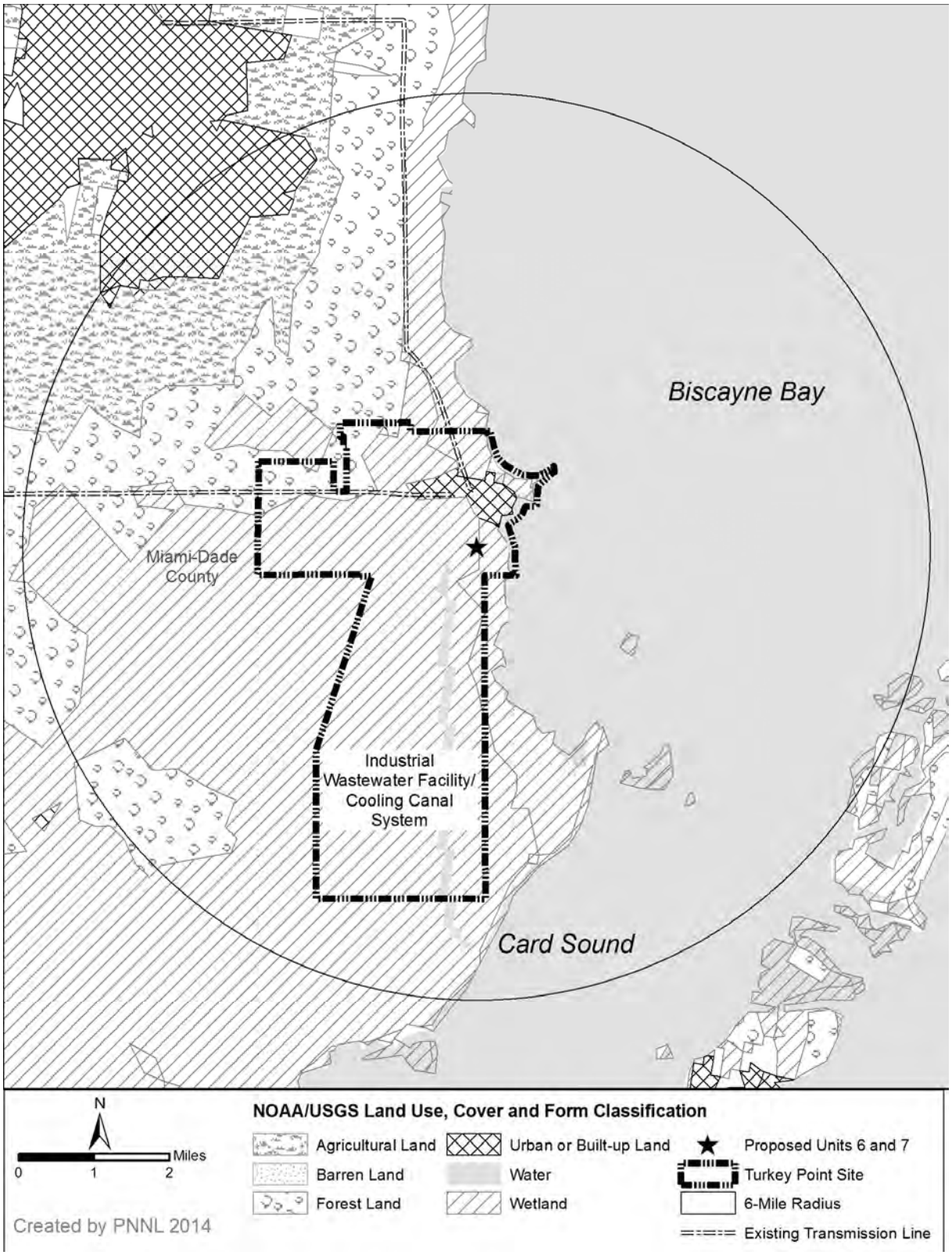


Figure 2-4. Principal Land Uses in the 6-Mile Vicinity of the Turkey Point Site (Adapted from FPL 2014-TN4058)

Biscayne Bay Aquatic Preserve

Biscayne Bay Aquatic Preserve consists of approximately 67,000 ac of submerged State land that has been designated as an Outstanding Florida Water, Class III, and is managed by the Florida Department of Environmental Protection (FDEP), Office of Coastal and Aquatic Managed Areas. Activities at the preserve include recreational and commercial water-related activities, such as boating, water sports, and fishing (FDEP 2010-TN156).

South Dade Wetlands

The South Dade Wetlands is a collective project consisting of the Model Lands Basin, much of the Model Lands Addition, and Southern Glades Addition projects. This project is a collaborative endeavor by the Environmentally Endangered Lands Program of Miami-Dade County (County) and the Save Our Rivers (SOR) Program of the SFWMD (District). The project consists of a broad zone of wetlands located in Miami-Dade County, south of Palm Drive (SW 344th Street) between the boundaries of Everglades National Park, the Southern Glades Wildlife Environmental Area, and the Turkey Point power plant facility. The Model Lands Basin, parts of the Model Lands Addition, and the Southern Glades Addition are being combined into the South Dade Wetlands for management purposes because both agencies own land within the collective project area. These lands are subject to the South Dade Wetlands Conceptual Land Management Plan (SFWMD 2005-TN217).

Biscayne National Park

Biscayne National Park is adjacent to Turkey Point site—to the north and east (Figure 2-1 and Figure 2-2). The waters adjacent to the proposed Units 6 and 7 plant area are within the boundary of Biscayne National Park. The park headquarters building is approximately 2.3 mi north of the proposed Units 6 and 7 plant area (NPS 2012-TN1284). Biscayne National Park was established in 1968 as a national monument and was expanded in 1980 to encompass approximately 173,000 ac of water, coastal lands, and 42 keys (islands). Activities at the multi-use park include boating, recreational and commercial fishing, snorkeling, diving, camping, picnicking, and hiking (NPS 2012-TN1284).

Biscayne National Park was first designated a national monument in 1968 before being expanded and re-designated a national park in 1980. The park was established “to preserve and protect for the education, inspiration, recreation and enjoyment of present and future generations a rare combination of terrestrial, marine, and amphibious life in a tropical setting of great natural beauty.” Biscayne National Park is home to a large segment of the Florida reef tract (the only living coral reef tract in the continental United States), contains the majority of Biscayne Bay, and is an Outstanding Florida Water (OFW). The park supports an incredible array of wildlife, including more than 600 species of fishes, many of which are commercially and recreationally used, over 200 species of birds, and 21 Federally threatened or endangered species. Biscayne National Park is home to the longest protected stretch of mangrove shoreline and protects the finest examples of coastal hardwood hammock on the east coast of the United States.

Everglades National Park

Everglades National Park was created in 1934 as a “public park for the benefit of the people. It is set aside as a permanent wilderness, preserving essential primitive conditions including the natural abundance, diversity, behavior, and ecological integrity of the unique flora and fauna.”

Public concern for the Everglades unique flora and fauna, which the wading birds epitomize, were the primary motivation for the establishment of Everglades National Park, as well as the addition of Northeast Shark River Slough and the East Everglades to the Park in 1989 (Everglades National Park Protection and Expansion Act of 1989 [16 U.S.C. § 410r-5 et seq.] [TN4096]). Through these Acts, Congress intended to improve the protection of these resources and the ecosystems upon which they depend. The park’s unique ecosystems support 34 native species that are listed as Federally threatened or endangered, or are candidates for listing. Seven of these species are currently considered to be extirpated from the park, and the remaining 27 species may occur in the park today. In addition, critical habitat is designated within Everglades National Park for 10 of these species, and well over half of the park is designated critical habitat for one or more species. Everglades National Park supports the entire range of the endangered Florida leafwing butterfly and nearly all of the remaining population of Cape Sable seaside sparrows. Everglades National Park’s rich biodiversity has been recognized by United National Educational, Scientific and Cultural Organization (UNESCO) as a World Heritage Site and an International Biosphere Reserve. Because of alterations of the hydrological regime (quantity, timing, and distribution of Shark Slough inflows); adjacent urban and agricultural growth (flood-protection and water-supply requirements that affect the property's resources by lowering water levels); and increased nutrient pollution from upstream agricultural activities, UNESCO added the park to its list of World Heritage Sites in Danger in 2014. The park is also designated a Ramsar Wetland of International Importance, Specially Protected Area under the Cartagena Convention, an OFW, and includes the Marjorie Stoneman Douglas Wilderness, the largest wilderness area east of the Rocky Mountains. Miami-Dade County has designated a 242 mi^2 area west of the urbanized part of the County contiguous to the Everglades National Park as an area of critical environmental concern (Miami-Dade Code of Ordinances 33B-TN4570).

The broader Everglades ecosystem, which includes Biscayne National Park, has been in decline and many of the species found in the two park’s fragile ecosystems are in danger of extinction or regional extirpation. The Comprehensive Everglades Restoration Plan (CERP) is a major restoration initiative that will restore the quantity, quality, timing, and distribution of fresh water in an effort to reverse decades of unintended environmental decline. The Biscayne Bay Coastal Wetlands (BBCW) project is an effort under CERP that will rehydrate wetlands and reduce point-source discharge to Biscayne Bay. CERP is vital to revitalizing habitat within Everglades and Biscayne National Parks and is a major initiative of the Department of Interior and a wide range of other agencies, including the U.S. Army Corps of Engineers (USACE). At a cost of more than $10.5 billion and with over a 35-year timeline, it is the largest hydrologic restoration project ever undertaken in the United States.

Homestead Bayfront Park

The nearest local park is Homestead Bayfront Park—a 97 ac public park. It is 1.5 mi from the proposed Units 6 and 7 plant area south of the North Canal on Biscayne Bay and adjacent to Biscayne National Park (Figure 2-2). The park has a marina and a public swimming area (FPL 2014-TN4058; NRC 2010-TN1457).

Everglades Mitigation Bank

FPL owns the 13,000 ac EMB (Figure 2-2), which is a preserve that is also operated as a mitigation bank, and not a recreational facility (FPL 2014-TN4112). It contains relatively undisturbed freshwater and estuarine wetlands (FPL 2014-TN4058).

Commercial Uses

The 2,938 ac Homestead Air Reserve Base (approximately 4.5 mi northwest of the proposed Units 6 and 7 plant area) (Figure 2-2) is the nearest airport and is primarily devoted to military uses. U.S. Air Force plans provide for future mixed economic uses that could include commercial development as well as residential or recreational uses, but would not include use as a civilian commercial airport (HAFRC 2007-TN1427).

The Homestead-Miami Speedway is 5 mi northwest of the proposed Units 6 and 7 plant area. The speedway has the capacity to seat 65,000 people in grandstands and accommodate more people in other areas of the facility (FPL 2014-TN4058). The City of Homestead recently approved expansion of the speedway (Miami-Dade County 2011-TN1504).

Industrial Uses

Nearby industrial uses include the RMC Florida Group Ltd. active limestone mine (6 mi west), and an abandoned quarry (6 mi north) of the Turkey Point site (FPL 2014-TN4058).

Agriculture – Prime and Unique Farmland

Agricultural land composes approximately 4.5 percent (2,857.5 ac) of land use within the 6 mi vicinity of the Turkey Point site (Figure 2-4; Table 2-2). The land acreage with a use/cover designation of agricultural in the vicinity is concentrated in an area adjacent to the west-northwest corner of the Turkey Point site within Miami-Dade County. No prime farmland or unique farmland, or other special status farmlands as defined in the Farmland Protection Act (7 U.S.C. § 4201(b)) (TN708), occur on the Turkey Point site or in the vicinity (USDA 2012-TN1314).

2.2.2 Transmission Line Corridors and Offsite Areas

The existing Turkey Point power-generation units are currently connected to the transmission system by eight 230 kV transmission lines in two corridors, one going north and one west (FPL 2014-TN4058). The existing transmission lines are shown in Figure 2-5. According to FPL (FPL 2014-TN4058), two 230 kV substations exist on the Turkey Point site, the 1 ac McGregor substation and the approximately 6 ac Turkey Point substation. Existing transmission

line corridors connecting the existing generation facilities at the Turkey Point site to the power grid occupy approximately 1,111 ac of land, all within Miami-Dade County (FPL 2014-TN4058).

2.2.2.1 Transmission Line Corridors

To connect proposed Units 6 and 7 to the power grid, two new 500 kV circuits and three new 230 kV circuits are proposed. FPL proposes to build the new transmission lines originating from a proposed new onsite substation (Clear Sky substation) and connecting to the existing Levee substation (500 kV circuits), and to the existing Turkey Point, Davis, and Pennsuco substations (230 kV circuits) (Table 2-4 and Figure 2-5). Two major corridors are proposed—the West and the East corridors—and multiple transmission lines are proposed within each corridor.

As FPL described in Section 2.2.2.2 of its Environmental Report (ER) (FPL 2014-TN4058), existing linear features would generally be followed where available, within two proposed corridors, the West corridor and the East corridor—from the Units 6 and 7 plant area to existing substations (Figure 2-5). These corridors feature several land uses (listed in Table 2-5) (FPL 2014-TN4058). FPL has outlined two options for the West corridor that differ primarily with respect to where the corridor would pass near Everglades National Park (even though no part of the corridor would actually extend inside the perimeter of the park). The first option, termed the West Preferred corridor, passes along a segment of the eastern perimeter of the park. The second option, termed the West Consensus corridor, avoids the park perimeter by passing through lands to the east used mostly for limerock mining. Details regarding the proposed alignment of new transmission lines in each of the corridors (and for the West corridor, each of the options) are presented below.

Table 2-4. Existing and Proposed Transmission Line Corridors

Corridor	Number of Lines/kV	Length (mi)	Total Acres
Existing Corridor			
Turkey Point – Davis	Three 230 kV double circuit lines One 230 kV single circuit	19	NA
Turkey Point – Levee	One 230 kV single circuit	23	NA
West Preferred Corridor			
Clear Sky – Levee	Two 500 kV lines, one 230 kV line	45	3,030.6
Levee – Pennsuco	One 230 kV line	8	312.3
Total		53	3,342.9
East Corridor			
Clear Sky – Davis	One 230 kV line	19	634.9
Davis – Miami	One 230 kV line	18	1,000.0
Total		37	1,634.9
West Consensus Corridor			
Clear Sky – Levee	Two 500 kV lines, one 230 kV line	43.8	3,695.3
Levee – Pennsuco	One 230 kV line	8	312.3
Total		51.8	4,007.6

Source: FPL 2014-TN4058; Note: only one of the West Preferred or West Consensus corridors would be utilized.

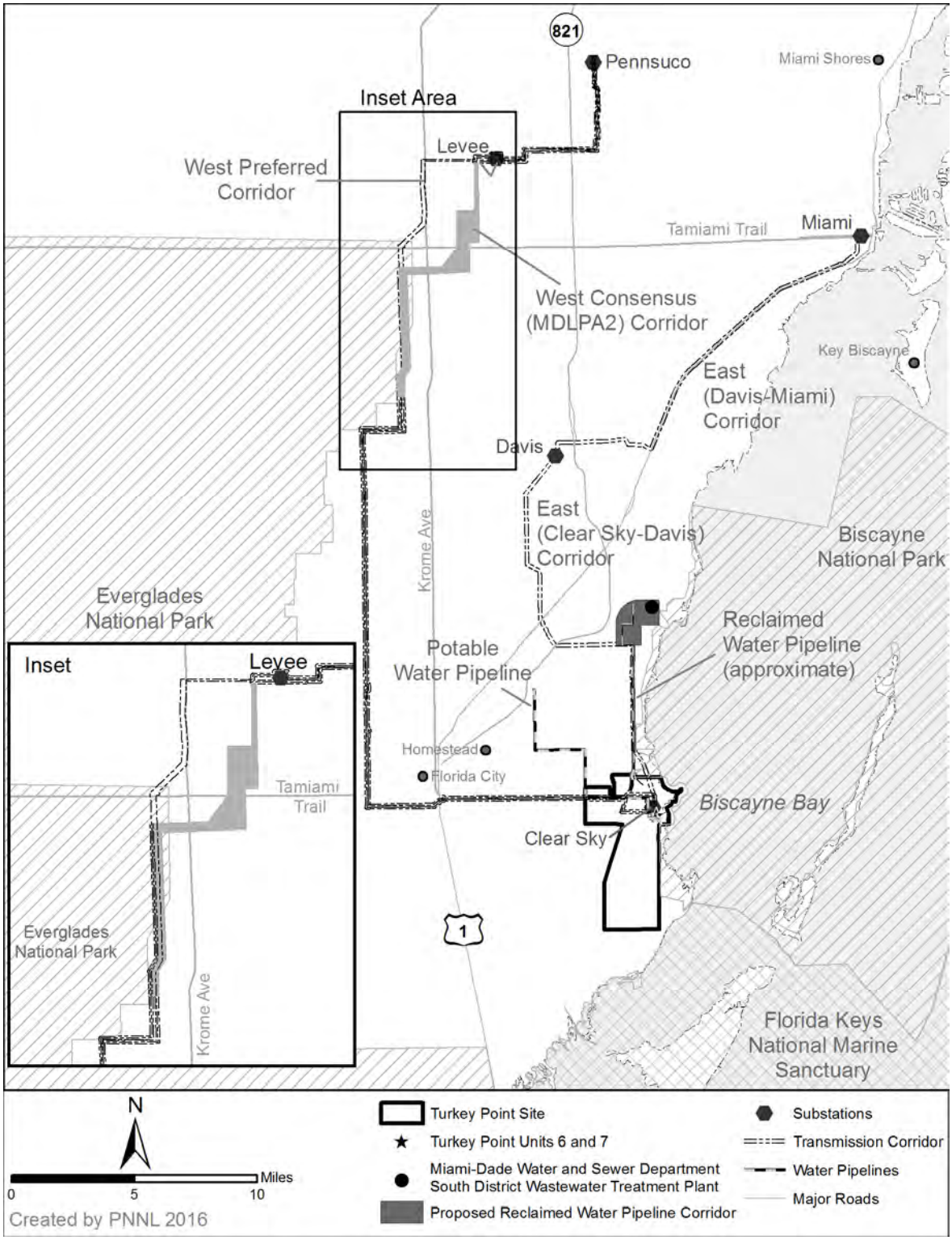


Figure 2-5. Locations of Proposed Transmission Line Corridors and Water Pipelines at the Turkey Point Site (FPL 2013-TN2941)

- West Preferred corridor: The West Preferred corridor, as described in the FPL's ER (FPL 2014-TN4058), consists of a corridor from the proposed new Clear Sky substation to the existing Levee 500 kV substation and then to the existing Pennsuco substation. The segment connecting the Clear Sky and Levee substations would be built in three segments (legs). The first leg passes just south of Homestead and Florida City, then travels north to SW 120th St. Major land use includes fields, pastures, row crops, tree nurseries, and citrus groves. The second and third legs traverse a landscape just east of Everglades National Park characterized by wetlands and disturbed wetlands with some agricultural land, limerock quarries, and scattered urban development. Part of the second leg would abut the eastern perimeter of the park. The segment between the Levee and Pennsuco substations also traverses a landscape characterized by mostly agricultural land, sawgrass wetlands, existing limerock quarries, and scattered urban development.
- West Consensus corridor: FPL describes the West Consensus corridor in a letter dated November 5, 2013 (FPL 2013-TN2941). It differs from the West Preferred corridor only in that portions of the second and third legs of the segment between the Clear Sky and Levee substations have been shifted to the east to avoid abutting the eastern perimeter of Everglades National Park. This corridor still crosses a landscape consisting mostly of wetlands and disturbed wetlands, but FPL states that its use would reduce the potential for adverse impacts on multiple Federally endangered species (FPL 2013-TN2941).
- East corridor: The East corridor is also described in the ER (FPL 2014-TN4058). A new, 230 kV, approximately 19 mi long, transmission line would be constructed to connect the proposed new Clear Sky substation to the existing Davis substation, and a new, approximately 18 mi long, 230 kV line would be constructed to connect the Davis substation to a new 230 kV bay position at the Miami substation. FPL stated (FPL 2014-TN4058) that these transmission lines would be largely collocated in an existing right-of-way or other linear/transportation corridors. FPL also stated that installation of these lines would require acquisition of additional easements. The existing land uses traversed by the East corridor are listed by segment in Table 2-5. The segment connecting the Clear Sky and Davis substations traverses a mostly rural landscape consisting predominantly of agricultural land interspersed with wetlands and rangeland and with widely scattered urban areas and forests. A small (less than 1 mi) portion of the Clear Sky to Davis segment would traverse the end of the APZ II zone of the Air Installation Compatible Use Zone adopted by the Homestead Air Reserve Base. The line would be collocated with an existing transmission line in this location. The segment between the Davis and Miami substations would traverse a mostly urban landscape but would be built mostly along existing roadways.

In addition to the transmission lines built within the corridors noted above, a new underground transmission line would be built within the plant area to connect Units 6 and 7 to the proposed new Clear Sky substation. As proposed, this underground transmission line would be built entirely within the 218 ac island comprising the plant area. The existing land use of the plant area is described above.

Transmission line siting in Florida is regulated under the Florida Power Plant Siting Act (PPSA) (Fla. Stat. 29-403.501 2011-TN1068), and Chapter 62-17 of the Florida Administrative Code (Fla. Admin. Code 62-17-TN1247). FPL obtained certification through the Florida PPSA Site

Certification Application (SCA) process for the new 500 kV and 230 kV transmission lines. FPL undertook a route-selection process to select the transmission line corridors that was submitted for approval under the Florida PPSA (Fla. Stat. 29-403.501 2011-TN1068).

On May 19, 2014, Florida's Governor and Cabinet, sitting as the Siting Board, issued a Final Order of Certification that approved FPL's application to construct and operate two new nuclear generating units at Turkey Point, as well as new electrical transmission lines and other offsite facilities. The West Consensus corridor was certified as the primary corridor for the location, construction, and operation of electrical transmission lines, and the West Preferred corridor as the backup location. The NRC staff is aware that on April 20, 2016, a Florida court issued an opinion in which it ruled that the Florida Siting Board should have considered whether to require FPL to bury a portion of the transmission lines, and that the record was inadequate to support certain mitigation measures associated with transmission lines in the East Everglades (State of Florida 2016-TN478). Although the opinion remands the Conditions of Certification to the Florida Siting Board for consideration of the possibility of burying a portion of the transmission lines and reconsideration of the specified mitigation measures, the NRC staff understands that the court's opinion is not yet final as of this writing (October 3, 2016). Accordingly, for the purposes of the FEIS evaluation of impacts, the NRC staff considers the transmission line route and conditions reviewed and approved by the Florida Siting Board as the most current information regarding the transmission line and associated potential mitigation measures. Even if the Conditions of Certification are revisited, the NRC staff considers it reasonable to expect that Conditions of Certification similar to or no less effective than those originally issued will be in place before construction and operation of the proposed units begins.

On March 16, 2016, the National Park Service (NPS) approved acquisition of 320 ac of FPL lands in the East Everglades expansion area of Everglades National Park in exchange for 260 ac along approximately 6.5 mi of the park's eastern boundary (NPS 2016-TN4532). The NPS will also provide a 90-ft-wide easement to FPL adjacent to the entire length of the exchange corridor. The 260 ac that FPL would acquire through the land swap, plus the easement, forms part of FPL's West Preferred and Consensus corridors. Table 2-5 summarizes the major land uses along each corridor/option.

As part of the West Preferred and West Consensus corridor alignments, multiple access roads would be built to provide vehicular access to the transmission lines. Two proposed access road corridors for the West Preferred corridor have been designated as the Tamiami Trail corridor and the Krome Avenue corridor. Four proposed access road corridors for the West Consensus corridor have been designated as the NW 12th Street, Tamiami Trail, L-31 Canal and Levee, and SW 88th Street corridors. Land uses in these corridors are primarily waterways, marshes, rock quarries, roads and highways, and other open lands with vegetation indicative of disturbed areas.

Table 2-5. FLUCFCS Land-Cover Acreage within Proposed Transmission Line Corridors and Transmission Access Roads

Segment	100	200	300	400	500	600	700	800	Total
West Corridor									
Clear Sky - Levee Preferred	8.5	848.9	89.3	67.3	401.3	1,346.6	69.9	198.9	3,030.6
Clear Sky - Levee Consensus		835.4	67.1	18.4	15.1	2,700.0	59.3		3,695.3
Levee – Pennsuco (Preferred or Consensus)	86.9				1.8	169.4	19.4	34.8	312.3
East Corridor									
Clear Sky - Davis	9.4	418.3	76.1	1.1	17.7	71.7	1.6	38.9	634.9
Davis-Miami	483.0	13.6	19.2	2.1	16.7			465.4	1,000.0
West Preferred Access Roads									
Krome Ave.					85.3	200.2		79.2	364.7
Tamiami Trail					2.7	3.1		4.7	10.5
West Consensus Access Roads									
88th St.	2.1		0.8	12.0	0.01	18.3	0.3		33.5
L-31 Canal					11.4	4.2	21.0		37.1
NW 12th St.	13.3	6.5	0.1	0.4					20.2
Tamiami Trail						19.6			19.6

Source: Adapted from Tables 2.2-4 of FPL 2014-TN4058 and FPL 2013-TN2941

2.2.2.2 Transmission Substation Improvements

Proposed substation improvements include building one new substation (Clear Sky), and upgrading and expanding the existing Turkey Point, Miami, Levee, Davis, and Pennsuco substations (Figure 2-5). Improvements at the Turkey Point, Levee, and Davis substations would require site expansions. In its ER (FPL 2014-TN4058), FPL stated that site expansions at these substations would take place on existing FPL property in previously disturbed areas, except that the improvements proposed at the Pennsuco substation would require acquisition of additional property. Existing land uses for the areas of substation expansion are summarized below.

- Turkey Point substation: The Turkey Point substation would be expanded by approximately 0.9 ac to accommodate proposed new facilities. In its ER (FPL 2014-TN4058), FPL stated that the expansion area is already fully occupied by uses associated with the existing operation. Areas adjacent to the existing substation are currently used for parking lots or are unused but surrounded by electrical power-generation facilities.
- Levee substation: The existing Levee substation, at NW 41st Street and NW 147th Avenue, would be expanded by 2.3 ac to accommodate proposed new facilities. Existing land use in the expansion area for the Levee substation comprises approximately 1.81 ac of hardwoods and 0.52 ac of electric power facilities (FPL 2014-TN4058).

- Pennsuco substation: The existing Pennsuco substation, at 10800 NW 107th Avenue, would be expanded by 2.42 ac to accommodate proposed new facilities. The expansion area for the Pennsuco substation is currently used for rock quarrying (FPL 2014-TN4058).
- Davis substation: The existing Davis substation, at 12701 SW 136th Street would be expanded by 1.12 ac to accommodate new installations. Existing land in the expansion area for the Davis substation is used for tree nurseries (FPL 2014-TN4058).
- Miami substation: The proposed improvements at the Miami substation, at 122 SW 3rd Street, would take place entirely within the existing fence line of the facility (FPL 2014-TN4058).

2.2.2.3 Makeup and Potable Water System Pipelines

As described in Chapter 3, approximately 9 mi of new reclaimed water pipelines would be installed between the FPL reclaimed water-treatment facility (RWTF) on the Turkey Point site and the Miami-Dade Water and Sewer Department (MDSAWD) South District Wastewater-Treatment Plant (SDWWTP) to the north (Figure 2-5). For about 6.5 mi, the pipelines would be collocated with the existing Clear Sky to Davis transmission line right-of-way. At the northern end, FPL has identified a pipeline corridor approximately one mile wide as it approachs the SDWWTP. This width provides for flexibility in the precise corridor location ultimately selected and does not reflect the anticipated width of the corridor. At the southern end it follows the L-31E Canal as it approaches the RWTF. Existing land uses along this route include mostly wetland, agricultural, and electrical power transmission line uses. A new 2.5 mi right-of-way would be located adjacent to a new pipeline corridor. The reclaimed water pipelines from the FPL RWTF (FPL 2014-TN4058) would be routed south along the eastern side of the cooling canals to the makeup-water reservoir (Figure 2-5).

Potable water pipelines, approximately 10 mi long, would be constructed to deliver potable water from the MDSAWD potable water source facility to the Units 6 and 7 plant area as shown in Figure 2-5. Potable water pipelines would be constructed within the rights-of-way for other construction activities and would not result in additional land disturbance (FPL 2015-TN4442).

Makeup-water pipelines would be installed within the site in areas currently used for power-generation purposes, and therefore would not require new land disturbance (FPL 2014-TN4058).

2.2.2.4 Fill Material Source Site

FPL proposes to obtain the offsite fill from established regional sources. A number of fill sources in the region could meet the needs of FPL at the Turkey Point site.

To provide context for the potential impacts of fill mining, the review team considered the Atlantic Civil, Inc. mine located about 10 mi west of the Turkey Point site as a viable commercial fill source (USACE 2013-TN3473). The review team also considered a rock mine in the Lake Belt region as another viable commercial source of fill. This allowed the review team to consider a nearby location with limited capacity and a more distant site with extensive capacity.

The Atlantic Civil rock mine is located about 10 mi west of the FPL site; it is a complex of quarries, fill areas, and mitigation areas occupying approximately 3,200 ac (SFWMD 2010-TN3553; SFWMD 2014-TN3554).

The rock mines in the Lake Belt region in northwest Miami-Dade County are located approximately 40 road miles northwest of the Turkey Point site. The USACE issued project-specific permits to several companies including to Cemex Construction Materials Florida for its FEC Quarry, named for the Florida East Coast (FEC) Railway that serves the quarry. The FEC Quarry and rail center are located near the intersection of the Florida Turnpike and Okeechobee Road (USACE 2010-TN3555; SFWMD 2010-TN3556). Other permitted quarries in the Lake Belt region include White Rock Quarries (North and South), Tarmac America, Florida Rock Industries, and APAC Southeast, Inc. (USACE 2010-TN3559; USACE 2010-TN3560; USACE 2010-TN3561).

2.2.2.5 Emergency Operations Facility

FPL states that the existing facility for Units 3 and 4 would also be used for Units 6 and 7. This facility is located offsite at the intersection of West Flagler Street and SW 92nd Avenue. FPL further states that it proposes no changes to this facility (FPL 2014-TN4058).

2.2.2.6 Roads and Highways

The major area roads and highways, shown in Figure 2-6, are as follows:

- U.S. highways
  - US-1
  - Interstate 75
  - Interstate 95
- State highways
  - Florida's Turnpike (Homestead Extension, SR-821)
  - SR-997

Local roadways serving the project site (Figure 2-2) are as follows:

- SW 344th Street/Palm Drive. SW 344th Street/Palm Drive intersects with US-1 and SR-997.
- SW 328th Street/North Canal Drive, paralleling SW 344th Street/Palm Drive to the north, connecting to US-1.
- From Florida's Turnpike, via the exit at SW 312th Street/Campbell Drive or via the Turnpike terminus at US-1.

Existing land uses in the areas to be used for the proposed access road improvements largely include roadways, urban and built-up land, marshes, mangroves, and agriculture (FPL 2014-TN4058).

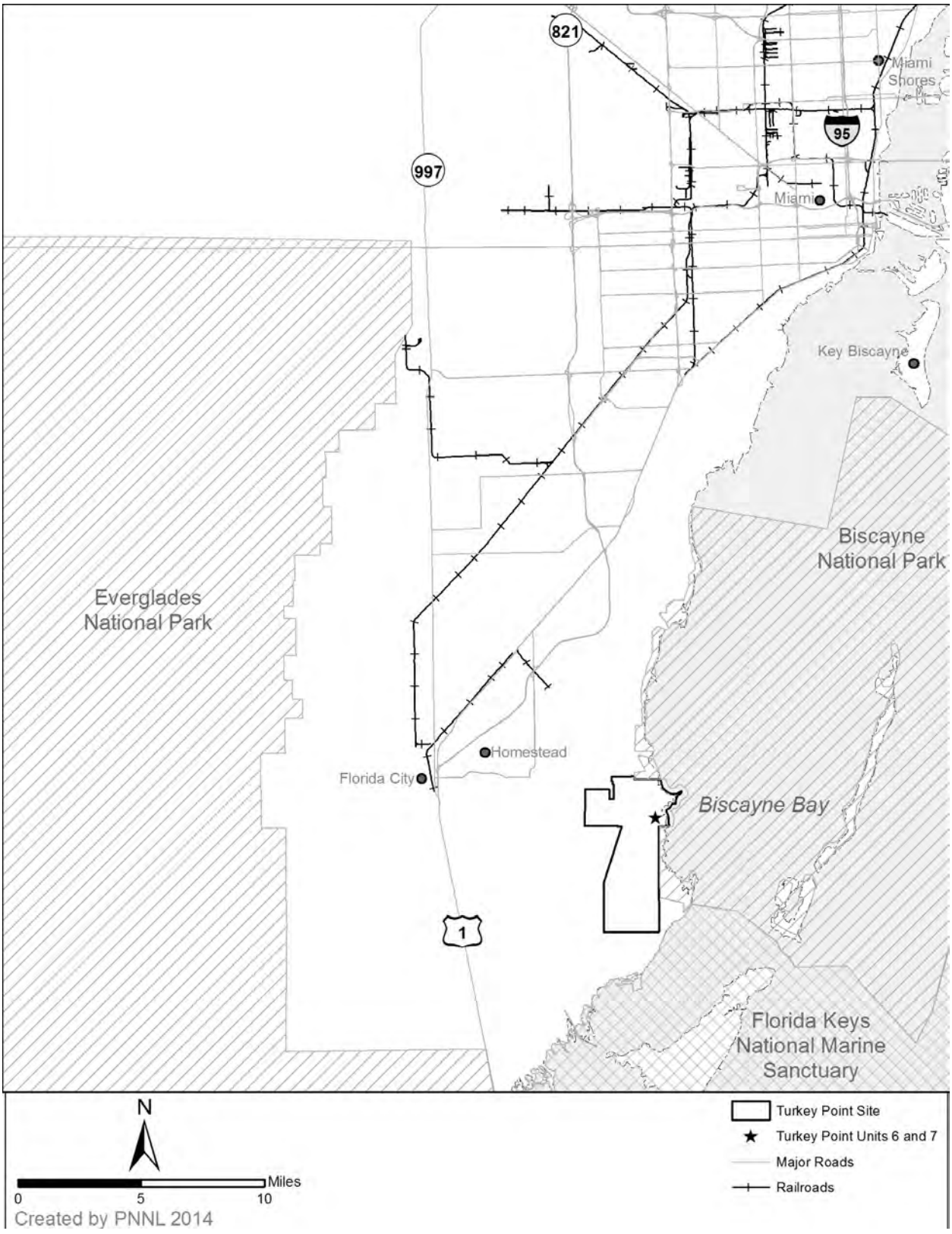


Figure 2-6. Map Showing Major Roads, Highways, and Rail Lines within the Turkey Point Site Vicinity (FPL 2014-TN4058)

2.2.3 The Region

Land within 50 mi falls into four counties: Broward, Collier, Miami-Dade, and Monroe. Existing major land-use classifications and waterways in the region are listed in Table 2-6 and shown in Figure 2-7. Major highways and rail lines are shown in Figure 2-6.

Table 2-6. Regional Land Use

FLUCFCS Code		Acres
100	Urban and Built-Up Land	353,440
200	Agriculture	83,286
300	Rangeland	21,369
400	Upland Forest	23,729
500	Water	690,568
600	Wetlands	1,416,931
700	Barren Land	3,030
800	Transportation, Communications, and Utilities	42,588

Source: FPL 2014-TN4058

All four counties within the region have adopted comprehensive land-use plans (Broward County 2010-TN1505; Collier County 2012-TN1506; Miami-Dade County 2012-TN1150; Monroe County 2012-TN1507). Because the project area, transmission line corridors, and offsite areas are all located in Miami-Dade County, the Miami-Dade CDMP is the relevant land-use planning document for the proposed project.

2.2.3.1 Rail and Ports

The nearest rail line is located 10 mi west of the proposed Units 6 and 7 plant area (Figure 2-1), (DOI 2012-TN1335). The rail line is part of the FEC Railway. The Port of Miami is located approximately 26 mi from the site.

2.2.3.2 Regional Land Uses and Jurisdictions

Land Uses

As described in ER Table 2.2-8 (FPL 2014-TN4058), the region within 50 mi of the proposed Units 6 and 7 plant area encompasses 2,634,939 ac of land (mostly excluding the Atlantic Ocean, Gulf of Mexico, Biscayne Bay, Card Sound, and Florida Bay). Most of this land is wetland (approximately 54 percent) and water (approximately 26 percent); urban or built-up lands account for approximately 15 percent (FPL 2014-TN4058). The remaining lands are agricultural land (approximately 3 percent), forestland (less than 1 percent), rangeland (less than 1 percent), and less than 1 percent barren land.

Public Lands

Federal, State, County, and city public lands account for much of the land in the region. Specific parks and other public lands are described below.

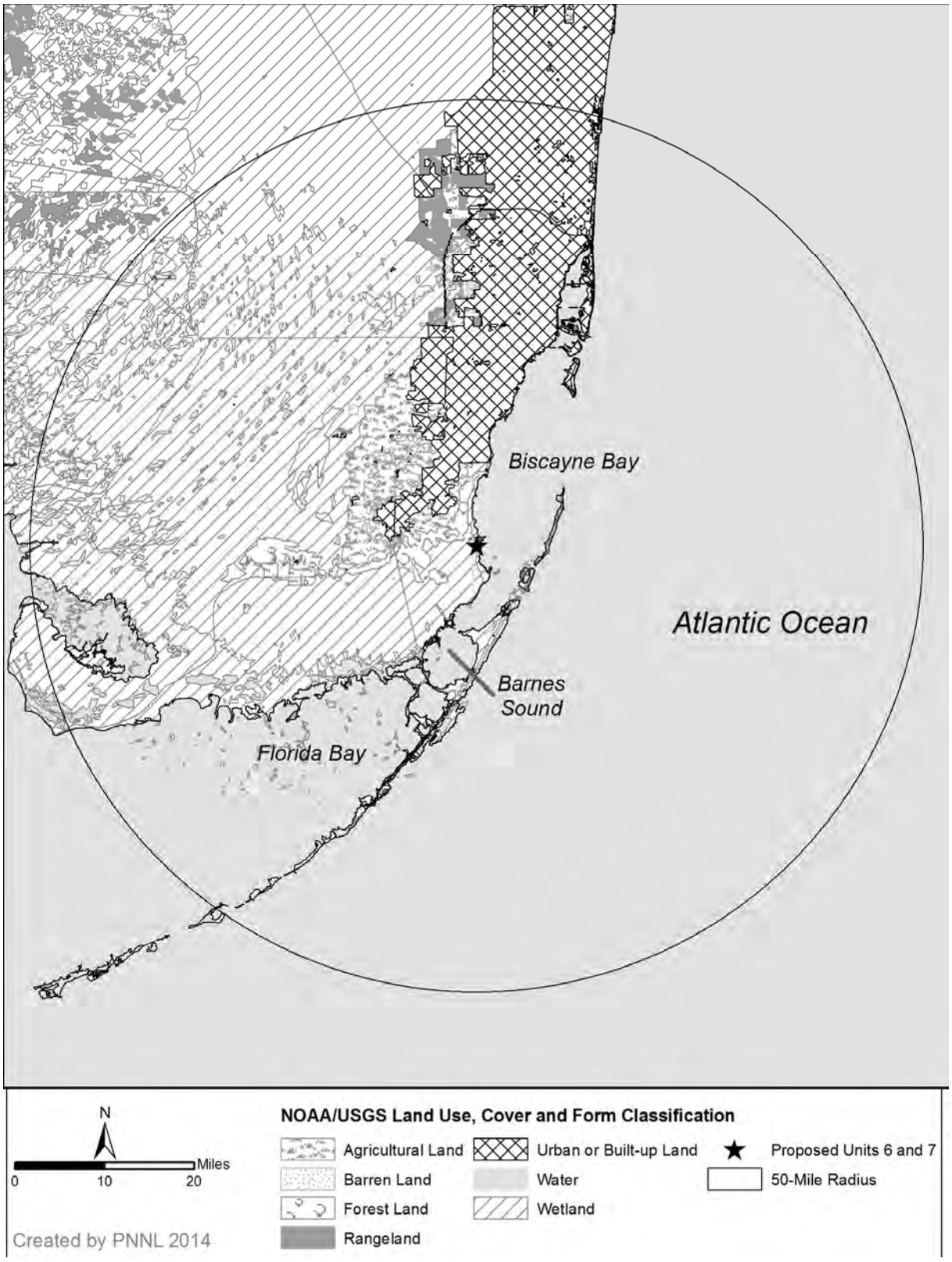


Figure 2-7. Land Use within the 50-Mile Radius of the Turkey Point Site (FPL 2014-TN4058)

Everglades National Park

Everglades National Park, 10 mi southwest of Turkey Point site (Figure 2-1), encompasses approximately 1,509,000 ac, including most of Florida Bay and its uninhabited islands. Ernest Coe Visitors Center is located approximately 16 mi southwest of the proposed Units 6 and 7 plant area (NPS 2010-TN192).

Crocodile Lake National Wildlife Refuge

The Crocodile Lake National Wildlife Refuge is located approximately 10 mi south of the Turkey Point site in the northern part of Key Largo. The refuge is not open to the public except for the interpretive butterfly garden at the refuge headquarters (FWS 2012-TN706).

Big Cypress National Preserve

Big Cypress National Preserve, located approximately 35 mi northwest of the Turkey Point site, consists of 729,000 ac of freshwater swamp and other inland habitats, which support the rich marine estuaries along Florida's southwest coast, including parts of Everglades National Park. The preserve contains a mixture of tropical and temperate plant communities that are home to a diversity of wildlife, including the endangered Florida panther (*Puma concolor coryi*). Activities at the preserve include a wide variety of recreational pursuits, including camping (NPS 2012-TN707).

Indian Reservations

Indian reservations in the region include the Miccosukee Indian Reservation (approximately 50 mi northwest) and the Seminole Tribe of Florida, Hollywood Reservation (approximately 50 mi north) (Figure 2-1).

Agriculture

Information about principal agricultural products, crop areas, and average annual yields is presented in Table 2-7 and was taken from the AgCensus, which is conducted every 5 years; the most recent data available were from 2007 (USDA 2009-TN1669).

Table 2-7. Agriculture in the Region

County	Total Agricultural Land (ac)	Harvested Cropland (ac)		Pastureland (ac)		Major Agricultural Products
Broward	8,737	2,577	(29%)	4,141	(41%)	Cattle, orchard crops, vegetables, poultry, hogs and pigs, and hay
Collier	109,934	35,288	(32%)	63,612	(58%)	Cattle and calves, poultry, orchards crops, vegetables, hogs and pigs, and hay
Miami-Dade	67,050	49,065	(73%)	9,108	(14%)	Cattle and calves, poultry, orchards crops, vegetables, hogs and pigs, sheep and lambs, sweet potatoes, and hay
Monroe	187	156	(83%)	12	(6%)	Not disclosed in 2007

Source: USDA 2009-TN1669.

2.3 Water

This section describes the hydrologic processes and waterbodies in and around the Turkey Point site, the existing water use, and the quality of water in the environment of proposed Turkey Point Units 6 and 7. The description is limited to the parts of the hydrosphere that may affect or be affected by building and operating the proposed units. For plant operations, there would be two independent sources of makeup water for nonsafety-related circulating-water system cooling. Each source would be capable of supplying 100 percent of the makeup-water demand. The primary source would be reclaimed water from the MDWASD, and the alternative source would be saltwater supplied from horizontal radial collector wells installed in the Biscayne aquifer between 25 and 40 ft beneath the bed of Biscayne Bay and adjacent to Biscayne National Park (FPL 2014-TN4058).

The reclaimed water, prior to being used in the circulating-water system, would receive further treatment at the FPL RWTF. The alternative source supplied by the radial collector wells would only be used when needed to supplement makeup-water demand when reclaimed water is not available in sufficient quantity or quality, and would be limited to a maximum of 60 days per year by the Florida State Conditions of Certification (State of Florida 2014-TN3637).

The blowdown from the cooling towers and other plant discharge effluents from proposed Units 6 and 7 would be collected in a sump and would be injected to the Boulder Zone—a cavernous, high-permeability South Florida geologic horizon within the Lower Floridan aquifer system. As such, the surrounding surface waterbodies would neither be directly used for the primary water supply, nor for a heat sink for proposed Units 6 and 7. However, if the radial collector wells are used, the water would be pumped directly from the Biscayne aquifer beneath the bay and most of this water would be drawn downward from Biscayne Bay in an area adjacent to Biscayne National Park. No waste effluent from proposed Units 6 and 7 would be discharged directly to the surrounding surface waterbodies. As described in Chapter 3, new pipelines would convey potable water from an existing MDSAWD water supply line. The original source of this water is the Biscayne aquifer in Miami-Dade County. Therefore, the affected environment described in this section includes surface-water resources such as the following:

- Biscayne Bay, BBCW (Biscayne Bay Coastal Wetlands), and adjacent marine waters (Card and Barnes Sound)
- Everglades hydrologic system including Shark River Slough and Taylor Slough
- South Florida canal system
- the FPL IWF.

The following groundwater resources are also described:

- the Biscayne aquifer
- the Upper Floridan aquifer
- the Boulder Zone of the Lower Floridan aquifer.

2.3.1 Hydrology

This section describes the site-specific and regional hydrological features that could be affected by building and operation of proposed Turkey Point Units 6 and 7. The hydrologic conditions at the Turkey Point site are described in Section 2.4 of the Final Safety Analysis Report (FSAR) (FPL 2015-TN4502). A summary of the hydrologic conditions of the Turkey Point site is provided in Section 2.3 of the ER (FPL 2014-TN4058). The following descriptions are based on information from the FSAR (FPL 2015-TN4502), the ER (FPL 2014-TN4058), and sources of publicly available hydrological data referenced below.

2.3.1.1 Surface-Water Hydrology

Topographic and geologic features over a range of spatial scales influence the surface-water hydrology at the Turkey Point site. The largest of these features is the South Florida Hydrologic System, within which the regional hydrology of the Biscayne Bay and Turkey Point hydrologic systems function. These are described in the following subsections.

South Florida Hydrologic System

South Florida is characterized by low topographic relief; the elevations south of Lake Okeechobee are mostly below 20 ft NAVD88 (Zilkoski et al. 1992-TN1232). Along the eastern portion of South Florida lies the Atlantic Coastal Ridge (ACR); its elevations are nearly 20 ft NAVD88 at the northern end and around 10 ft NAVD88 at the southern end (Figure 2-8). Extending southward from Lake Okeechobee is a relatively low trough (Everglades trough), which includes Shark River Slough draining to the south into Everglades National Park (Figure 2-8). Shark River Slough is more than 30 mi wide and has an elevation of around 8 ft NAVD88 north of Miami and around 4 ft NAVD88 west of Miami. Historically, it was inundated much of the time and remains subject to seasonal flooding (Renken et al. 2005-TN110). While the ACR generally forms a barrier to flows from Shark River Slough, historically natural swales (relatively low areas locally referred to as “glades”) traverse the coastal ridge, which allowed conveyance of flows toward the Atlantic Coast as hydrologic conditions allowed (Renken et al. 2005-TN110). Taylor Slough flows eastward south of the ACR providing potential freshwater flows to the southeastern region of South Florida, including Barnes and Card Sounds and southern Biscayne Bay. Limestone bedrock underlies the region, while layers of muck and peat cover the bedrock in the Everglades trough with historical thicknesses ranging from 24 ft near Lake Okeechobee to 2.5 ft in the southern Everglades (Renken et al. 2005-TN110).

In the early twentieth century, canal construction began in Southeast Florida to support agricultural land development (Renken et al. 2005-TN110; Cantillo et al. 2000-TN108). Increases in population and changes in land use led to modifications of the hydrologic system to reduce flooding associated with conversion of wetlands to agricultural uses (Renken et al. 2005-TN110; Cantillo et al. 2000-TN108). The first canals to drain the Everglades were constructed in 1903 (Cantillo et al. 2000-TN108). Figure 2-9(a) shows the extent of the canal network by 1920, when the canals primarily provided drainage from the area south of Lake Okeechobee. Increased population in Southeast Florida led to the need for additional dry land so that the canal network was greatly expanded by 1990 (Figure 2-9(b)). In general, the construction of the canal network had its intended effect of controlling the hydrologic system of Southeast Florida

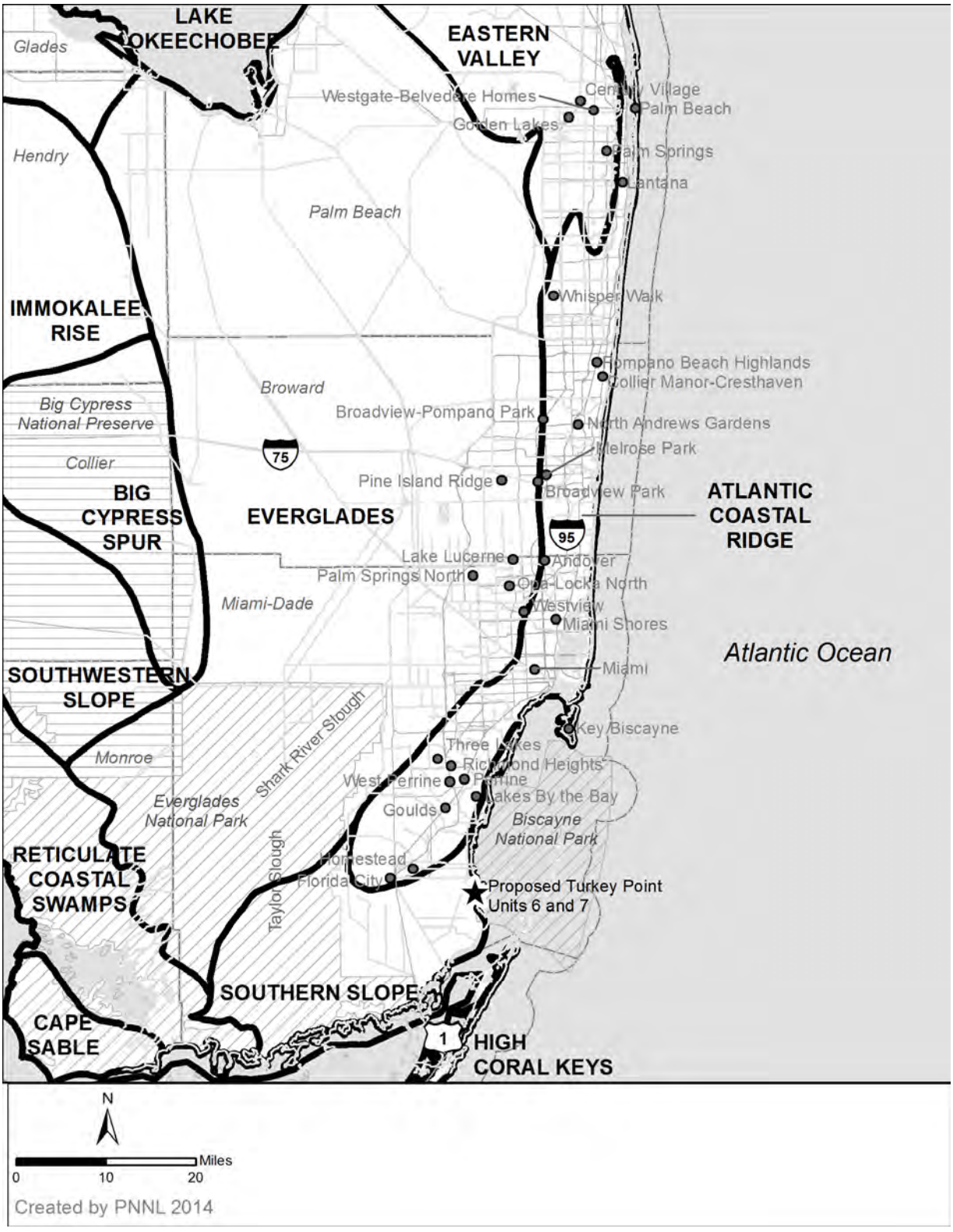


Figure 2-8. Physiographic Provinces in Southeast Florida

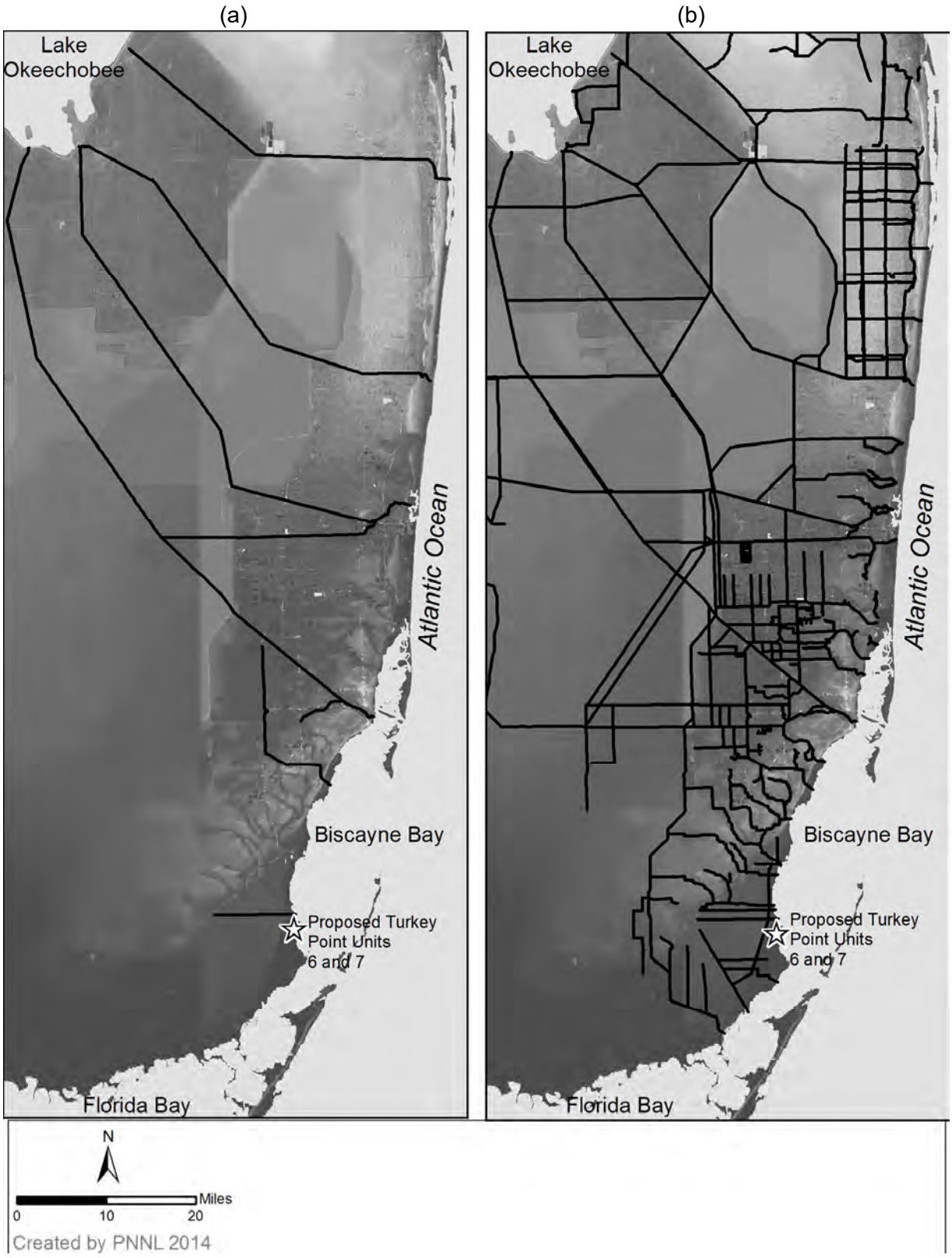


Figure 2-9. South Florida Canal System (a) 1920 and (b) 1990

including flood control and land drainage. As illustrated in Figure 2-10, the surface-water hydrologic system went from one characterized by sheet flow down the Everglades trough (Figure 2-10(a)) to one characterized by channel flow through the canal network (Figure 2-10(b)). Under the channelized flow regime, most of the freshwater was discharged to Biscayne Bay, Card Sound, Barnes Sound, and Florida Bay, which greatly reduced sheet flow into the southernmost section of the Everglades (now established as Everglades National Park). Smith et al. (1989-TN122) estimated the reduction in freshwater flow from the Everglades into Florida Bay to be as much as 59 percent between pre- and post-canal building periods; the estimated annual flows into Shark River Slough during the period 1881–1939 were 1,145,777 ± 96,700 ac-ft, while the estimated annual flow during the period 1940–1986 was 471,610 ± 62,829 ac-ft. The rate of sheet flow down the poorly defined channel of Shark River Slough is estimated to be 80.5 km/yr during high-flow conditions, while during low-flow conditions the rate may drop to zero and have an average rate of 32 km/yr (Smith et al. 1989-TN122).

Comprehensive Everglades Restoration Program

In 1992 and 1996, Congress authorized feasibility studies of structural and operational modifications that could restore the Everglades and the South Florida ecosystem (USACE/SFWMD 1999-TN116). In 2000, Congress approved as part of the Water Resources Development Act the development of the CERP—a long-term effort to capture, store, and redirect freshwater for environmental restoration of the entire Everglades ecosystem (USACE 2010-TN113). The work accomplished for the 2005 reporting period included projects with relatively rapid implementation schedules and included studies and reports for planning additional actions and managing the restoration of the Everglades.

The 2010 report to Congress summarizes the progress over the previous 5 years and briefly discusses progress since the inception of the project. The work accomplished for the 2010 reporting period included implementation of restoration actions to re-establish flows into the Everglades and important environments to the east, particularly the BBCW. The 2010 report also identifies anticipated projects through 2020. As identified in Figure 2-11, these projects include the following:

- WCA3 Decompartmentalization and Sheetflow Enhancement
- L-31N (L-30) Seepage Management Pilot
- West Miami-Dade Reuse
- South Miami-Dade Reuse
- Wastewater Reuse Technology Pilot
- BBCW (Biscayne Bay Coastal Wetlands)
- Restoration of Pineland and Hardwood Hammocks in C-111 Basin
- C-111 Spreader Canal.

The goal of the South Miami-Dade Reuse project is to supply additional water to South Biscayne Bay and the Coastal Wetlands restoration projects after advanced treatment of the wastewater. The West Miami-Dade Reuse project is to supply additional water for recharge to Shark River Slough after advanced treatment of the wastewater. One of the goals of the Wastewater Reuse Technology Pilot project was to determine the ecological effects of reuse of

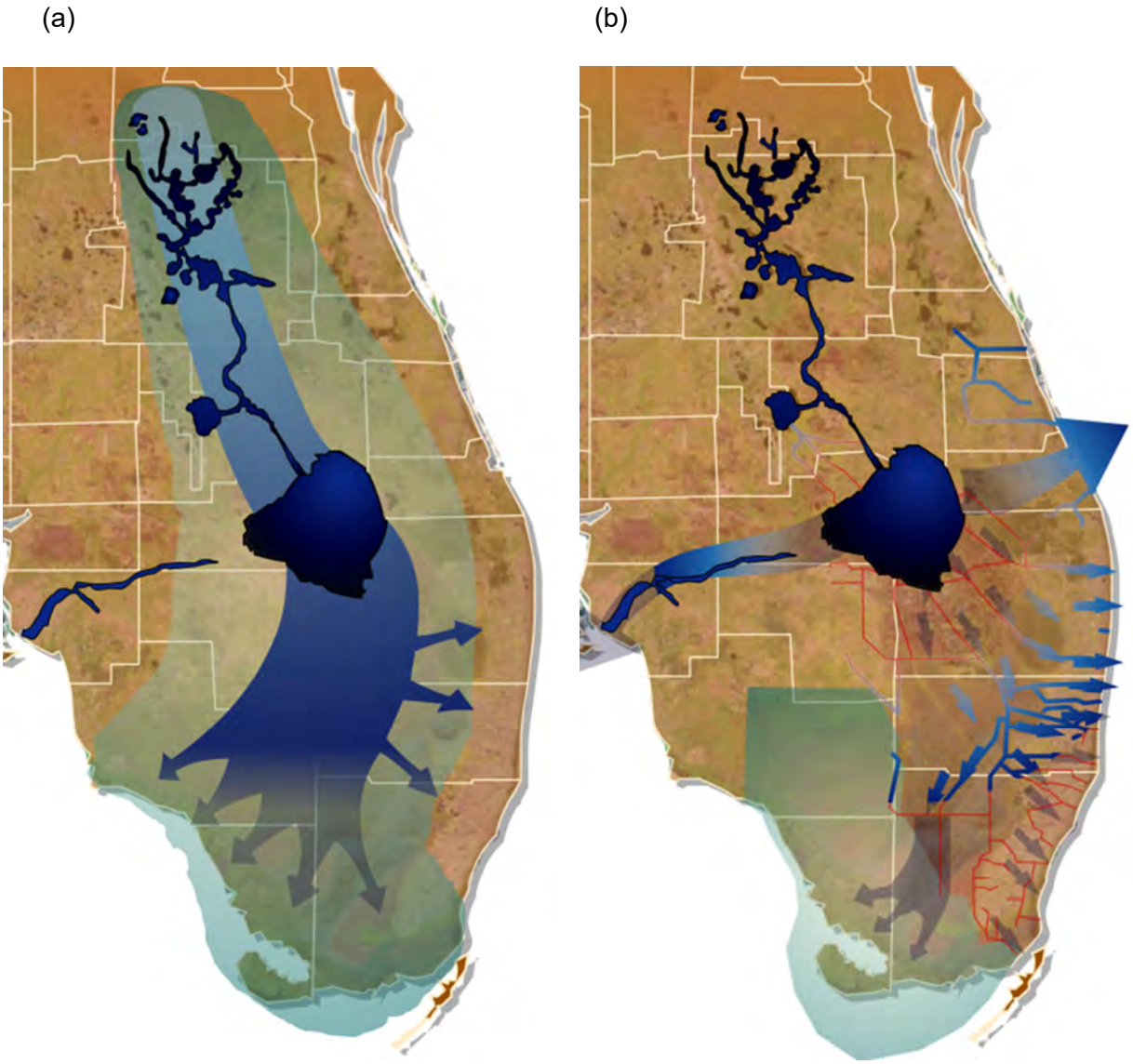


Figure 2-10. South Florida Typical Surface Hydrologic Flows (a) Historic and (b) Present. (Adapted from the Comprehensive Everglades Restoration Program [USACE 2010-TN113])

wastewater after advanced treatment. The hydrologic modifications implemented and planned by CERP will have an effect on the regional-scale hydrology near the Turkey Point site, particularly those modifications that increase sheet flow to the nearshore coastal waters around the Turkey Point site, as well as potential modifications of the freshwater groundwater hydrology. Future CERP projects that are discussed in the 2010 report (USACE 2010-TN113) are included in the cumulative effects analysis discussed in Chapter 7.

In the vicinity of Turkey Point, the role of CERP is limited to the Model Lands. The Model Lands are described in Section 2.2.1.6 and include FPL's 13,367 ac South Dade Mitigation Bank (USACE/SFWMD 2011-TN1330), which is targeted for restoration through CERP. The CERP project BBCW is discussed below in the Biscayne Bay System subsection.

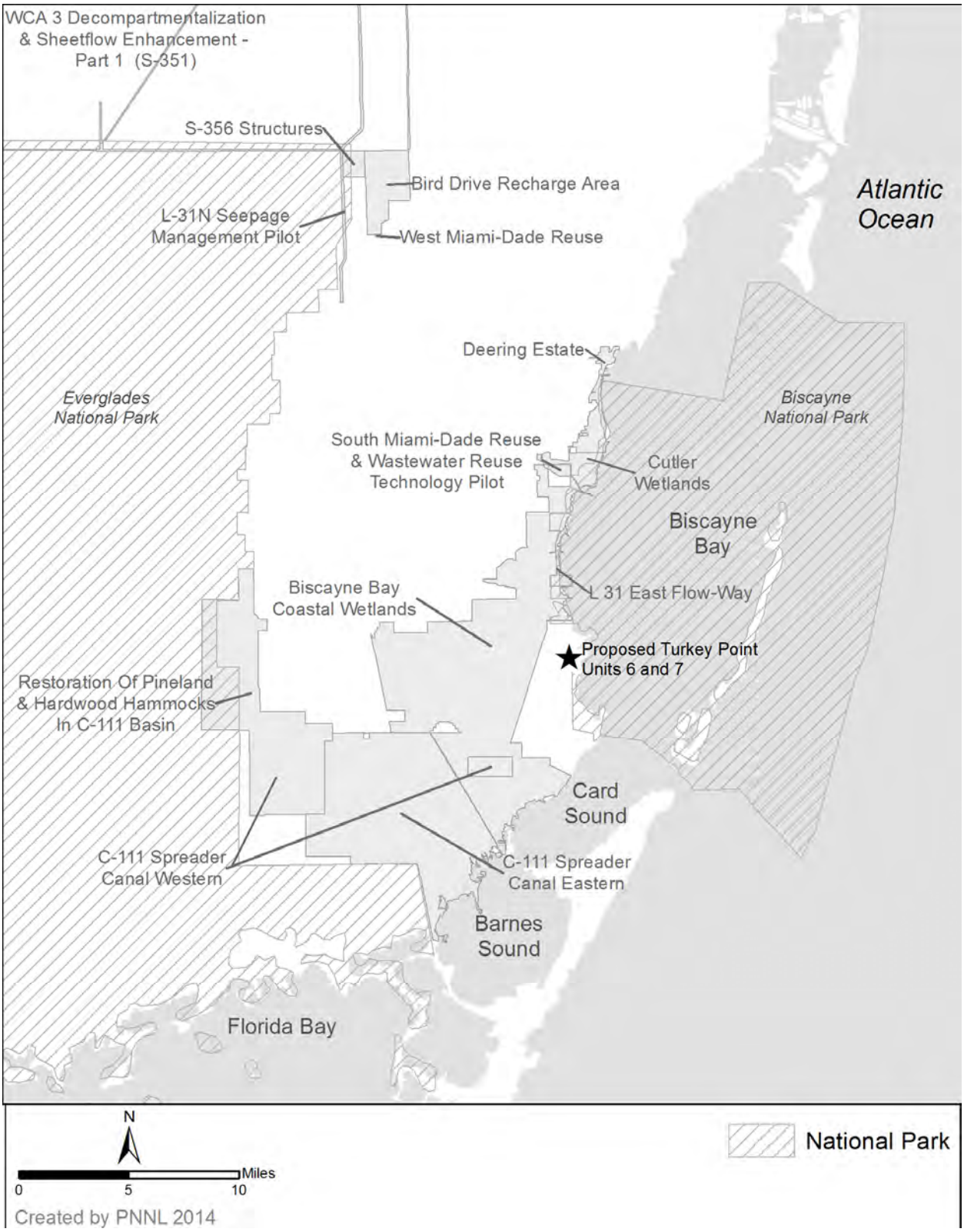


Figure 2-11. Comprehensive Everglades Restoration Plan Projects in Southeastern Florida that Are Planned through 2020 (USACE 2010-TN113)

Regional Hydrologic System

For surface water, the regional hydrologic system is considered to encompass the area east and south of the section of the ACR near Biscayne Bay (Figure 2-12). As described in the subsection on the South Florida Hydrologic System, the ACR has swales that connect Shark River Slough to the coastal areas west of Biscayne Bay. At the southern end of the ACR, Taylor Slough heads southward from Shark River Slough and connects to the coastal wetlands to the south and east. These areas include those west of the Turkey Point site such as the Model Lands. Under historical conditions and during higher flow periods, freshwater could be conveyed eastward through the various swales or glades and sloughs to the coastal wetlands (Figure 2-10(a) and Figure 2-12).

Under current conditions, canals crisscross the landscape and discharge into Biscayne Bay and Card Sound. As seen in Figure 2-12, the canals are routed through the transverse swales or glades to drain interior regions. The following are the major canals in the region, particularly those near the Turkey Point site:

- L-31E Canal extends southward along Biscayne Bay past Turkey Point site and the cooling canals.
- Florida City, North, and Mowry Canals extend from the ACR to Biscayne Bay north of Turkey Point site.
- Model Land, Model Land S, and Card Sound Canals are west and south of Turkey Point site and extend from the Model Lands Area eastward; the Card Sound Canal extends to the Card Sound.
- The C-111 Canal is the southernmost canal of the system, which ultimately discharges into Manatee Bay (Figure 2-12).
- Aerojet Canal is west of Turkey Point site and on the west and south sides of the ACR, extending to Manatee Bay and Barnes Sound via the C-111 Canal (Figure 2-12).
- Princeton, Goulds, Black Creek, Cutler Drain, Snapper Creek, and Coral Gables Canals are north of Turkey Point site, are placed in swales crossing the ACR, and extend to Biscayne Bay.

As discussed in the CERP section above, several projects have been or are being implemented in the region near the Turkey Point site. Of these, the ones that are designed to enhance sheet flow into Everglades National Park via Shark River Slough (Figure 2-12), including increased sheet flow into Taylor Slough (Figure 2-12), are expected to increase the hydroperiod of the regional wetlands by exceeding the hydroperiod observed prior to restoration. The projects for the restoration of BBCW are discussed in the Biscayne Bay System subsection below.

The implementation of the C-111 spreader canal system is intended to create a hydraulic ridge along the east side of Everglades National Park, which in turn will improve the quantity, timing, and distribution of flows through Taylor Slough into Florida Bay (USACE/SFWMD 2011-TN1330). Improvements in hydroperiod and distribution are anticipated in the Model Lands and Southern Glades. Reduction of salinities in Florida Bay and adjacent waterbodies is also expected.

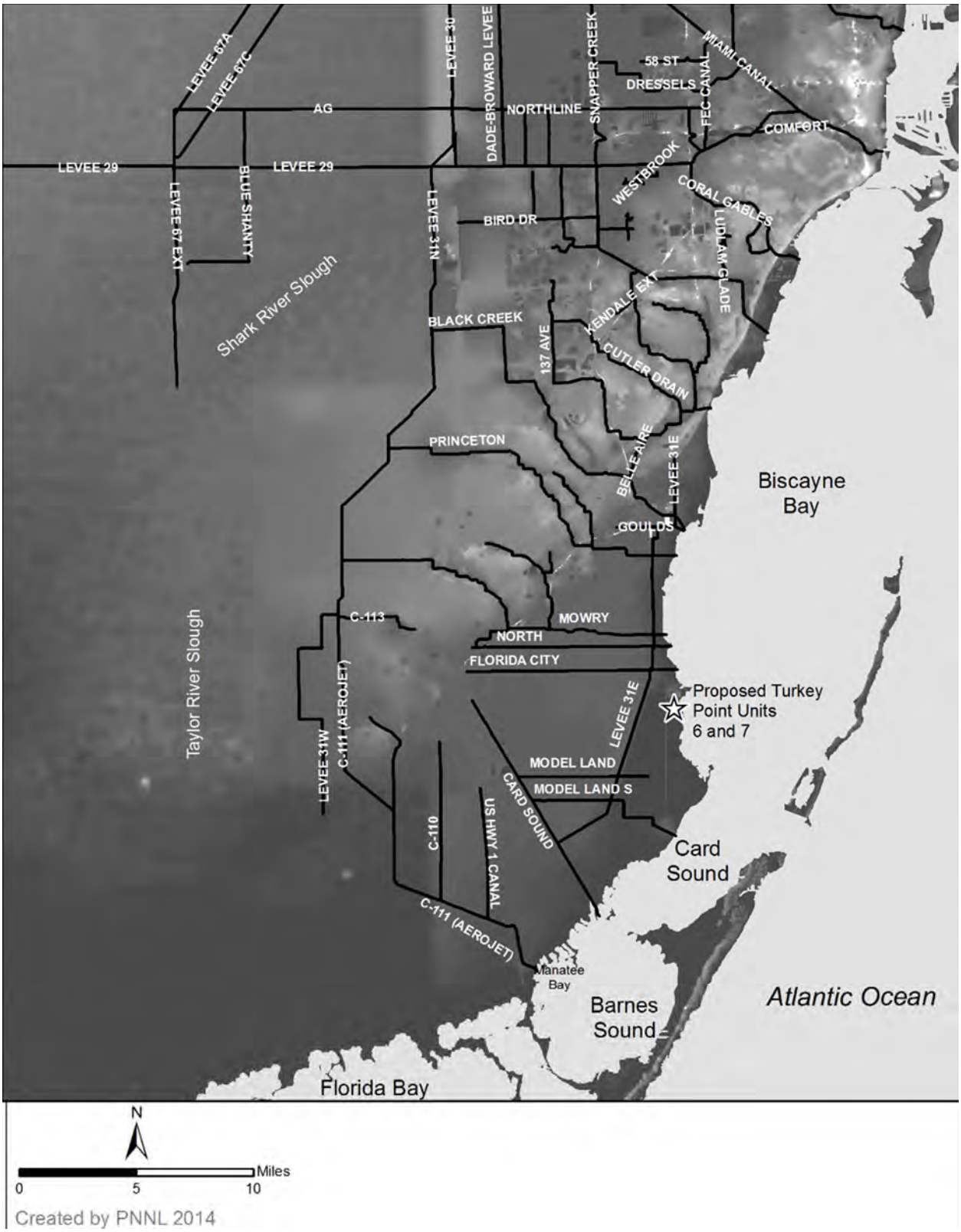


Figure 2-12. Regional Hydrologic System Showing the Canals, Glades, etc. (Adapted from Renken et al. 2005-TN110). ***The 1990 canal system is shown, as are the transverse swales through the Atlantic Coastal Ridge.***

Biscayne Bay System

The hydrology and hydrodynamics of Biscayne Bay are influenced by several factors: tidal exchange with the marine waters of the Atlantic Ocean, surface and groundwater inflows of freshwater, precipitation, and evaporation.

Tidal exchange occurs through the channels and openings between the keys that define the east margin of Biscayne Bay (Figure 2-13). Tidal exchange with the Atlantic Ocean influences both the tidal elevations and the salinity of Biscayne Bay. Along the western margin, the salinity of the coastal region of Biscayne Bay is affected by freshwater inflows, which historically entered via sheet flow and creek flows across the landscape, but which at present enter via the many canals that discharge to Biscayne Bay. In addition, historical reports of freshwater springs bubbling up through the saltwater in Biscayne Bay appear in the literature (Cantillo et al. 2000-TN108). Bellmund et al. (2008-TN123) supporting the assertion that there is continued influx of freshwater to the bay from groundwater, although it is reduced from historical levels. Rainfall is another significant source of freshwater entering Biscayne Bay. Evaporation from the surface of Biscayne Bay during warmer periods tends to increase salinity to concentrations greater than those present in the nearby Atlantic Ocean, especially if freshwater inflows are at a minimum.

The development of South Florida and the construction of canals throughout southern Florida have altered the quality, quantity, timing, and distribution of freshwater flow into Biscayne Bay. The modified hydrology can produce hypersaline (with salinity greater than marine waters) conditions during the dry season (November to June) in Biscayne Bay and a coastal region of low productivity (USACE/SFWMD 2011-TN1038). The addition of canals that discharge into Biscayne Bay has increased freshwater flows into the bay but at discrete locations rather than as widespread sheet flow.

Stalker et al. (2009-TN124) used isotope tracer analysis to estimate the fraction of freshwater inflows from available sources using monthly samples collected from 2004 to 2006. They found the respective bay-wide percentages of canal, precipitation, and groundwater input to Biscayne Bay to be 37 percent, 53 percent, and 10 percent during the wet season and 40 percent, 55 percent, and 5 percent during the dry season. The largest groundwater fractions were found at stations near the western coastline of Biscayne Bay, but overall freshwater groundwater inflows accounted for less than 2 percent of the total input of marine waters and freshwaters (Stalker et al. 2009-TN124). Drainage canal inflows accounted for the greatest variability of salinity in the western areas of Biscayne Bay of the three freshwater sources, while precipitation accounted for the greatest salinity variation in the eastern portion of Biscayne Bay (Stalker et al. 2009-TN124). The review team's examination of Stalker et al.'s Figure 7 (Stalker et al. 2009-TN124) indicates that the areal extent of groundwater influence on salinity variation in the western portion of Biscayne Bay was greatest during the wet season.

The CERP-related restoration plans for the Biscayne Bay System are summarized in the Environmental Impact Statement (EIS) Regional Hydrologic System subsection of the Final Integrated Project Implementation Report and EIS (USACE/SFWMD 2011-TN1038). The

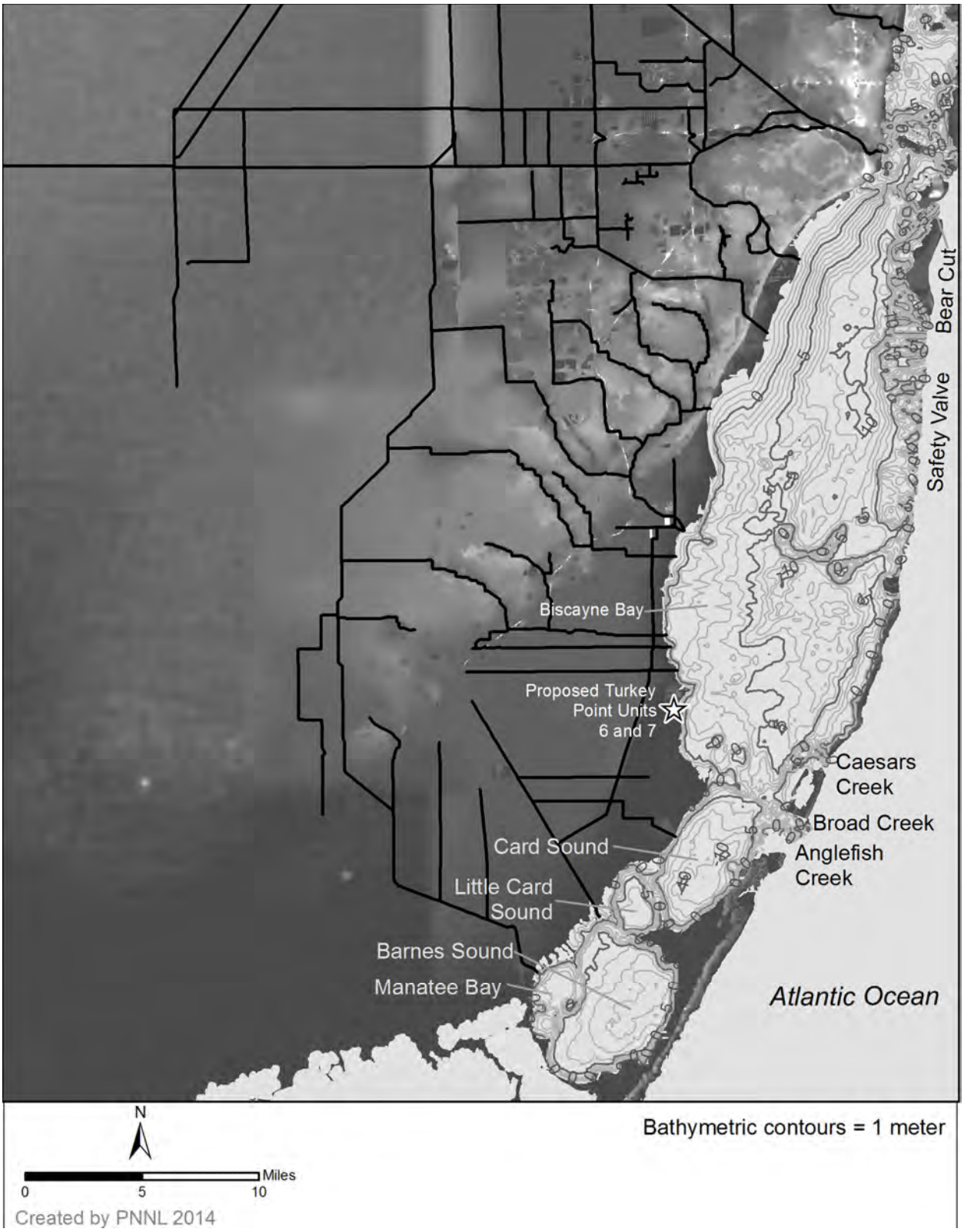


Figure 2-13. Biscayne Bay Bathymetry and Features (major canals, openings to the Atlantic Ocean)

restoration plan for Biscayne Bay uses a phased approach. Phase 1 encompasses 3,761 ac in three hydrologically distinct regions. The three regions include the following:

- Deering Estate – construction of a freshwater wetland and delivery of freshwater to the coastal wetlands via the Cutler Drain Canal
- Cutler Wetlands – conveyance of freshwater via a lined canal to a spreader canal in a saltwater wetlands
- L-31 East Flow Way – isolation of the L-31E Canal from the major discharge canals and allowing freshwater flow through the L-31E Levee into saltwater marsh. Pump stations and culverts are to be added to facilitate freshwater discharges.

A fourth region included in the overall restoration plan is the Model Lands west of Turkey Point site, but it is not part of the Phase 1 effort.

Phase 1 is anticipated to divert 59 percent of the freshwater discharges from the current direct discharges to Biscayne Bay and add them to the freshwater and saltwater wetlands along the coast (USACE/SFWMD 2011-TN1038). The Phase I effort is expected to also reduce nitrogen and phosphorus loading to Biscayne Bay by 50 percent (USACE/SFWMD 2011-TN1038).

Bellmund (2011-TN1317) presents the results of a salinity study of Biscayne Bay through 2008 from 34 stations largely found in the western portion of the bay. Several surface-water sampling stations are near Turkey Point site, and the review team used the measurements to examine salinity variability under the existing conditions. Bellmund (2011-TN1317) designates the months of June through October as the wet season and November through May as the dry season; the review team used these same periods to define wet and dry seasons.

To analyze the salinity results, the review team considered several factors: average ocean salinity, evaporative losses, and freshwater inflows. Average ocean salinity provides the baseline around which salinities vary. Evaporation varies seasonally; the highest rates of evaporation occur during the summer (the wet season), which tends to increase salinity. Freshwater inflows (canal discharges and precipitation) vary seasonally; the highest rates occur in the summer to early fall (wet season), which tends to decrease the salinity. The review team analysis considered available measurements at four stations near Turkey Point site (Figure 2-14). These samples were collected from the bottom of the water column.

The salinity time series (at 15-minute intervals) for these stations are shown in Figure 2-15. Salinities vary seasonally with the wet and dry season due to freshwater inflows and evaporation. The lowest salinities typically appear in late summer through the end of the calendar year, while the highest salinities occur in spring to early summer, which corresponds with the generally accepted dry period of November through May. The seasonal range is greater for the nearshore stations than for the mid-bay stations. A statistical summary of the salinity data for the nearshore stations (BISCA6 and BBCW10) and the mid-bay stations (BISC12 and BISC18) is provided in Table 2-8. The nearshore stations have larger ranges and standard deviations than the mid-bay stations (Table 2-8), indicating higher salinity variability at the nearshore stations. The minimum salinities at the nearshore stations are less than 10 psu, while the minimum salinities at the mid-bay stations are just below 20 psu. The maximum

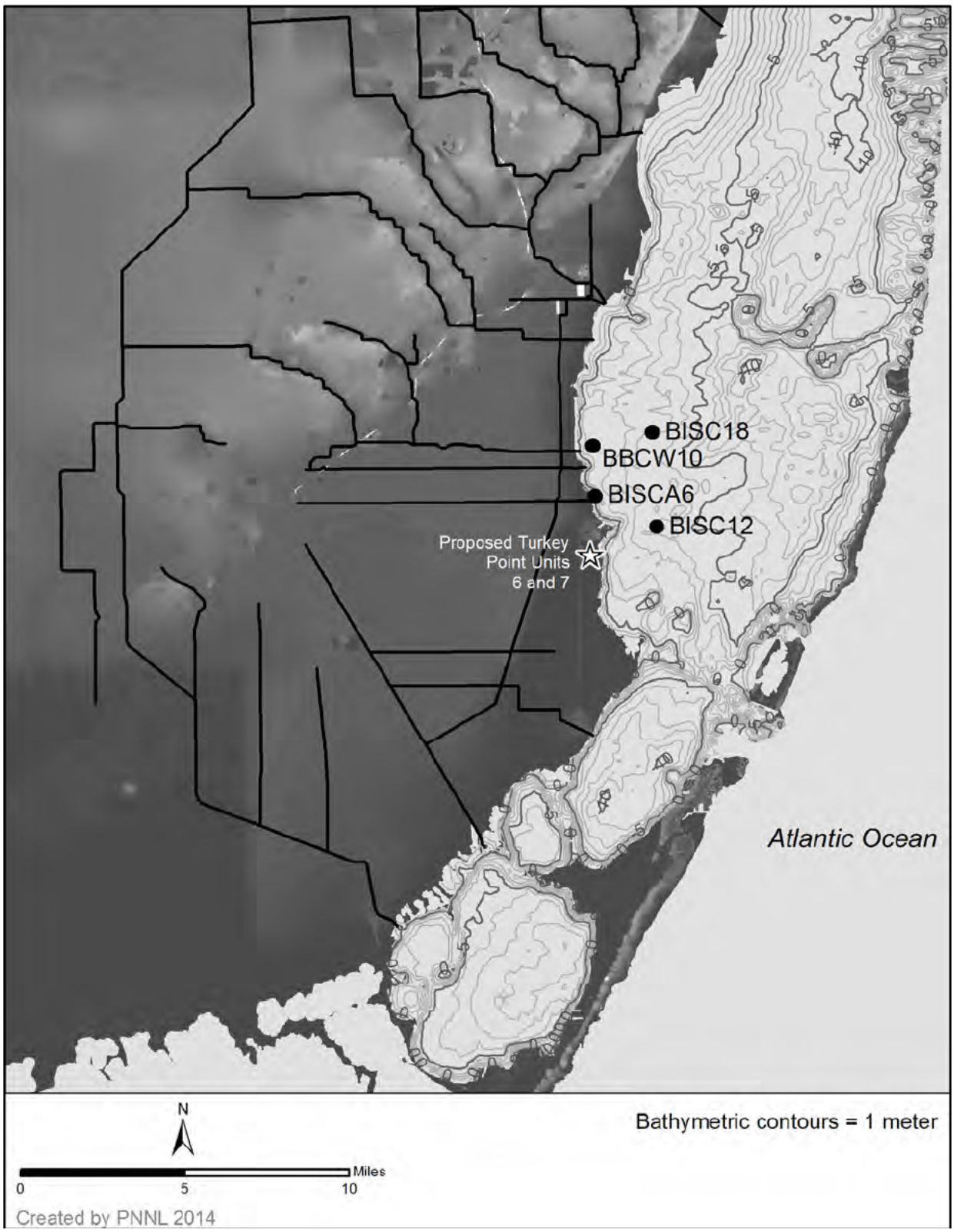


Figure 2-14. Salinity Station Locations in Biscayne Bay. ***Stations BISC12 and BISC18 are mid-bay stations, while stations BISCA6 and BBCW10 are nearshore stations (*****Bellmund 2012-TN4118*****).***

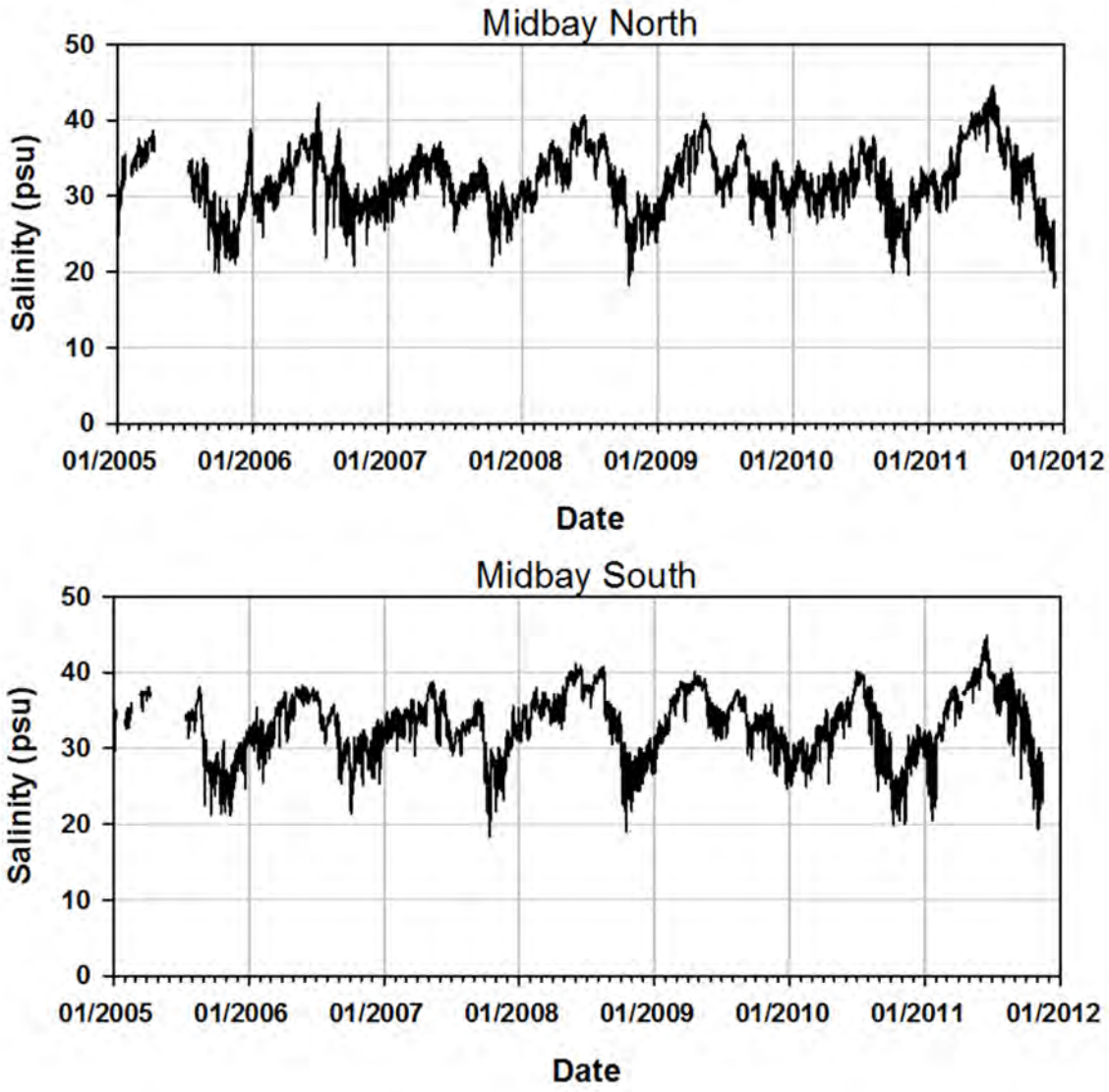


Figure 2-15. Salinity Time Series from 2005 through 2012 for the Four Stations near the Turkey Point Site (Bellmund 2012-TN4118)

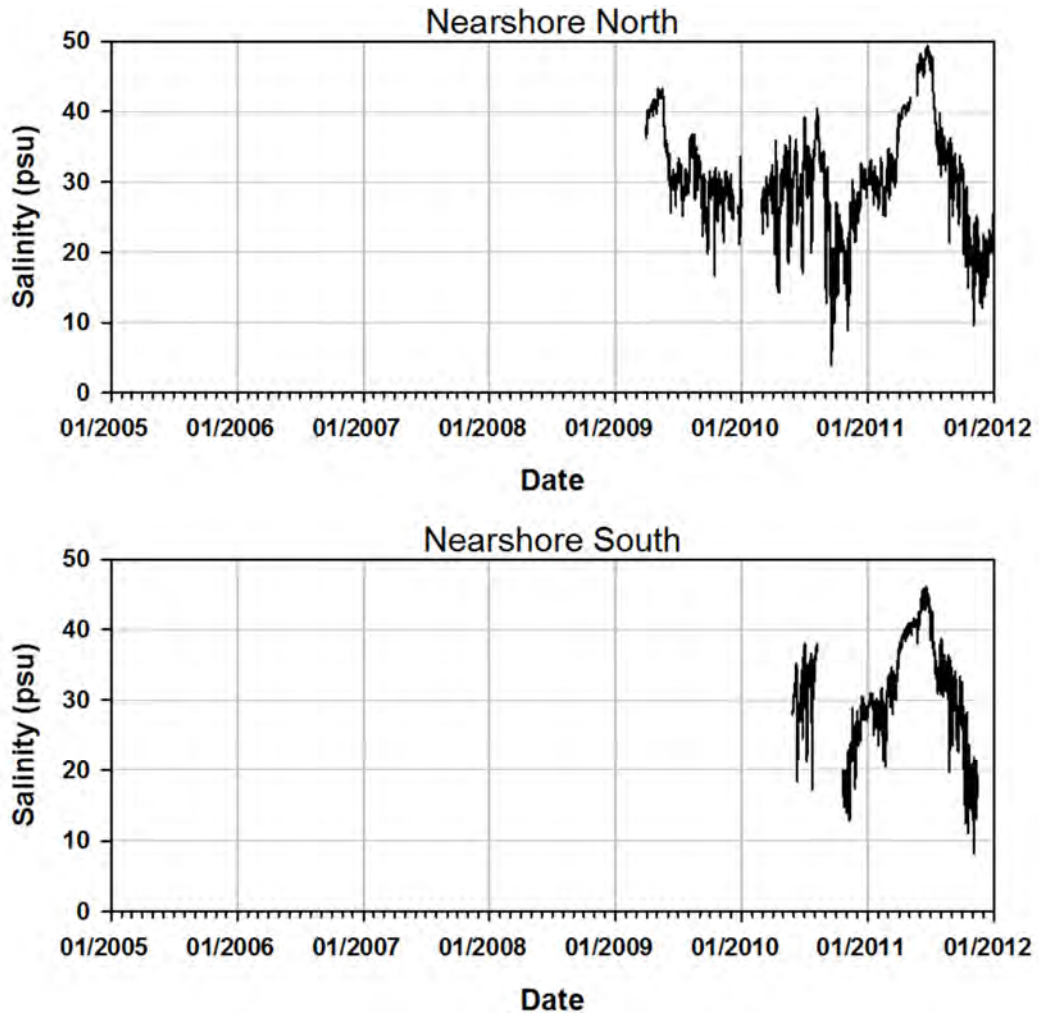


Figure 2-15. (contd)

Table 2-8. Summary Statistics of Salinity at the Four Measurement Stations near the Turkey Point Site

Station	Number of Sample	Mean (psu)	Standard Deviation (psu)	Minimum (psu)	Median (psu)	Maximum (psu)
Nearshore North	86,371	30.2	7.6	4.0	30.1	49.4
Midbay North	232,583	32.1	4.0	17.9	32.0	44.5
Nearshore South	44,233	31.1	7. 7	8.2	31.6	46.1
Midbay South	226,683	33.1	4.1	18.3	33.5	44.9

psu = practical salinity units

salinities at the nearshore stations are between 45 and 50 psu, while the mid-bay stations have maximum salinities just below 45 psu. The nearshore stations have a larger range and standard deviation because they are influenced by freshwater inflows and evaporation in the nearshore (evaporation from a smaller depth and volume increases the salinity more than evaporation from a greater depth).

Local (Site) Hydrologic System

Local drainage areas include the proposed Units 6 and 7 plant area, the RWTF, and the facilities for the radial collector wells. In addition, natural hydrologic features that are near the Turkey Point site include the Model Lands to the west and south and the immediate coastal areas of Biscayne Bay to the east. Another important local hydrologic feature is the cooling canals, which have a water-surface area of 4,370 ac south of the Turkey Point site (Figure 2-2). The cooling canals are part of the 5,900 ac IWF; they are not considered a natural waterbody and are not subject to State and Federal (Environmental Protection Agency) water-quality standards. Releases of industrial wastewater to the IWF and eventual infiltration into groundwater are authorized by State Industrial Wastewater Facility Permit No. FL0001562 (FPL 2014-TN4058).

Site Drainage

To estimate a water budget for the environmental review, the review team estimated average and maximum annual runoff from the facilities of proposed Units 6 and 7 using the areas reported in FPL's stormwater management plan (FPL 2011-TN303). Within the 507 ac Units 6 and 7 project area, the sub-basin areas considered by FPL (2011-TN303) for the existing condition include the following (Figure 2-16):

- Units 6 and 7 power block including the area of the proposed makeup-water reservoir (198.3 ac) and laydown areas (46.0 ac west of the plant site across the west-return canal of the cooling-canal system [CCS]). Both the plant area and laydown areas drain into the IWF.
- The proposed locations for east and west administration and training buildings and parking area (31.8 ac). There is currently no stormwater discharge from these areas because they are surrounded by berms, and stormwater is retained within the berms and infiltrates into the ground.
- The proposed location for the RWTF (43.5 ac) is west-northwest of the plant area. The location currently is undeveloped with drainage to the surrounding wetlands.

The review team located the nearest continuous precipitation gage at Homestead General Aviation (Coop ID 084095) (NOAA 2012-TN1316), which is about 15 mi northwest of the site. The review team estimated an average annual precipitation of 57.10 in. and maximum annual precipitation of 71.53 in. during the period from 2001 through 2010. USDA (2012-TN1314) reports that the soil type at the proposed RWTF location, from which stormwater discharge is anticipated to discharge to the local area, is largely Pennsuco marl with some Terra Ceia muck. Both of these soil types are described as being poorly drained, having water tables very near (within 6 in.) or at the surface, and being subject to frequent flooding. Because the water table is so close to the surface the soil has almost no capability to absorb precipitation. Hence, the review team conservatively assumed 100 percent of precipitation runs off the areas. As stated above, the proposed locations for east and west administration and training buildings and parking area are enclosed by berms, but for the other areas, the review team again conservatively assumed that all precipitation runs off because of the shallow water table. Using the average precipitation rate and conservatively assuming 100 percent runoff with no losses to groundwater or evaporation, the review team computed the annual average runoff from the proposed RWTF area to be approximately 207 ac-ft (Table 2-9), which discharges to its

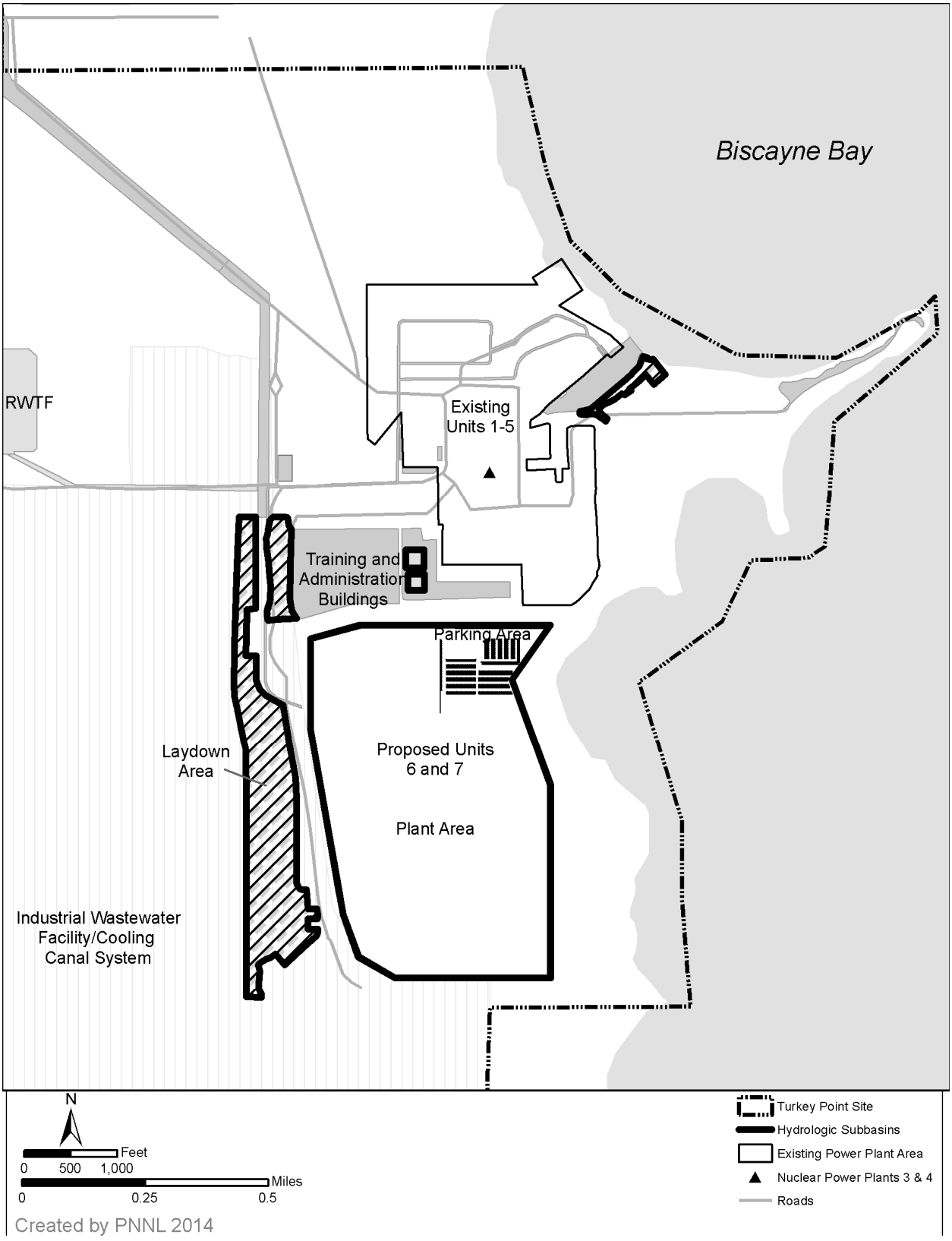


Figure 2-16. Site Drainage Sub-Basins for the Existing Condition (FPL 2011-TN303)

Table 2-9. The Review Team Estimates of Average and Maximum Annual Runoff under the Existing Condition from Sub-Basins on FPL Property at the Turkey Point Site

Sub-Basin	Area (ac)	Average Annual Runoff (ac-ft)[(a)]	Maximum Annual Runoff (ac-ft)[(b)]
Units 6 and 7 Power Block and Laydown Areas	244.3	1,163	1,456
Proposed Admin Buildings and Parking Areas	31.8	No Runoff[(c)]	No Runoff[(c)]
Subtotal	276.1	1,163	1,456
Proposed RWTF	43.5	207	259
Total	319.6	1,307	1,715

(a) Based on review-team-computed runoff for 2001 through 2010. Assumes 100 percent runoff from the average annual rainfall for the period.
(b) Assumes 100 percent runoff from the maximum annual rainfall for the period.
(c) Area is surrounded by berms so there is no surface drainage (FPL 2014-TN4058)

surrounding wetland area. With maximum annual precipitation, the review team computed the maximum annual runoff to be 259 ac-ft from the proposed RWTF area. For the combined Units 6 and 7 power block and laydown areas, which drain into the IWF, the review team computed the annual average runoff to be 1,163 ac-ft and the maximum annual runoff to be 1,456 ac-ft. Because the proposed locations of the east and west administration and training buildings and parking area are enclosed by berms, they do not drain to the Biscayne Bay or the IWF but infiltrate into the surficial aquifer.

Nearby Hydrologic Features

The natural surface-water hydrologic systems near the Turkey Point site include the Model Lands to the west (which function as wetlands) and the nearshore of Biscayne Bay to the east. The Model Lands include FPL's 13,367 ac South Dade Mitigation Bank (USACE/SFWMD 2011-TN1330). At present, the Model Lands are hydrologically isolated from Everglades's flows due the presence of roads and drainage canals (USACE/SFWMD 2011-TN1330). Currently, the area is composed of wetlands that can experience extreme hydroperiod events (periods without inundation) (USACE/SFWMD 2011-TN1330). Biscayne Bay to the east is a shallow saline estuary in a limestone depression (USACE/SFWMD 2011-TN1038). The Biscayne Bay coast near the Turkey Point site is lined by mangrove wetlands, particularly north of the site (USACE/SFWMD 2011-TN1038). An existing barge-turning basin was dredged from the shoreline of the Turkey Point site in 1979 to provide for oil and equipment delivery (FPL 2014-TN4058) to the existing site.

Industrial Wastewater Facility

Biscayne Bay is the most important and most visible natural hydrologic feature in the vicinity of the proposed site and the IWF is by far the most important and most visible anthropogenic feature in the vicinity of the proposed site. The IWF covers an area running approximately 5 mi along the Biscayne Bay shoreline and covering an area of about 5,900 ac (FPL 2014-TN4058).

The initial cooling system design for the existing power-generation facilities at the Turkey Point site was a once-through design that withdrew water from and discharged water to the Biscayne Bay through intake and discharge structures. In a consent decree entered in 1971 by the

Federal District Court for the Southern District of Florida (United States of America v. Florida Power & Light Company 1971-TN4726), FPL built the IWF and substituted it for the original once-through cooling system. The decree included a requirement that all cooling water used at the Turkey Point facilities must be discharged into a closed-cycle cooling canal system and, except in limited circumstances, all discharges from the cooling system into Biscayne Bay be stopped. The IWF does not rely on intake and discharge structures with a direct connection to the Biscayne Bay.

The IWF is a closed-cycle cooling system, but is not a closed hydrologic system. Instead of rejecting heat to nearby waterbodies, the IWF closed-cycle cooling system was designed to reject waste heat to the atmosphere. Heat exchange to the atmosphere occurs through a variety of processes including evaporation. Evaporation results in an overall net loss of water in the cooling canals. However, water from the cooling canals also infiltrates the underlying Biscayne aquifer in some areas (FPL 2012-TN3439).

The design of the IWF uses gravity to force the cooling water to follow a long and slow trajectory through a series of parallel canals from where the heated water leaves plants to where it returns to the plant after having lost heat to the atmosphere. Pumping the water from the return side of the IWF closest to Biscayne Bay to a higher elevation on the inland side of the existing units causes the water to circulate.

The water in the IWF is designed to circulate from north to south and then return from the south to the north along the east side of the IWF cooling canals. During normal operation of the existing nuclear power Units 3 and 4, this results in lower overall water surfaces along the eastern berm with the lowest water surface at the north end along the eastern berm because of the drawdown created by the existing plant cooling-water intake (FPL 2015-TN4502).

Evaporation from the IWF causes freshwater to enter the atmosphere causing the concentration of remaining solutes in the IWF to increase proportionally. Salinity in the IWF can exceed the typical value of ocean salinity by a factor of two or more. The increase in salinity results in an increase in the density of the water in the cooling canals (FPL 2012-TN3439).

The temperature of the water discharged from the existing plant's cooling systems is elevated by the rejected heat. The increase in temperature results in a slight decrease in density of the water in the cooling canals. However, density increase associated with the increase in salinity dominates. The water in the IWF cooling canals is more dense than either seawater or freshwater.

The normal operation of the existing nuclear power Units 3 and 4, results in the release of tritium to the IWF. Unlike other constituents in the water (e.g., salt), evaporation results in tritium being released to the atmosphere. Radioactive decay also reduces tritium concentrations so that they do not continue to build up in the cooling canals.

The water quality in the canals varies inter-annually and intra-annually in response to plant operation and meteorological conditions. Rainfall will cause the salinity in the canals to decrease. Evaporation from induced evaporation and hot, dry meteorological conditions will cause salinity to increase over time. Temperatures in the cooling canal will decrease during the winter (FPL 2012-TN3439).

The construction of the IWF and the canals outside the IWF has prevented freshwater sheet flow from inland areas from reaching Biscayne Bay adjacent the cooling canals. Given the vast extent of the canals this has likely further increased the hypersalinity in poorly mixed shallow coastal areas subject to natural evaporation, although, the exact magnitude of this alteration is unknown.

While the IWF is appropriately called a closed-cycle cooling system, this does not mean it is a closed hydrologic system. The unlined canals allow the water in the IWF to exchange with adjacent surface waterbodies and groundwater aquifers beneath the site. The rates of water exchange are determined by the potentiometric head gradients between the various waterbodies. These potentiometric head gradients change spatially and temporally (FPL 2012-TN3439).

Water can seep through the unlined berms surrounding the IWF. Based on the potentiometric gradient at a given time, water can move either into or out of the IWF from the adjacent waterbodies. Given the length of the berms and the proximity to waterbodies, seepage through the western berm into the interceptor ditch and eastern berm into Biscayne Bay are the largest and most significant exchanges.

The interceptor ditch was installed to create a hydraulic barrier outside the western berm to prevent migration of hypersaline seepage westward. Water seeping into the interceptor ditch is pumped back into the IWF (FPL 2014-TN4058).

The potentiometric gradient along the eastern berm is controlled by the tidal elevation in Biscayne Bay, the water-surface elevation in the IWF along the eastern berm, and the density of the water in the IWF. During low tide conditions the potentiometric gradient could cause water to seep from the IWF into Biscayne Bay along the entire length of the eastern berm. During high tide conditions the potentiometric gradient could cause water to seep into the IWF from Biscayne Bay along the entire length of the eastern berm. Since water-surface elevation in the cooling canals decreases from south to north along the eastern berm during operation, there will be times when water may seep out of the IWF at the south end of the berm and into the IWF at the north end of the berm. Actual seepage will be attenuated by the tidal cycle relative to the travel time through the berm. The volume of the IWF and this attenuation masks any response between the IWF and Biscayne Bay to daily tidal fluctuations. The review team does acknowledge that some degree of hydraulic connection related to the tidal cycle exists.

Water from the IWF also can move into and out of the aquifer beneath the IWF. The downward movement of water is impelled by the increased density because of the elevated salinity of the water in the IWF. Observations of water quality beneath the IWF suggest a hypersaline plume extending down to the base of the Biscayne aquifer that may increase in size because of the continued presence of hypersaline water in the IWF. While the overall general movement is from the IWF downward, during certain conditions water from the aquifer can also move upward. High potentiometric heads in the regional groundwater system possibly associated with high tides and wet conditions can cause water from the aquifers to move back up into the IWF (FPL 2012-TN3439).

Change in IWF Condition in Summer of 2014

During the summer of 2014, between the time that the review team completed most of the writing on the draft EIS and early 2015, when the draft EIS was published, the IWF experienced record high salinity and temperature levels and algae abundance. These algae, salinity concentrations, and temperature levels were significantly outside the range observed over the entire history of the cooling canals and were outside the IWF conditions discussed above in the draft EIS (NRC 2015-TN4444). FPL implemented measures approved by FDEP to mitigate the record high salinity, temperature, and algae abundance in the IWF. FPL has proposed further mitigation measures to address these conditions. Because of the timing of the implementation and proposal of these mitigations measures, the review team did not consider any of the mitigation measures directed to these conditions in the draft EIS. Inasmuch as the cooling canals and Biscayne aquifer are part of the affected environment of the proposed action, the review team determined that an updated discussion of this portion of the affected environment was warranted. This section provides this update.

The review team observed that during the summer of 2014, the canal water was clear enough for the staff to make out details on the bottoms of the canals and to see schools of fish in the water, but abruptly changed to being fully opaque. FPL reported algae counts historically at 50,000 cell/ml had increased in the summer of 2014 to as high as 1,800,000 cell/ml.

In October 2014, the review team conducted a supplemental site audit (NRC 2014-TN4115) to determine if the changes in the IWF operation made during the summer of 2014 would alter conclusions drawn in the draft EIS (NRC 2015-TN4444). In January 2016, the review team conducted another supplemental site audit to determine if the actions, including mitigation measures, proposed in response to the Administrative Order (FDEP 2014-TN4144) and the Consent Agreement (Miami Dade County v. Florida Power & Light 2015-TN4505) would alter conclusions drawn in the draft EIS (NRC 2015-TN4444). Information obtained during these audits was considered in assessing the impacts described in this EIS.

Until the spring of 2014, the temperature and salinity in the IWF at the intake to Units 1, 2, 3, and 4, where the temperatures are the lowest in the canals at any specific time, had typically remained below 92°F and 70 psu, respectively. Beginning in spring 2013 the canals began to experience higher than average temperatures and increasing salinities. The temperature at the intake to Units 1, 2, 3, and 4 exceeded 100°F for brief periods of time. However, as shown in Figure 2-17 and Figure 2-18, the temperature at the discharge to Units 1, 2, 3, and 4, where the temperatures are the highest, exhibits a persistent period of higher than average temperatures for the period from the spring of 2013 through the summer of 2014 with a maximum temperature in excess of 115°F. Salinity during this period shows a steady increase eventually exceeding 100 psu by the summer of 2014

In response to the increase in temperature observed in the canals, FPL requested permission from the State of Florida in June 2014 to add water to the cooling canals from onsite wells to help reduce the temperature of water in the canals (FPL 2014-TN4565). FPL received approval for this action from the State on June 27, 2014 (FDEP 2014-TN4144). From September 2014 through September 2015, FPL pumped over 6,000 million gallons from the Biscayne aquifer and over 800 million gallons from the Upper Floridan aquifer into the IWF.

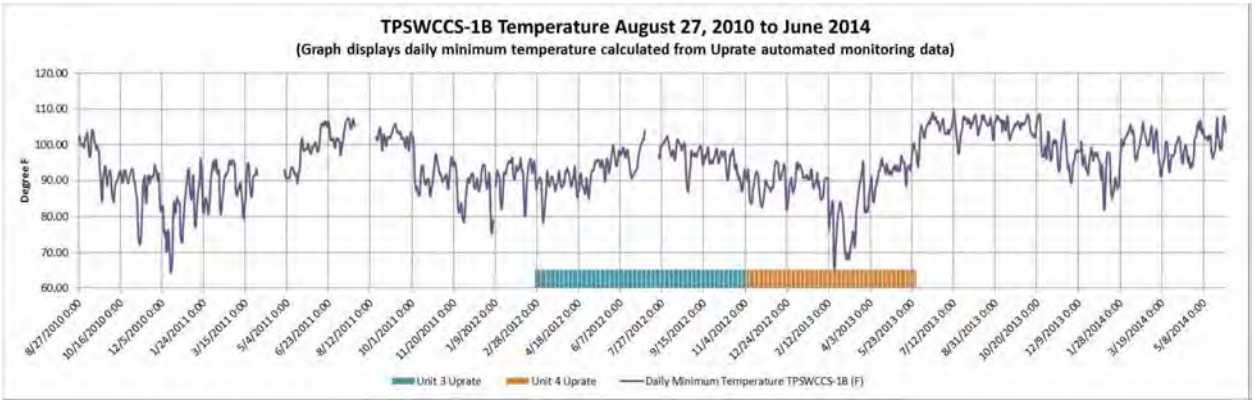


Figure 2-17. Temperature in Cooling Canals

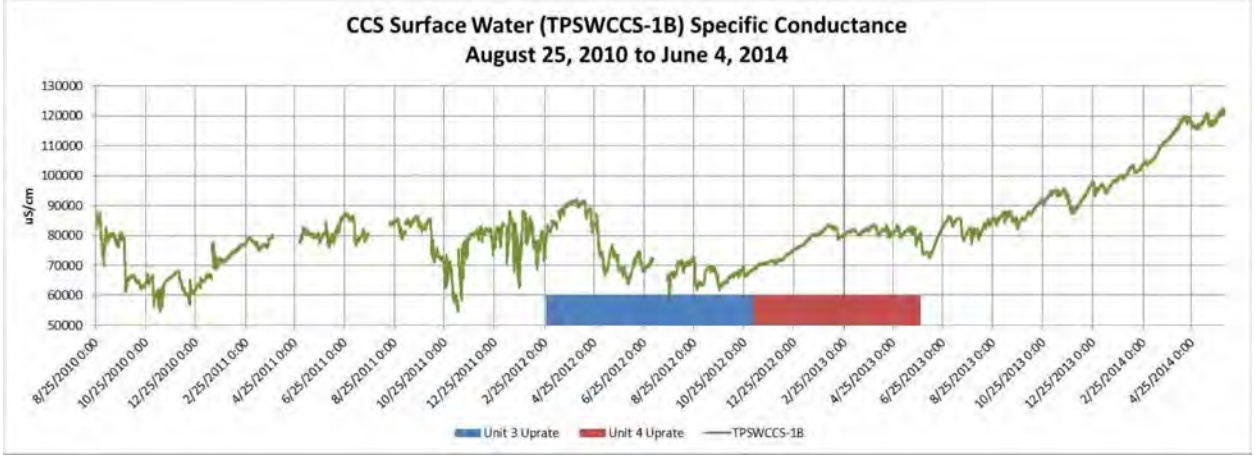


Figure 2-18. Salinity (Specific Conductance) in Cooling Canals

In July 2014, FPL began chemical treatment of the cooling canals to control algae in the waters of the CCS. FPL reported that while algae concentrations declined, the temperature in the IWF remained elevated.

In August of 2014, FPL requested permission from the SFWMD to divert water from the L-31E Canal to aid in salinity reduction within the cooling canals. The SFWMD approved FPL's request on August, 28 2014. From September 2014 through October 2015 FPL pumped about 3,000 million gallons from the L-31E Canal into the IWF.

Subsequent to these additions of about 10,000 million gallons, the IWF had a large rainfall event that refreshened the canals. For reference, 12 inches of rainfall over the surface of the IWF results in an addition of 1,700 million gallons in the IWF. In response to these additions of water, the IWF water temperatures and salinities returned to pre-summer 2014 levels. The algae level in the canals and the biological function of the canals, however, has remained substantially altered.

In December 2014, the FDEP issued an Administrative Order (FDEP 2014-TN4144) requiring FPL to submit to the FDEP a salinity management plan to describe how FPL would reduce and maintain the average annual salinity in the CCS at or below 34 psu. The proposed plan includes the addition of water from the L-31E Canal in the near term and water from the Upper Floridan aquifer in the long term to the CCS to achieve the objective of the Order (this information is from the 2015 Consent Agreement [Miami Dade County v. Florida Power & Light 2015-TN4505]).

In addition to these actions, on October 2, 2015 Miami-Dade County issued a Notice of Violation to FPL indicating that groundwater originating from the CCS exceeded the allowable chlorinity limit (19,000 mg/L) beyond the boundaries of the FPL property (Miami-Dade County 2015-TN4575). In response to this Notice of Violation, FPL and the County entered into a Consent Agreement on October 6, 2015 (Miami Dade County v. Florida Power & Light 2015-TN4505). The Consent Agreement, identified the steps FPL will take to remediate the hypersaline plume in groundwater such that groundwater with a chlorinity greater than 19,000 mg/L would be limited to the area within the FPL property boundary. FPL proposes to install remediation wells to withdraw hypersaline groundwater. The water will be disposed of through an existing underground injection control well that is completed in the Boulder Zone. The amount of water removed from the hypersaline plume to implement this remediation will range up to 12 Mgd.

The review team considered the report prepared by Dr. David A. Chin of the University of Miami (Chin 2016-TN4529) for the Miami-Dade County Department of Environmental Resource Management and the subsequent comments on the report provided by FPL (2016-TN4530). Dr. Chin developed a water and energy balance model for the IWF. The review team analyzed the Chin report and the associated FPL response and determined that it did not alter our understanding of the IWF behavior.

Uprate Monitoring Plan

In connection with the amendment of the Units 3 and 4 licenses to allow an increase in each unit's maximum power (called a "power uprate") the FDEP, the SWFMD, Miami-Dade County, and FPL developed a monitoring plan in 2009 that requires the collection of groundwater, surface water, meteorological, flow, and ecological data in and around the plant to assess Pre-uprate and Post-uprate conditions in, around, and beneath the IWF (FPL 2016-TN4615). Monitoring conducted under this program has shown that water from the cooling canals is entering Biscayne Bay via the groundwater pathway. Miami-Dade County reported tritium concentrations of over 4,000 pCi/L in samples collected at the bottom of the bay adjacent to the cooling canals (Miami-Dade County 2016-TN4510). The sampling site is located in a deep excavation in the bay bottom that was once part of a canal that is now isolated from the CCS. While the County measurement is well below the EPA drinking water standard of 20,000 pCi/L, the observed concentrations confirm the review team's conceptual model that the IWF is hydraulicly connected to the Biscayne Bay via the groundwater pathway. Recent additions of water to reduce the salinity in the CCS and the related increases in water level in the CCS, as well as above average rainfall, increased the force impelling water to move from the CCS toward the bay. Although the 4,000 pCi/L value was identified on or about December 28, 2015, the monitoring station was relocated nearer the IWF (Miami-Dade County 2016-TN4510), and

periods of high water-surface levels in the CCS have also happened in the past, and therefore the review team cannot presume that the elevated tritium level is just a recent occurrence.

On June 20, 2016 FPL and FDEP signed a Consent Order that supercedes the Administrative Order of December 2014. It includes many of the provisions of the Administrative Order and the 2014 Consent Agreement for reducing salinity in the CCS and remediating the hypersaline plume beneath the canals. In addition, the 2016 Consent Order requires FPL to perform restoration projects on Turtle Point Canal and the Barge Basin to "prevent releases of groundwater from the CCS to surface waters connected to Biscayne Bay that result in exceedances of surface-water quality standards in Biscayne Bay" (FDEP 2016-TN4625).

2.3.1.2 Groundwater Hydrology

Groundwater aquifers in the region and the vicinity of the Turkey Point site are described in Section 2.3 of the ER (FPL 2014-TN4058). Additional information about the site groundwater and geology is also provided in Sections 2.4.12 and 2.5 of the FSAR (FPL 2015-TN4502). Geohydrologic descriptions provided in these documents are consistent with regional descriptions for Southeast Florida provided in the U.S. Geological Survey (USGS) Ground Water Atlas of the United States, Chapter 6 (Miller 1990-TN550).

The two major aquifer systems found at Turkey Point are the surficial aquifer system and the deeper Floridan aquifer system. The uppermost surficial aquifer system in the vicinity of Turkey Point site is called the Biscayne aquifer. Low-permeability confining units separate the Biscayne aquifer and the underlying Floridan aquifer system and limit exchange of groundwater between these aquifer systems (Miller 1990-TN550). Figure 2-19 shows the sequence of aquifer systems and their relative depths and thicknesses at the site. The review team compiled this information based on local site investigations presented in the FSAR (FPL 2015-TN4502), results from FPL's exploratory well 1 (EW-1) presented in FPL 2012 (TN1577), and information from Reese and Richardson (2008-TN3436).

Biscayne Aquifer

The Biscayne aquifer has an area of about 4,000 mi^2 and underlies nearly all of Dade and Broward Counties. It varies from 0 ft thick in the south-central part of Florida to more than 240 ft thick north of Fort Lauderdale (Miller 1990-TN550) and is approximately 80 to 115 ft thick in the vicinity of the Turkey Point site (FPL 2014-TN4058).

Regionally, the Biscayne aquifer is primarily under unconfined conditions. However, stratification caused by beds of lower and higher permeability may cause semi-confined or locally confined conditions (Fish and Stewart 1991-TN1340). At the Turkey Point site, the Miami Limestone (Miami Oolite) unit of the Biscayne aquifer is overlain by a surficial layer of "organic muck" described as light to dark gray to pale brown with trace amounts of shell fragments, or as black to brown with organic fibers (FPL 2014-TN4058). This organic layer was estimated to vary from 2 to 7 ft thick in the Units 6 and 7 plant area. The water table at the site is found either in the Miami Limestone or in the overlying organic muck (FPL 2014-TN4058). The bottom of the Biscayne aquifer is defined by the top of laterally extensive beds of much lower permeability rock called the Intermediate Confining Unit, which separates it from the underlying Floridan aquifer system (Reese 1994-TN1439). At the plant site, the Intermediate Confining

Unit is about 870 ft thick and contains extensive layers of clay-rich sediments within the lower part of the Tamiami Formation and the underlying Hawthorne Group (Fish and Stewart 1991-TN1340; FPL 2012-TN1264; FPL 2012-TN1577).

Recharge of the Biscayne aquifer from precipitation occurs primarily during the wet season, from June to October with minimal recharge during the dry season, from November to May. However, seepage from freshwater canals usually continues to recharge the aquifer during the dry season (Fish and Stewart 1991-TN1340).

SERIES	STRATIGRAPHIC UNIT	LITHOLOGY	TOP DEPTH (ft)	THICK-NESS (ft)	HYDRO-GEOLOGIC UNIT	TOP DEPTH (ft)
HOLOCENE	organic muck	organic soil and silt	0	3	Biscayne Aquifer	0 - 3
PLEISTOCENE	Miami Formation	sandy, oolitic limestone	3	25		
	Key Largo Limestone	well indurated, vuggy, coraline limestone	28	22		
	Ft Thompson Formation	poor/well indurated fossiliferous limestone	50	65		
PLIOCENE	Tamiami Formation	sand and silt with calcarenite limestone	115	105		
MIOCENE	Hawthorne Group: Peace River Formation	silty calcareous sand and silt	220	235	Intermediate Confining Unit	140
	Hawthorne Group: Arcadia Formaion	calcareous wackestone with indurated limestone, sandstone and sand	455	555		
OLIGO-CENE	Suwannee Limestone	fine-grained limestone and dolomitic limestone	1010	245	Upper Floridan Aquifer (USDW)	1010
EOCENE	Avon Park Formation	fine-grained limestone and dolomite	1255	(~445)	Middle Floridan Confining Unit	1450
		permeable limestone	(~1700)	(~75)	APPZ (?)	(1700)
		fine-grained limestone and dolomite	(1775)	745	Middle Floridan Confining Unit	1930
	Oldsmar Formation	limestone, dolomitic limestone and dolomite	2580	450		
		Boulder Zone	3030	>200	Lower Floridan Aquifer	2915
					Boulder Zone	3030

APPZ (?) denotes uncertainty

Figure 2-19. Geologic Stratigraphy and Major Aquifers beneath the Turkey Point Site (based on information from FPL 2012-TN1577 and FPL 2015-TN4502)

Before development, including construction of canals to drain inland areas, the wet season recharge was greater than it is today, and resulted in higher subsurface flows of groundwater into

Biscayne Bay (Renken et al. 2005-TN110). In a study of groundwater discharge to Biscayne Bay, Langevin (2001-TN1338) used a regional-scale model to estimate that the average rate of fresh groundwater discharge to Biscayne Bay for the 10-year period (1989–1998) was about 53 Mgd over a 100 km length of coastline. He estimated that this simulated discharge rate was about 6 percent of the measured surface-water discharge to Biscayne Bay over the same period, which compares favorably with the 5 percent estimated by Stalker et al. (2009-TN124). Through this same modeling effort, Langevin (2003-TN4568) also determined that nearly all of the groundwater discharge occurs in the northern part of Biscayne Bay with very little occurring south of the S-123 control structure, which is north of Turkey Point. Discharge of groundwater in the southern area was small because the low elevation of the water table reduces the hydraulic gradient toward the coast. This indicates that the freshwater canals are a much larger source of freshwater flow to Biscayne Bay in this area than is flow from the inland Biscayne aquifer. Langevin (2003-TN4568) adds that, while the model was well calibrated to groundwater levels and canal fluxes, it is not calibrated to submarine groundwater discharge, because submarine discharges of groundwater are difficult to measure. As discussed in Section 2.3.1.1 above, efforts are under way through the CERP BBCW Project to restore some of the diminished infiltration into the Biscayne aquifer and the resultant flow of groundwater to Biscayne Bay (USACE 2010-TN113).

Limited groundwater discharge from the aquifer to Biscayne Bay combined with pumping of groundwater for irrigation and water supply has caused saltwater to migrate inland (Klein and Hull 1978-TN1351; Renken et al. 2005-TN110; Prinos et al. 2014-TN4569). Although the EPA has designated the Biscayne aquifer in this area as a “sole-source aquifer,” saltwater intrusion to the aquifer along the coast has made the groundwater too salty to meet drinking water standards over an area from the bay coastline to about 6 to 8 mi inland (Langevin 2001-TN1338; Renken et al. 2005-TN110) near the Turkey Point site, as illustrated in Figure 2-12. Migration of hypersaline water from the IWF into the Biscayne aquifer has also contributed to saltwater intrusion.

Hydraulic Properties of Biscayne Aquifer

The permeable limestones and sandstones forming the Biscayne aquifer are highly heterogeneous with varying hydraulic properties and may form one or more aquifers separated by locally confining units. USGS studies indicate that the Biscayne Bay sediments form a dual-porosity system consisting of (1) unconnected pores and larger vugs (cavities) in the rock matrix; and (2) connected vugs and solution channels (Cunningham and Sukop 2011-TN1339). These secondary porosity features can result in a layered system with very high horizontal permeability and significantly lower vertical permeability. At the Turkey Point site, two relatively thin high-permeability zones were found during geophysical investigations that included the drilling of 20 groundwater monitoring wells and two deeper geotechnical piezometer boreholes (FPL 2015-TN4502). Well MW-1 was drilled on the Turkey Point peninsula near the planned location of the radial collector wells. At this well, an upper high-permeability zone occurred at the base of the Miami Limestone and in the underlying Key Largo Limestone at a depth of about 25 to 34 ft below ground surface; and another potential lower high-permeability zone was identified within the Fort Thompson Formation at a depth of about 66 to 75 ft below ground surface (FPL 2009-TN1263). However, additional recently drilled boreholes showed that this lower zone of

increased permeability is not a laterally persistent layer, but consists of more isolated zones at varying depths below the top of the Fort Thompson Formation (FPL 2009-TN1263).

FPL conducted tests to estimate aquifer hydraulic properties for the Biscayne aquifer. Slug tests were conducted at several monitoring wells in both the upper and lower portions of the aquifer. However, the slug test results are not considered valid because of the high hydraulic conductivity of the aquifer and the effects of the well filter pack, which can limit groundwater flow into the well in very high-permeability aquifers. In addition to the slug tests, FPL conducted aquifer performance (pumping) tests at each of the proposed reactor unit locations and on the Turkey Point peninsula near the planned radial collector well locations.

Results of the pumping tests at proposed reactor locations are described in FPL's FSAR (FPL 2015-TN4502). At each of the proposed reactor sites, separate pumping tests were conducted in both a well completed in the upper Biscayne aquifer (Key Largo Limestone) and a well completed in the lower Biscayne aquifer (Fort Thompson Formation). These completion zones were chosen to pump water from the identified high-permeability zones. The upper zone pumping wells were open from about 22 to 45 ft below ground surface. The lower zone pumping wells were open from 67 to 87 ft at the proposed Unit 6 site, and from 66 to 105 ft below ground surface at the proposed Unit 7 site. At each reactor site pumping test location, water-level responses were monitored in four observation well clusters about 10 ft from the pumped well and two additional observation well clusters about 25 ft from the pumped well. Each observation well cluster consisted of two or three wells completed at different depths. Duration of pumping was 24 hours for each test and recovery was monitored for more than 24 hours. Results of these tests indicated averaged horizontal hydraulic conductivity of 9,400 to 12,000 ft/d for the upper interval and 300 to 1,000 ft/d for the lower interval (FPL 2015-TN4502). Although the pumping test analysis results presented in FPL 2015 (TN4502) may be affected by the complexity of the groundwater flow system and assumptions of the Hantush leaky-aquitard analysis technique (Hantush 1967-TN1860), the review team determined that the test results verify the Biscayne aquifer conceptual model of vertically discrete permeable zones separated by less permeable rocks, with the highest permeability in the interval from about 22 to 45 ft below ground surface. Comparison of the results from the different test sites and from different observation wells at the same site also shows that permeability varies laterally within the Biscayne aquifer.

The aquifer performance test conducted on the Turkey Point peninsula is described by FPL (2009-TN1263). The pumping well was open from 22 to 46 ft below ground surface and five observation wells were completed over approximately the same depth interval at radial distances from 80 to about 2,600 ft. However, a measurable response was detected at only the four nearest observation wells, which were within about 2,000 ft of the pumping well. The longest duration pumping test was 7 days at an average rate of 7,097 gpm. Water-level responses at the observation wells were consistent with the conceptual model of a "leaky" aquifer separated from a constant-head water source (Biscayne Bay) by a confining layer.

FPL's analyses of drawdown at the four observation wells resulted in reported aquifer transmissivity ranging from 368,000 to about 1,000,000 ft^2/d based on a water-level drawdown versus time analysis method that accounted for leaky aquifer conditions (Hantush 1964-TN3655). The FPL-calculated transmissivity values appeared to increase with distance from the pumped well and FPL (2009-TN1263) hypothesized that the increase in hydraulic conductivity

with distance was related to aquifer heterogeneity. However, the review team determined that the increase in calculated hydraulic conductivity with distance resulted from the analysis methodology. The review team's independent analysis of the drawdown data (described in Appendix G) was consistent with the aquifer transmissivity of 800,000 ft^2/d estimated by FPL (2009-TN1263) using a distance-drawdown analysis (Cooper and Jacob 1953-TN1508) based on the drawdown at four observation wells. This resulting calculated transmissivity equates to an average hydraulic conductivity of 10,000 ft/d for an aquifer thickness of 80 ft.

The confining layer consists of a combination of relatively low-permeability sediment on the bay floor and the moderately permeable upper portion of the Miami Limestone. The vertical permeability of the Miami Limestone is typically lower than the horizontal permeability. FPL estimated the bay floor sediment to have an average vertical hydraulic conductivity of 0.7 ft/d (FPL 2009-TN1263). The review team's independent analysis of the aquifer performance test resulted in an average vertical hydraulic conductivity of 0.6 ft/d for the confining layer above the Biscayne aquifer.

Groundwater Flow Direction

Regional groundwater flow in both the Biscayne and Upper Floridan aquifers is generally west to east toward the coast (Miller 1990-TN550). However, local flow direction in the Biscayne aquifer near the Turkey Point site is affected by tides and canals (Langevin 2001-TN1338). FPL installed 10 monitoring well pairs (20 wells) in 2008 across the proposed plant area for measuring groundwater levels. Each pair included a well completed in the Miami Limestone/Key Largo Limestone at depths ranging from 24 to 28 ft and a well completed in the Fort Thompson Formation at depths ranging from 85 to 110 ft below ground surface. Results showed that water levels and flow directions in the proposed plant area vary for both the shallow and deep Biscayne aquifer wells depending on the tidal influence of Biscayne Bay (FPL 2014-TN4058). At high tide, the groundwater hydraulic gradient was toward the inland aquifer and at low tide the hydraulic gradient was toward the bay.

The presence of the unlined 4,370 ac IWF cooling canals affects groundwater levels in the proposed location of Units 6 and 7. The canals interact with groundwater in the underlying Biscayne aquifer. Because of high rates of evaporation of the heated water in the IWF, there is an average net inflow of groundwater to the cooling canals (FPL 2012-TN3439). However, groundwater movement between the cooling canals and the underlying aquifer varies by location and is affected by several factors including precipitation, IWF discharge rate, air temperature and humidity, and tidal fluctuations. The salinity of the cooling-canal water is greater than that of seawater and about twice the average salinity of Biscayne Bay (FPL 2014-TN4058). The higher density has caused hypersaline water to migrate downward into the aquifer beneath the cooling canals. Movement of cooling-canal water into the aquifer was simulated using a numerical model (Hughes et al. 2010-TN1545), which showed that "finger plumes" of hypersaline water likely form beneath the cooling canals and move downward from the base of the cooling canals to the bottom of the permeable zone in a period of days to several years, depending on density differences and the hydraulic conductivity of the aquifer. The hypersaline water would then mix with water in the aquifer through advective and dispersive processes. Water samples collected during the pre-uprate monitoring for Turkey Point Units 3 and 4 from 2010 to 2012 showed that groundwater beneath the approximate center of the

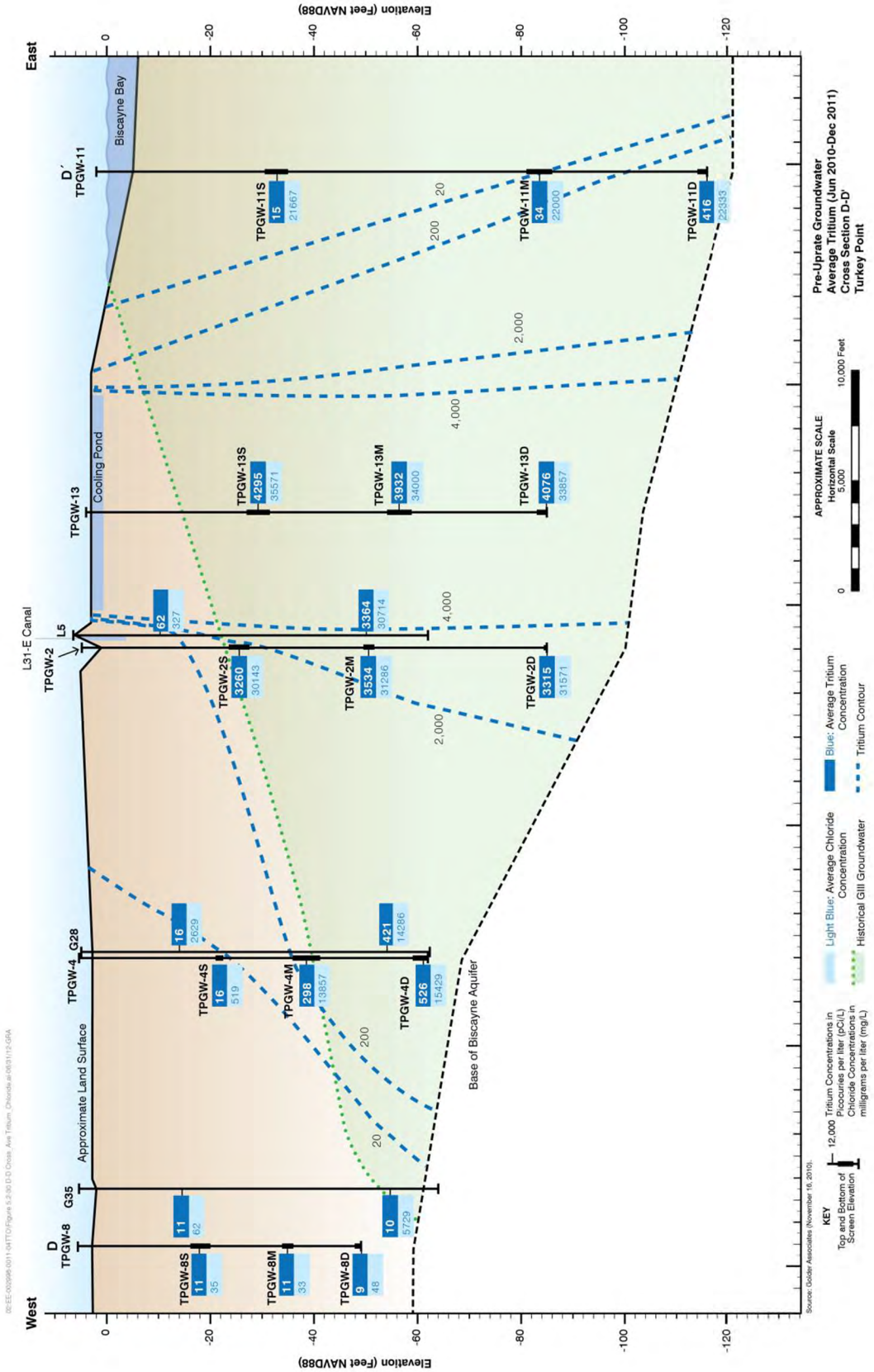


Figure 2-20. Specific Conductance Isopleths along a West-to-East Cross Section through the IWF (FPL 2012-TN3439)

cooling canals had chloride concentrations over 35,000 mg/L (Figure 2-20) and tritium concentrations greater than 4,000 pCi/L compared to about 2,200 mg/L chloride and 15 pCi/L tritium in Biscayne aquifer groundwater under Biscayne Bay (FPL 2012-TN3439). Based on this information, the review team concluded that downward migration of cooling-canal water into the underlying Biscayne aquifer has occurred and is likely still occurring. However, information from the Units 3 and 4 pre-uprate monitoring also shows that interaction between the cooling canals and aquifer varies both spatially and temporally. Precipitation events were shown to have a large impact of water levels in monitoring wells. Tidal effects on well water levels were only observed in wells in or near the bay. Inland wells showed much greater water-level variation between wet and dry seasons than wells near the bay. Increases in operating unit discharges to the IWF could cause increases in both the cooling-canal water level and wetted surface area, which are expected to affect the movement of groundwater between the cooling canals and the aquifer.

Groundwater flow in the Biscayne aquifer is also affected by an interceptor ditch adjacent to the west side of the cooling canals and east of the L-31E Canal. Water is pumped from the interceptor ditch into the IWF cooling canals when needed to maintain a water level in the ditch that is lower than the water level in the L-31E Canal. This is designed to keep groundwater from moving westward from the interceptor ditch toward the L-31E Canal and keep cooling-canal water from affecting groundwater quality to the west (FPL 2015-TN4502). However, because deeper permeable layers within the Biscayne aquifer may be isolated from hydraulic head in the ditch by lower permeability layers, it is possible that some water from the cooling canals could move to the west. As discussed in Section 2.3.3.2 below, monitoring by FPL indicates that hypersaline water from the cooling canals has moved west of the L-31E Canal in the deeper part of the Biscayne aquifer.

Floridan Aquifer System

Below the Biscayne aquifer is the Floridan aquifer system, which is composed of dolomite and limestone (Miller 1990-TN550). The Floridan aquifer system is separated from the shallower Biscayne aquifer by the Intermediate Confining Unit (Figure 2-19), which is composed mainly of rocks from the Tamiami Formation and the deeper Hawthorne Group. At the site, the top of the Intermediate Confining Unit occurs at a depth of about 140 ft and is over 800 ft thick (Figure 2-19). The Floridan aquifer system consists of three units which are, from shallowest to deepest; the Upper Floridan aquifer (also called UFA, a less permeable formation known as the Middle Confining Unit (MCU), and the Lower Floridan aquifer. Studies of the hydrogeology of south Florida indicate that the MCU may be separated into three distinct units, namely; an upper confining zone known as MC1, a permeable zone called the Avon Park Permeable (or Producing) Zone (APPZ) within the Avon Park Formation, and a lower confining zone known as MC2 (Reese and Richardson 2008-TN3436).

Before 2008, the APPZ had not been widely identified in southeastern Florida. In addressing this, Reese and Richardson (2008-TN3436) reported that the APPZ, "…has been identified in previous studies as the…lower part of the Upper Floridan aquifer in…the southern part of southeastern Florida". Because of this, the Upper Floridan aquifer is now recognized as less vertically extensive and the MCU as more vertically extensive than in preceeding studies of the Floridan aquifer, including those at deep well injection sites (McNeill 2002-TN4571; Starr et al

2001-TN1251; EPA 2003-TN3658). As a result, previous hydraulic datasets may not have been truly representative of the units they were used to describe leading researchers to conclude in one case that, "…it can be inferred that the MCU…is a better confining unit than indicated by the hydraulic conductivity dataset" (Starr et al. 2001-TN1251).

The Upper Floridan aquifer is an important source of freshwater in parts of Florida and is designated an underground source of drinking water (USDW) at the Turkey Point site because the total dissolved solids concentration is less than 10,000 mg/L. However, water from the Upper Floridan is too saline (dissolved solid concentrations greater than 2,000 mg/L) in southeastern Florida to be used for drinking water without treatment (Renken et al. 2005-TN110).

Within the Lower Floridan aquifer in southern Florida there is a cavernous, high-permeability geologic horizon called the Boulder Zone, which is the zone identified for deep-well injection of blowdown water from proposed Units 6 and 7. The extremely high permeability is thought to result from horizontal caverns occurring at multiple elevations connected by large vertical tubes (Miller 1990-TN550) within the unit. The water in the Boulder Zone is very similar to modern seawater both in salinity and temperature. It is thought that the Boulder Zone connects to the Atlantic Ocean at a depth of about 2,500 ft about 25 mi off the coast of Miami. The salinity precludes any interest in the Boulder Zone as a supply of freshwater. Based on water quality, hydraulic head, age dating and water temperatures Meyer (1989-TN2255) indicated that natural flow within the Boulder Zone in eastern Florida is generally westward and considered to be very slow- on the order of thousands of years.

The low-permeability dolomite and limestones of the MCU limits the upward migration of water from the Boulder Zone. Because of its isolation and high permeability, the Boulder Zone has been used for injection of municipal and industrial wastewater in Florida (Miller 1990-TN550). At the exploratory well (EW-1) constructed on the Units 6 and 7 plant site, the Upper Floridan aquifer is composed of relatively permeable layers of sediment within the Suwannee Limestone Formation and the upper portion of the Avon Park Formation, as shown in Figure 2-19 (FPL 2012-TN1577). Lower permeability confining layers that impede the vertical mixing of groundwater were also identified within these depth intervals. The bottom of the deepest USDW was determined to be between 1,430 and 1,505 ft below ground surface based on water samples collected during packer testing, and was estimated at 1,450 ft based on specific conductance logging (FPL 2012-TN1577). At the Turkey Point site, the bottom of the USDW is within the Avon Park Formation, and is considered part of the Upper Floridan aquifer because of its relatively low salinity (Figure 2-19).

As shown in Figure 2-19, the uppermost portion of the MCU (MC1), the APPZ, and the lower MCU (MC2) zones are within the Avon Park Formation with the deeper MCU extending into the Oldsmar Formation. The top of the APPZ zone was not explicitly identified by FPL in the report about exploratory well EW-1 or in the report about the dual-zone monitoring well DZMW-1 (FPL 2014-TN4052). Based on information from the EW-1 (FPL 2012-TN1577) and regional information, if it exists at the Turkey Point site, the APPZ is likely within the interval from 1,535 and 1,770 ft below ground surface where FPL documented the presence of both confining and permeable zones at EW-1. While drilling DZMW-1, FPL noted a "significant increase in salinity below a depth of 1,614 feet indicate [sic] the presence of a relatively saline productive interval

below this depth." This zone may be part of the APPZ based on its permeability and high salinity. Reese and Richardson (2008-TN3436) show the top of the APPZ at a depth of approximately 1,700 ft at a borehole south of Turkey Point, and missing at a borehole north of Turkey Point. The APPZ is probably less than 100 ft thick based on regional information.

The section of the middle Floridan confining unit between 1,930 and 2,915 ft below ground surface was primarily composed of low-permeability sediments at EW-1. This section includes the lower portion of the Avon Park Formation from 1,930 ft to 2,580 ft and the upper portion of the Oldsmar Formation from 2,580 ft to the top of the Lower Floridan aquifer at about 2,915 ft below ground surface (FPL 2012-TN1577). FPL identified the interval from 1,930 to 2,915 ft as the primary confinement for injectate at the site. The top of the Boulder Zone was identified at a depth of 3,030 ft and extended below the bottom of the EW-1 borehole at 3,230 ft. These depths and thicknesses are consistent with the mapping of statewide information of the Floridan aquifer presented in Reese and Richardson (2008-TN3436).

Seismic-reflection studies performed by the USGS in southeastern Florida have identified both linear tectonic faults and "karst collapse" structures up to about 2 mi in diameter that may result in areas of increased vertical flow through the Floridan aquifer confining units such as the MCU (Cunningham et al. 2012-TN4576; Cunningham 2013-TN4573; Cunningham 2014-TN4051; Cunningham 2015-TN4574). Seismic data have not been collected as the Turkey Point site. Nonetheless, Cunningham (2015-TN4574) suggests that, "other evidence for karst collapse includes borehole geophysical log signatures that indicate highly fractured rock."

Staff evaluated return velocities in sonic logs obtained at EW-1 and found sections of the MCU to have log signatures and transit times consistent with unfractured rock. This is supported by other characterization including geophysical and lithologic log results, hydraulic properties, and injection and pump tests as discussed in greater detail in Section 5.2 (FPL 2014-TN4052). There is currently no evidence of similar features at the Turkey Point site.

Groundwater Flow Directions within the Floridan Aquifer

Regional groundwater flow within the Floridan aquifer system in South Florida has been generally characterized as complex by Meyer (1989-TN2255) who evaluated previous studies, water quality, hydraulic head, age dating and water temperatures. Based on this data Meyer found that a groundwater divide in the Upper Floridan aquifer runs the length of the Floridan Peninsula with groundwater west of this divide flowing west and east of this divide flowing east. Groundwater levels in wells within the Upper Floridan aquifer near the Turkey Point site confirm that groundwater flows eastward.

The FDEP has permitted over 180 Class I injection wells for municipal and industrial wastewater disposal. The wells predominately inject into the Boulder Zone of the Lower Floridan aquifer. As a result a number of site-specific and regional studies have evaluated fluid movement within the MCU and Boulder Zone. Meyer indicates that in eastern Florida, flow from the Boulder Zone is generally lateral (westward) with a component of upward flow into the MCU. However, hydraulic parameters and age dating indicate that this horizontal and vertical flow is driven by temperature differences and may take many thousands of years (Meyer 1989-TN2255) due to the confining nature of the MCU. Other studies, conducted primarily at injection sites, indicate

that transit times may be shortened when pathways within the MCU are created through improper well construction or a network of interconnected fractures. This is discussed in more detail below. Evidence from a study by Walsh and Price (2010-TN3656) conducted at the SDWWTP north of the Turkey Point site shows that while flow within MC1 and MC2 is generally vertical, flow within the APPZ is horizontal providing for more rapid flow and mixing of waters entering the APPZ from the underlying MC2 confining unit. This is consistent with findings from a USGS revision of the Floridan Aquifer System, which determined that "in southern Florida, the APPZ is more isolated by thicker lower permeability rocks than elsewhere iin the system and may act as a distinct aquifer within the system" (Williams and Kuniansky 2015-TN4577).

Upward migration of treated municipal wastewater injected into the Boulder Zone has been observed at a minority of injection sites, including 9 mi north of the proposed Turkey Point site at the Miami-Dade SDWWTP, where injection rates are around 97 Mgd. As a result, studies have been performed to evaluate the cause and extent of this migration. Studies have investigated whether this observed migration may have been caused by flow through the matrix of the MCU or through conduits or preferential flow paths provided by either natural geologic features or by a well construction problem.

These studies generally indicate that sections of low permeability limestones and dolostones of the MCU, "appears to act as a competent confining unit" (McNeill 2002-TN4571) and that, "…contaminants are not migrating upward through the Middle Confining Unit across a broad area." (Starr, et. al. 2001-TN1251). Maliva et al. (2007-TN1483) present evidence from site studies of vertical migration at two water facilities in South Florida as well as variable density transport modeling that shows dolostones with sufficiently low vertical hydraulic conductivities can provide local confinement sufficient to prevent migration into the USDW, even if the underlying rock is fractured.

Improper well construction can create the potential for upward migration across the MCU for several reasons. In the past, a smaller-diameter pilot hole was often drilled first, and then the pilot hole was reamed to a larger diameter. Maliva et al. (2007-TN1483) states that "If the reamed hole for a casing string diverged from the pilot hole, then the pilot hole may become a conduit for vertical fluid migration. However, well construction problems as a cause for vertical fluid migration have not yet been conclusively confirmed at any injection well site." Despite this, studies by McNeill (2002-TN4571) and Walsh and Price (2010-TN3656) indicate that upwelling at the SDWWTP may be attributed, at least in part, to well construction issues. Such a construction problem is not expected at the Turkey Point site because under newer well construction techniques, the pilot hole is cemented before the actual well is drilled. Also tests would be performed every 5 years to verify well integrity (FPL 2011-TN51).

A 2002 study (McNeill 2002-TN4571) of upwelling of injected fluid at the SDWWTP indicated that upwelling can also occur when wells are improperly completed. This study identified an "important low-permeability interval" which "appears to act as a competent confining unit" between the Boulder Zone and Middle Confining Unit and also indicated that 10 of 17 injection wells were drilled through this unit but completed above it, leaving an open hole and upward pathway for injected effluent. Walsh and Price (2008-TN3657) evaluated water chemistry data from wells at the SDWWTP site and determined that injected wastewater likely migrated upward through a lower section of the MCU and into the APPZ section of the MCU. However, wastewater migration was not apparent in the low-permeability portion of the MCU that lies

above the APPZ and below the Upper Floridan aquifer. Additional analysis by Walsh and Price (2010-TN3656) concluded that in three of the four instances of upward migration of injected wastewater at the SDWWTP the plumes moved into the APPZ and in the fourth instance the plume moved into the low-permeability layer below the APPZ. As a result, this report presented a conceptual model that postulates the vertical migration through the MC2 of the MCU is density driven due to salinity or temperature differences between the formation water and injectate. If migration to the APPZ occurred, horizontal flow and mixing would likely diminish the buoyant forces and reduce the impact above the APPZ.

Cunningham (2012-TN4576; Cunningham 2013-TN4573; Cunningham 2014-TN4051; Cunningham 2015-TN4574) has used seismic-reflection data to identify natural vertical "karst collapse" features that could act as conduits for flow across the MCU and identified a municipal wellfield for the City of Sunrise, where upwelling was coincident with a karst collapse feature. However, migration had not occurred above the Lower Floridan aquifer (LFA).

An EPA study of 93 deep-well injection facilities in South Florida also indicates that fluid movement underground is influenced by buoyancy created by temperature and density differences between native and injected waters. Injection pressures, which are influenced by the geology and injection rates, can also induce upward migration (68 FR 23673) (TN3658). As mentioned above, injection rates at the SDWWTP site, where upward migration has occurred, are around 97 Mgd. As discussed above, FPL evaluated the confining ability of the MCU during the drilling and completion of EW-1 through geophysical logging, core analysis and pressure testing (FPL 2012-TN1577) and concluded that there was "no indication of vertically extensive or significant fracturing at several intervals throughout the MCU."

Section 5.2.1.3, 5.2.2.2, and Appendix G contain a more detailed discussion of the confining capability of the Middle Confining Unit and the review team assessment of the impacts of deep well injection at the Turkey Point site.

Hydraulic Properties of the Floridan Aquifer System at the Turkey Point Site

Exploratory well EW-1 was constructed on the site to determine the properties of the Boulder Zone and the confining nature of the overlying MCU that separates the Boulder Zone from the USDW zone within the Upper Floridan aquifer. The exploratory well was constructed to a depth of 3,232 ft below the drill pad. At the well location water-quality samples and rock core were collected and analyzed at various depths, and geophysical logging, video surveys and packer testing were performed to determine the hydraulic parameters of the rock layers. Based on these data the rocks encountered between depths of 1,535 and 3,232 ft were divided into three distinct zones (FPL 2012-TN1577; FPL 2012-TN1264). These zones roughly coincide with the MC1 and APPZ of the MCU, MC2 of the MCU, and the Boulder Zone of the Lower Floridan aquifer, respectively, and are as follows:

- 1,535 to 1,980 ft: This interval is characterized as having variable lithology and porosity and therefore not providing a reliable barrier to vertical flow of water. Hydraulic conductivities and porosities were not determined for this interval however, total dissolved solids (TDS) values are at or below 10,000 mg/L indicated that the base of the USDW (TDS <10,000 mg/L) would be located at or above this interval, which is within the zone identified as the APPZ of the MCU. Selected depth intervals were isolated using packers and hydraulic flow tests were conducted to estimate the permeability of the rock in those intervals. Straddle packer test

performance data indicate that specific capacities within this zone ranged from 0.003 to 2.43 gpm/ft. Specific capacity is a measure of the pumping rate corresponding to water-level drawdown of 1 ft.

- 1,980 to 2,915 ft: This interval below the drill pad was found to be composed of consistently softer material. Lithologic logs indicate that the formation is comprised on layers of limestone, dolomitic limestone and dolomite. Core laboratory data indicated that vertical hydraulic conductivities ranged from 1.6x10-6 to 5.4x10-4 cm/sec and total porosities ranged from 27.4 to 43.4 percent. Pumping tests of packer-isolated intervals from 1,930 to 1,950 ft, 1,970 to 1,972 ft, and 2,058 to 2,080 ft below the drill pad resulted in low specific capacity values of 0.03, 0.003 and 0.05 gpm/ft, respectively (FPL 2012-TN1265). In some tested zones, a large drawdown resulted from a low pumping rate, indicating low hydraulic conductivity. Nine cores were collected throughout this interval. Core recovery was variable but between 85.7 percent, and 95.4 percent at three depths. Return velocities on sonic logs for depths within this interval are generally high. These data indicate that this unit, which is the MC2 of the MCU, is more confining than over and underlying units, is over 900 ft thick, and likely provides a barrier to vertical groundwater flow. These preliminary results indicate that a thick low-permeability confining layer exists between the proposed injection point within the Boulder Zone and the overlying USDW aquifer. These site-specific findings are consistent with characterization data and conclusions presented in studies of these same formations in South Florida and near the Turkey Point site. Maliva et al. (2007-TN1483) found that a confining layer with vertical hydraulic conductivity of 10–6 cm/sec resulted in minimal vertical migration over a 25-year simulation period. McNeill (2002-TN4571) similarly indicated that thin dolomitic units (such as the “Dolomite Confining Unit” discussed in section 5.2.1.3) were continuous throughout southeast Florida and provided, “…additional effective confinement of upwardly buoyant injected fluids.”
- 3,020 to 3,232 ft: This interval below the drill pad was found to contain highly porous and permeable rocks that form the Boulder Zone of the Lower Floridan aquifer. TDS values are greater than 30,000 mg/L which is comparable to seawater. Geophysical logging indicate a very large hole diameter consistent with open voids, low resistivity, and short formational acoustic travel times. Pumping tests indicated that this zone has a high specific capacity, with values measured around 49 gpm/ft. These preliminary results indicate that a thick low-permeability confining layer exists between the proposed injection point within the Boulder Zone and the overlying USDW aquifer. These site-specific findings are consistent with characterization data and conclusions presented in studies of these same formations in South Florida and near the Turkey Point site.

2.3.2 Water Use

Consideration of water use involves estimating the magnitude and timing of consumptive and nonconsumptive water uses. Nonconsumptive water use does not result in a reduction in the available water supply. An example near the Turkey Point site is the Everglades Alligator Farm that raises alligators (EAF 2014-TN3659). The farm pumps freshwater that is used in the farming of alligators but returns approximately the same volume of water to nearby watercourses or aquifers. On the other hand, consumptive water use results in a net reduction of the water supply available for downstream users. For instance, as a backup system of cooling water for proposed Turkey Point Units 6 and 7, water may be withdrawn from beneath Biscayne Bay for normal cooling. Most of that water would be evaporated in the cooling towers,

and that evaporated water would be considered a consumptive loss. The following two sections describe the consumptive and nonconsumptive users of surface water and groundwater near the Turkey Point site. Although surface-water use and groundwater use are discussed separately, there is a close connection and interchange between surface-water and shallow groundwater resources in South Florida. For example, removing water from a pond will likely result in groundwater flow into the pond from the surficial aquifer, and pumping of a shallow well is likely to remove water from nearby surface-water features. One of the goals of the CERP is to increase sheet flow, and consequently enhance infiltration of surface water to the shallow Biscayne aquifer in the Biscayne coastal wetlands area.

2.3.2.1 Surface-Water Use

Regional water uses primarily support the restoration actions of CERP, in which surface runoff from areas to the north of the Everglades, including Lake Okeechobee, is being returned to natural channels (Shark River Slough and Taylor Slough) entering Everglades National Park. CERP restoration actions also include the restoration of sheet flow into Biscayne Bay. CERP projects in the region are identified in EIS Section 2.3.1.1 in the CERP subsection and in Figure 2-8.

For the local area, 34 permitted surface-water users were identified within a 10 mi radius of Turkey Point; the identified uses of water include landscaping, agriculture, industrial, and recreational irrigation (a golf course) (FPL 2014-TN4058). Landscape use accounts for the largest number (31) of permitted users but the golf course represents the largest single permitted use of 115.8 Mgd/yr. The water sources range from onsite lakes/ponds, onsite canals, onsite borrow pits, and Biscayne aquifer/onsite canals. Given that significant exchange occurs between surface water and shallow groundwater it is somewhat arbitrary to assign certain sources as surface water, except that waters may be withdrawn from a body of surface water. The review team confirmed the water uses by examining permit information for surface-water sources from the SFWMD (2012-TN1319), which are listed in Table 2-10. These permit locations are broken down by township and range (approximately 6 mi by 6 mi blocks).

Table 2-10. Consumptive Use Surface-Water Permits in the Region around the Turkey Point Site (from SFWMD 2012-TN1319). ***The surface-water sources include canals, lakes, and bays. The locations are by township and range; Turkey Point is located in T57S R40E, in the southeast portion of the grid (approximately Section 36).***

Location	Water Use	Number of Permits	Permit Volume (Mgm)
T56S-R40E	Agricultural	1	2.95
T56S-R40E	Industrial	3	1.52
T56S-R40E	Landscape	12	18.09
T56S-R39E	Landscape	6	13.6
T57S-R40E	Industrial	1	1.52
T57S-R39E	Golf Course	1	14.68
T57S-R39E	Industrial	1	42.00
T57S-R39E	Landscape	27	16.14
T57S-R38E	Industrial	1	0.30
T58S-R38E	Aquaculture (alligator farm)	1	2.25
T58S-R38E	Public Water Supply	1	6.30

Mgm = million gallons per month.

Subsequent to publication of the draft EIS, in accordance with the Administrative Order (FDEP 2014-TN4144), water from the L-31E Canal can be used as a short term resource during periods of excess flow to freshen the IWF in order to maintain an annual average salinity of no more than 34 psu. Because water in the L-31E Canal is freshwater, it is more efficient to use this water for freshening the IWF than water from the Upper Floridan aquifer or the Biscayne aquifer.

2.3.2.2 Groundwater Use

Biscayne Aquifer

The generally high permeability of the limestone, sandstone, and sand in the Biscayne aquifer has resulted in it being an important water supply. The USGS estimates that 486.2 Mgd of fresh groundwater was withdrawn from the Biscayne aquifer in Miami-Dade County during 2005 (Marella 2009-TN1521). About 400 Mgd of that was used for public water supplies, 46.5 Mgd was for agriculture, 29 Mgd was for industrial uses, 7.7 Mgd was used for recreational irrigation, and 2.9 Mgd went to household self-supply.

Nearly all of the potable water supplied by the MDWASD to southern Miami-Dade County comes from the Biscayne aquifer (Miami-Dade County 2014-TN3647). The exception is water from the Alexander Orr, Jr. water-treatment plant, which mixes some brackish groundwater from the Upper Floridan aquifer with Biscayne aquifer groundwater to serve County residents living between SW 8th Street and SW 264th Street (Miami-Dade County 2014-TN3647). The public water-supply wells located nearest to the proposed plant site serve the City of Homestead and are located at Newton Field, Harris Field and Witkop Park in Homestead (City of Homestead 2012-TN3648). These well fields are approximately 6.8, 7.3, and 7.7 mi, respectively, west-northwest of the plant site (distance measured from Google Earth). The potable water supply for the Florida Keys comes from Biscayne aquifer wells and an Upper Floridan aquifer well located west of Florida City (FKAA 2014-TN3649) approximately 9 mi west of the plant site.

The EPA has designated the Biscayne aquifer as a sole-source aquifer pursuant to Section 1424(e) of the Safe Drinking Water Act of 1974 (42 U.S.C. § 300f et seq.) (TN1337). However, the Biscayne aquifer in the immediate vicinity of proposed Units 6 and 7 is too saline to be used as a potable water supply over an area from the coastline to about 6 to 8 mi inland (Langevin 2001-TN1338; Renken et al. 2005-TN110) near the Turkey Point site (see Figure 2-12).

Subsequent to publication of the draft EIS, in accordance with the Administrative Order (FDEP 2014-TN4144), the Biscayne aquifer beneath the Turkey Point site can be used to freshen the IWF in order to maintain an annual average salinity of no more than 34 psu.

Also subsequent to publication of the draft EIS, in accordance with the Consent Agreement with Miami-Dade County (Miami Dade County v. Florida Power & Light 2015-TN4505), the hypersaline plume that extends beyond FPL's property line will be retracted so that a chlorinity of 19,000 does not extend beyond the property line. Water withdrawn from the hypersaline plume will be injected into the Boulder Zone using an existing underground injection control well.

Upper Floridan Aquifer

Marella (2009-TN1521) reports that 3.5 Mgd of Floridan aquifer groundwater was used in Miami-Dade County during 2005 and 93 percent of that water was saline. Upper Floridan aquifer water is used for irrigation at seven golf courses in Southeast Florida (SFWMD 2013-TN3461). Two of these, the Ocean Reef and Card Sound Golf Clubs, are located approximately 7.7 and 9 mi southeast of the Turkey Point site. The Upper Floridan aquifer in the immediate vicinity of the Turkey Point plant area is used to supply cooling-tower makeup water at a rate of about 12.6 Mgd to Turkey Point Unit 5 (FPL 2014-TN4058). Desalinization is used to treat brackish water from the Upper Floridan aquifer for domestic use at several locations in South Florida, including the well operated by the Florida Keys Aqueduct Authority (SFWMD 2013-TN3461) and two plants in Miami-Dade County (SFWMD 2012-TN1522). Therefore, additional future use of brackish water from the Upper Floridan aquifer is possible.

Projections of groundwater use for the SFWMD Lower East Coast Planning Area indicate an 18 percent increase in the demand for public water supplies from 2010 to 2030 for Miami-Dade County (SFWMD 2013-TN3461). The SFWMD determined that part of this increased demand will be met by "alternative supplies" including desalinization, reclaimed water treatment, water conservation programs, and aquifer storage systems. Additional freshwater will also be needed for ecosystem restoration projects such as CERP. This water will come mainly from rerouting of excess runoff and potentially from reclaimed water.

The FDEP has permitted over 180 Class I injection wells for injection of municipal and industrial wastewater into the Boulder Zone of the Florida aquifer system. The Boulder Zone of the Lower Floridan aquifer is used for injection of municipal and industrial wastewater because of its isolation, high permeability, and salinity similar to seawater (Miller 1990-TN550). The top of the Boulder Zone at the Turkey Point site about 3,000 ft below ground surface and is proposed for injection disposal of cooling-tower blowdown and other waste streams from Units 6 and 7. The Boulder Zone is currently used for treated municipal waste water injection at MDWASD's SDWWTP approximately 9 mi north of the Turkey Point site and at several other locations in Florida (Maliva et al. 2007-TN1483).

Subsequent to publication of the draft EIS, in accordance with the Administrative Order (FDEP 2014-TN4144), the Upper Floridan aquifer can be used to freshen the IWF to maintain an annual average salinity of no more than 34 psu. Because Upper Floridan aquifer currently has salinities around 3 psu, it is far more effective than Biscayne aquifer water in freshening the IWF. Withdrawals from the Upper Floridan aquifer for freshening are limited to 14 Mgd.

2.3.3 Water Quality

The following sections describe the quality of surface-water and groundwater resources in the vicinity of the Turkey Point site. Monitoring programs for thermal and chemical water quality are also described.

2.3.3.1 Surface-Water Quality

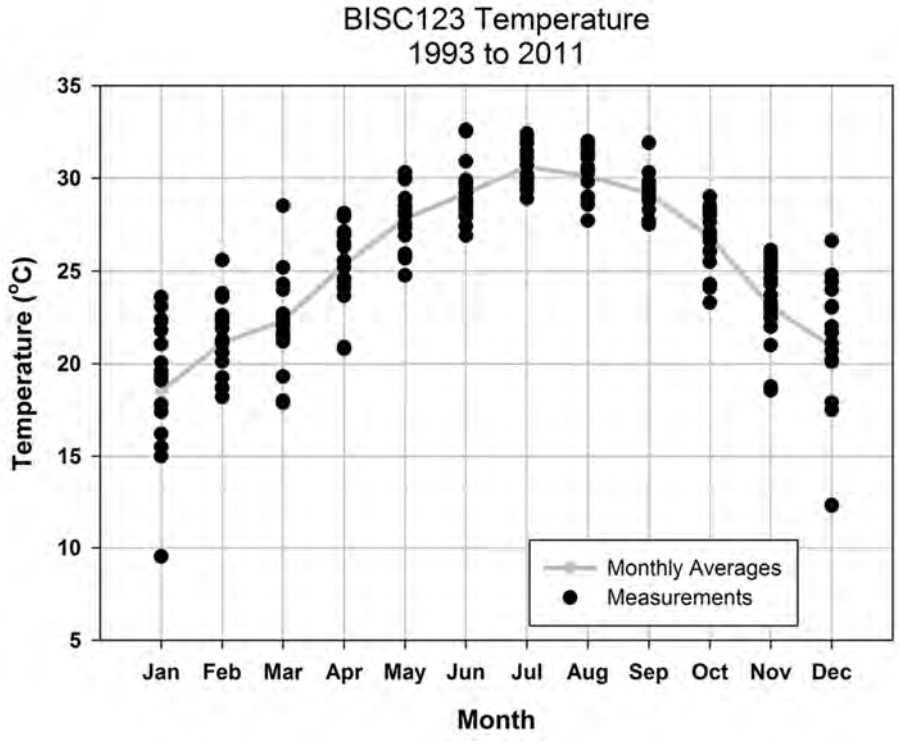
The FDEP, under the Federal Water Pollution Control Act (Clean Water Act) Section 305(b) (33 U.S.C. § 1344 et seq.) (TN1019), prepares a statewide Water Quality Inventory. The FDEP also identifies impaired waterbodies during this inventory process and lists them on the Clean Water Act's Section 303(d) List of Impaired Waters. Portions of the estuary and streams along the southeast coast, including Biscayne Bay, appear on the final 2010 Section 303(d) List as impaired waterbodies because of copper, fecal coliforms, mercury, and nutrients (FDEP 2010-TN1253).

Surface-water quality is routinely monitored by the SFWMD and other agencies (SFWMD 2012-TN1318). For the purposes of the analysis of the impacts from the operation of the radial collector wells, FPL also collected a sample from Biscayne Bay and analyzed it for conventional and priority pollutants (FPL 2009-TN1263). For the data collected during the SFWMD's monitoring program, only results from station BISC123 (the same location as BISC12 in Figure 2-14) are examined because it is the station nearest the site. Routine monitoring occurred at monthly intervals. The review team reviewed the data for seasonal variations and the variability within each month of the year; hence, the measurements over the period of record are plotted by month (Figure 2-21) with the monthly data and the monthly averages for the period of record. The measurements are from samples collected at depths of <3 ft and are regarded as surface measurements. Measurements at >3 ft depths are not available for many of the constituents and are not examined here.

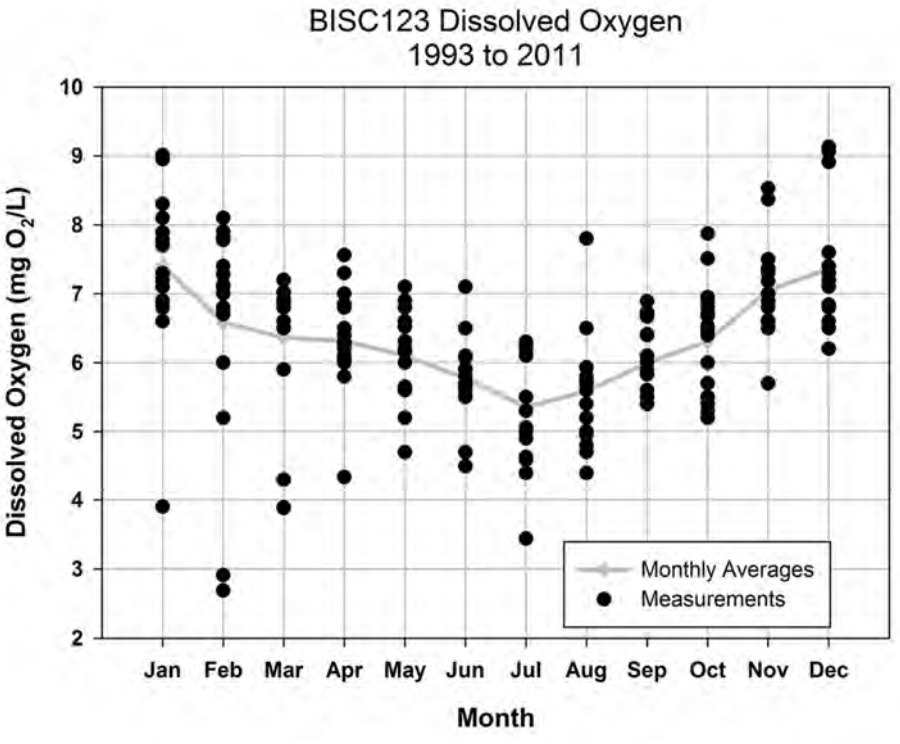
Average surface-water temperatures vary from 18.5°C during the winter months to 30.6°C during the summer months (Figure 2-21(a)). The temperature range during the summer months (approximately 3°C) is relatively small in comparison to the range during the winter (approximately 14°C). During the winter, air temperatures in South Florida can be much cooler than normal because of the penetration of cold fronts, while during the summer, weather patterns typically produce more uniform temperatures.

Dissolved oxygen is governed first by temperature; lower oxygen saturation concentrations occur at higher temperatures and the highest saturation concentrations occur at the lowest temperatures. Secondarily, dissolved oxygen is increased by production from photosynthetic organisms (algae, marine vegetation) and decreased by respiration from all organisms inhabiting Biscayne Bay. In addition, dissolved oxygen is decreased by the decay of organic matter present in the Biscayne Bay. Because of these factors, the average surface dissolved oxygen during the winter months reaches a maximum of 7.4 mg O_2/L, while during the summer, average dissolved oxygen concentrations decline to 5.4 mg O_2/L (Figure 2-21(b)). The maximum and minimum dissolved oxygen concentrations occurred during the winter (9.1 mg O_2/L and 2.7 mg O_2/L). The maximum concentrations tend to be lowest during the summer, while the minimum concentrations exhibit two peaks: one in the late spring and another in late fall/early winter.

Average pH generally varied within a small range of 8.1 to 7.8 throughout the year; the highest pH values occurred during the summer months, likely due to photosynthetic processes (Figure 2-21(c)).

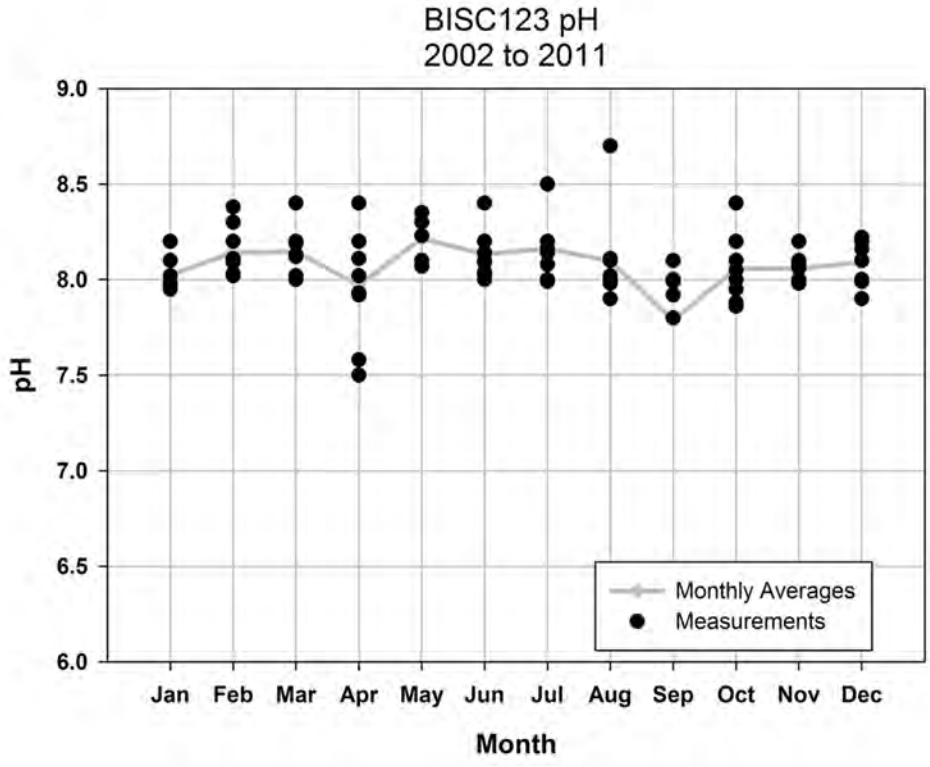


(a)

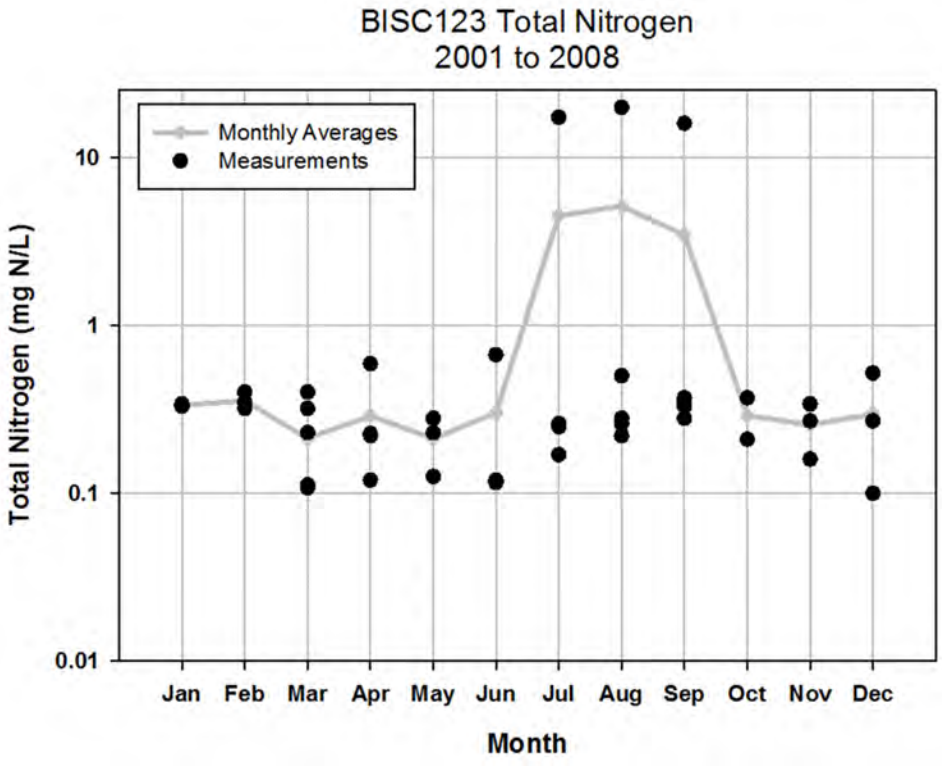


(b)

Figure 2-21. Monthly Water-Quality Measurements at Station BISC123 for the Period of Record Including the Monthly Averages for Each Constituent (SFWMD 2012-TN1318)

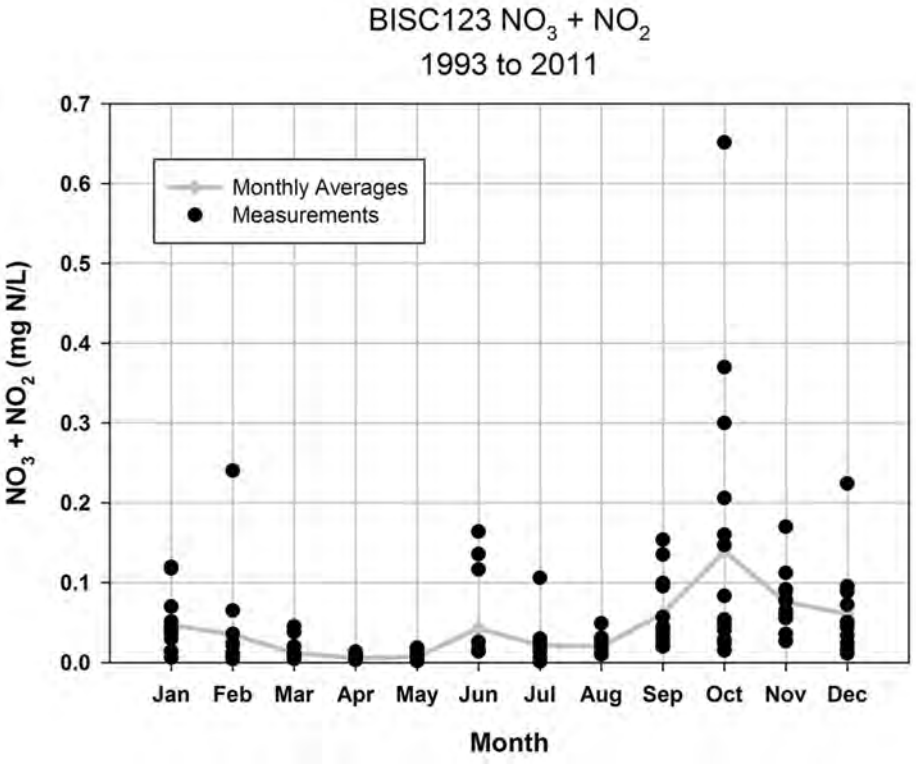


(c)

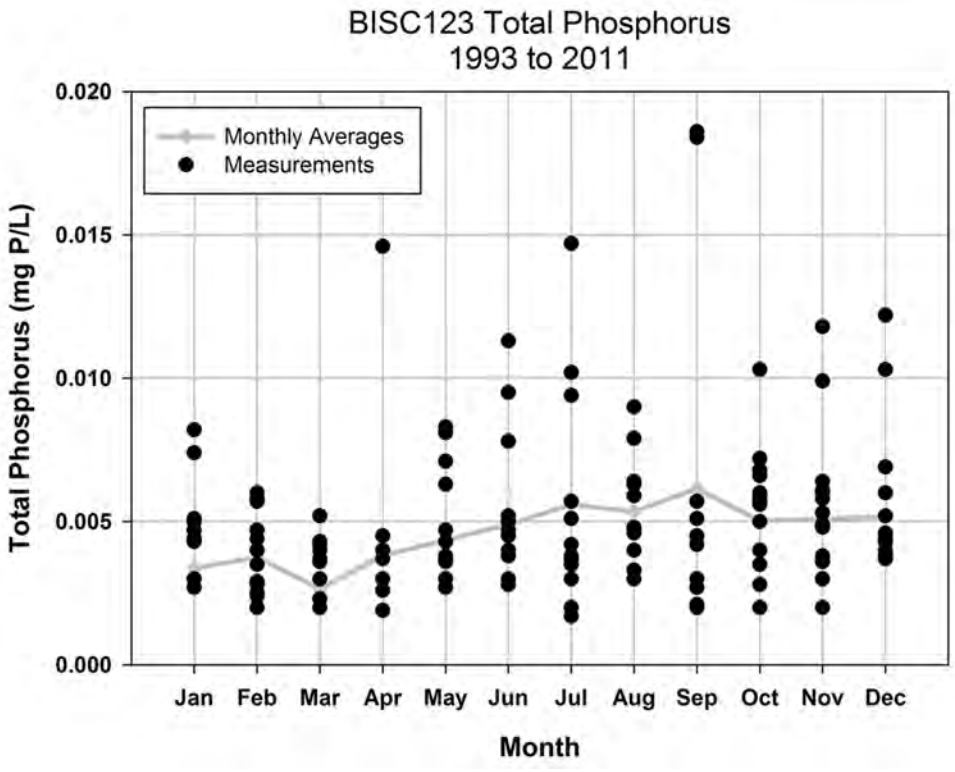


(d)

Figure 2-21. (contd)

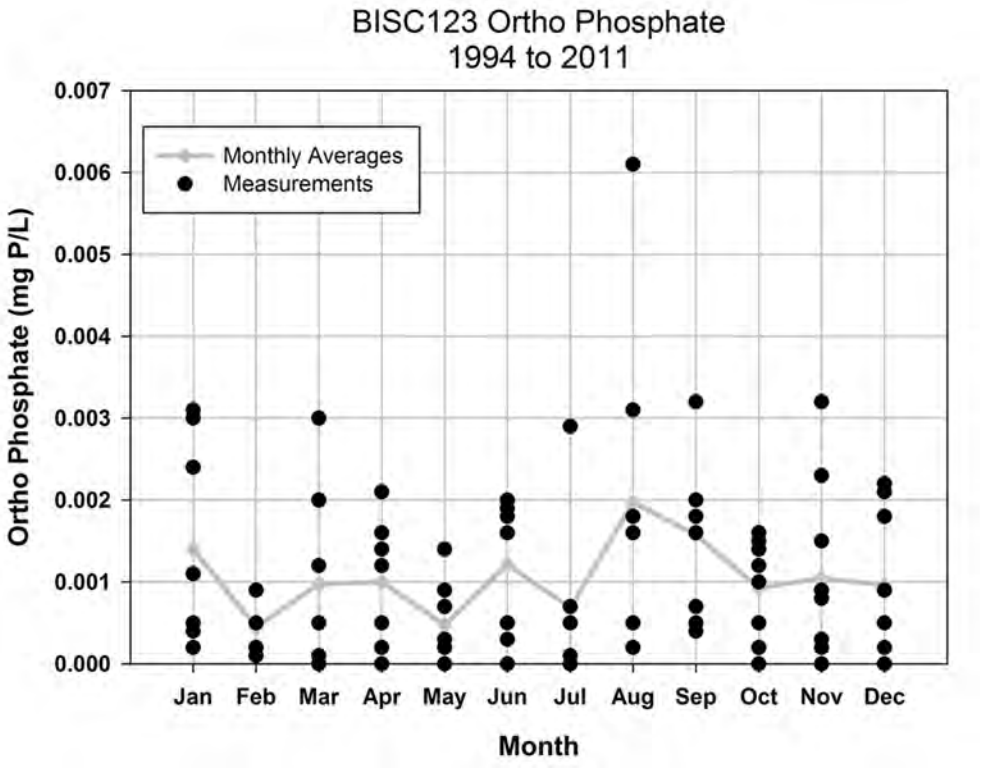


(e)

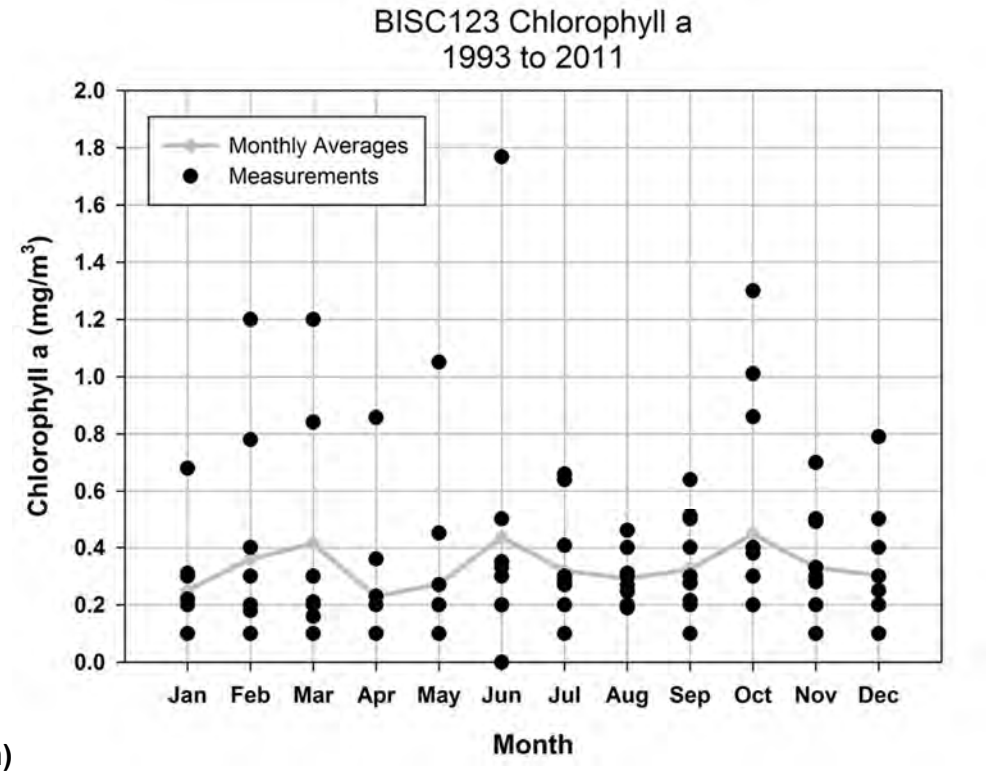


(f)

Figure 2-21. (contd)



(g)



(h)

Figure 2-21. (contd)

The average concentrations of total nitrogen (TN) were below 0.4 milligrams of nitrate per liter (mg N/L) throughout the year, but the period of record for this constituent is only 2001 to 2008, while most other constituents have measurements from 1993 to 2011 (Figure 2-21(d)). Note that three values included in the plot were from summer 2007 and had concentrations greater than 15 mg N/L. It is unclear why these samples had such large TN values. Other than these sample concentrations, the greatest reported concentration is <0.7 mg N/L. The average line in Figure 2-21(d) includes the effect of the large concentration in 2007. TN includes the components organic nitrogen, ammonia nitrogen, and nitrate + nitrite nitrogen. While inclusion of the large concentration values produces a trend in the average concentrations, no general trend can be ascribed. No clear trend is evident in the measured data because of the relatively high monthly variability and the short period of record.

Monthly average concentrations of nitrate+nitrite (NO_3+NO_2) are generally <0.1 mg N/L, although a small increase is seen in October measurements (Figure 2-21(e)). The October measurements also show that nitrate+nitrite reached concentrations of 0.3 mg N/L or greater in three separate years of monitoring (each point of a given month is a separate year). The lowest concentrations occur in the spring, particularly in April and May when measurements are near zero. In many systems this is the time of spring diatom blooms that would reduce inorganic nitrogen concentrations.

For total phosphorus, the monthly average concentrations suggest a slight maximum in summer and a minimum in late winter (Figure 2-21(f)). However, the relatively high variability of the measurements during the spring, summer, and fall may not support this visual analysis of the averages. During the three seasons, measurements tend be around 0.005 mg P/L or lower, but several measurements in each month have higher concentrations. The only months with relatively low variability are February and March.

Ortho phosphate concentrations are generally around 0.003 mg P/L or less. They show no apparent trends in monthly averaged concentrations or in the measurements, although it could be said that the maximum measurements in April, May, and June are the smallest for all the monthly measurements (Figure 2-21(g)).

Chlorophyll a measurements range widely except during the summer and winter months (Figure 2-20(h)). The largest measured values (>0.6 mg/m^3) occurred in late winter through spring and in October, although the monthly average tended to be around 0.3 mg/m^3 without any clear seasonal trend.

As part of the testing program for the radial collector wells, FPL collected a surface sample from Biscayne Bay for analysis of conventional and priority pollutants (FPL 2009-TN1263). The sampling station was located at north latitude 25° 26’ 15.2132” and west longitude 80° 19’ 35.6518”, which is 1 mi north of the proposed location of the radial collector wells. Typical wet chemistry constituents (such as TDS, alkalinity, sodium, potassium, calcium, and magnesium) were analyzed and reported. Other constituents (radiological, metals, chlorinated herbicides, organophosphorus pesticides, volatile organic compounds, organochlorine pesticides, and polychlorinated biphenyls [PCBs]) were analyzed for potential effects from effluents and drift from the cooling towers. Of these other constituents, strontium was measured at 9.84 mg/L, radium 226 was measured at 0.5±0.1 pCi/L, endosulfan I was detected at 0.00247 ug/L, Heptachlor was detected at 0.00691 ug/L 0.00152, and acetone was measured at 18.3 ug/L.[1]

(1) Based on experience with acetone, a laboratory solvent, the review team determined that the acetone measurement may reflect some sample contamination.

Subsequent to publication of the draft EIS, in accordance with the Administrative Order (FDEP 2014-TN4144), FPL is required to maintain an annual average salinity of no more than 34 psu in the IWF. This is a decrease in salinity from recent years. Some of the water used to freshen the IWF could come from the L-31E Canal. Water in the L-31E Canal could add other constituents including nutrients to the IWF. Any withdrawal of water from the L-31E Canal would decrease the total freshwater flow into Biscayne Bay.

2.3.3.2 Groundwater Quality

The State of Florida has conducted an extensive characterization of the background water quality in the major aquifer systems (Renken et al. 2005-TN110). Groundwater quality in the vicinity of the Turkey Point site has also been assessed in support of FPL's Units 3 and 4 Uprate Project (FPL 2012-TN3439). Because of high salinity, groundwater in the vicinity of Turkey Point is not used as a drinking water source (FPL 2014-TN4058). The Biscayne aquifer at Turkey Point extends beneath Biscayne Bay and is in hydraulic communication with the water of the bay. Saltwater has migrated inland along the base of the inland portion of the aquifer in this area in response to the lowering of inland groundwater levels.

Saltwater intrusion into the inland portion of the Biscayne aquifer has occurred over a large area of the Southeast Florida coast including the Turkey Point site. Figure 2-22 shows the estimated extent of saltwater intrusion in the area at different times since 1951. Estimates of saltwater intrusion for Southeast Florida for 2011 are similar to the 2008 extent shown in Figure 2-20 above (Prinos et al. 2014-TN4569). This study also uses tritium measurements to illustrate that west of the site, salinity intrusion is due in part to westward migration of the hypersaline plume from the CCS. Differences in these estimated extents may be caused by changes in the number of available observation points as well as the degree of saltwater intrusion. The most important factors contributing to the regional intrusion of saltwater from the ocean into the aquifer are rerouting of sheet flow to drainage canals and groundwater pumping (Klein and Hull 1978-TN1351; Renken et al. 2005-TN110). Under natural conditions and with adequate inland recharge of freshwater, the aquifer water table is higher than the average sea-level elevation to balance the higher density of seawater. When the aquifer water table is lowered by pumping or canal drainage, the saltwater begins to move inland, usually at the base of the aquifer because of its higher density. Drainage canals without control structures drain freshwater from inland areas and also provide a conduit for seawater to flow inland at high tide and infiltrate the aquifer. Figure 2-23 shows canals and existing control structures in relation to the estimated extent of saltwater intrusion in 1996. Saltwater movement through the aquifer responds to inland groundwater levels with low groundwater levels resulting in inland and upward migration of saltwater and high groundwater levels resulting in seaward and downward movement of the saltwater plume.

The ER lists groundwater quality indicator parameters (temperature, pH, dissolved oxygen, specific conductivity, turbidity, and oxidation-reduction potential) for 12 observation wells completed in the Biscayne aquifer (FPL 2014-TN4058).

The State of Florida has conducted an extensive characterization of the background water quality in the major aquifer systems (Renken et al. 2005-TN110). Groundwater quality in the Biscayne aquifer has also recently been assessed to support FPL's Units 3 and 4 Uprate

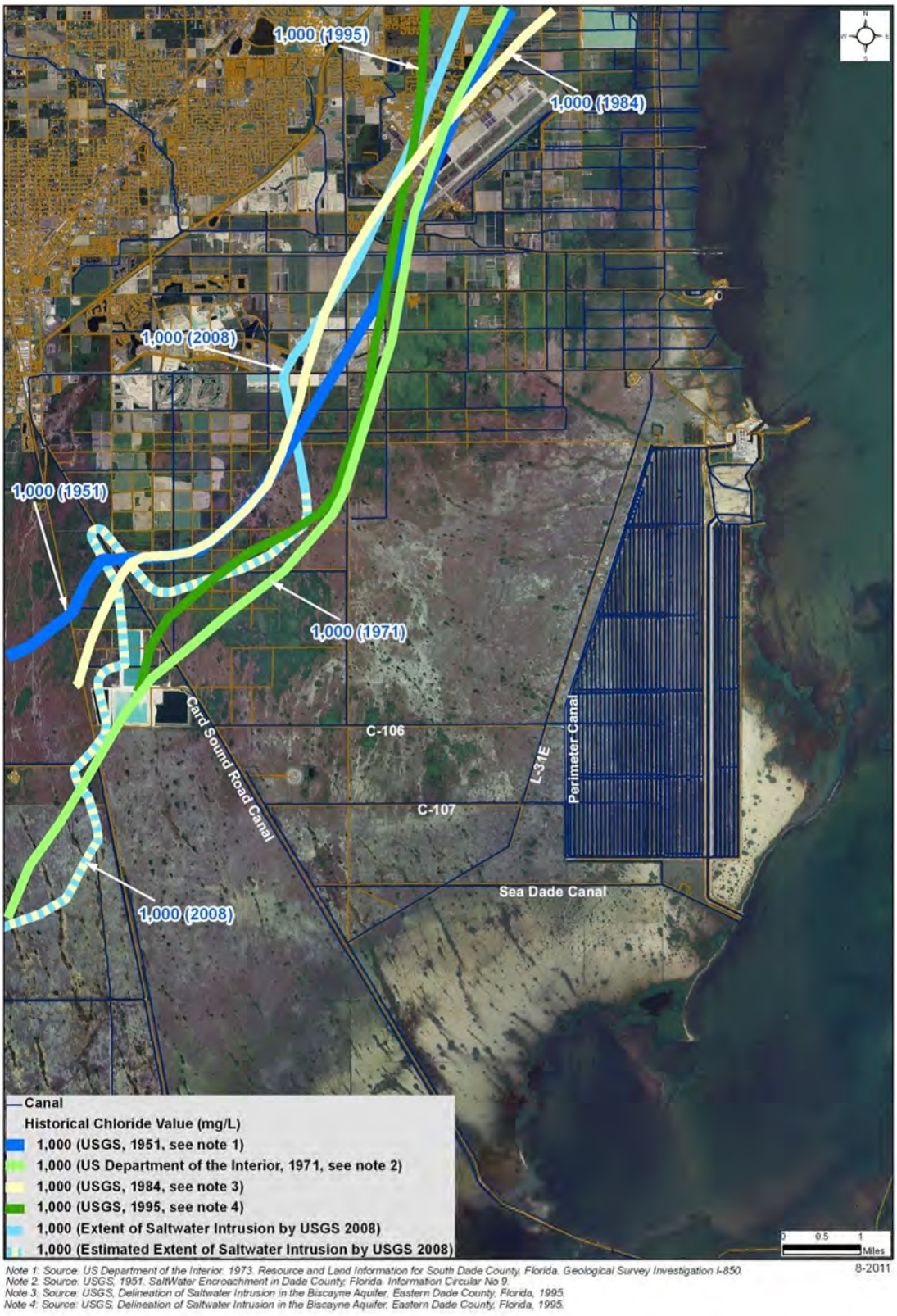


Figure 2-22. USGS Estimated Extent of Saltwater Intrusion from 1951 to 2008 (FPL 2012-TN3439)

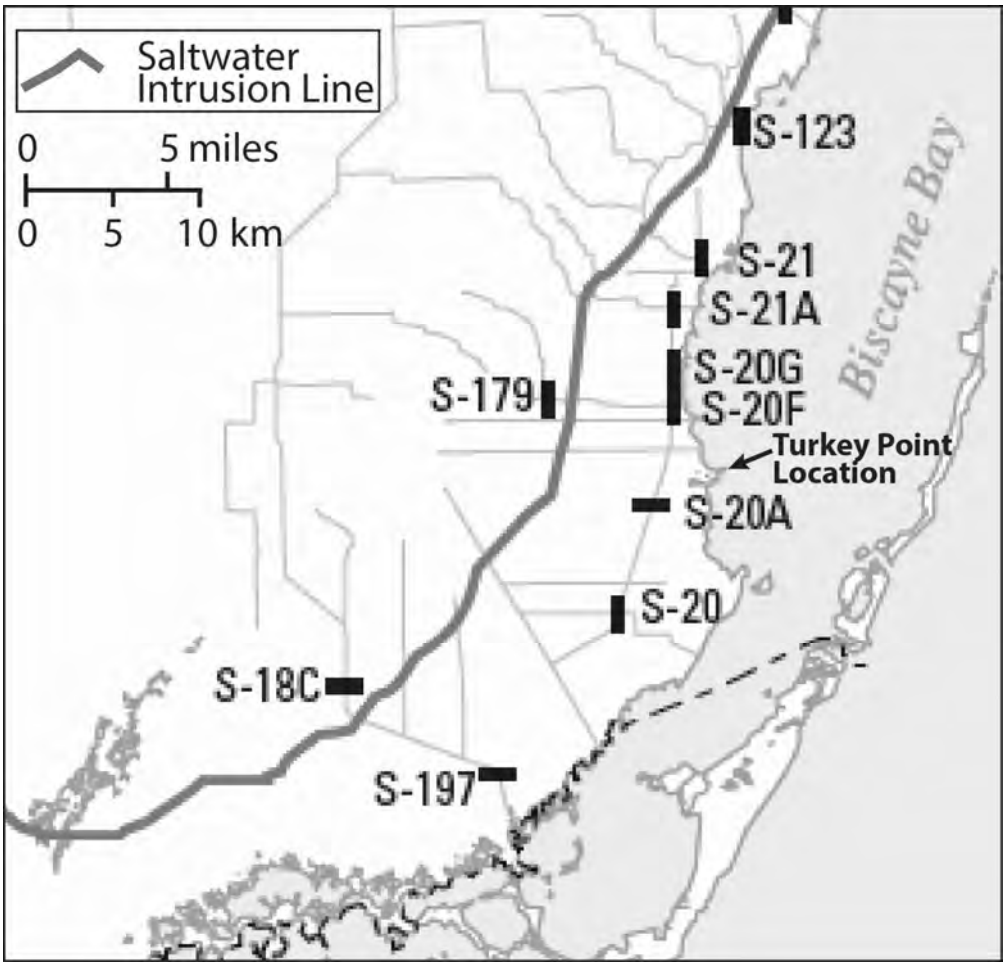


Figure 2-23. Landward Limit of the Saltwater Interface in 1996 and Canal Control Structures (modified from Renken et al. 2005-TN110)

Monitoring Project (FPL 2012-TN3439). The objective of the Uprate Monitoring Project is to better understand the interaction of the cooling canals with Biscayne aquifer and Biscayne Bay. Both tritium and TDS concentrations were found to be elevated in the Biscayne aquifer beneath the cooling canals and in groundwater below the bay adjacent to the cooling canals. Tritium was monitored as a tracer for the cooling-canal water, but is not regarded as a health concern at the observed concentrations (FPL 2012-TN3439). These data show that water in the cooling canals has moved into the Biscayne aquifer groundwater. Water can move from the aquifer into the cooling canals and from the cooling canals into the aquifer at different times depending on seasonal variation in the water table and variations in cooling-canal water levels caused by precipitation, evaporation, or changes in plant discharge. Hydraulic heads in monitoring wells near Biscayne Bay fluctuated in response to tidal cycles indicating a potential for tide-induced flow between the bay, shallow groundwater and the cooling canals in this area of the IWF.

Water quality in the Floridan aquifer system is affected by the degree of confinement, the length of flowpaths from recharge sources, and the proximity and connection to the ocean (Miller 1990-TN550). The Upper Floridan aquifer in southeastern Florida is generally brackish to saline depending on depth and distance from the coast (Reese 1994-TN1439). An average TDS concentration of 5,451 mg/L was reported for the Upper Floridan aquifer in the SCA for Turkey Point Unit 5 (FPL 2003-TN3437). Water in the Boulder Zone has quality similar to seawater and is likely recharged from the ocean based on the water chemistry and the anomalously low temperature of water in the Boulder Zone (Meyer 1989-TN2255). Water quality in the Boulder Zone and within Lower Floridan aquifer confining units has also been affected in some local areas by wastewater injection.

Subsequent to publication of the draft EIS, per the Administrative Order (FDEP 2014-TN4144), FPL is required maintain an annual average salinity of no more than 34 psu in the IWF. The addition of water to freshen the IWF would increase the water surface in the IWF, which would increase downward pressure from the IWF toward the Biscayne aquifer encouraging the (reduced salinity) water in the IWF into the aquifer on top of the existing hypersaline plume.

Also subsequent to publication of the draft EIS, per the Consent Agreement with Miami-Dade County (2015-TN4505), the hypersaline plume that extends beyond FPL's property line will be retracted so that a chlorinity of 19,000 does not extend beyond the property line. Water withdrawn from the hypersaline plume will be injected into the Boulder Zone using an existing underground injection control well. Rehydration of the Model Lands may also be attempted to provide increased hydraulic pressure against any advancement of the hypersaline plume toward the west. Neither an exact design of the system nor an estimate of the time it will take to achieve its goal, relative to construction and operation of Units 6 and 7, is known at this time.

2.3.4 Water Monitoring

Surface-water and groundwater monitoring at and near the proposed site are described below.

2.3.4.1 Surface-Water Monitoring

The SFWMD maintains an extensive database of monitoring stations (SFWMD 2012-TN1320) that includes water quality for Biscayne Bay and selected canals and stage measurements at some Biscayne Bay and canal stations. Figure 2-24 shows the locations of the surface stations from the SFWMD (2012-TN1320) near the IWF cooling canals and in Biscayne Bay. The SFWMD (2012-TN1318) discusses the purpose of the monitoring program for Biscayne Bay (BISC) and indicates that the Miami-Dade County Department of Environmental Resources Management (Miami-Dade County 2014-TN3663) and Florida International University conduct the monitoring of Biscayne Bay.

The NPS has provided the review team additional monitoring data (Figure 2-24) measured in Biscayne Bay (Bellmund 2012-TN4118). The monitoring data include salinity and water depth time series. The stations are located closer to the shoreline than the stations typically monitored by SFWMD and monitor salinity variations as CERP projects are implemented to increase freshwater inflows to Biscayne Bay.

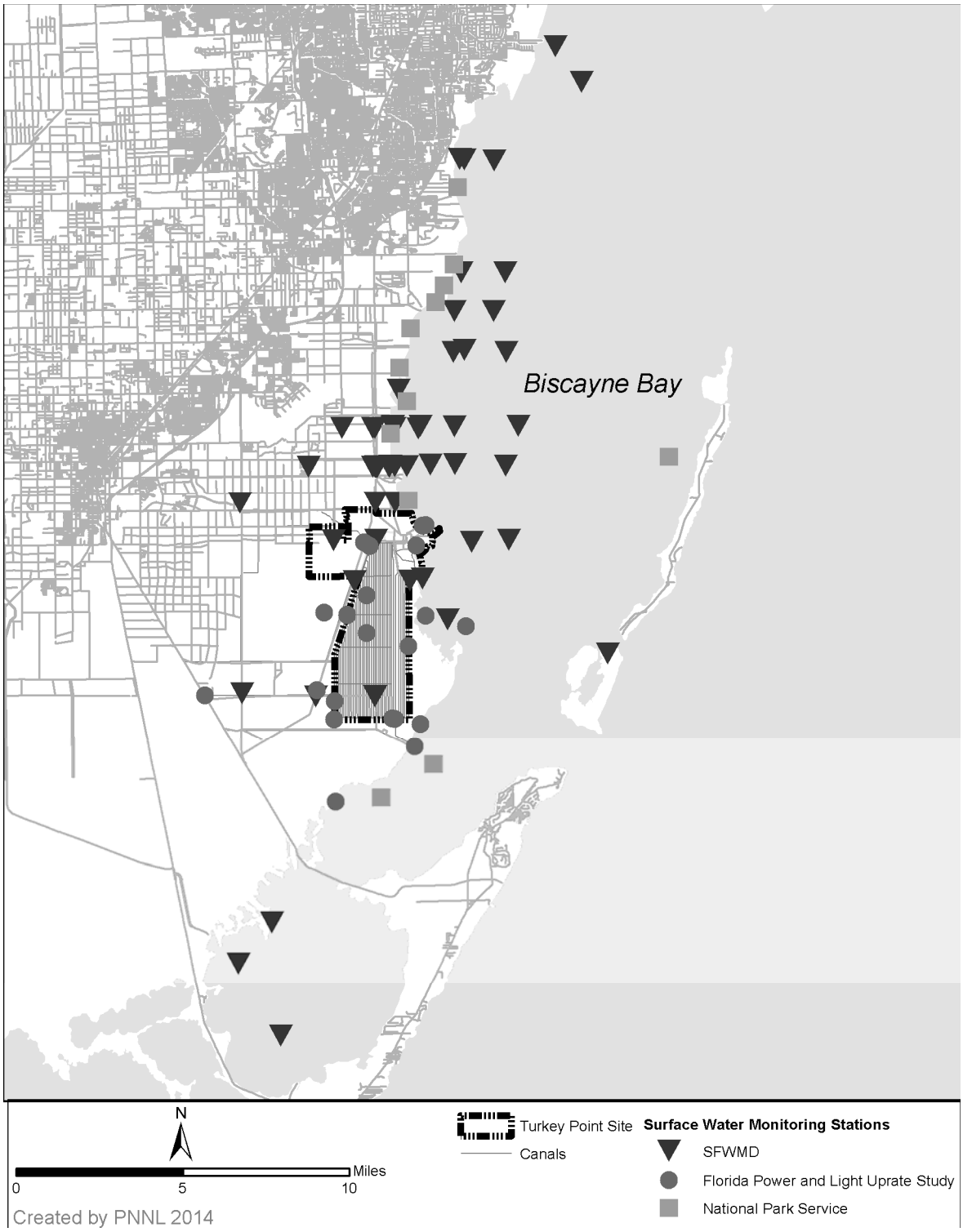


Figure 2-24. Locations of Surface-Water Monitoring Stations from SFWMD (SFWMD 2012-TN1320), the FPL Units 3 and 4 Uprate Project (FPL 2012-TN3439), and NPS (Bellmund 2012-TN4118)

FPL conducted a study of the CCS to evaluate its functioning with additional cooling-water requirements from uprating of Units 3 and 4 (FPL 2012-TN3439). This required monitoring of surface-water and groundwater elevations and water quality to determine the dynamic exchange processes that influence the CCS's functioning. Figure 2-24 shows the locations of the surface-water monitoring stations used for the uprate study (FPL 2012-TN3439). As part of the site certification process for the State of Florida, FPL is conducting a monitoring study of the IWF to evaluate the horizontal and vertical hydrologic exchanges with the surrounding environment. For the study, FPL installed 20 surface-water monitoring stations at locations surrounding the IWF.

Both the Consent Agreement (Miami Dade County v. Florida Power & Light 2015-TN4505) and Administrative Order (FDEP 2014-TN4144) may require additional surface-water monitoring. However, details about the monitoring required are not available at this time.

2.3.4.2 Groundwater Monitoring

Monitoring of groundwater occurs on the Turkey Point site in accordance with existing National Pollutant Discharge Elimination System and industrial stormwater permits associated with existing FPL facilities. Additional groundwater monitoring was performed to support the license application for Units 6 and 7, and to assess the impacts of the IWF cooling canals on groundwater as required by the Florida State Conditions of Certification for FPL's Units 3 and 4 Uprate Project.

Pre-application monitoring of the groundwater system underlying the proposed site for Units 6 and 7 included 10 monitoring well pairs (20 wells) installed in 2008 across the proposed plant area for measuring groundwater levels. Each pair included a well completed in the Miami Limestone/Key Largo Limestone at depths ranging from 14 to 28 ft and a well completed in the Fort Thompson Formation at depths ranging from 85 to 110 ft below ground surface. Water-level data were collected from these wells from June 2008 through June 2010 and are presented in Section 2.3 of the ER (FPL 2014-TN4058).

As discussed in Section 2.3.3.2 above, FPL installed 42 wells in 14 well clusters with monitoring wells completed in the shallow, intermediate, and deep portions of the Biscayne aquifer at each cluster to support FPL's Units 3 and 4 Uprate Monitoring Project (FPL 2012-TN3439). Monitoring well cluster locations are shown in Figure 2-25. Data on water levels and groundwater chemistry have been collected from these wells on an ongoing basis since June 2010 to support the Florida State Conditions of Certification for the proposed uprate of Turkey Point Units 3 and 4. The water quality of Biscayne Bay and the cooling canals and precipitation were also measured. Groundwater level and electrical conductance measurements were collected by an automated system every 15 minutes. And other parameters were measured on a periodic basis. This effort has resulted in automated near-continuous measurements of groundwater electrical conductivity, and periodic measurements of several other parameters, including major ions, nutrients, trace elements, gross alpha, tritium, deuterium, and isotopes of oxygen, strontium, and carbon.

Regional aquifer monitoring data are also routinely collected by the USGS and the SFWMD. Wells currently monitored the within 6 mi of the proposed plant location are shown in Figure 2-26 (USGS 2014-TN3575). Some of these wells are also included in the uprate monitoring well network (Figure 2-25).

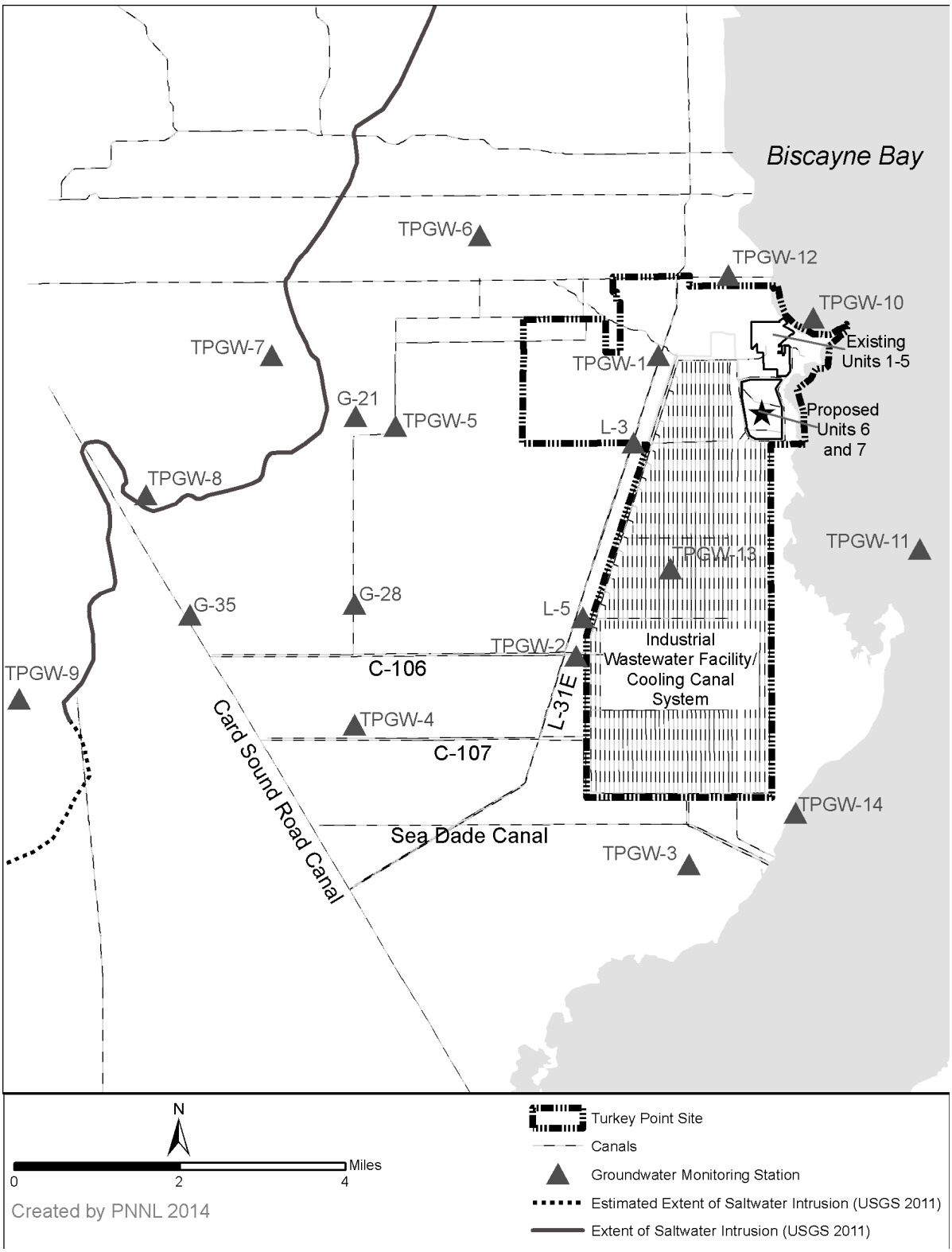


Figure 2-25. Locations of Groundwater Monitoring Well Clusters for the FPL Units 3 and 4 Uprate Project (FPL 2012-TN3439; USGS 2011-TN1801)

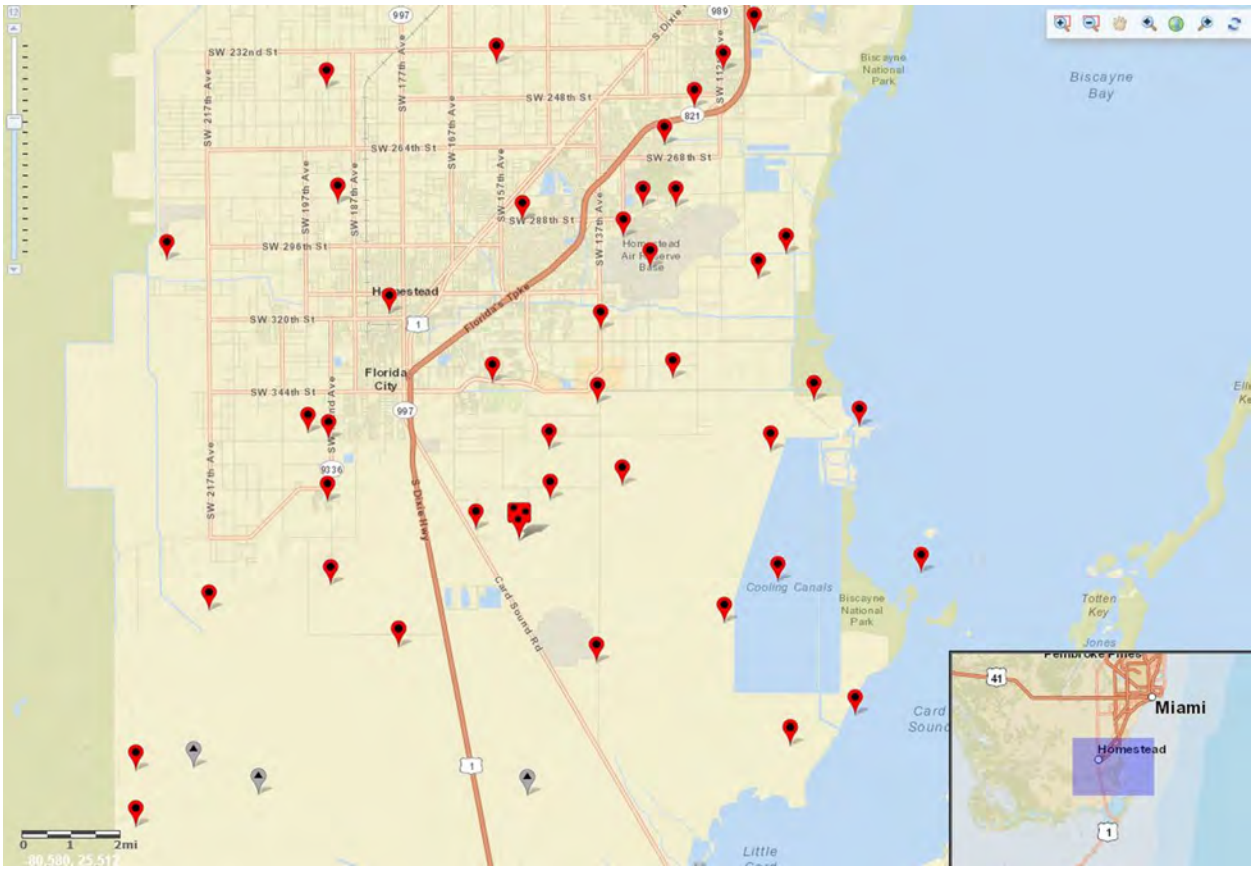


Figure 2-26. USGS Groundwater Monitoring Locations (red markers) within 6 Miles of the Proposed Plant Location (active in April 2014) (USGS 2014-TN3575)

Information from the testing of deep-injection Exploration Well 1 (EW-1) showed that the Upper Floridan aquifer within the Suwanee Limestone and upper part of the Avon Park Formation at the Turkey Point site contains brackish water with TDS concentrations less than 10,000 mg/L. The deeper Avon Park Formation below the MCU contained saline water with TDS concentrations higher that 10,000 mg/L. These intervals will be monitored at all of the deep-injection monitoring wells as part of the requirements of the FDEP Underground Injection Control (UIC) program. Boulder Zone injection interval and the deepest overlying USDW aquifer (Upper Floridan aquifer) monitoring data are required to be submitted to the FDEP on a monthly basis for permitted injection and monitoring wells at wastewater injection sites.

Both the Consent Agreement (Miami Dade County v. Florida Power & Light 2015-TN4505) and Administrative Order (FDEP 2014-TN4144) may require additional groundwater monitoring. However, details about the monitoring required are not available at this time.

2.4 Ecology

This section describes the terrestrial and aquatic ecology of the site and vicinity that might be affected by the design, siting, building, operation, and maintenance of proposed Turkey Point Units 6 and 7. Detailed descriptions are provided where needed to support the analysis of potential environmental impacts from the building, operation, and maintenance of new nuclear

power generating facilities and the new transmission line and pipeline rights-of-way. These descriptions support the evaluation of mitigation activities identified during the EIS analyses to avoid, reduce, minimize, rectify, or compensate for potential impacts. Descriptions are also provided to help compare the alternative sites to the proposed Turkey Point site. Monitoring programs for terrestrial and aquatic environments are also described.

2.4.1 Terrestrial and Wetland Ecology

This section identifies terrestrial and wetland ecological resources and describes species composition and other structural and functional attributes of terrestrial biotic assemblages that could be affected by the building, operation, and maintenance of the proposed Turkey Point Units 6 and 7. It also identifies "important" terrestrial species and resources, such as Federally and State-listed plants or wildlife, wildlife sanctuaries and natural areas as defined by the NRC in NUREG−1555 (NRC 2000-TN614) that might be affected by the proposed action. The purpose of this section is to describe current ecological communities and existing conditions. Some of the information presented in this section is based on FLUCFCS codes introduced in Section 2.2. Maps displaying FLUCFCS codes provide useful information about the composition and distribution of terrestrial habitats and wetlands. However, FLUCFCS codes and maps serve primarily to reflect land use and land cover and provide only an approximation of terrestrial habitat. The distribution of FLUCFCS codes indicative of wetlands (the 600-series codes) does not necessarily align with the presence or distribution of jurisdictional wetlands as defined by the USACE.

2.4.1.1 Terrestrial and Wetland Communities of the Site and Vicinity

Turkey Point Site

Turkey Point site is on the western shore of Biscayne Bay, which opens to the Atlantic Ocean. It is in the Mangrove and Coastal Glades physiographic province (McPherson and Halley 1996-TN98). This province occurs along the southern Florida coast in a band that narrows significantly northward from Biscayne Bay. The Mangrove and Coastal Glades province is defined as a broad band of wetlands at or near sea level that is often flooded by tides or freshwater runoff (McPherson and Halley 1996-TN98). The name of this province is derived from its abundance of three species of mangrove trees: black (*Avicennia germinans*), white (*Laguncularia racemosa*), and red (*Rhizophora mangle*). The descriptions of terrestrial habitats provided in this section are derived from different data sources. FLUCFCS maps were used to characterize lands of the Turkey Point property and lands within the 6 mi vicinity. Habitats within the proposed Units 6 and 7 area were characterized during an ecological assessment conducted in 2008 (FPL 2014-TN4058).

The ecology in southern Florida is directly tied to the hydrology and natural seasonal hydrologic fluctuations that occur in this region. Wetlands are the predominant landscape feature of southern Florida. The low and flat elevation, proximity to Biscayne Bay, and high average rainfall result in the predominance of wetlands. Terrestrial land cover on the Turkey Point site is presented in Table 2-2. Land on the Turkey Point site is used primarily for electric power facilities, and facilities for existing Turkey Point Units 1−5 occupy approximately 5,672 ac, composing almost half of the Turkey Point site. Freshwater marsh is the predominant natural land cover on the Turkey Point site.

Wetlands are also the predominant habitat type within the proposed Units 6 and 7 plant area and include mudflats, dwarf mangrove, mangrove heads, open water, canals, and wetland spoil areas (Figure 2-27). Most of the plant area comprises mudflats that are inundated annually for 3 to 4 months and are sparsely vegetated with saltwort (*Batis maritime*), sea-oxeye (*Borrichia frutescens*), wood glasswort (*Salicornia virginica*), and dwarf glasswort (Salicornia begelovii) (FPL 2014-TN4058). Dwarf mangrove habitats contain stunted mangroves of the three species present (black, white, and red), but individual plants are stunted due to high salinities and fluctuating water levels. Mangroves that occupy approximately 12 ac of the proposed Units 6

and 7 plant area are remnant mangrove populations found within historical tidal creeks that were disconnected from Biscayne Bay during previous development; they are known as mangrove heads (FPL 2014-TN4058). Open waters, adjoining cooling canals of the IWF, occupy approximately 8 ac and contain scattered widgeon grass (*Ruppia maritima*) and shoal grass (*Halodule wrightii*) patches (FPL 2014-TN4058). Wetland spoil areas totaling about 9 ac occur adjacent to remnant canals and contain mangrove species as well as buttonwood (*Conocarpus erectus*) and non-native Australian pine (*Casuarina equisetifolia*) (FPL 2014-TN4058).

The proposed project area also contains highly disturbed upland habitats including roadways raised with fill and spoil piles (FPL 2010-TN272). The raised fill areas contain maintained grasses as well as poisonwood (*Metopium toxiferum*), buttonwood, wild sage (*Lantana involucrata*), ground orchid (*Bletia* species), sea grape (*Coccoloba uvifera*), and the exotics Brazilian pepper (*Schinus terebinthifolius*) and Australian pine (FPL 2014-TN4058). Miami-Dade County Code (Part III, Chapter 24, Section 24.49) (Miami-Dade Code of Ordinances 24-49-TN1168) mandates protection of specific native tree species and protections do not include poisonwood, Brazilian pepper, Australian pine, or Melaleuca. Results of a tree survey, that documented all trees with either a diameter greater than 3 in. or a total height greater than 12 ft, indicate over 1,300 individual stems of 43 species of trees occur in survey areas encompassing the project area (FPL 2011-TN1312). Trees generally occur on artificial raised fill areas created by past construction activities that constitute most uplands areas on the site, such as raised roadsides, canal berms, and undeveloped portions of raised areas (FPL 2011-TN1312). FPL tree survey results do not include wetland trees such as buttonwood or the three mangrove species (FPL 2011-TN1312) even though they are defined and protected as such by Miami-Dade County (Miami-Dade Code of Ordinances 24-49-TN1168). Mangroves and other wetland trees are regarded and regulated as wetlands in this EIS.

Land-cover classes in the vicinity of the Turkey Point site are presented in Table 2-3. Most lands within 6 mi are classified as wetlands. Most of the uplands support forest, occupying 23 percent of the nearby landscape. Although much of the forested habitat in the vicinity is dominated by non-native tree species, even these trees provide valuable habitat to local wildlife. Previously disturbed or developed land-use classes within the Turkey Point site vicinity include agriculture and urban development as well as lands classified as “other,” which includes open water and barren land. Although considerable industrial and residential development has occurred within Miami-Dade County, the Turkey Point site is in a relatively undeveloped and rural area where most lands within 6 mi have not been developed into agriculture or urbanized.

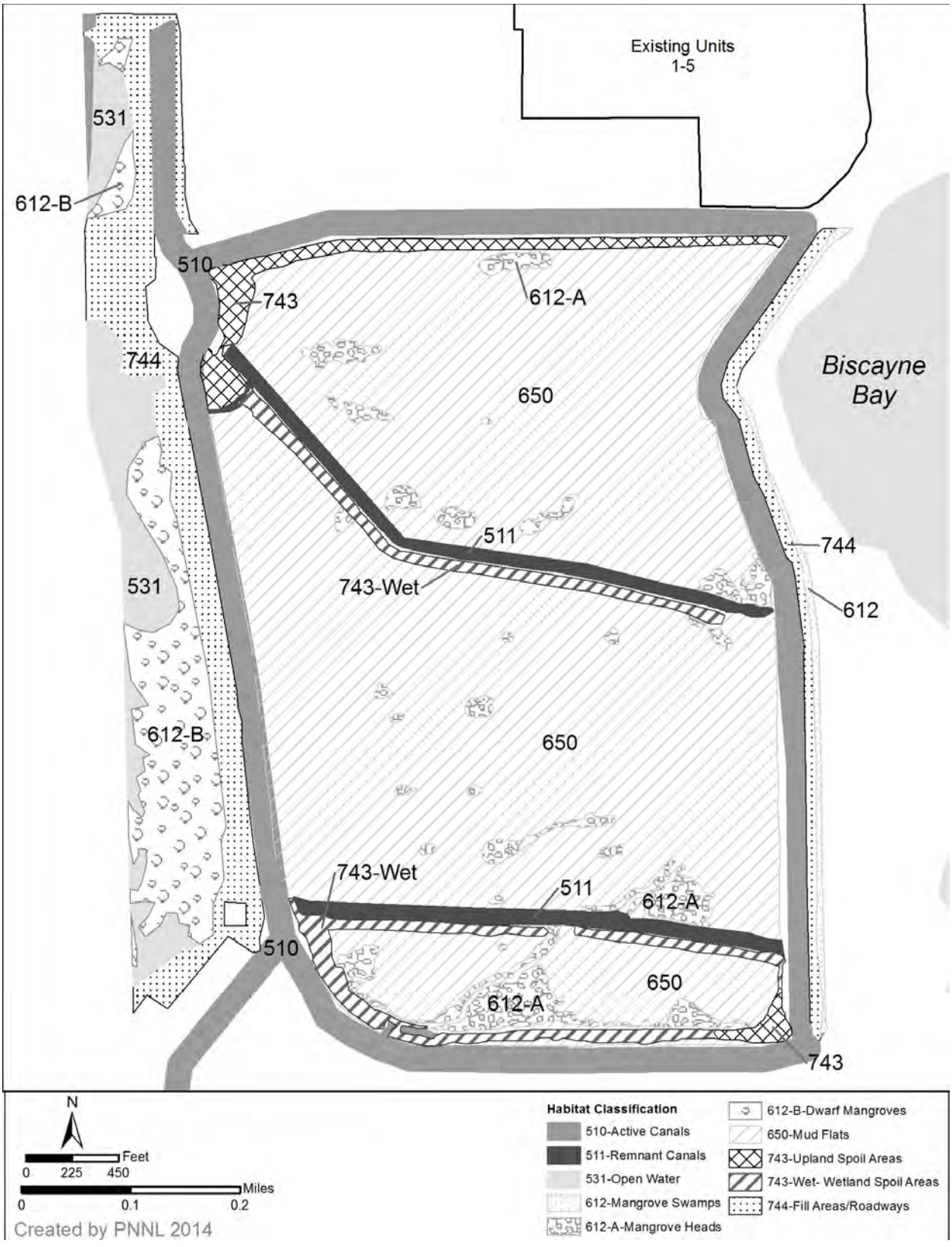


Figure 2-27. Habitat Classification at the Proposed Units 6 and 7 Plant Area (FPL 2014-TN4058)

Wildlife

Ecosystems within South Florida support rich wildlife diversity, including approximately 350 bird, 50 reptile, 40 mammal, and 15 amphibian species (NPS 2015-TN4437). Surveys to characterize wildlife on the Turkey Point site and in the vicinity were conducted in 1972 and in 2005 through 2009 (FPL 2014-TN4058). The most recent surveys included limited pedestrian and vehicular surveys to determine the relative abundance of migratory and resident bird species. Most of the project area was surveyed, including the IWF, the plant area, two mangrove areas immediately north of the plant area, the radial collector well site, the originally proposed reclaimed water-treatment site, and a small portion of the proposed access road west of the IWF (FPL 2009-TN1334).

Wildlife species observed during these surveys were those expected to occur in the types of habitats present in South Florida. Most of the site comprises wetlands, and wetland birds are the predominant fauna. Forty-six species of birds within 11 bird families were observed, 35 of which are commonly associated with wetlands (FPL 2010-TN272). Wading birds (*Pelicaniformes*) are common and abundant on the mudflats and along the canals on the site and include various herons, egrets, and ibis. Shorebirds (*Charadriiformes*) are also strongly represented by sandpipers, plovers, and numerous others (FPL 2010-TN272). Historical data and other observations indicate at least 38 additional bird species have been observed on the site (FPL 2014-TN4058).

During April 2009, surveys were also conducted to determine small mammal, amphibian, and reptile presence and relative abundance within areas that would be disturbed by building proposed Units 6 and 7 (FPL 2009-TN1444). Small mammals were trapped and identified using baited live traps. Reptiles and amphibians were captured using coverboards, minnow traps, and dip nets, and were also recorded during pedestrian searches. Habitats surveyed included marsh, mangrove, and ditches. Reptiles were observed, including the American crocodile (*Crocodylus acutus*), eastern diamondback rattlesnake (*Crotalus adamanteus*), the non-native green iguana (*Iguana iguana*), and an unidentified gecko (*Hemidactylus* sp.). In addition, three species of anole lizards (*Anolis* sp.), the Florida softshell turtle (*Apalone ferox*), and five snake species were observed. Amphibians were also observed, including nine frog species (FPL 2014-TN4058). An eastern narrow-mouthed toad (*Grastrophryne carolinensis*) was found in April 2009 and the southern toad (*Bufo terrestris*) was also observed (FPL 2009-TN1334).

Four mammal species, the cotton rat (*Sigmodon hispidus*), black rat (*Rattus rattus*), raccoon (*Procyon lotor*), and marsh rabbit (*Sylvilagus palustris*), were observed. White-tailed deer (*Odocoileus virginianus*), opossum (*Didelphis virginiana*), and eastern cottontail (*Sylvilagus floridanus*) have also been observed on the Turkey Point site. Although numerous bat species occur in South Florida, no bats were observed in 2009 during a single 2-hour bat survey conducted between mangrove habitat and the existing facilities, and bat distribution and abundance is unknown (FPL 2014-TN4058). As in most areas of South Florida, bats presumably occur within the 6 mi vicinity of Turkey Point.

Immediately to the east and adjoining the boundary of the Turkey Point site is Biscayne National Park, which encompasses approximately 270 mi^2 and includes the mangrove forests along the mainland shoreline, the southern portion of Biscayne Bay, barrier island keys, and the nearshore waters out to approximately 14 mi from the shoreline (NPS 2011-TN103). Biscayne

National Park is recognized for both terrestrial and aquatic resources as well as cultural history, and management of the park is focused on preservation of natural and cultural resources while providing recreation (NPS 2011-TN103). The Everglades National Park, the largest subtropical wilderness in the United States, is approximately 12 mi west of the Turkey Point site. The Everglades National Park encompasses almost 1.5 million ac and is recognized for its rich biological diversity. It has been designated an International Biosphere Reserve, World Heritage Site, and Wetland of International Significance. Management of the Everglades National Park balances the preservation of these resources while providing recreation (NPS 1979-TN104). Extensive canal and levee systems constructed for agricultural purposes have altered surface-water flow and have changed the ecology of South Florida, including Biscayne National Park and Everglades National Park. Goals of the CERP include restoration of the Everglades ecosystem (CEPP 2011-TN107).

2.4.1.2 Terrestrial Resources – Associated Offsite Facilities

Reclaimed Water Pipeline Corridor

Units 6 and 7 would use reclaimed wastewater for cooling purposes and a reclaimed water pipeline would convey this water to the site. The 9 mi long corridor for this pipeline would include a 6.5 mi section that would be installed within the Clear Sky to Davis transmission line corridor. The remaining 2.5 mi would be installed within a new corridor. The 134 ac of land cover within the entire 9 mi corridor that would be affected consists of mostly developed lands and wetlands, including mostly mangrove swamps, mixed wetland hardwoods, and freshwater marsh (Table 2-11).

Table 2-11. Acreage of Land-Cover Classes within the Proposed Units 6 and 7 Offsite Reclaimed Water Pipeline Corridor

FLUCFCS Code[(a)]	Code Description	Acres
166	Holding ponds	0.56
215	Field crops	0.13
241	Tree nurseries	13.29
241-W	Wet tree nurseries	0.16
242	Sod farms	0.02
310	Hebaceous (dry prairie)	1.07
320	Shrub and brushland	0.5
422	Brazilian pepper	0.27
510	Canals	0.98
511	Ditches	0.72
612	Mangrove swamps	17.15
612/619	Mangrove swamps/exotic wetland hardwoods	4.46
612-B	Dwarf mangroves	2.36
617	Mixed wetland hardwoods	10.65
641	Freshwater marshes	7.09
740	Disturbed land	1.68
744	Fill areas (highways and railways)	0.02
814	Roads and highways	55.31
831	Electrical power facilities	9.8
834	Sewage treatment	6.98
835	Solid waste disposal	0.46
	Total	133.66

(a) FLUCFCS = Florida Land Use, Cover, and Forms Classification System.

Potable Water Pipeline Corridor

A potable water pipeline would also be built within a 10 mi long corridor from the MDWASD facility to support the proposed units. This corridor would lie within the footprint of other proposed access roadway improvments and existing roadway medians (FPL 2014-TN4058; FPL 2015-TN4442).

Transmission Line Corridors

FPL has proposed East and West corridors to service proposed Units 6 and 7. Two different routes for the western corridor, the Preferred and the Consensus, have also been proposed. Both the Preferred and Consensus routes are redundant over a substantial portion of their lengths. However, the routes diverge for a portion of the distance between the Clear Sky and Levee substations (Figure 2-5).

The West Preferred corridor between the Clear Sky and Levee substations traverses a landscape of mostly agriculture, wetlands, and open water (Table 2-4) and includes a segment along the eastern boundary of Everglades National Park. Wetland cover types include mostly freshwater marshes, dwarf mangroves, mixed wetland hardwoods, exotic wetland hardwoods, wet prairies, mangrove swamps, and sawgrass. Wetland plant communities in this vicinity have been adversely affected by previous development immediately adjacent to the corridor, including the effects of habitat and hydrologic modifications, increased nutrients, and introduction of exotic plant species (NPS 2015-TN4437). Upland habitats include shrub and brushland along with dry prairie. Two access roads would also be required to access the West Preferred corridor. The route for the Krome Avenue access road traverses freshwater marsh, exotic wetland hardwoods, streams and waterways, and existing roads. Land within the proposed Tamiami Trail access road consists of wetlands and existing roads.

Land within the West Consensus corridor consists mostly of wetlands and includes sawgrass, exotic wetland hardwoods, wet prairie, freshwater marsh, and mixed wetland shrubs. Wetlands here have also been adversely affected by previous development, and exotic plants are abundant in previously disturbed locations (NPS 2015-TN4437). The abundance of non-native and invasive wildlife species would also be expected to be greater in this corridor than in the West Preferred corridor due to its proximity to disturbance from previous development, possibly reducing the overall habitat quality (FWS 2008-TN4438). The West Consensus corridor also contains uplands including dry prairie. Four new access roads would be needed if the west transmission line is built within this corridor. An access near NW 12th Street would occupy rock quarry and agricultural lands. Access to the West Consensus corridor from Tamiami Trail would occur through wetlands composed mostly of exotic wetland hardwoods. Access near the L-31 Canal would occur over or through dikes, levees, and canals. An access road near NW 88th Street would occupy Australian pine cover, freshwater marsh, and exotic wetland hardwoods in addition to small amounts of other land cover. The Levee to Pennsuco segment of both proposed west transmission line corridors is mostly wetlands and previously developed land.

The Clear Sky to Davis segment of the East corridor occupies mostly agriculture land cover. Wetland types are almost exclusively mangrove swamp. Dry prairie is the predominant upland

cover. The Davis to Miami segment lies within an urban landscape. No wetlands are present and very little natural cover remains.

In addition to transmission lines, four substations would be modified in support of proposed Units 6 and 7. A new substation, the Clear Sky substation, is also proposed to be constructed on the Units 6 and 7 project area. All existing and proposed transmission facilities are or would be within Miami-Dade County.

2.4.1.3 Important Terrestrial Species and Habitats – Site and Vicinity

This section describes Federally and State-listed, proposed threatened and endangered terrestrial species, candidate species for listing, commercially and recreationally valuable species, species critical for ecological structure and function, and biological indicatory species as defined as important by the NRC in NUREG−1555 (NRC 2000-TN614). Designated and proposed critical habitat that may occur in the vicinity of the site is also discussed. Only species with recorded occurrences in Miami-Dade County (FFWCC 2011-TN158; FNAI 2014-TN3668) and species having the potential to occur in Miami-Dade County are discussed (FWS 2012-TN117). Species identified by FPL as being commercially or recreationally valuable are also included in this section (FPL 2014-TN4058).

Federally Listed Species

Thirty-nine terrestrial species listed or proposed to be listed by the U.S. Fish and Wildlife Service (FWS) as Federally threatened, endangered, or candidates for listing as threatened or endangered are known to occur in Miami-Dade County (FWS 2012-TN117). Almost half (18) of this list consists of plants, and the rest of the list includes 12 birds, 2 mammals, a single reptile, and 5 invertebrates (Table 2-12). Other listed species that occur in the aquatic environment, including the American crocodile, are discussed in the aquatic ecology sections.

Table 2-12. Federally Listed Species Known to Occur within Terrestrial Habitats of Miami-Dade County or in the Vicinity of the Turkey Point Site

Common Name	Scientific Name	Federal Status[a,b]	State Status[c]
Plants			
Crenulate lead-plant	*Amorpha herbacea var. crenulata*	LE	SE
Blodgett's silverbush	*Argythamnia blodgettii*	PT	SE
Florida brickell-bush[d]	*Brickellia eupatorioides (mosieri) var. floridana*	LE	SE
Deltoid spurge	*Chamaesyce deltoidea ssp. deltoidea*	LE	SE
Pinelands (spurge) sandmat[d]	*Chamaesyce deltoidea ssp. pinetorum*	C	SE
Garber's spurge	*Chamaesyce garberi*	LT	SE
Cape Sable thoroughwort	*Chromolaena frustrata*	LE	SE
Florida semaphore cactus	*Consolea (Opuntia) corallicola*	LE	SE
Okeechobee gourd	*Cucurbita okeechobeensis ssp. okeechobeensis*	LE	
Florida prairie-clover	*Dalea carthagenensis floridana*	C	SE

Table 2-12. (contd)

Common Name	Scientific Name	Federal Status[a, b]	State Status[c]
Florida pineland crabgrass	*Digitaria pauciflora*	C	SE
Small's milkpea	*Galactia smallii*	LE	SE
Beach jacquemontia	*Jacquemontia reclinata*	LE	SE
Sand flax[d]	*Linum arenicola*	PE	SE
Carter's small-flowered flax	*Linum carteri carteri*	LE	SE
Tiny polygala	*Polygala smallii*	LE	SE
Everglades bully	*Sideroxylon reclinatum ssp. austrofloridense*	C	
Florida filmy or bristle fern	*Trichomanes punctatum ssp. floridanum*	LE	SE
Invertebrates			
Florida leafwing butterfly	*Anaea troglodyte floridalis*	LE	
Miami blue butterfly	*Cyclargus thomasi bethunebakeri*	LE	ST
Schaus swallowtail butterfly	*Heraclides [Papilio] aristodemus ponceanus*	LE	SE
Bartram's scrub-hairstreak butterfly	*Strymon acis bartrami*	LE	
Stock Island tree snail	*Orthalicus reses reses*	LT	ST
Miami tiger beetle	*Cicendelidia floridana*	PE	
Reptiles			
Eastern indigo snake	*Drymarchon corais couperi*	LT	ST
Birds			
Cape Sable seaside sparrow	*Ammodramus maritimus mirabilis*	LE	SE
Florida grasshopper sparrow	*Ammodramus savannarum floridanus*	LE	SE
Florida scrub jay	*Aphelocoma coerulescens*	LT	ST
Rufa red knot	*Calidris canutus rufa*	LT	
Ivory-billed woodpecker	*Campephilus principalis*	LE	SE
Piping plover	*Charadrius melodus*	LT	ST
Kirtland's warbler	*Dendroica kirtlandii*	LE	SE
Wood stork	*Mycteria americana*	LT	SE
Red-cockaded woodpecker	*Picoides borealis*	LE	SE
Audubon's crested caracara	*Polyborus plancus audubonii*	LT	ST
Everglade snail kite	*Rostrhamus sociabilis plumbeus*	LE	SE
Bachman's warbler	*Vermivora bachmanii*	LE	SE
Mammals			
Florida bonneted bat	*Eumops floridanus*	LE	ST
Florida panther	*Puma (=Felis) concolor coryi*	LE	SE

(a) Federal status: confirmed 1/14/2014; (FWS 2014-TN2918). State status confirmed 1/14/2014; FNAI 2014-TN3668).
(b) Federal Status: LE = Federal endangered; LT = Federal threatened; C = Federal candidate.
(c) State status: FE = Federally designated and endangered; PE = Federally proposed endangered; FT = Federally designated threatened; PT = Federally proposed threatened; SE = State endangered; ST = State Threatened; blank = no status. All Federally listed species that occur in Florida are not included on the State of Florida's list as Federally designated species in addition to the State listing process (FFWCC 2011-TN158)
(d) Species detected in surveys of plant site and/or transmission line corridor right-of-way (Tables 2.4-1 and 2.4-4 in the ER) (FPL 2014-TN4058)

Source: FWS 2014-TN2918

Terrestrial species listed as endangered or threatened under the Federal Endangered Species Act of 1973, as amended (ESA) (16 U.S.C. § 1531 et seq.) (TN1010) are under the jurisdiction of the FWS. The staff has prepared a biological assessment of the Federally listed threatened and endangered terrestrial plant and animal species that potentially could occur at or near Turkey Point site (Appendix F).

Plants

Crenulate Lead-Plant (*Amorpha herbacea var. crenulata*). This Federally and State-listed endangered species is found in eight sites within Miami-Dade County (FWS 2012-TN117; FNAI 2014-TN3668). The plant is a deciduous shrub that occurs in seasonally hydrated soils and in areas subject to frequent burning. It is found specifically in marl prairies (flatlands with marl over limestone substrate that are seasonally inundated) and wet pine rocklands (flatlands with exposed limestone substrate) (FWS 1999-TN136). FPL indicated this species was observed within the vicinity of the Turkey Point Property (FPL 2011-TN1374) and it is known to occur in six conservation areas near the Turkey Point site, although none occur within 6 mi of the site (Gann et al. 2012-TN137). It was not observed during survey of the transmission line corridors. Plant surveys were not conducted offsite within the potable water corridor or reclaimed water corridor. Land-cover classification indicates suitable habitat may not be present at these locations.

Blodgett's Silverbush (*Argythamnia blodgettii*). This species is proposed as Federally threatened and is also a State-listed endangered species within Miami-Dade County (FWS 2012-TN117; FNAI 2014-TN3668). It is a forb that occurs in sunny gaps and edges in pine rockland, rockland hammock, and coastal berm habitats (FNAI 2000-TN139). This spurge is found in 18 conservation areas in Miami-Dade and Monroe counties (Gann et al. 2012-TN137), including Biscayne National Park and Everglades National Park, which are adjacent to the Turkey Point site (FNAI 2012-TN1445). FPL acknowledged this species has been observed in the vicinity of the Turkey Point property (FPL 2011-TN1374) although it was not observed within the transmission line corridors during a ground survey, conducted following freezing weather, of a pine rockland between SW 300 and 304 Streets. Ground surveyors acknowledged this species has the potential to occur within this rockland (FPL 2009-TN657). It is unknown if it occurs at other offsite facilities as plant surveys were not conducted within the potable water corridor or reclaimed water corridor but land-cover classification information indicates suitable habitat may not be present at these locations.

Florida Brickell-Bush (*Brickellia eupatorioides [mosieri] var. floridana*). This plant is a Federally and State-listed endangered species found within Miami-Dade County (79 FR 52567 [TN4068]; FNAI 2014-TN3668). The Florida brickell-bush is a forb that inhabits pine rocklands with an open shrub layer, exposed limestone, and minimal leaf litter (FNAI 2000-TN139). It is endemic to the Miami Rock Ridge and has been observed in the vicinity of the Turkey Point property (FPL 2011-TN1374) and within transmission line corridor rights-of-way associated with proposed Turkey Point Units 6 and 7 (FPL 2014-TN4058). Critical habitat for this species has been designated within and adjacent to proposed transmission line corridors for Units 6 and 7 (80 FR 49845) (TN4493). Occurrence within the potable water corridor or reclaimed water corridor is unknown because there were no surveys conducted at these locations. Land-cover classification information indicates habitat suitable for this species may not be present at these locations.

Deltoid Spurge (*Chamaesyce deltoidea ssp. deltoidea*). This Federally and State-listed endangered species in Miami-Dade County (FWS 2012-TN117; FNAI 2014-TN3668) is a perennial forb endemic to Miami-Dade County and occurs in areas with open shrub canopy, exposed limestone, and minimal litter. It is most often associated with the edges of sand pockets; the plants grow both in sand and on oolitic limestone (Gann et al. 2012-TN137). Deltoid spurge is found in 10 conservation areas in Miami-Dade County north and west of the Turkey Point site (Gann et al. 2012-TN1322). FPL indicated deltoid spurge has been observed in the Turkey Point property vicinity, and habitat preferences indicate berms within the IWF created with limestone fill may provide suitable habitat. However, plant surveys were not conducted within the IWF. Surveys were also not conducted within the potable water corridor or reclaimed water corridor so occurrence at these locations is unknown. This species was not observed within the transmission line corridors.

Pineland Sandmat (*Chamaesyce deltoidea ssp. pinetorum*). This plant is proposed as a Federally threatened species and is also a State-listed endangered species that occurs within Miami-Dade County (79 FR 52567 [TN4068]; FNAI 2014-TN3668). It is a perennial forb found in pine rocklands with scattered shrubs and exposed limestone (FNAI 2000-TN139). It is endemic to South Florida and has been observed in the vicinity of the Turkey Point property (FPL 2011-TN1374) as well as in the transmission line corridor rights-of-way associated with proposed Turkey Point Units 6 and 7 (FPL 2014-TN4058). It has not been observed within any of the other offsite facility locations, but no surveys were conducted within the other offsite facilities. Land-cover classification information indicates suitable habitat may not be present at the other offsite facility locations.

Garber's Spurge (*Chamaesyce garberi*). This plant is a Federally listed threatened species and a State-listed endangered species in Miami-Dade County (FWS 2012-TN117; FNAI 2014-TN3668). The plant is a short-lived, perennial forb. It requires open sunny areas where frequent fires have maintained an open canopy. It has been found in the following four habitats: beach dune, coastal rock barren, hammock edge, and pine rockland (FWS 2007-TN3529). Garber's spurge is present in Everglades National Park west of the Turkey Point site (Gann et al. 2012-TN137). It is not known to occur within the proposed Units 6 and 7 plant area, the vicinity of the Turkey Point property, the transmission line corridors, and potable and reclaimed water corridors. However, a ground survey of a pine rockland between SW 300 and 304 Streets along the west transmission line corridor was done following freezing weather and ground surveyors acknowledged Garber's spurge has the potential to occur along the west transmission line corridor (FPL 2009-TN657). Disturbed upland habitats can be found at many proposed facility locations. Suitability of these uplands as habitat for Garber's spurge is unknown.

Cape Sable Thoroughwort (*Chromolaena frustrata*). This plant is a Federally listed endangered species that is found at rockland hammock edges, in coastal rock barrens, and in the ecotone between buttonwood hammock and coastal hardwood hammock (78 FR 63796) (TN4628). It does not occur in disturbed habitats (FWS 2010-TN1323). The Cape Sable thoroughwort is not known to occur within any of the proposed onsite or offsite project locations. Land-cover information does indicate hammock habitats are not present within any of the proposed locations, so the thoroughwort's unique habitat requirements likely preclude its occurrence within project areas.

Florida Semaphore Cactus (*Consolea [Opuntia] corallicola*). This cactus is a Federally listed endangered species and a State-listed endangered species within Miami-Dade County (FWS 2012-TN117; (78 FR 63796) (TN4628); FNAI 2014-TN3668). It is found in the buttonwood zone between rockland hammocks and coastal swamps (FNAI 2000-TN139). It was historically known to occur on coastal berms. It is not known to occur within the proposed Units 6 and 7 plant area but it has been recorded in Biscayne National Park (Gann et al. 2012-TN137). It also has not been observed at any offsite facilities, although surveys were limited to proposed transmission line corridors.

Okeechobee Gourd (*Cucurbita okeechobeensis ssp. okeechobeensis*). A Federally listed endangered species in Miami-Dade County (FWS 2012-TN117), this vine was locally common in pond apple (*Annona glabra*) forests that were formerly present within the region. The plant grows in swamps and wet soils along rivers and lakes; it appears to require fluctuating water levels where high water allows for seed dispersal and seeds germinate when water levels decline. Plants were seen north of Homestead in an agricultural area in 1965 (FWS 1999-TN136), but more recently the species appears to be restricted to nine sites in Glades and Palm Beach Counties (Gann et al. 2012-TN137). Okeechobee gourds have not been observed within any of the proposed project areas, on- or offsite. They have been observed growing in mowed power-line rights-of-way (FWS 1999-TN136), and land-cover information indicates the proposed transmission lines will cross through extensive wetland habitats. Wetland habitats also exist within the proposed potable water pipeline corridor and reclaimed water pipeline corridor (FPL 2014-TN4058). The occurrence of the Okeechobee gourd at any of these sites is unknown.

Florida Prairie-Clover (*Dalea carthagenensis floridana*). This plant is a Federally listed candidate species and a State-listed endangered species within Miami-Dade County (FWS 2012-TN117; FNAI 2014-TN3668). It is a shrub that inhabits pine rocklands, edges of rockland hammocks, coastal uplands, and marl prairies (FNAI 2000-TN139). Currently, there are only nine known populations (76 FR 66370) (TN1011), many of which are found on conservation lands north and west of the Turkey Point site, including Everglades National Park (Gann et al. 2012-TN137). The Florida prairie-clover was not observed within any of the proposed project sites. Suitable habitat is likely not present within the project sites within the Turkey Point property, and FPL determined the probability that this plant would occur within the Turkey Point vicinity was low (FPL 2011-TN1374). Offsite plant surveys were conducted within pine rocklands within proposed transmission line corridors, and those sites selected were remnant pine rocklands that would likely represent the most suitable habitats for the Florida prairie-clover.

Florida Pineland Crabgrass (*Digitaria pauciflora*). This plant is a Federally listed candidate species and a State-listed endangered species within Miami-Dade County. This grass species is endemic to South Florida where it is found in marl prairie and pine rockland habitats. Currently, it is found only in the Big Cypress National Preserve and Everglades National Park (Gann et al. 2012-TN137). FPL reported Florida pineland crabgrass was observed in the vicinity of the Turkey Point property (FPL 2011-TN1374). It has not been reported to occur within any of the offsite project areas including within selected pine rockland habitats along proposed transmission line corridors. Land-cover classification information indicates suitable habitat may not be present within the proposed Units 6 and 7 plant area and potable and reclaimed water pipeline corridors.

Small's Milkpea (*Galactia smallii*). This plant is a Federally and State-listed endangered species in Miami-Dade County (FWS 2012-TN117; FNAI 2014-TN3668). Small's milkpea is a small, perennial legume with small purple flowers and a prostrate habit. The plant occurs in the pine rocklands of southern Miami-Dade County, and in 2007 it was only known at two sites near Homestead (FWS 1999-TN136). A 1994 survey found the plant at seven conservation areas, and it may occur in two additional conservation areas (Gann et al. 2012-TN137). None of these areas are within 6 mi of the Turkey Point site. Small's milkpea was not observed within the proposed Units 6 and 7 plant area as well as at any of the proposed offsite project areas. However, conditions during ground survey of a pine rockland between SW 300 and 304 Streets within the west transmission line corridor was done following freezing weather. Ground surveyors acknowledged Small's milkpea has the potential to occur within a pine rockland between SW 300 and 304 Streets within the west transmission line corridor (FPL 2009-TN657).

Beach jacquemontia (*Jacquemontia reclinata*). This Federally and State-listed endangered species in Miami-Dade County (FWS 2012-TN117; FNAI 2014-TN3668) is a member of the morning glory family. It is restricted to beach coastal strand and maritime hammock habitats (FWS 1999-TN136) and requires open areas generally found on the crest and lee side of stable dunes. It is also found in disturbed openings in maritime hammocks, coastal strand, and coastal scrub habitat (FWS 1999-TN136). Fewer than 500 plants are known from nine sites, all of which are more than 6 mi from the Turkey Point site (FNAI 2000-TN139). Beach jacquemontia was not observed within any of the proposed project areas, although only limited surveys were conducted in selected habitats along the transmission line corridors. Land-cover classification information indicates suitable habitat is likely not present within any of the project areas.

Sand flax (*Linum arenicola*). A proposed Federally endangered species and a Florida State endangered species found in Miami-Dade County (FWS 2012-TN117; FNAI 2014-TN3668), this forb is found in pine rockland, marl prairie, and adjacent disturbed areas (FNAI 2000-TN139). Sand flax occurs in Homestead Bayfront Park, which is less than 1 mi north of the Turkey Point site boundary (FNAI 2000-TN139). FPL also noted sand flax was observed in the vicinity of the Turkey Point site (FPL 2011-TN1374). Sand flax was also observed during survey of selected rockland habitats associated with the proposed transmission line corridors, and suspected as occurring within a pine rockland between SW 300 and 304 Streets along the west transmission line corridor (FPL 2009-TN657). It was not observed within any of the other proposed project areas offsite, but ground surveys for plants were not conducted at these locations.

Carter's Small-Flowered Flax (*Linum carteri* var. *carteri*). This Federal and Florida State endangered species in Miami-Dade County (79 FR 52567 [TN4068]; FNAI 2014-TN3668) is an annual herb found in pine rockland habitat. It is found in several conservation areas north of the Turkey Point site (Camp Owaissa Bauer, Deering Estate at Cutler, R. Hardy Matheson Preserve, and Rockdale Pineland) (Gann et al. 2012-TN137). Although it was not observed during ground surveys of the proposed transmission lines (FPL 2009-TN657), ground surveyors acknowledged it has the potential to occur within a pine rockland between SW 300 and 304 Streets within the west transmission line corridor. Critical habitat for this species has been designated within and adjacent to proposed transmission line corridors for proposed Units 6 and 7 and includes 11.2 ac within an FPL utility corridor (80 FR 49845) (TN4493). FPL also confirmed it was observed in the vicinity of the Turkey Point site (FPL 2011-TN1374). The

occurrence, distribution, and abundance of Carter's small-flowered flax within the potable and reclaimed water pipeline corridors are unknown.

Tiny Polygala (*Polygala smallii*). The tiny polygala is a short-lived forb that is a Federally and State-listed endangered species found in Miami-Dade County (FWS 2012-TN117; FNAI 2014-TN3668). The only known populations occur in sand pockets of pine rocklands, open sand pine scrub, slash pine, high pines, and well-drained coastal spoil. Within these habitats it requires high light levels and open sand with little to no organic litter. As of 2007, there were only 11 known populations of tiny polygala all of which are found within about 6 mi of the Atlantic Coast (FWS 1999-TN136). FPL noted this species has been observed in the vicinity of the Turkey Point property (FPL 2011-TN1374). It was not observed growing within the proposed transmission line corridors (FPL 2009-TN657). The occurrence of the tiny polygala at any of the other proposed offsite facility locations is unknown.

Everglades Bully (*Sideroxylon reclinatum ssp. austrofloridense*). A Federally listed candidate species within Miami-Dade County (FWS 2012-TN117), the Everglades bully is a thorny shrub that is endemic to Miami-Dade County. It is found in marl prairie and pine rockland habitats, and in several conservation areas to the west of the Turkey Point site (Lucille Hammock and Frog Pond/L-31 N Transition Lands) as well as in Everglades National Park (Gann et al. 2012-TN137). The Everglades bully was not observed growing in the Turkey Point property vicinity or within selected pine rockland habitats within the proposed transmission line corridors. Occurrence of this species at other proposed facility locations is unknown.

Florida Bristle Fern (*Trichomanes punctatum ssp. floridanum*). This fern is a Federally and State-listed endangered species within Miami-Dade County (FWS 2012-TN117; FNAI 2014-TN3668). It is found in rockland hammocks, sinkhole habitats (Gann et al. 2012-TN137), and on tree trunks that are in deep shade (NatureServe 2010-TN140). Although it has been documented in eight conservation areas in Miami-Dade County and historically occurred in Everglades National Park (Gann et al. 2012-TN137), there are currently only six small known populations, including four in Miami-Date County (80 FR 60439) (TN4492). The Florida bristle fern has not been observed within the proposed transmission line corridors and its occurrence at other proposed facility locations is not expected.

Invertebrates

Florida Leafwing Butterfly (*Anaea troglodyta floridalis*). A Federally listed endangered species in Miami-Dade County (79 FR 47222) (TN3726), the Florida leafwing butterfly lives in pine rocklands of Long Pine Key in the Everglades National Park that contain the larval host plant, pineland croton (*Croton linearis*) (78 FR 49878) (TN2844). A single adult Florida leafwing was observed in the Navy Wells Pine Rockland that lies in the vicinity of the west transmission line corridors as recently as 2008 (78 FR 49878) (TN2844) and major portions of this land parcel has been designated as critical habitat for this species (79 FR 47180) (TN3727). However, it is only known to occur in Long Pine Key in Everglades National Park and is not known to occur within any of the proposed project areas. The proposed East transmission line corridor borders another rockland fragment located on SW 152nd Street that has been proposed as Florida leafwing critical habitat for almost one-half mile. In addition, the pineland croton was observed growing in a pine rockland fragment (King's Highway rockland) found within a segment of all

proposed west transmission line corridors between SW 300 and 304 Streets, and SW 202 and 204 Avenues (FPL 2009-TN657).This land parcel was originally proposed as critical habitat but was ultimately not designated as such (79 FR 47180) (TN3727).

Miami Blue Butterfly (*Cyclargus thomasi bethunebakeri*). This butterfly is a Federally listed endangered species and a State-listed endangered species within Miami-Dade County (FWS 2012-TN117; FNAI 2014-TN3668). Primarily a coastal species, the Miami blue inhabits tropical coastal hammocks, scrub, and pine rocklands (Daniels 2005-TN141). The butterfly relies on the pods of balloonvine (*Cardiospermum corindum*) and yellow nicker (*Caesalpinia bonduc*) as its primary larval hosts, and also possibly love-in-a-puff (*Cardiospermum halicacabum*). The butterfly now only occurs within the boundaries of Bahia Honda State Park on Bahia Honda Key in the Lower Florida Keys (Daniels 2005-TN141). Invertebrate surveys have not been conducted at any proposed project locations, so the occurrence of this butterfly at those locations is unknown. Pine rockland habitats exist within the proposed transmission line corridors.

Schaus Swallowtail Butterfly (*Heraclides aristodemus ponceanus*). This butterfly is a Federally and State-listed endangered species in Miami-Dade County (FWS 2012-TN117; FNAI 2014-TN3668). Schaus swallowtail butterflies historically occurred in hardwood hammocks from South Miami to Lower Matecumbe Key, Florida (FWS 1999-TN136). The species is currently known to occur in 13 areas on the mainland and the Upper and Middle Keys since reintroduction efforts between 1995 and 1997. The males prefer trails and hammock edges while the females more often fly within the hammock, occasionally venturing out to feed on flowers but typically staying within the hammocks proper. The species rarely feeds in areas open to direct sunlight. Schaus swallowtail butterfly uses torchwood (*Amyris elemifera*) and wild lime (*Zanthoxylum fagara*) to deposit its eggs. Torchwood is also the primary source of food for the Schaus butterfly (FWS 1999-TN136). Invertebrate surveys have not been conducted at any proposed project locations, so the occurrence of this butterfly at those locations is unknown. Hammock habitats can still be found in the vicinity of Turkey Point and the proposed transmission line corridors, but they are small remnants in widely scattered in a highly fragmented landscape.

Bartram's Scrub-hairstreak Butterfly (*Strymon acis bartrami*). A Federally listed endangered species in Miami-Dade County (79 FR 47222) (TN3726), the hairstreak is found in pine rockland habitats (NatureServe 2010-TN140) in forest openings (Opler et al. 2012-TN142). Bartam's hairstreak is known to occur on Long Pine Key in the Everglades National Park and is sporadically observed within pine rockland fragments near the Everglades National Park border including the Navy Wells and Richmond Pine Rocklands (78 FR 49878) (TN2844). The larval host plant is the pineland croton (*Croton linearis*); adults feed on nectar from the flowers of the narrow-leafed croton and shepherd's needle (*Scandix pectenveneris*) (Opler et al. 2012-TN142). Pineland croton was observed within a pine rockland known as the King's Highway Pineland along the west transmission line corridor (FPL 2009-TN657), and this pine rockland fragment has been designated as critical habitat for Bartam's scrub-hairstreak (79 FR 47180) (TN3727). The proposed East transmission line corridor also borders designated critical habitat for this species. A rockland fragment located on SW 152nd Street borders an existing transmission route that would be expanded for almost one-half mile. Another rockland fragment designated as critical habitat lies immediately adjacent another existing transmission line corridor northeast

of the Davis substation. The occurrence of Bartram's scrub-hairstreak at this location or any other proposed location is unknown, as invertebrate surveys have not been conducted at this or other proposed project locations.

Stock Island Tree Snail (*Orthalicus reses reses*). This snail is a Federally listed threatened species and a State-listed endangered species in Miami-Dade County (FWS 2012-TN117; FNAI 2014-TN3668). This species has two subspecies, *O. r. reses* is listed and *O. r. nesodryas* is not. This arboreal snail inhabits the hardwood hammocks of the Florida Keys (FWS 1999-TN136). The snails historically occurred on Stock Island and Key West, but appear to have been extirpated from their historic range. Snails have been introduced by snail collectors to areas outside of their historic range including Key Largo and the southernmost parts of the mainland. The Stock Island tree snail survives best in hammocks with smooth-barked native trees that support relatively large amounts of lichens and algae. The snails lay their eggs in a cavity dug into the soil humus, usually at the base of a tree (FWS 1999-TN136). Invertebrate surveys have not been conducted at any proposed project locations, so the occurrence of the Stock Island tree snail at any of the proposed project locations is unknown. Hammock habitats can still be found in the vicinity of Turkey Point and the proposed transmission line corridors, but they are small remnants widely scattered in a highly fragmented landscape.

Miami Tiger Beetle (*Cicendelidia floridana*). The Miami tiger beetle is a pine rockland obligate species proposed to be Federally listed as endangered (80 FR 79533) (TN4578). This species was believed to be extinct until its rediscovery in 2007 (Brzoska et al. 2011-TN4494). These tiger beetles are very habitat specific in that they are only found in open sand microhabitat within pine rocklands of the Miami Rock Ridge. The historic distribution of this species is also believed to be restricted to the Miami Rock Ridge because pine rocklands here are the only ones that provide pockets of open, sandy microhabitat. The northern end of the Miami Rock Ridge stretches approximately from the city of North Miami Beach south to SW 216th Street (80 FR 79533) (TN4578). Currently Miami tiger beetles are known to occur in two locations, one being within four contiguous parcels within the Richmond Pine Rocklands complex. The second location is undisclosed, but is a pine rockland within urbanized south Miami near the Richmond Pine Rockland complex (80 FR 79533) (TN4578). The overall population size of this species is exceptionally small. The Richmond Pine Rocklands complex borders SW 137th Avenue and Coral Reef Drive near their intersection. Approximately 0.46 mi of the proposed East transmission corridor also borders the Richmond Pine Rockland complex near this intersection.

Reptiles

Eastern Indigo Snake (*Drymarchon corais couperi*). A Federally and State-listed threatened species in Miami-Dade County (FWS 2012-TN117; FNAI 2014-TN3668), the eastern indigo snake is a large, black, non-venomous snake found primarily in upland habitats (FWS 1999-TN136). They have also been found in pinelands, tropical hardwood hammocks, and mangrove forests. The eastern indigo snake needs a mosaic of habitats to complete its annual cycle. In extreme South Florida (the Everglades and Florida Keys), eastern indigo snakes are found in tropical hardwood hammocks, pine rocklands, freshwater marshes, abandoned agricultural land, coastal prairie, mangrove swamps, and human-altered habitats (FWS 1999-TN136). Although the snake was previously observed within the EMB south of the IWF in 2004 and just south of

SW 344th Street/Palm Drive in 1982 (FPL 2014-TN4058), it was not observed during recent surveys of the Turkey Point site (FPL 2011-TN94). Eastern indigo snakes were also observed at two locations within the eastern transmission line corridor in 2011 (FPL 2012-TN1446). No road-killed eastern indigo snakes were observed during a year of monitoring in the vicinity of the western transmission corridors and the NPS determined the probability of occurrence within the vicinity of the corridor was low (NPS 2015-TN4437). Use of a wide range of habitats by this species makes it possible that it occurs at offsite locations. Occurrence of this snake within the potable water pipeline corridor and reclaimed water pipeline corridor is unknown.

American crocodile (*Crocodylus acutus*). See Section 2.4.2 for information about the American crocodile and the American alligator.

Birds

Cape Sable Seaside Sparrow (*Ammodramus maritimus mirabilis*). A Federally and State-listed endangered species in Miami-Dade County (FWS 2012-TN117; FNAI 2014-TN3668) and a bird of conservation concern (FWS 2008-TN4438), this medium-sized sparrow has a range that is restricted to the southern Florida peninsula (FWS 1999-TN136; FWS 2010-TN256). They are non-migratory residents of freshwater to brackish marshes of the Everglades region of Miami-Dade and Monroe counties. Their preferred nesting habitat appears to be a mixed marl prairie community that often includes muhly grass (*Muhlenbergia filipes*). The birds tend to avoid tall, dense, sawgrass-dominated communities and sites with permanent water cover (FWS 1999-TN136).

The species includes six subpopulations and the total estimated population is approximately 2,900 individuals (FWS 2010-TN256). Critical habitat designated for this species includes suitable habitat contained within five polygons that range in size from 4,800 to 39,000 ac that are south and west of the Turkey Point site. No Cape Sable seaside sparrows were observed during surveys at the Turkey Point site or the transmission line rights-of-way (FPL 2014-TN4058). Their well-known distribution and ecologically narrow habitat preference of this species very likely excludes the potential for this species to occur at any of the proposed project areas, as land-cover classification information indicates suitable habitat is not present.

Florida Grasshopper Sparrow (*Ammodramus savannarum floridanus*). This bird is a Federally and State-listed endangered species as well as a bird of conservation concern (FWS 2008-TN4438). Although listed by the FWS as occurring in Miami-Dade County, this species appears to be restricted to inland counties on the Florida peninsula and would not be expected to be found in Miami-Dade County (FWS 2012-TN284; FNAI 2000-TN139). Therefore, it is not expected to occur onsite or at any of the proposed offsite project locations.

Florida Scrub Jay (*Aphelocoma coerulescens*). This bird is a Federally and State-listed threatened species. Although listed by the FWS as occurring in Miami-Dade County, distribution information indicates the Florida scrub jay occurs in peninsular Florida, but only in counties north of Miami-Dade (FWS 2012-TN285). Therefore, it is also not expected to occur onsite or at any of the proposed offsite project locations.

Red Knot (*Calidris canutus rufa*). The red knot is a Federally threatened species (78 FR 60024) (TN3199) and a bird of conservation concern (FWS 2008-TN4438). As of 2008, the *rufa* subspecies is thought to have three biogeographically distinct populations, one of which winters in the Southeast United States including Georgia, South Carolina, and Florida (FWS 2013-TN3202). During the winter of 1993-1994 the Florida Fish and Wildlife Conservation Commission (FFWCC) evaluated wintering shorebird distribution and abundance along the entire coast of Florida. It determined the most important shorebird wintering areas in Florida are along the Gulf Coast and there are no important sites for wintering shorebirds along the Atlantic Coast of Miami-Dade County (Sprandel et al. 2000-TN3203). Like other shorebirds, red knots winter in Florida primarily along the central Gulf Coast and that is where survey efforts are focused (FWS 2013-TN3202; FWS 2012-TN146; Niles et al. 2008-TN143). Approximately 550 red knots were observed during the winter of 2007-2008 along a portion of the west coast of Florida between Anclote Key and Cape Romano (Niles et al. 2008-TN143). More than 3,000 red knots were counted in Florida in 2006, and more than 1,000 were counted again in 2011 (FWS 2013-TN3202). A single red knot was observed during March 2009 in the vicinity of the existing CCS (FPL 2009-TN1334). Red knot migration flight has been observed to be very long, and includes flight over the open ocean directly to South America from coastal Massachusetts. However, during migration red knots can occur at suitable habitats all along the coast (FWS 2013-TN3202) and could be expected to occasionally occur in small numbers at the Turkey Point site.

Habitats used by red knots in winter include coastal beaches, tidal mudflats, salt marshes, and peat banks; they also use mangrove and brackish-water lagoons (FWS 2012-TN146). Roosting habitat that provides areas above the highest tides that is free from excessive human disturbance may also be important. Beach habitat along the east border of the Turkey Point property could be suitable for wintering red knots, and the proposed Units 6 and 7 plant area could also provide mudflat habitat suitable for foraging or roosting. Suitable habitat is not present at any of the offsite locations.

Ivory-Billed Woodpecker (*Campephilus principalis*). Although this species was once believed to be extinct, its status has been revised to a Federally endangered species and would therefore be considered a Florida State-listed endangered species (see footnote “c” of Table 2-12). Although listed by the FWS as occurring in Miami-Dade County, distribution information indicates these woodpeckers do not occur in Florida (FWS 2012-TN286). Therefore, ivory-billed woodpeckers are not expected to occur onsite or at any of the proposed offsite project locations.

Piping Plover (*Charadrius melodus*). A Federally and State-listed threatened species in Miami-Dade County (FWS 2012-TN117; FNAI 2014-TN3668), the plover is a small, migratory shorebird that breeds only in three geographic regions of North American (FWS 1999-TN136). Piping plovers do not breed in Florida, but individuals from all three breeding populations do winter there and have been observed in Miami-Dade County. Their winter habitats include beaches, mudflats, and sandflats as well as barrier island beaches and spoil islands. Piping plovers seem to prefer landforms that provide tidal flats for foraging and open beaches for roosting within close proximity of each other. The migration pattern of piping plovers is not well documented, but birds should appear in Florida any time after late July through September and leave from late February to early April (FWS 1999-TN136). The piping plover is not known to occur on the Turkey Point property, and no piping plovers were seen during surveys of the Turkey Point site or the transmission line rights-of-way (FPL 2014-TN4058). Although the

piping plover has not been observed on the Turkey Point property, FPL acknowledged the probability of occurrence in the vicinity is moderate (FPL 2011-TN1374). The FFWCC has determined that piping plovers may occur within the proposed project area and have the potential to be affected (FFWCC 2012-TN520), and the proposed Units 6 and 7 plant area could provide suitable mudflat habitats for wintering piping plovers. Land-cover classification information indicates it is unlikely suitable habitat for the piping plover exists within the potable and reclaimed water pipeline corridors.

Kirtland's Warbler (*Dendroica kirtlandii*). This bird is a Federally listed endangered species in Miami-Dade County (FWS 2012-TN117; FNAI 2014-TN3668). The warbler nests in a relatively small area of central Michigan and migrates south to the Bahamas in winter. Its migratory pattern brings it to the east coast of Florida in spring and fall. Migrating Kirtland's have been observed in a variety of habitats including woodlands, scrub, fencerows, and vegetated yards. They appear to prefer dense vegetation less than 1.5 m in height (FWS 1999-TN136). Sightings in Florida have occurred between late April and early May, and early September and late November. No Kirtland's warblers were observed on surveys of Turkey Point site or the transmission line rights-of-way and this species is not known to occur on any of the onsite of offsite project areas (FPL 2014-TN4058). Preference of a range of low shrub habitats including landscaping in urbanized areas indicates suitable habitat may exist at offsite facilities but is not present within proposed onsite locations.

Wood Stork (*Mycteria americana*). This large, long-legged wading bird is a Federally and State-listed threatened species in Miami-Dade County (79 FR 37077 [TN4039]; FNAI 2014-TN3668). It breeds in South Florida (FWS 1999-TN136) using a variety of wetlands including freshwater and estuarine habitats for nesting, roosting, and foraging (FWS 1997-TN225). Wood storks typically construct their nests in medium to tall trees that occur in stands either in swamps or on islands surrounded by relatively broad expanses of open water and often reuse colony sites many years. Wood storks have abandoned colony locations when water-management practices removed surface water from beneath nesting trees that afforded protection from land-based predators. During the non-breeding season, wood storks occur in a wide variety of wetland habitats including freshwater marshes, stock ponds, shallow, seasonally flooded roadside or agricultural ditches, narrow tidal creeks, or shallow tidal pools (FWS 1999-TN136). Foraging occurs in almost any shallow, open water where prey items become concentrated (FWS 1997-TN225).

Wood storks do not nest at the Turkey Point site but have been observed there as recently as June 2008 using shallow portions of the IWF to forage and roost during winter (FPL 2014-TN4058). Three storks were also observed using shallow wetlands of the mangrove area immediately west of the proposed Units 6 and 7 plant area. Wood storks nest in four colonies within 5 mi of the proposed Turkey Point-Levee transmission line corridors including a major colony within Everglades National Park (FPL 2012-TN2043). The distance from the nearest colony (3b Mud East) to the proposed West Preferred corridor is approximately 1,576 ft. The distance from the proposed West Consensus corridor to the Tamiami East 1 colony is approximately 1,237 ft (NPS 2015-TN4437). Wood stork colony use varies among years, and is related to hydrologic conditions and food availability (FWS 1999-TN136). Although in some years no storks may nest at any of these colonies, nesting was observed at one or more of them during 4 out of every 5 years (Table 2-13). Although there is no designated critical habitat for

the wood stork, the FWS Southeast Florida Ecological Services Office recognizes a 0.47 mi (0.76 km) nest colony buffer and an 18.6 mi (29.9 km) core foraging area buffer around all known wood stork colonies that have had active nests within the last 10 years in South Florida (FWS 2010-TN226). None of the Turkey Point site occurs within the designated core foraging area for any wood stork colony (FWS 2014-TN3732). Portions of both the east and west transmission lines do intersect the core foraging areas of nine wood stork colonies (FPL 2012-TN2043). Impacts on suitable habitats within either of these buffer zones would require mitigation depending on the impact level (FWS 2010-TN226).

Table 2-13. Number of Nests at Wood Stork Colonies Located near the Proposed West Transmission Corridors from 1992–2011 (from NPS 2015-TN4437)

Year	Tamiami East 1	Tamiami East 2	Tamiami West (Coopertown)	3B Mud East
1992	20-150	0	30-100	0
1993	0	0	0	0
1994	0	0	0	0
1995	0	0	0	0
1996	0	0	150-180	0
1997	0	0	20-220	0
1998	0	0	0	0
1999	50	0	75-1374	0
2000	400	0	0	0
2001	0	0	1,400	0
2002	0	0	200-450	0
2003	0	0	20-400	0
2004	0	0	50	130
2005	0	0	5-110	20
2006	0	0	150-400	15
2007	0	0	50-75	0
2008	0	0	0	0
2009	10	20	240-1300	7
2010	15	30	650	0
2011	0	0	100-600	0

Red-Cockaded Woodpecker (*Picoides borealis*). This woodpecker is a Federally and State-listed threatened species. Although listed by the FWS as occurring in Miami-Dade County, distribution information indicates this species is not known to occur in Miami-Dade County and would not be expected to occur at or in the vicinity of any of the proposed project locations (FWS 2012-TN287).

Audubon's Crested Caracara (*Polyborus plancus audubonii*). A Federally and State-listed threatened species in Miami-Dade County (FWS 2012-TN117), the caracara is a resident, diurnal, and non-migratory species that occurs in Florida and parts of the southwestern United States. The Florida population commonly occurs in dry or wet prairie areas with scattered cabbage palms (*Sabal palmetto*) or in lightly wooded areas. Caracaras prefer to nest in cabbage palms surrounded by open habitats with low ground cover and a low density of tall or shrubby vegetation. Observation and radio-telemetry suggest there are three congregation areas in south-central Florida: one along the Kissimmee River north of SR-98, one north of

US-27 in Glades County, and one in the vicinity of Eagle Island Road in northern Okeechobee County (FWS 1999-TN136). This species is not known to occur at any of the proposed project locations and no caracaras were observed during surveys of the Turkey Point site or along transmission line rights-of-way (FPL 2014-TN4058). Suitable habitat is not present within the proposed Units 6 and 7 plant area or within the Turkey Point property. It is unknown if suitable habitat is present at any of the proposed offsite locations.

Everglades Snail Kite (*Rostrhamus sociabilis plumbeus*). This Federally and State-listed endangered species in Miami-Dade County (FWS 2012-TN117; FNAI 2014-TN3668) is a subspecies of a wide-ranging New World raptor found primarily in lowland tropical freshwater marshes in Central and South America. In the United States it is restricted to peninsular Florida in the watersheds of the Everglades, lakes Okeechobee and Kissimmee, and the upper St. Johns River. The Everglade snail kite was first listed as endangered in 1967 when the entire population was estimated to number in the dozens. Populations estimates approached 300 individuals in the late 1970s (Sykes 1979-TN4040), and 1,000 individuals in 1994 (FWS 1999-TN136). Recent Everglade snail kite population modeling indicates the population may have peaked at approximately 3,500 individuals in the late 1990s (Martin 2007-TN4041). More recently, the entire Florida population was dramatically decreasing in size and last estimated to number approximately 700 individuals in 2008 (Reichert et al. 2011-TN2467; NPS 2015-TN4437). Most of the Florida lands occupied by Everglade snail kites are located north and west of the proposed project areas. Lowland freshwater marsh habitat is present within much of the West Preferred corridor and Everglade snail kite nesting has also been previously observed along the section of the West Preferred corridor that lies along the east Everglades. During 2010–2012, at least 14 snail kites were observed by the FFWCC from the L-31 Levee where the preferred transmission line corridor would be built, including nests within 1,000 ft of both the Preferred and Consensus corridors (FFWCC 2013-TN2339; NPS 2015-TN4437). The FFWCC observed 31 snail kite nests during this same time frame immediately north in Water Conservation Area 3B that is bordered by the West Preferred route. Snail kite nests within Water Conservation Area 3B tend to be located along existing canals and kites forage across the local landscape (Reichert et al. 2011-TN2467). Snail kite nesting here represents one of few areas where successful nesting has occurred within the southern portion of the snail kites range (FFWCC 2013-TN2339). A snail kite was also observed within the EMB adjacent to the Turkey Point site (FPL 2014-TN4058). FWS-designated critical habitat for the snail kite exists in western Miami-Dade County beginning about 22 mi west of the Turkey Point site. None of the proposed project areas occurs within FWS-designated critical habitat. The FWS has also established a snail kite consultation area that includes much of southern Florida. Although Turkey Point site is excluded from this consultation area, major portions of the west transmission route lie within this designated area (FWS 2003-TN227). Land-cover classification information indicates freshwater marsh habitat also exists within the potable water pipeline corridor, and reclaimed water pipeline corridor. Suitability of these habitats for the Everglades snail kite is unknown.

Bachman's Warbler (*Vermivora bachmanii*). This bird is a Federally listed endangered species in Miami-Dade County (FWS 2012-TN117). Bachman's warbler breeds in the southeastern United States and winters in western Cuba and the Isle of Pines (FWS 1999-TN136). There are no breeding records for Florida where this species is an early spring and fall transient.

Bachman's warbler has not been observed in Florida since 1977 and not anywhere in the United States since 1988 (FWS 1999-TN136). Migratory records of this species are scarce, especially since their rapid decline in the early 1990s; as a result, habitat information is almost nonexistent. It is not expected to occur at any of the proposed project locations due to its apparent extirpation from the U.S.

Mammals

Florida Bonneted Bat (*Eumops floridanus*). This bat is a Federally listed endangered species that was originally proposed for listing as an endangered species in 2012 (77 FR 60750 [TN2276]; FWS 2012-TN117) and subsequently listed in October 2013. It is also a Florida State-listed endangered species within Miami-Dade County (FNAI 2014-TN3668). The bat is a year-round resident and roosts in palms and hollow trees, and may also use building roofs covered with Spanish tiles (FNAI 2000-TN139). They forage high in the air over natural and man-made landscapes (FNAI 2000-TN139). Florida bonneted bat calls were recorded near Homestead, Florida (FWS 2011-TN147), along the L-31 Canal in the vicinity of the West Preferred corridor, and at Zoo Miami located in the vicinity of the East Preferred corridor (78 FR 61004 [TN2659]; NPS 2015-TN4437) indicating this species is known to occur in highly urbanized landscapes in eastern Miami-Dade County. Very little is known about the distribution and abundance of this bat at any of the proposed project locations, but FPL acknowledged the Florida bonneted bat has been observed in the Turkey Point vicinity (FPL 2011-TN1374). All proposed project sites lie within the FWS Florida bonneted bat consultation area. Most of the proposed west transmission corridors and a portion of the east transmission corridor also occur within the FWS Florida bonneted bat focal area. Species consultation areas are used to determine whether formal consultation is required for a listed species, and specific guidance is provided in focal areas for making effect determinations provided in Appendix L. Suitable habitat (palms, hollow trees, and buildings roofed with Spanish tiles) does not appear to be abundant in the landscape around much of the project areas. Palms planted for landscaping are present around existing facilities within the Turkey Point site and may be more abundant where transmission line corridors, such as the Davis to Miami section of the East corridor, pass through previously developed residential and industrial areas.

Florida Panther (*Puma concolor coryi*). This subspecies of the mountain lion is a Federally and State-listed endangered species in Miami-Dade County (FWS 2012-TN117; FNAI 2014-TN3668). A small population of 100 to 160 individuals in South Florida represents the only known remaining wild population of this subspecies (FFWCC 2010-TN3438). The panther presently occupies one of the least-developed areas in the eastern United States; a contiguous system of large private ranches and public conservation lands in Broward, Collier, Glades, Hendry, Lee, Miami-Dade, Monroe, and Palm Beach Counties totaling more than 809,400 ha. The largest contiguous tract of panther habitat is in the Big Cypress Swamp/Everglades physiographic regions south and west of the proposed project areas. Telemetry surveys indicated panthers use a mosaic of habitats and although they prefer upland and wetland forested habitats during daylight hours, they also use grassland/prairie and, marsh-shrub, and agricultural habitats (Kautz et al. 2006-TN3440; Land et al. 2008-TN4439). Understory thickets of tall, almost impenetrable, saw palmetto (*Serenoa repens*) have been identified as important denning cover for panthers. The FWS recognizes much of Miami-Dade County and South Florida as a Florida Panther Focus Area (FWS 1999-TN136). Although most of the FPL Turkey

Point site lies outside of the focus area, lands immediately adjacent to the south and west are contained within the focus area and are also considered to be within the panther's primary zone (FWS 2007-TN230). No confirmed panther occurrences have been recorded within the proposed reclaimed and potable water pipeline corridors on the Turkey Point property (FPL 2014-TN4058). Radio-collared panthers have been recorded near both routes of the proposed west transmission line corridor between the Clear Sky and Levee substation locations, and in October 2013 an adult and kitten were observed traveling east along the corridor approximately 2 mi west of the Turkey Point site boundary in the Model Lands Area (SFWMD 2013-TN2917). A historical Florida panther den was also located near the proposed western transmission line corridor. The FFWCC has determined that the Florida panther may occur within the proposed project area and could potentially be affected (FFWCC 2012-TN520).

Puma (or mountain lion) (*Puma concolor*, all subspecies except *coryi*). This species is a Federally listed threatened species based on its similarity in appearance to the Florida panther (FWS 2012-TN117). The mountain lion occupies a wide variety of habitats including swamps, riparian woodlands, and broken country with good cover of brush or woodland (NatureServe 2010-TN140). The mountain lion is widely distributed throughout the United States but is not known to occur in Florida. This species will not be considered in further discussion.

Red wolf (*Canis rufus*). This species is a Federally listed endangered species in Miami-Dade County (FWS 2012-TN117; FNAI 2014-TN3668). The red wolf has been extirpated from its former range throughout the southeastern United States; it is not known to exist in Florida and now only exists in one major population in northeastern North Carolina, plus a couple of islands used for propagation (NatureServe 2010-TN140). This species will not be considered in further discussion.

State-Listed Species

The FFWCC is responsible for maintaining lists of rare species in Florida. Southern Florida is a biologically rich area with many endemic species (species naturally occurring nowhere else). In addition to Federally listed species there are 110 plant species (Table 2-14) and 23 animal species (Table 2-15) in Miami-Dade County that the FFWCC has listed as endangered, threatened, or as Species of Concern in addition to those that are also listed as endangered or threatened under the Federal ESA. Of these, FPL acknowledged one reptile, nine birds, a mammal, and 60 plant species were observed within the vicinity of the Turkey Point property (FPL 2011-TN1374). The least tern (*Sterna antillarum*), white-crowned pigeon (*Patagioenas leucocephala*), little blue heron (*Egretta caerulea*), roseate spoonbill (*Platalea ajaja*), snowy egret (*Egretta thula*), tricolored heron (*Egretta tricolor*), reddish egret (*Egretta rufescens*), and white ibis (*Eudocimus albus*) were previously observed on or adjacent to the proposed Units 6 and 7 plant area at the Turkey Point site (FPL 2014-TN4058). A single Florida burrowing owl (*Athene cunicularia floridana*) was observed once in 2010 along a road within the IWF (FPL 2012-TN1468).

Table 2-14. State-Listed Terrestrial or Wetland Plant Species Occurring in the Vicinity of the Turkey Point Site not Previously Discussed as a Federally Listed Species

Scientific Name	Common Name	State Status	Observed[(a)]	Habitat
Acrostichum aureum	Golden leather fern	ST	X	Brackish and freshwater marshes[(b)]
Adiantum melanoleucum	Fragrant maidenhair fern	SE		Sides of limestone sinks[(b)]
Adiantum tenerum	Brittle maidenhair fern	SE		Moist limestone in rockland hammocks[(b)]
Aeschynomene pratensis	Meadow jointvetch	SE		Marl prairie; cypress domes; swales[(c)]
Aletris bracteata	Bracted colic-root	SE		Marl prairie; pine rockland[(b)]
Alvaradoa amorphoides	Everglades leaf lace	SE		Pine rocklands and transition zones with rockland hammocks
Anemia wrightii	Wright's anemia	SE		Limestone pinnacles; walls of solution holes; pine rockland; rockland hammocks[(c)]
Argusia gnaphalodes	Sea lavender	SE		Beach dunes; coastal thickets[(b)]
Aristolochia pentandra	Marsh's dutchman's pipe	SE		Rockland hammock[(b)]
Asplenium trichomanes-dentatum	American toothed spleenwort	SE		Tropical hardwood hammocks; limestone outcrops; walls of limesinks[(c)]
Asplenium serratum	American bird's nest fern	SE		Cypress swamps; tropical rockland hammocks[(c)]
Asplenium verecundum	Modest spleenwort	SE		Rockland hammock; limestone outcrops, grottoes, and sinkholes
Basiphyllaea corallicola	Rockland orchid	SE		Pine rocklands and rockland hammock[(c)]
Beloglottis costaricensis	Costa Rican ladies'-tresses	SE		Rockland hammock[(b)]
Bourreria cassinifolia	Smooth strongbark	SE		Pine rocklands[(c)]
Brassia caudata[a]	Spider orchid	SE		Rockland hammock[(b)]
Byrsonima lucida	Locustberry	ST	X	Pine rocklands and rockland hammock[(b)]
Calyptranthes zuzygium	Myrtle-of-the-river	SE		Rockland hammocks; coastal berm[(c)]
Catopsis berteroniana	Powdery catopsis	SE		Tropical hammocks; cypress swamps[(c)]
Catopsis floribunda	Many-flowered catopsis	SE		Tropical hammocks; cypress swamps[(c)]

Table 2-14. (contd)

Scientific Name	Common Name	State Status	Observed[a]	Habitat
Chamaesyce deltoidea ssp. adhaerens	Hairy deltoid spurge	SE		Pine rockland[c]
Chamaesyce porteriana	Porter's broad-leaved spurge	SE		Pine rocklands, rockland hammock, coastal rock barrens, marl prairie[c]
Coccothrinax argentata	Florida silver palm	ST	X	Five habitats: coastal berm, coastal strand, maritime hammock, marl prairie, and pine rockland[b]
Colubrina cubensis var. floridana	Cuban snake-bark	SE		Rockland hammocks and pine rocklands[c]
Crossopetalum ilicifolium	Quailberry (Christmas berry)	ST	X	Marl prairie, pine rockland, rockland hammock[b]
Crossopetalum rhacoma	Rhacoma	ST		Coastal berm, coastal strand, pine rockland, rockland hammock[b]
Ctenitis sloanei	Florida tree fern	SE		Rockland hammocks and strand swamp[b]
Cyclopogon elatus	Tall neottia	SE		Rockland hammocks[b]
Cyrtopodium punctatum	Cowhorn orchid	SE		Cypress swamps, coastal hammocks, occasionally pinerocks and marl prairies[c])
Drypetes diversifolia	Milkbark	SE		Rockland hammocks[b]
Eltroplectris calcarata	Spurred neottia	SE		Mesic hammock, rockland hammock[c]
Prosthechea boothiana var. erythronioides	Dollar orchid	SE		Disturbed upland, rockland hammock, tidal swamp[b]
Encyclia cochleata var. triandra	Clamshell orchid	SE		Trunks and branches of pond apple, cypress, live oak, and buttonwood trees in swamps and hammocks[c]
Epidendrum nocturnum	Night-scented orchid	SE		Tree trunks, branches, and stumps in hammocks, swamps, and sloughs[c]
Ernodea cokeri	Coker's beach creeper	SE		Pine rocklands[c]
Eugenia confusa	Tropical ironwood	SE		Rockland hammocks[c]
Eugenia rhombea	Red stopper	SE		Rockland hammocks[c]
Eupatorium villosum	Villose fennel	SE		Pine rocklands, rockland hammocks[c]
Euphorbia pinetorum	Rockland painted-leaf	SE		Pine rocklands[b]
Galeandra bicarinata	Two-keeled helmet orchid	SE		Hammocks[b])

Table 2-14. (contd)

Scientific Name	Common Name	State Status	Observed[a]	Habitat
Glandularia maritima	Coastal vervain	SE		Back dunes, dune swales, coastal hammocks; disturbed, sandy areas[c]
Govenia floridana	Sheathing govenia	SE		Rockland hammocks[b]
Guaiacum sanctum	Lignumvitae	SE		Rockland hammocks[c]
Guzmania monostachia	Fakahatchee guzmania	SE		Swamps and wet hammocks[c]
Harrisia simpsonii	Simpson's prickly apple	SE		Scrubby flatwoods and xeric hammocks on the Atlantic Coastal Ridge[c]
Hippomane mancinella	Manchineel	SE		Coastal berms and hammocks in brackish areas just inland of the mangrove zone[c]
Hypelate trifoliata	White ironwood	SE		Rockland hammocks[c]
Ilex krugiana	Krug's holly	ST	X	Pine rockland, rockland hammock[b]
Ipomoea microdactyla	Wild potato morning glory	SE		Pine rocklands[c]
Ipomoea tenuissima	Rocklands morning glory	SE	X	Pine rocklands[c]
Jacquemontia curtissii	Pineland jacquemontia	ST	X	Disturbed upland, marl prairie, mesic flatwoods, pine rockland[b]
Jacquemontia pentanthos	Skyblue clustervine	SE	X	Bayhead, coastal rock barren, disturbed upland, marl prairie, pine rockland, rockland hammock[b]
Jacquinia keyensis	Joewood	ST		Coastal rock barren, coastal strand, disturbed upland, maritime hammock, pine rockland[b]
Lantana canescens	Small-headed lantana	SE		Transition zones between rockland hammock and pine rockland[c]
Lantana depressa var. depressa	Florida lantana	SE	X	Pine rocklands[b]
Lantana depressa var. floridana	Atlantic Coast Florida lantana	SE		Stabilized dunes of the Atlantic Coast barrier islands and relictual dunes of central Florida[b]
Voyria parasitica	Ghost plant	SE	X	Rockland hammocks, sinkholes[b]
Licaria triandra	Gulf licaria	SE		Rockland hammocks[c]
Linum carteri var. smallii	Small's flax	SE	X	Pine rocklands, pine flatwoods, adjacent disturbed areas[c]
Lomariopsis kunzeana	Holly vine fern	SE		Rockland hammocks, sinkholes[b]
Microgramma heterophylla	Climbing vine fern	SE		Rockland hammocks[b]

Table 2-14. (contd)

Scientific Name	Common Name	State Status	Observed[a]	Habitat
Odontosoria clavata	Wedgelet fern	SE		Pine rocklands, sinkholes, limestone ledges, rocky glades[c]
Okenia hypogaea	Burrowing four-o'clock	SE		Beach dune, disturbed upland[b]
Oncidium floridanum	Florida dancing lady orchid	SE		Rockland hammocks, cypress swamps[c]
Ophioglossum palmatum	Hand fern	SE		"Boots," or old leaf bases, of cabbage palms in maritime hammocks and wet hammocks[c]
Passiflora multiflora	White passion flower	SE		Tropical hammocks[c]
Passiflora sexflora	Everglades Key passion flower	SE		Tropical hammocks[c]
Pavonia paludicola	Mangrove mallow	SE		Disturbed wetland, tidal marsh, tidal swamp[b]
Peperomia obtusifolia	Blunt-leaved peperomia	SE		Rockland hammocks, hydric hammocks, strand swamps[c]
Phoradendron rubrum	Mahogany mistletoe	SE		Rockland hammock[b]
Picramnia pentandra	Bitter bush	SE		Rockland hammocks[c]
Dendrophylax lindenii	Ghost orchid	SE		Dense, wet subtropical to tropical forests and hammocks
Prescotia oligantha	Small-flowered prescotia	SE		Rockland hammock[b]
Prunus myrtifolia	West Indian cherry	ST		Rockland hammock[b]
Pseudophoenix sargentii	Florida cherry-palm	SE		Coastal berm, rockland hammock[b]
Psidium longipes	Mangrove berry	ST		Pine rockland, rockland hammocks[c]
Psychotria ligustrifolia	Bahama wild coffee	SE		Rockland hammock[c]
Pteris bahamensis	Bahama brake	ST	X	Disturbed upland, marl prairie, pine rockland, rockland hammock, sinkholes[b]
Pteroglossaspis ecristata	Giant orchid	ST		Sandhill, scrub, pine flatwoods, pine rocklands[c]
Roystonea elata	Florida royal palm	SE		Rocklands.
Sachsia polycephala	Bahama sachsia	ST	X	Disturbed upland, pine rockland[b]
Sacoila lanceolata var. paludicola	Fahkahatchee ladies'-tresses	ST		Swamps and hydric hammocks[c]
Schaefferia frutescens	Yellowwood	SE		Rockland hammock[b]

Table 2-14. (contd)

Scientific Name	Common Name	State Status	Observed[a]	Habitat
Actinostachys pennula	Ray fern	SE		Bayhead, floodplain forest, mesic flatwoods, rockland hammock[b]
Scutellaria havanensis	Havana skullcap	SE		Disturbed upland, pine rockland[b]
Selaginella eatonii	Eaton's spike moss	SE		Rockland hammocks and pine rocklands[b]
Spiranthes polyantha	Green ladies'-tresses	SE		Rock outcrops in mesic hammock, rockland hammock, maritime hammock[c]
Spiranthes torta	Southern ladies'-tresses	SE		Pine rockland, marl prairie, edges of rockland hammock[c]
Stylosanthes calcicola	Pineland pencil flower	SE		Pine rocklands and marl prairies, especially the transition zones between these two communities[c]
Swietenia mahagoni	West Indies mahogany	ST		Between pine rockland and marl prairie communities[c]
Tectaria fimbriata	Least Halberd fern	SE		Solution holes in limestone in rockland hammocks[c]
Tephrosia angustissima var. angustissima[a]	Devil's shoestring	SE		Pine rocklands[c]
Tephrosia angustissima var. corallicola	Rockland hoary-pea	SE		Pine rocklands[c]
Tephrosia angustissima var. curtissii	Coastal hoary-pea	SE		Scrub and sandy areas[c]
Thelypteris reptans	Creeping maiden fern	SE		Limestone grottoes and sinkholes[c]
Thelypteris sclerophylla	Stiff-leaved maiden fern	SE		Rockland hammock and sinkholes[b]
Thelypteris serrata	Toothed maiden fern	SE		Cypress swamps, sloughs, floodplains[c]
Thrinax morrisii	Brittle thatch palm	SE		Coastal berm, rockland hammock, pine rockland, maritime hammock, disturbed upland[b]
Thrinax radiata	Florida thatch palm	SE		Coastal berm, rockland hammock, pine rockland[b]

Table 2-14. (contd)

Scientific Name	Common Name	State Status	Observed[a]	Habitat
Tillandsia flexuosa	Banded wildpine	ST	X	17 habitats: coastal berm, coastal grassland, coastal rock barren, disturbed upland, dome swamp, freshwater tidal swamp, maritime hammock, marl prairie, pine rockland, rockland hammock, sandhill, scrub, shell mound, strand swamp, tidal marsh, tidal swamp, xeric hammock[b]
Tragia saxicola	Pineland noseburn	ST	X	Disturbed upland, pine rockland[b]
Trema lamarckianum	Lamarck's trema	SE	X	Disturbed upland, pine rockland, marl prairie, rockland hammock[b]
Trichomanes krausii	Kraus' bristle fern	SE		Buttressed roots and tree bases in rockland hammocks[c]
Trichomanes punctatum ssp. floridanum	Florida filmy fern	SE		Pine rockland[c]
Tripsacum floridanum	Florida gamagrass	ST	X	Pine rockland, marl prairie[b]
Tropidia polystachya	Young-palm orchid	SE		Rockland hammock[b]
Vanilla barbellata	Worm-vine orchid	SE		Mangroves, coastal hammocks, rocky pinelands, island hammocks in the Everglades[c]
Vanilla phaeantha	Leafy vanilla	SE		Island hammocks in the Everglades
Zanthoxylum coriaceum	Biscayne prickly ash	SE		Tropical coastal hammocks[c]
Zephyranthes simpsonii	Redmargin zephyrlily	ST		Disturbed upland, disturbed wetland, mesic flatwoods, swale, wet flatwoods[b]

(a) Species not listed as occurring in Miami-Dade County by the Florida Natural Areas Inventory (2000-TN139). Observed during botanical surveys within proposed transmission line corridor (FPL 2009-TN657).
(b) Gann et al. 2012-TN137
(c) FNAI 2000-TN139

Source: FPL 2014-TN4058

Table 2-15. State-Listed Terrestrial or Wetland Animal Species Occurring in the Vicinity of the Turkey Point Site Not Previously Discussed as a Federally Listed Species

Scientific Name	Common Name	State Status[a]	Observed[b]	Habitat[c]
Reptiles				
Gopherus polyphemus	Gopher tortoise	ST		Dry upland habitats, including sandhills, scrub, xeric oak hammock, and dry pine flatwoods; also disturbed habitats such as pastures, oldfields, and road shoulders
Pituophis melanoleucus mugitus	Florida pine snake	SSC		Sandhill and former sandhill, including oldfields and pastures; also sand pine scrub and scrubby flatwoods
Tantilla oolitica	Rim rock crowned snake	ST		Tropical hardwood hammocks, slash pine rocklands, and disturbed habitats (vacant lots and pastures)
Birds				
Aramus guarauna	Limpkin[d]	SSC		Mangroves, freshwater marshes, swamps, springs and spring runs, and pond and river margins; mostly resident
Athene cunicularia floridana	Florida burrowing owl[d]	SSC	X	Sparsely vegetated, sandy ground; open habitats among developed landscapes; resident
Egretta caerulea	Little blue heron[d]	SSC	X	Nests in coastal areas; feeds in shallow freshwater, brackish, and saltwater habitats; resident
Egretta rufescens	Reddish egret[d]	SSC	X	Nests on coastal mangrove islands; forages in shallow water; resident
Egretta thula	Snowy egret[d]	SSC	X	Nests in both inland and coastal wetlands; forages in permanently and seasonally flooded wetlands, streams, swamps, and in man-made impoundments and ditches; resident
Egretta tricolor	Tricolored heron[d]	SSC	X	Nests on mangrove islands or willow thickets; forages in permanently and seasonally flooded wetlands, swamps, tidal creeks, ditches and edges of ponds and lakes; resident
Eudocimus albus	White ibis[d]	SSC	X	Freshwater and wetlands, wet prairies, swales, seasonally inundated fields, and man-made ditches; resident
Falco sparverius paulus	Southeastern American kestrel	ST		Open pine habitats, woodland edges, prairies, and pastures; resident

Table 2-15. (contd)

Scientific Name	Common Name	State Status[a]	Observed[b]	Habitat[c]
Grus canadensis pratensis	Florida sandhill crane	ST		Prairies, freshwater marshes, and pasture lands; frequent feedlots, crop fields, golf courses and other open lawns; nests constructed in shallow water or in marshy areas; resident
Haematopus palliatus	American oystercatcher[d]	SSC		Large areas of beach, sandbar, mudflat and shellfish beds for foraging; sparsely vegetated, sandy areas for nesting; resident
Pandion haliaetus	Osprey	SSC		On or near large lakes, rivers, and coastal areas; nest in large living or dead trees and man-made structures; resident
Patagioenas leucocephala	White-crowned pigeon[d]	ST	X	Nests on mangrove islands and islets; forages in tropical hardwood hammocks; summer resident
Pelecanus occidentalis	Brown pelican[d]	SSC	X	Coastal; uses sand spits, sand bars, and islets for roosting; nests on small islands in bays and estuaries; resident
Eudocimus albus	Roseate spoonbill[d]	SSC	X	Nests on coastal mangrove islands or man-made dredge spoil islands; forages on shallow waters of variable salinity; resident
Rynchops niger	Black skimmer[d]	SSC		Coastal waters; nest on sand beaches, small coastal islands and dredge spoil islands; resident
Sterna antillarum	Least tern[d]	ST	X	Coastal areas for foraging; nests on substrate of well-drained sand or gravel that features little vegetation; summer resident
Mammals				
Neovison vison evergladensis	Everglades mink[d]	ST		Wetland communities, including salt marsh, freshwater marsh, cypress swamp, and hardwood swamp
Podomys floridanus	Florida mouse	SSC		Xeric upland communities with sandy soils, including scrub, sandhill, and ruderal sites
Ursus americanus floridanus	Florida black bear	ST		Variety of forested habitats including forested wetlands

(a) State Status: ST (threatened); SSC (Species of Concern); source: FNAI 2014-TN3666.
(b) Previously observed within the Turkey Point site or within the proposed Units 6 and 7 transmission line corridors.
(c) Sources for habitat information: FNAI 2000-TN139.
(d) Determined or presumed by the FFWCC to present and have the potential to be affected (FFWCC 2012-TN520).

Individuals or populations of 17 plant species listed by the State of Florida were observed within proposed transmission line corridors (FPL 2009-TN1449). Occurrences of both State threatened and State endangered species were common within the first 8 mi segment of the West corridors and the first 6 mi segment of the East corridor originating at Units 6 and 7. Numerous State endangered species were also observed within the final 3 mi segment of the West corridors nearest the Pennsuco substation. Scattered occurrences were also observed in other segments of the corridors. The Davis-Miami segment of the East corridor was not surveyed so the occurrence, distribution, or abundance of State-listed species is unknown (FPL 2009-TN1449). This portion lies within a mostly urbanized landscape, so occurrence of State-listed species would be expected to occur within scattered remnants of native vegetation.

Although many of the State-listed plants are found in either pine rockland or marl prairie habitats, neither of which occurs on the Turkey Point site, the range of habitats in which they occur indicates unreported species and populations likely occur within other proposed project areas. For instance, Small's flax (*Linum carteri var. smallii*) and the Bahama ladder brake (*Pteris bahamaensis*) are known to occur in disturbed habitat, much of which has not been surveyed. Also the banded wildpine (*Tillandsia flexuosa*) is an epiphyte that grows on a variety of other plants that occur in a wide range of habitat conditions. The full extent of which State-listed plant species occur within all proposed project areas is undetermined.

The FFWCC determined that the 12 bird and 1 mammal species described below and listed by the State of Florida are either known or likely to be present on the Turkey Point site (Table 2-15).

Limpkin (*Aramus guarauna*)

The limpkin is a resident wading bird that uses wetlands including mangroves, freshwater marshes, swamps, ponds, and canal banks (FNAI 2000-TN139). Although listed as a Species of Concern in Florida and a bird of conservation concern (FWS 2008-TN4438), its distribution is widespread in southern Florida. Land-cover classification information indicates habitat suitable for limpkins is present at all proposed onsite and offsite project locations.

Florida Burrowing Owl (*Athene cunicularia floridana*)

Florida burrowing owls are named for their propensity to nest in underground burrows. They prefer sparsely vegetated, sandy, upland habitats including dry prairies and sandhills. They have taken advantage of disturbances that create open habitats and use pastures, airports, parks, rights-of-way, and vacant residential lots (FNAI 2000-TN139). A single burrowing owl was observed in 2010 on a roadway within the IWF (FPL 2014-TN4058). The presence and abundance of this species at other proposed project locations is unknown. The affinity for upland habitats for burrowing would exclude this bird from most of the proposed project locations. Vacant upland lots and canal berms along some of the transmission line corridors may provide suitable burrowing habitat.

Little Blue Heron (*Egretta caerulea*)

This resident heron feeds in virtually all wetland habitat types in South Florida. Little blue herons nest in trees and their nesting colonies can be found nearly statewide in Florida (FNAI 2000-TN139). Little blue herons have been observed throughout the Turkey Point site where appropriate habitat is present (FPL 2014-TN4058). Wetlands are present at all proposed project locations and this heron is likely present there.

Reddish Egret (*Egretta rufescens*)

The reddish egret is a coastal bird of conservation concern (FWS 2008-TN4438) that nests on mangrove islands as well as non-native Brazilian pepper stands on dredge spoil islands. It forages in shallow water and will use sparsely vegetated tidal flats, shorelines, and salt evaporation pools (FNAI 2000-TN139). It is a resident species in Florida. Reddish egrets have been observed throughout the FPL Turkey Point site where appropriate habitat is present (FPL 2014-TN4058). This species is also likely to occur in wetlands at all offsite locations.

Snowy Egret (*Egretta thula*)

The snowy egret is also a resident species in South Florida. It nests in woody shrubs such as willow and mangrove and prefers nesting over the water or on islands. These egrets require a variety of wetland habitat types near nesting colonies to successfully forage, and breeding success has been related to water depth (FNAI 2000-TN139). Snowy egrets have been observed throughout the Turkey Point site where appropriate habitat is present (FPL 2014-TN4058). Snowy egrets regularly nest within wading bird colonies adjacent to the proposed western transmission line corridors and are also likely to occur in wetlands at all offsite locations.

Tricolored Heron (*Egretta tricolor*)

Like the snowy egret, the tricolored heron is a resident species that also nests in mangroves and willows as well as other woody vegetation over standing water or in islands. Tricolored herons prefer to feed in coastal wetlands including seasonally flooded habitats, mangrove swamps, ditches, and tidal creeks. Seasonal water-level fluctuation is critical to nesting success (FNAI 2000-TN139). Tricolored herons have been observed throughout the Turkey Point site where appropriate habitat is present (FPL 2014-TN4058) and are likely to occur in suitable wetland habitats at all offsite locations.

White Ibis (*Eudocimus albus*)

The white ibis is a medium-sized wading bird that uses a wide variety of freshwater and saltwater wetland habitats including brackish marsh, salt flats, forested wetlands, wet prairies, and ditches. Although present in Florida throughout the year, they are known for spring and fall movements in response to changing water levels. White ibis nests are found in trees, shrubs, and vines and their nomadic behavior can result in large annual fluctuations within a local breeding population (FNAI 2000-TN139). White ibises have been observed throughout the Turkey Point site where appropriate habitat is present (FPL 2014-TN4058). White ibis

commonly nest within wading bird colonies adjacent to the proposed western transmission line corridors and suitable wetland habitat is also present at all other proposed offsite locations.

Roseate Spoonbill (*Eudocimus albus*)

The roseate spoonbill is a medium-sized wading bird that uses a variety of freshwater and saltwater wetlands in search of food. Spoonbills nest on mangrove islands, in Brazilian pepper stands on dredge spoil islands, or in willows near freshwater wetlands (FNAI 2000-TN139). It is a resident in South Florida and a bird of conservation concern (FWS 2008-TN4438). Roseate spoonbills were observed within Turkey Point site and within the proposed Units 6 and 7 plant area (FPL 2014-TN4058). They occasionally nest within wading bird colonies adjacent to the proposed western transmission line corridors and are likely present at all proposed offsite locations.

American Oystercatcher (*Haematopus palliates*)

The American oystercatcher is a large, resident shorebird along coastal Florida classified as a bird of conservation concern (FWS 2008-TN4438). Oystercatchers require large, open expanses including beaches, sandbars, mudflats, and shellfish beds to effectively forage. They prefer to nest on the ground in a large expanse of sparsely vegetated sandy habitat, but will also nest in or near sparse cover (FNAI 2000-TN139). Although not previously observed at any of the proposed project locations, FPL determined the likelihood of occurrence in the vicinity of the Turkey Point property was moderate (FPL 2011-TN1374).

White-Crowned Pigeon (*Patagioenas leucocephala*)

This pigeon, classified as a bird of conservation concern (FWS 2008-TN4438), nests on isolated mangrove islands in extreme South Florida. It feeds on the fruit produced by hardwood trees including poisonwood (FNAI 2000-TN139). Most white-crowned pigeons are only present during the May-September nesting season, although some may be present in South Florida during winter. White-crowned pigeons were observed within the proposed Units 6 and 7 plant area at the Turkey Point site (FPL 2014-TN4058). The presence and abundance of this pigeon at other proposed project locations is unknown.

Brown Pelican (*Pelecanus occidentalis*)

The brown pelican is a coastal resident species that feeds mostly in shallow estuaries. It loafs and perches on exposed sand habitat such as spits and bars as well as mangrove islands. Brown pelicans nest on small islands near bays and estuaries either in small trees and shrubs or on the ground (FNAI 2000-TN139). Brown pelicans were observed during reconnaissance of the proposed project area (FPL 2014-TN4058). They would not be expected to occur at any of the offsite project areas as they are all inland.

Black Skimmer (*Rynchops niger*)

The black skimmer is a gull-like bird that forages over coastal waters including bays, estuaries, tidal creeks, and inland lakes. It is a bird of conservation concern (FWS 2008-TN4438) that resides along most of the coast but is more abundant in South Florida during the winter. Black

skimmers nest on sand beaches, small islands, and dredge spoil islands, and have also been found nesting along a road in an agricultural setting (FNAI 2000-TN139). They are not known to occur at any of the proposed project locations, but roads within the IWF could provide suitable nesting habitat.

Least Tern (*Sterna antillarum*)

The least tern is a coastal bird of conservation concern (FWS 2008-TN4438) that migrates to Florida to nest. Nesting occurs on well-drained sand or gravel substrates with little vegetation. These conditions typically exist on beaches along lagoons, bays, and estuaries. However, least terns have also been observed nesting on dredge spoil islands, construction sites, causeways, and mining areas (FNAI 2000-TN139). Least terns have nested along canals within the Turkey Point site (FPL 2012-TN1058). They are not known to occur at any of the proposed locations offsite and would not be expected due to habitat preferences.

Everglades Mink (*Neovison vison evergladensis*)

Very little is known about the Everglades mink, but it is a recognized subspecies of mink believed to occur locally in Florida (FFWCC 2011-TN643). Where it occurs, it would generally be found in wetland habitats. Wetland habitats occur at all onsite and offsite locations.

Other Important Species and Habitats

In addition to Federally and State-listed species and those proposed for listing, Environmental Standard Review Plan (ESRP) guidance (NRC 2000-TN614) identifies important species as those that are commercially valuable, recreationally valuable, essential to the maintenance or survival of commercially or recreationally valuable species, critical to the structure and function of local terrestrial ecosystems, and those that serve as biological indicators. Important habitats include wildlife refuges, sanctuaries, preserves, FWS-designated critical habitat, other State or Federally protected habitats, wetlands, and floodplains including EPA-designated Aquatic Resources of National Importance (ARNI). Factors that determine if an aquatic resource is an ARNI include economic importance, rarity or uniqueness, and the importance of the resource to protect, maintain, or enhance the quality of the Nation's waters (EPA 2015-TN4626).

Mangrove forests play a key role in the ecosystems where they occur and are the most biologically productive ecosystems in the world. Mangroves represent the link between upland and marine ecosystems in many tropical and subtropical areas, which contribute significant organic material to coastal and estuarine waters and provide a nursery to many aquatic and terrestrial animal species (USGS 2003-TN1304; FWS 1999-TN136). Mangrove forests are an integral part of South Florida's ecology and support an incredible number of bird species and provide vital habitat for many neotropical migrant songbirds, raptors, and estuarine birds. The red mangrove (*Rhizophora mangle*) is an important indicator of this highly valuable forest type in South Florida. Listed species that depend on or use mangroves include the Florida panther, wood stork, eastern indigo snake, Florida black bear, Everglades mink, white-crowned pigeon, brown pelican, tricolored heron, little blue heron, white ibis, snowy egret, reddish egret, and roseate spoonbill. Much of South Florida's mangrove forests have been lost to coastal urbanization and alteration of freshwater hydroperiod from impoundment (FWS 1999-TN136).

The EPA considers mangroves of South Florida as ARNI because they buffer uplands from storms, filter overland runoff, reduce turbidity, and fuction biologically in all of the ways mentioned in this paragraph.

Pine rockland is a savanna-like forest that occurs on limestone outcrops of the Miami Rock Ridge, which supports diverse shrub and herb layers that include almost as many as 374 different plant species (FWS 1999-TN136). Many endemic plant and animal species are dependent upon pine rocklands, and many Federally and State-listed plants and wildlife use pine rockland, including Blodgett's silverbush, Carter's small-flowered flax, Florida lantana, Garber's spurge, deltoid spurge, tiny polygala, small's milkpea, crenulate lead-plant, Kirtland's warbler, eastern indigo snake, Florida panther, and both Florida leafwing and Bartram's scrub-hairstreak butterflies. More than 90 plant Species of Concern have been recorded in pine rocklands (FWS 1999-TN136). Because pine rocklands occur at relatively high elevations in the southern Florida landscape, they are also ideal for urbanization and rural development, which has resulted in extensive loss and fragmentation. On the Florida peninsula, pine rockland fragments persist in Miami-Dade County from Florida City north to Southwest 32nd Street, northern Monroe County, and southeast Collier County (FWS 1999-TN136).

Marl prairie is a sparsely vegetated, grass-dominated community that is seasonally flooded. It occurs on marl substrates, which are impermeable fine white muds deposited on limestone (FWS 1999-TN136). Unlike similar marsh habitat, marl prairie supports a very high diversity of native plants including Federally and State-listed species. Historically, marl prairie was maintained by fire and is the primary habitat of the Cape Sable seaside sparrow.

Wetlands in various forms are the dominant land cover in South Florida. Likewise, most of the Turkey Point site and the vast majority of the proposed Units 6 and 7 plant area are also wetlands including open water, mud flat, remnant canals, wetland spoil, and mangroves.

Everglades National Park, immediately west of the Turkey Point site, encompasses over 1.5 million ac in Dade, Monroe, and Collier Counties in South Florida. It is recognized as a World Heritage Site, a Biosphere Reserve, a Wetland of International Significance, and an OFW. The EMB is a FPL-owned wetland mitigation area that links Everglades National Park with Biscayne Bay. It borders the Turkey Point site immediately west and south of the industrial wastewater canal system and encompasses over 13,000 ac. Biscayne National Park, bordering much of the east side of the Turkey Point site, encompasses 172,000 ac. Included within this national park is the southern expanse of Biscayne Bay, northern portion of Card Sound, the mangroves along the mainland shore, northern-most Florida Key islands, and extensive offshore coral reefs. Crocodile Lake National Wildlife Refuge, 10 mi south of the Turkey Point site, occupies 6,700 ac near Key Largo, Florida.

There is no FWS-designated critical habitat for terrestrial species on the FPL Turkey Point site (see Section 2.4.2.3 for discussion of the American crocodile designated critical habitat). However, critical habitat has been designated for the Cape Sable seaside sparrow and Everglades snail kite within a 50 mi radius of the FPL Turkey Point site. Cape Sable seaside sparrow critical habitat exists in southwestern Miami-Dade County as near as 15 mi to the west. Everglades snail kite critical habitat can be found in west and northwest Miami-Dade County about 22 mi west of the site as well as in Broward County to the north. Critical habitat has also

been designated for the Florida leafwing and Bartram's scrub-hairstreak butterflies, Florida brickell-bush, and Carter's small-flowered flax. A single pine rockland fragment designated as critical habitat for Bartram's scrub-hairstreak, Florida brickell-bush, and Carter's small-flowered flax lies within both of the proposed western transmission line corridors. Additional critical habitat for all four of these species lies alongside or nearby other portions of the proposed transmission system.

Commercially and Recreationally Valuable Species

Although numerous game species including white-tailed deer (*Odocoileus virginianus*), mourning dove (*Zenaida macroura*), and cottontail rabbit (*Sylvilagus floridanus*) are present, public access for harvest of game animals is prohibited on the Turkey Point site (FPL 2014-TN4058). Waterfowl habitat is present and waterfowl are likely to occur in local wetlands and open water habitats. As with other game animals, public waterfowl hunting on the site is prohibited, and if hunting occurs in the immediate vicinity of the Turkey Point site waterfowl may be artificially concentrated on the site during hunting seasons.

Disease Vector and Pest Species

In epidemiology, a vector does not cause a disease, but instead spreads infection from one host to another. Numerous disease vectors exist in the animal kingdom. Blood-sucking insects such as mosquitoes, ticks, and fleas are widely known to transmit disease to both animals and humans. Mammals such as bats, raccoons, and skunks (*Mephitidae*) have also been implicated in the spread of disease. No known occurrences of vector-borne illness have been associated with disease vectors and pests on the Turkey Point site (FPL 2014-TN4058).

Exotic plant species, when aggressive in nature, can displace or eliminate native plant species. The Florida Exotic Pest Plant Council maintains a list of invasive plant species (FLEPPC 2011-TN240). Melaleuca (*Melaleuca quinquenervia*), Old World climbing fern (*Lygodium microphyllum*), Asian swordfern (*Nephrolepus multiflora*), and Burma reed (*Neyraudia reynaudiana*) have been observed during reconnaissance surveys of the proposed Units 6 and 7 transmission line corridors (FPL 2009-TN657). Brazilian pepper and Australian pine also occur in these corridors. The NPS funds efforts to control the spread of Malaleuca in the East Everglades Expansion Area (NPS 2011-TN242).

The tropical climate of South Florida has enabled the establishment of numerous reptile species in the region. The Burmese python (*Python molurus* ssp. *bivittatus*) is probably the most well-known exotic reptile that now inhabits South Florida. The establishment of this snake species has coincided with a dramatic decrease in medium-sized mammals within Everglades National Park, and control efforts to limit the Burmese python population in Florida are ongoing (Dorcas et al. 2011-TN241). The Argentine black-and-white tegu (*Tupanimbis merianae*) is a relatively new arrival, but has spread rapidly in the vicinity of Turkey Point. This egg-eating omnivore has the potential to affect many species, including alligators and crocodiles, and is the subject of a multi-agency control effort in the immediate vicinity of the Turkey Point site.

Biological Indicators

Wading birds are an important part of the South Florida ecosystem and have been identified as an indicator of ecosystem health for the Everglades and a primary goal of CERP

(Recover 2005-TN4031). Listed wading bird species include the Federally threatened wood stork and State-listed little blue heron, tricolored heron, reddish egret, snowy egret, white ibis, and roseate spoonbill. Additional South Florida wading bird species in the project vicinity include the double-crested cormorant (*Phalacrocorax auritus*), great egret (*Ardea alba*), cattle egret (*Bubulcus ibis*), green heron (*Butorides virescens*), great blue heron (*A. herodias*), and black- and yellow-crowned night-herons (*Nicticorax nicticorax* and *Nictanassa violacea*). Historic wading bird population estimates, although controversial, were estimated to be approximately 125,000−150,000 attempted nests in the 1930s (Bancroft 1989-TN3571). Populations have since declined and in 2013 it was estimated that almost 50,000 wading bird nests were initiated, which is twice as many as were estimated annually from 2010−2012. As recently as 2009 more than 87,500 nests were estimated (SFWMD 2013-TN4034). Four wading bird species are used to monitor ecosystem restoration and health: the great egret, snowy egret, white ibis, and the wood stork. Generally, populations of these species are trending upward since the 1990s with the exception of snowy egrets, which have declined recently (SFWMD 2013-TN4034).

2.4.1.4 Important Terrestrial Species – Transmission Lines

This section describes commercially and recreationally valuable species, Federally and State-listed and proposed threatened and endangered terrestrial species, and designated and proposed critical habitat that may occur in the transmission line corridors and in the vicinity of the proposed 500 kV transmission line. Habitat types observed within transmission line corridors have been described as disturbed upland, disturbed wetland, Everglades tree island, marl prairie, pine rockland, Everglades swale, tidal marsh, tidal swamp, dwarf mangrove swamp, rocky glade, sinkhole, cypress strand swamp, dwarf cypress prairie, agriculture, and urban development (FPL 2009-TN657). Natural and disturbed transitional areas such as canal edges, ditch banks, and dirt roads also provide habitat.

Federally Listed Species

All existing and proposed transmission lines that would support proposed Units 6 and 7 are in Miami-Dade County. Federally listed species that could be affected by the construction, operation, and maintenance of proposed Units 6 and 7 transmission facilities are listed in Table 2-12. Field reconnaissance surveys to determine the presence, absence, distribution, and abundance of Federally listed wildlife were conducted along existing or proposed transmission lines during April and June 2008 (FPL 2011-TN94).

Fauna

The FWS and the State of Florida has identified 29 Federally and State-listed terrestrial wildlife species as occurring or potentially occurring within the existing or proposed transmission line corridors (Table 2-16). Although Bartram's scrub-hairstreak and the Florida leafwing do not occur within the corridors, proposed critical habitat for these two butterflies does occur within the western transmission line corridors. In addition, the bald eagle (*Haliaeetus leucocephalus*) is managed under the Bald and Golden Eagle Protection Act (16 U.S.C. § 668 et seq.) (TN1447) and the State of Florida Bald Eagle Management Plan (FFWCC 2008-TN1448).

Table 2-16. Federally and State-Listed Terrestrial Wildlife Species Identified by the State of Florida as Occurring or Potentially Occurring within Transmission Line Corridors Associated with Proposed Units 6 and 7

Common Name	Scientific Name	Federal Status[a]	State Status[b]
American oystercatcher	*Haematopus palliatus*		SSC
Black skimmer	*Rhynchops niger*		SSC
Brown pelican	*Pelecanus occidentalis*		SSC
Florida burrowing owl	*Athene cunicularia*		SSC
Cape Sable seaside sparrow	*Ammodramus maritimus mirabilis*	LE	SE
Eastern indigo snake	*Drmarchon couperi*	LT	ST
Everglades mink	*Mustela vison*		ST
Florida bonneted bat	*Eumops floridanus*	LE	SE
Florida black bear	*Ursus americanus floridanus*		ST
Florida mouse	*Podomys floridanus*		SSC
Florida panther	*Puma concolor*	LE	SE
Florida pine snake	*Pituophis melanoleucus mugitus*		SSC
Florida sandhill crane	*Grus canadensis pratensis*		ST
Gopher frog	*Lithobates capita*		SSC
Gopher tortoise	*Gopherus polyphemus*		ST
Least tern	*Sterna antillarum*		ST
Little blue heron	*Egretta caerulea*		SSC
Limpkin	*Aramus guarauna*		SSC
Piping plover	*Charadrius melodus*	LT	ST
Reddish egret	*Egretta rufescens*		SSC
Rim rock crown snake	*Tantilla ooliticus*		ST
Roseate spoonbill	*Platalea ajaja*		SSC
Everglades snail kite	*Rostrhamus sociabilis plumbeus*	LE	SE
Snowy egret	*Egretta thula*		SSC
Southeastern American kestrel	*Falco sparverius paulus*		ST
Tricolored heron	*Egretta tricolor*		SSC
White-crowned pigeon	*Patagioenas leucocephala*		ST
White ibis	*Eudocimus albus*		SSC
Wood stork	*Mycteria americana*	LT	SE

(a) Federal Status: LE = endangered; LT = threatened.
State Status: SE (endangered); ST (threatened); SSC (Species of Concern); source Florida Natural Areas Inventory – 4/5/2010. All Federally listed species that occur in Florida are not included on the State of Florida's list as Federally designated species in addition to the State listing process (FFWCC 2011-TN158).

Source: FFWCC 2011-TN554

The Cape Sable seaside sparrow is a Federally and State-listed endangered species that nests in mixed marl prairie community in Miami-Dade County (FWS 2012-TN117; FNAI 2014-TN3668). The entire species has a total estimated population of only 2,900 individuals (FWS 2010-TN256). No Cape Sable seaside sparrows were observed during surveys of the transmission line corridors associated with rights-of-way (FPL 2014-TN4058).

The eastern indigo snake is a Federally and State-listed threatened species (FWS 2012-TN117; FNAI 2014-TN3668). Although this species is found primarily in upland habitats, it requires a mosaic of habitats and has been found in pinelands, tropical hardwood hammocks, mangrove forests, and human-altered habitats (FWS 1999-TN136). None were observed during recent surveys of the transmission line corridors (FPL 2014-TN4058).

Historically, Florida panthers have been observed within lands that occur within the two proposed western transmission line corridors. Also, both existing and proposed transmission lines pass through the FWS-designated Florida panther primary and secondary focus zones.

The piping plover is a Federally and State-listed threatened species (FWS 2012-TN117; FNAI 2014-TN3668). Piping plovers do not breed in Florida, but individuals from all three breeding populations winter there and have been observed in Miami-Dade County (FWS 1999-TN136). Their winter habitat includes beaches, mudflats, and sandflats, as well as, barrier island beaches, and spoil islands. No piping plovers were seen during surveys of Turkey Point plant or the transmission line rights-of-way (FPL 2014-TN4058).

The Everglades snail kite is a Federally and State-listed endangered species (FWS 2012-TN117; FNAI 2014-TN3668). The snail kite is a wide-ranging New World raptor found primarily in lowland freshwater marshes. In Florida, the population appears to be restricted to the watersheds of the Everglades, Okeechobee and Kissimmee lakes, and the upper St. Johns River. FWS-designated critical habitat for the snail kite exists in western Miami-Dade County beginning about 22 mi west of the Turkey Point site.

The only Federally listed species directly observed during reconnaissance surveys was the Everglades snail kite. A single snail kite was observed perched along the West Preferred transmission line corridor. This observation was made within a portion of the proposed corridor that lies along the boundary of the East Everglades Expansion Area and passes through a sawgrass marsh. Snail kites are known to forage in sawgrass habitats.

The wood stork is a Federally and State-listed threatened species (79 FR 37077 [TN4039]; FNAI 2014-TN3668). The wood stork uses a variety of wetlands including freshwater and estuarine habitats for nesting, roosting, and foraging and constructs nests in medium to tall trees surrounded by open water. Colonial nest sites are often reused over many years (FWS 1997-TN225). Wood storks forage in almost any shallow, open water where prey items become concentrated (FWS 1997-TN225).

Wood storks have historically nested in two different locations south of the Tamiami Trail (US-41) within 5 mi of the proposed Turkey Point to Levee transmission line corridors (FPL 2014-TN4058). One colony occurs within 1 mi of the West Preferred transmission line corridors. The other colony is within 3 mi of this corridor. Wood storks could be found in shallow wetlands within existing and proposed transmission line corridors (FPL 2011-TN94). Although there is no designated critical habitat for the wood stork, the FWS Southeast Florida Ecological Services Office recognizes a 0.47 mi (0.76 km) nest colony buffer and an 18.6 mi (29.9 km) core foraging area buffer around all known wood stork colonies that have had active nests within the last 10 years in South Florida. Impacts on suitable habitats within either of these buffer zones would require mitigation depending on the impact level (FWS 2010-TN226).

Habitat within the West Preferred and West Consensus corridors has been designated as critical habitat for the endangered Bartram's scrub-hairstreak and Florida leafwing butterflies. Expansion of the Clear Sky to Davis portion of the East corridor would also occur adjacent to pine rockland that surrounds the Miami Metro Zoo, University of Miami-south campus, and the Gold Coast Railroad Museum that has also been designated as critical habitat for these two butterflies.

Flora

A single Federally listed species and two candidates have been observed within transmission line corridors that would support proposed Units 6 and 7 at the Turkey Point site. The endangered Florida brickell-bush inhabits pine rocklands with an open shrub layer, exposed limestone, and minimal leaf litter (FNAI 2000-TN139). It is endemic to the Miami Rock Ridge (FPL 2014-TN4058). The pineland spurge or pineland sandmat is found in pine rocklands with scattered shrubs and exposed limestone (FNAI 2000-TN139). Sand flax is also found in pine rockland, marl prairie, and adjacent disturbed areas (FNAI 2000-TN139). During 2009 reconnaissance surveys, two remnant pine rockland habitat patches were noted adjacent to the Davis to Miami corridor. Pine rockland habitat is known to harbor many endemic plant species, and a threatened and endangered plant survey was recommended in these areas (FPL 2009-TN1449).

State-Listed Species

As with Federally listed species, the State-listed species in Table 2-14 and Table 2-15 for the FPL Turkey Point site are also the species that could be affected by building and operating the proposed Units 6 and 7 transmission facilities. Surveys for State-listed wildlife have not been conducted along existing or proposed transmission lines. Reconnaissance surveys were conducted during September 2008 and February 2009 to determine the presence, distribution, and abundance of State-listed plants.

A total of 36 State-listed plant species, including a Federally endangered species and two candidate species, have been observed within transmission line corridors that would support proposed Units 6 and 7 (Table 2-17) (FPL 2014-TN4058; FPL 2009-TN657). The vast majority of the listed plants were found in fragments of pine rockland habitat. However, some of the plants were also observed in disturbed habitats, including at the sides of dirt roads, on transmission tower pads created from spoil within mangrove stands, in marl prairie remnants, and along canal edges.

Although numerous game species, including white-tailed deer, mourning dove, and cottontail rabbit, are present, public access for harvest of game animals is prohibited on the Turkey Point site (FPL 2014-TN4058). Waterfowl habitat is present and waterfowl are likely to occur in local wetlands and open water habitats. As with other game animals, public waterfowl hunting on the site is prohibited, and if hunting occurs in the immediate vicinity of the Turkey Point site waterfowl may be artificially concentrated on the site during hunting seasons.

Table 2-17. Federally and State-Listed Plant Species Observed within Transmission Line Corridors Associated with Proposed Units 6 and 7 (Source: FPL 2014-TN4058)

Common Name	Scientific Name	Federal Status[a]	State Status[b]	Habitats Observed Growing In[c]
Golden leather fern	*Acrostichum aureum*		ST	Bayhead
Pineland-allamanda	*Angadenia berteroi*		ST	Pine rockland
Pinepink	*Bletia purpurea*		ST	Road edge, mangrove spoil pads
Florida brickell-bush	*Brickellia mosieri*	LE	SE	Pine rockland
Locustberry	*Byrsonima lucida*		ST	Spoil pad, Pine rockland
White sunbonnets	*Chaptalia albicans*		ST	Pine rockland
Pineland (spurge) sandmat	*Chamaesyce deltoidea ssp. pinetorum*	LC	SE	Pine rockland
Florida silver palm (Silver palm)	*Coccothrinax argentata*		ST	Pine rockland
Quailberry (Christmas berry)	*Crossopetalum ilicifolium*		ST	Pine rockland
Blodgett's swallowwort	*Cynanchum blodgettii*		ST	Pine rockland
Krug's holly	*Ilex krugiana*		ST	Pine rockland
Rockland morning glory (Wild potato morning glory)	*Ipomoea tenuissima*		SE	Pine rockland
Pineland clustervine (jacquemontia)	*Jacquemontia curtissii*		ST	Pine rockland
Skyblue clustervine	*Jacquemontia pentanthos*		SE	Pine rockland
Shrub eupatorium	*Koanophyllon villosum*		SE	Pine rockland
Pineland (Florida) lantana	*Lantana depressa var. depressa*		SE	Pine rockland
Ghost plant	*Leiphaimos parasitica*		SE	Pine rockland
Sand flax	*Linum arenicola*	LC	SE	Disturbed road edge
Carter's large-flowered flax	*Linum carteri var. smallii*		SE	Canal edge
Pineland blackanthers	*Melanthera parvifolia*		ST	Pine rockland
Southern fogfruit	*Phyla stoechadifolia*		SE	Disturbance, marl prairie
Pineland poinsettia	*Poinsettia pinetorum*		SE	Pine rockland
Bahama ladder brake	*Pteris bahamensis*		ST	Road edge, mangrove spoil pads, pine rockland
Small-leaf snoutbean	*Rhynchosia parvifolia*		ST	Pine rockland
Bahama sachsia	*Sachsia polycephala*		ST	Pine rockland
Bahama senna	*Senna mexicana var. chapmanii*		ST	Pine rockland
Mullein nightshade	*Solanum donianum*		ST	Roadsides, marl prairie, mangrove spoil pads

Table 2-17. (contd)

Common Name	Scientific Name	Federal Status[a]	State Status[b]	Habitats Observed Growing in[c]
Everglade Keys false buttonweed	*Spermacoce terminalis*		ST	Pine rockland
West Indian lilac	*Tetrazygia bicolor*		ST	Pine rockland
Abrupt-tip maiden fern	Thelypteris augescens		ST	mangrove spoil pads, roadside
Twisted wildpine	Tillandsia balbisiana		ST	Bayhead
Banded wildpine	Tillandsia flexuosa		ST	Bayhead
Giant wildpine	Tillandsia utriculata		SE	Bayhead
Pineland noseburn	Tragia saxicola		ST	Pine rockland
West indian (Lamarck's) trema	Trema lamarckianum		SE	mangrove spoil pads, roadside,
Florida gamagrass	Tripsacum floridanum		ST	Pine rockland

(a) Federal Status: LE = Federal endangered; LC = Federal candidate species.
(b) State Status: SE = endangered; ST = threatened. Source: FNAI 2009-TN815.
(c) Habitat information provided by FPL 2009-TN657.

Surveys for other important species, including ecologically, commercially, and recreationally important species and habitats, were not conducted within the transmission line corridors. Peninsular Florida includes the entire range of a subspecies of wild turkey, the Osceola turkey (*Meleagris gallopavo osceola*) that is a popular game species. White-tailed deer, mourning doves, rabbits, waterfowl, and other game species would be expected in appropriate habitats.

As noted above, pine rockland and marl prairie habitats occur within transmission line corridors associated with proposed Units 6 and 7. These habitats are recognized for their high species diversity and ecological value. The proposed transmission line corridors also pass through mangroves, another ecologically important habitat in South Florida.

2.4.1.5 Important Terrestrial Species and Habitats – Other Offsite Facilities

Access Roads, Potable and Reclaimed Water Pipelines

FPL would build approximately 11 mi of access roads and 9 mi of potable water pipelines to support proposed Turkey Point Units 6 and 7. Although most of this work would occur within existing road rights-of-way, some agriculture, disturbed, canal, and wetland cover types would also be traversed. No surveys were conducted to determine the presence, distribution, or abundance of important terrestrial wildlife or plant species in the affected areas. FLUCFCS land-cover types present indicate water birds such as the wood stork, roseate spoonbill, white ibis, and various egret and heron species may be present. Plant species that thrive on disturbed lands in South Florida, including pinepink, sand flax, Bahama ladder brake, mullein nightshade, and West Indian trema, may be present along existing roadways (FPL 2014-TN4058). Proposed road development would occur within the primary zone of the Florida Panther Focus Area.

2.4.1.6 Terrestrial Monitoring

Ecological monitoring was required by the State of Florida Site Certification process for Units 3 and 4 at the Turkey Point site (SFWMD 2009-TN149). FPL's Groundwater, Surface Water, and Ecological Monitoring Plan calls for ecological monitoring to be conducted to establish the current status of ecological baseline conditions and biotic components (SFWMD 2009-TN149). FPL proposed a broad-scale vegetation assessment to characterize distribution and density of vegetation (SFWMD 2009-TN149). The plan calls for transects to be established within freshwater marshes, mangroves, sawgrass, pond, and nearshore habitats within the Turkey Point site to record patterns of plant community status and environmental conditions in consultation with relevant State of Florida agencies. Various vegetation characteristics, such as species composition, canopy height, and the number of sawgrass culms, would be recorded within plots at predetermined intervals. Measurements would be recorded annually, twice annually, and quarterly depending on the plot type. Leaves would be sampled twice a year for morphological and physiological characterization to document change over time. Surface and pore-water levels and attributes would also be measured at plots and within plants. Assessment methodologies differed slightly between freshwater and saline wetland habitats. All proposed methodologies were to be consistent with those used in the Everglades National Park by the National Science Foundation-funded Long-Term Ecological Research Program. Two years of data collection before Units 3 and 4 coming online was expected, and post-operation monitoring shall be specified by the State agencies. The level of effort and results of these activities is unknown.

2.4.1.7 Related Federal Projects and Consultation

The review team reviewed the possibility that activities of other Federal agencies (e.g., building a dam) might affect the issuance of a COL to FPL. Any such activities could result in cumulative environmental impacts and the possible need for another Federal agency to become a cooperating agency for preparation of the EIS (10 CFR 51.10(b)(2)) (TN250).

Federal lands within a 50 mi radius of the Turkey Point site include Everglades National Park, which lies to the south and west. The CERP is a long-term effort to capture, store, and redirect freshwater for environmental restoration of the entire Everglades ecosystem. Ecologic goals of the restoration include increasing the spatial extent of natural areas, improving habitat and its functional quality, and improving native plant and animal abundance and diversity. These goals would be accomplished through water management, invasive species control, protection and restoration of key ecosystem functions and habitats, and soil conservation measures.

Biscayne National Park borders the Turkey Point site to the east. Efforts to restore the ecological function to Biscayne Bay are ongoing.

State parks within 50 mi of the Turkey Point site include Oleta River State Park, Bill Baggs Cape Florida Park, Cape Florida State Recreation Area, Barnacle Historic State Park, John U. Lloyd Beach State Park, Dagny Johnson Key Largo Hammock Botanical State Park, John Pennekamp Coral Reef State Park, Long Key State Park, Curry Hammock State Park, Lignumvitae Key Botanical State Park, and Windley Key Fossil Reef Geological State Park.

The NRC is required under Section 102(2)(C) of the National Environmental Policy Act of 1969, as amended (NEPA) (42 U.S.C. § 4321 et seq.) (TN661) to consult with and obtain the comments of any Federal agency that has jurisdiction by law or special expertise with respect to any environmental impact involved in the subject matter of the EIS. During the course of preparing this EIS, NRC consulted with the FWS and National Marine Fisheries Service (NMFS). Contact correspondence is included in Appendix F.

2.4.2 Aquatic Ecology

This section describes the aquatic environment and biota near the Turkey Point site and other areas potentially affected by the building, operation, and maintenance of proposed Turkey Point Units 6 and 7 and associated facilities, including transmission lines and pipelines. This section includes a description of the aquatic ecosystems at or near the site, a description of representative important species that are present or are expected to occur, and the location of sanctuaries, reserves, national parks, critical habitats, or other areas carrying special designation, as required by ESRP 2.4.2 (NRC 2000-TN614) and Executive Order 13158 (65 FR 34909) (TN3454).

As described in Section 2.1, the Turkey Point site is located on the southeastern coast of Florida in unincorporated Dade County. Figure 2-28 shows the location of the Turkey Point site with respect to Biscayne Bay and Card Sound, and the locations of the principal canal network near the area. Onsite aquatic resources include the IWF (cooling canals), surface-water habitats and canal systems, and Biscayne Bay nearshore areas adjacent to the Turkey Point peninsula (Figure 2-29). Nearby offsite aquatic resources include Biscayne Bay, Biscayne National Park, Biscayne Bay Aquatic Preserve, Florida Keys National Marine Sanctuary (FKNMS), and Card Sound. Everglades National Park is located south and west of the site.

Prior to drainage and development activities, the wetland and aquatic ecosystems of southern Florida encompassed approximately 8.9 million ac, and included ridge and slough landscapes, sawgrass plains, cypress and mangrove swamps, and coastal lagoons and bays (USACE/SFWMD 1999-TN116). Ogden et al. (2005-TN196) characterized this pre-drainage condition as a “hydrologically interconnected, slow-flowing system that extended from the Kissimmee River and Lake Okeechobee southward over low-gradient lands to the estuaries of Biscayne Bay, Ten Thousand Islands, and Florida Bay, and eastward and westward to the northern estuaries.” Browder et al. (2005-TN151) noted that prior to development, Biscayne Bay possessed both marine and estuarine habitat and fauna, and that construction of major canals and subsequent water drainage affected the salinity gradients and ecotones from the Everglades through coastal wetlands and tidal creeks into Biscayne Bay. Historical accounts suggest that prior to inlet and navigational dredging and related development, the northern and central portions of Biscayne Bay had much lower salinity conditions, low nutrient concentrations, and low turbidity/high light transmittance that promoted the presence of extensive seagrass meadows on the bay bottom (USACE/SFWMD 1999-TN116).

As described below, anthropogenic impacts over the last century have substantially altered the ecosystem and profoundly affected the three essential characteristics—salinity, nutrient concentrations, and turbidity—that defined historical conditions.

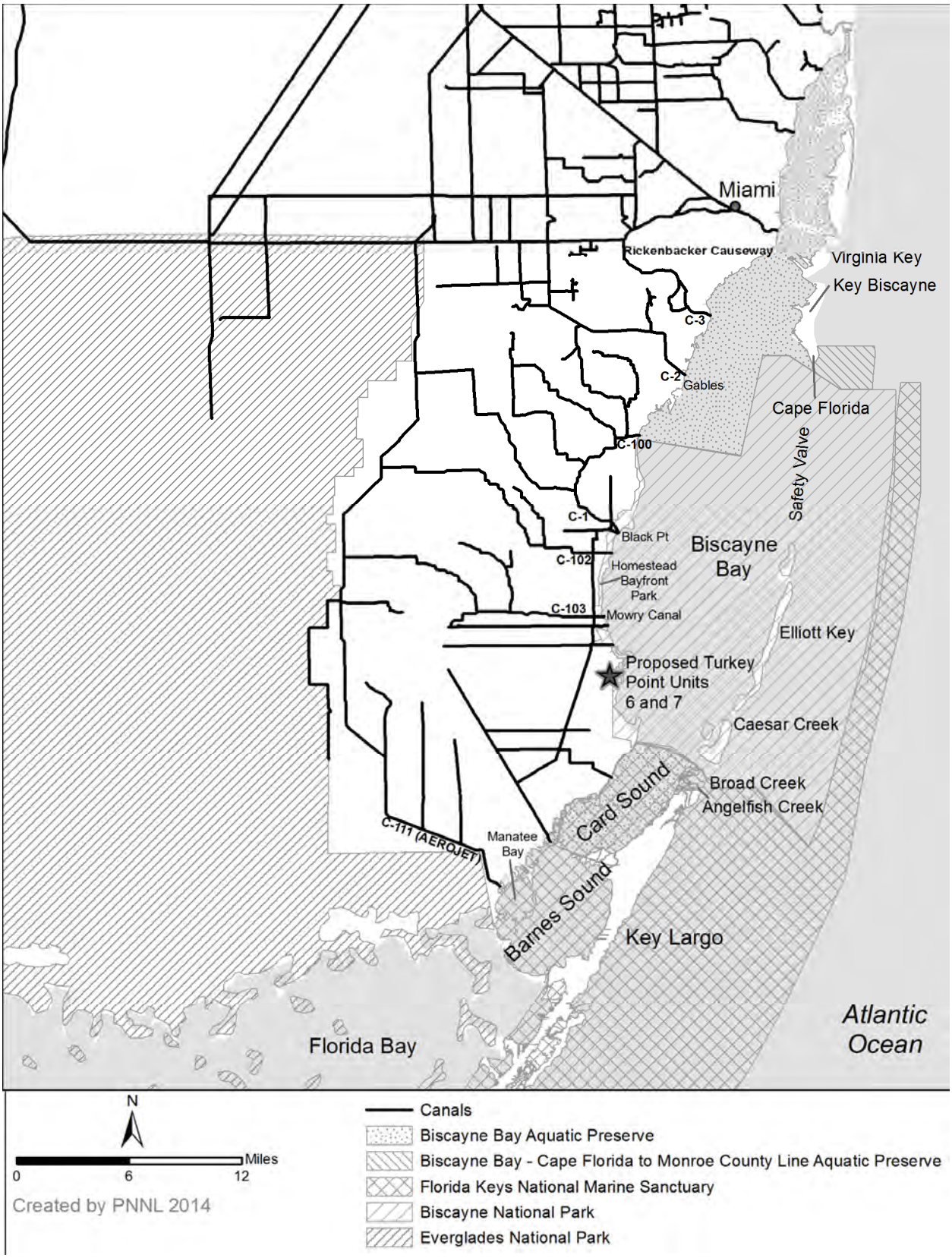


Figure 2-28. Turkey Point Site Location with Respect to Protected Areas

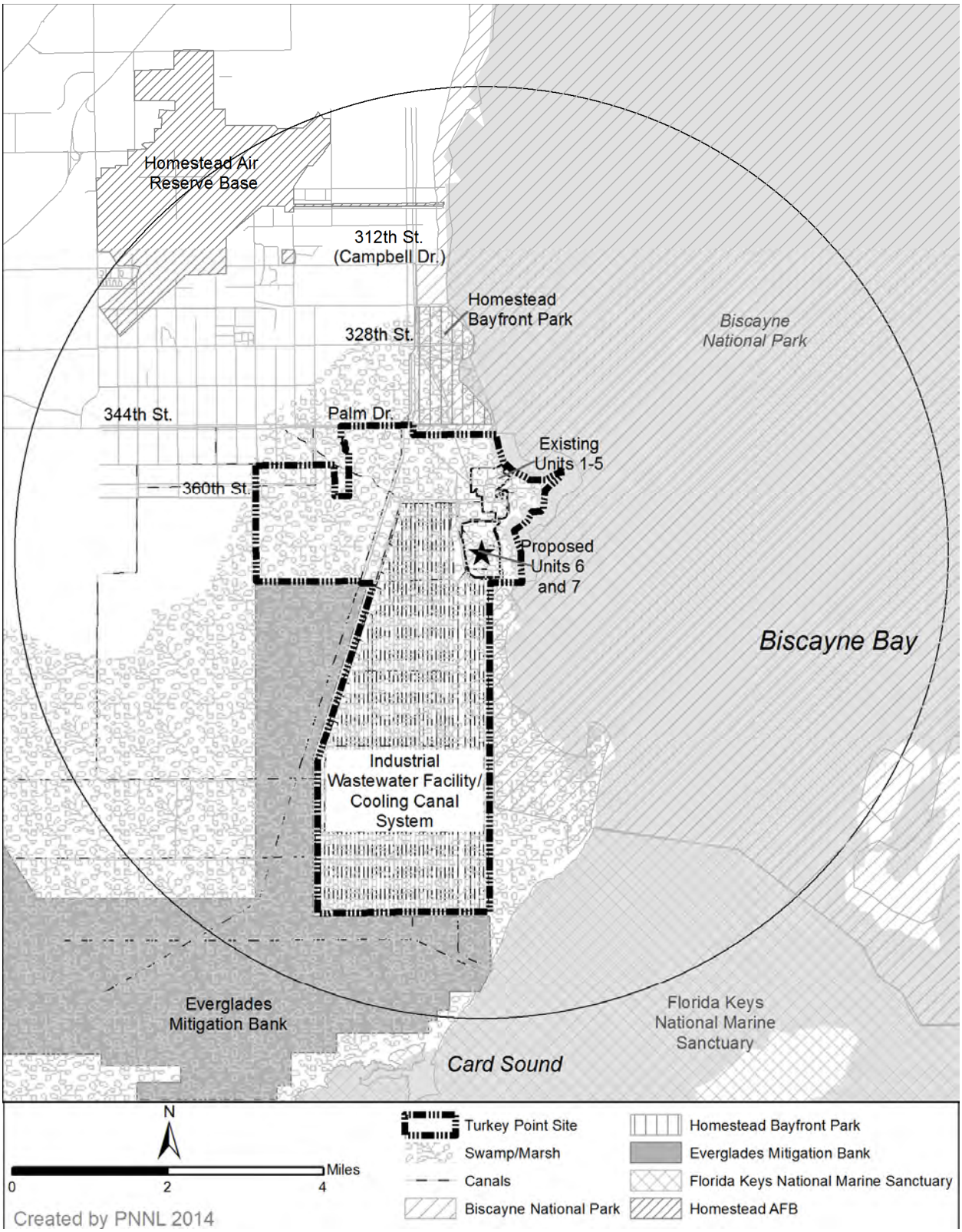


Figure 2-29. Turkey Point Site Showing Onsite Aquatic Resources, Surface-Water Habitats and Canal Systems, and Nearshore Areas Adjacent to the Turkey Point Peninsula

During the late 1800s and early 1900s, the lack of flood control was recognized as the principal impediment to development in South Florida. Land was drained to support urban and agricultural development, and a series of canals was constructed to support flood control, water supply and retention, irrigation, and transport. In 1948, Congress authorized the creation of the Central and Southern Florida Flood Control Project—one of the largest water-management systems in the world (Ogden et al. 2005-TN196). As a result of this and other projects, a substantial portion of the original wetland system in South Florida has been lost or converted to support agriculture, urban development, and related infrastructure. These changes have dramatically reduced sheet flow, and have created point-source discharge of freshwater into estuarine and coastal wetland areas. This substantially changed the dynamics of the system and resulting aquatic species compositions by reducing sheet flow, and creating pulsed point-source discharges into nearshore areas that are dissimilar in timing and duration to pre-development patterns. The effects of these practices have included the creation of deeper water habitats within canal systems that have contributed to the spread of exotic and nuisance species (Harvey et al. 2010-TN3158), the creation of unnatural habitats for predatory fishes and alligators, and unnatural reversals in wet and dry patterns (Ogden et al. 2005-TN197). Water-control structures and navigational locks have also contributed to the deaths of manatees (*Trichechus manatus latirostris*) (FWS 2001-TN223).

What follows is a description of the aquatic resources currently present at or near the Turkey Point site, including areas proposed for new transmission lines and pipelines. Resource descriptions include information provided by FPL as well as studies conducted by others to evaluate temporal trends or develop baseline assessments in support of the CERP. As discussed in Section 3, cooling-tower blowdown from the operation of proposed Units 6 and 7 would be injected into the Boulder Zone, an extremely permeable zone within a karstic fractured dolomite layer within the Lower Floridan aquifer in southeastern Florida, which extends from approximately 2,400 ft to at least 3,000 ft below ground surface (bgs) in the Miami-Dade County area (FPL 2014-TN4058). Because the review team is unaware of any aquatic resources within the Boulder Zone, it will not be discussed further with respect to aquatic resources.

2.4.2.1 Aquatic Resources – Site and Vicinity

This section provides a general description of aquatic resources that are or could be present at or near the Turkey Point site and the proposed Units 6 and 7 plant area. Sections 2.4.2.2 and 2.4.2.3 provide detailed information about proposed transmission lines and reclaimed and potable pipelines and representative important species that may be affected by the building and operation of proposed Turkey Point Units 6 and 7. As described in the ER (FPL 2014-TN4058), the surface-water habitats associated with the proposed Turkey Point Units 6 and 7 plant area include hypersaline mudflats, remnant and active canals and channels associated with operation of Units 1–4, dwarf mangrove wetlands, and open water.

What follows is a discussion of the aquatic species and habitats present on or near the Turkey Point site. As defined by ESRP 2.4.2 and Table 2.4.2.1 (NRC 2000-TN614), important habitats include the following:

- protected areas such as sanctuaries, refuges, or preserves, if they may be adversely affected by plant or transmission line and pipeline building or operation and maintenance, and
- habitats identified by State or Federal agencies as unique, rare, or of priority for protection, if these areas may be adversely affected by plant or transmission line and pipeline building, operation, and maintenance, including areas that have been designated as habitat for an evolutionary significant unit, distinct population segment, critical habitat, or essential fish habitat.

Onsite Aquatic Resources

Onsite aquatic resources include surface-water habitats and the IWF.

Onsite Surface-Water Habitats

As described in the ER (FPL 2014-TN4058), onsite surface-water habitats inclusive of the IWF include hypersaline mudflats, remnant canals, channels, dwarf mangrove wetlands, and areas of open water. As part of the pre-application monitoring, a survey of fish species was conducted in June 2009 in areas that would be affected by the building of the proposed new units. A variety of sampling gear was used, including minnow seines, cast nets, and minnow traps; entangling gear such as gill and trammel nets were avoided to protect resident American crocodile (*Crocodylus acutus*) populations. Water-quality measurements collected during sampling showed water temperatures ranged from 23.9 to 36.5°C; salinity was above 50 ppt at six sampling stations (TP-3A, TP-4, TP-5, TP-6, TP-7, TP-8) and ≤1.5 ppt at two stations in sawgrass/mangrove habitats (TP-1 and TP-2) (FPL 2009-TN201) (Figure 2-30). Fish collection results showed the Sheepshead Minnow (*Cyprinodon variegatus*)—the dominant species that occurred in seven of the eight sampling stations—represented 63 percent of the species composition. Sailfin Molly (*Poecilia latipinna*) and Goldspotted Killifish (*Floridichthys carpio*) were present at the majority of the sampling stations and represented 20.8 percent and 9.9 percent of the species composition, respectively. The remaining species that occurred were less common and collectively represented about 6 percent of the species composition (Table 2-18). No fish were collected at TP-2, which is in a marsh/mangrove community adjacent to Palm Drive (FPL 2009-TN201). All fish collected represented hardy species common to South Florida; no rare, unusual, sensitive, or protected species were collected (FPL 2009-TN201).

Industrial Wastewater Facility

The IWF occupies approximately 5,900 ac on the Turkey Point site (Figure 2-29). This facility provided cooling for Turkey Point Units 1 and 2, still provides cooling for Units 3 and 4, and receives blowdown water from the operation of Unit 5. The IWF contains an extensive system of canals and berms, and it has supported a variety of species of fish, mollusks, crustaceans, and submerged aquatic vegetation that are tolerant of subtropical, hypersaline environments. Table 2-19 provides a list of species known to occur in the IWF based on FPL monitoring studies (FPL 2014-TN4058). Many of these species are eaten by the State and Federally threatened American crocodiles that live in the IWF. FPL employees historically have also reported observing large game species such as Common Snook (*Centropomus undecimalis*) and Tarpon (*Megalops atlanticus*) in the IWF. These are most likely older individuals that have

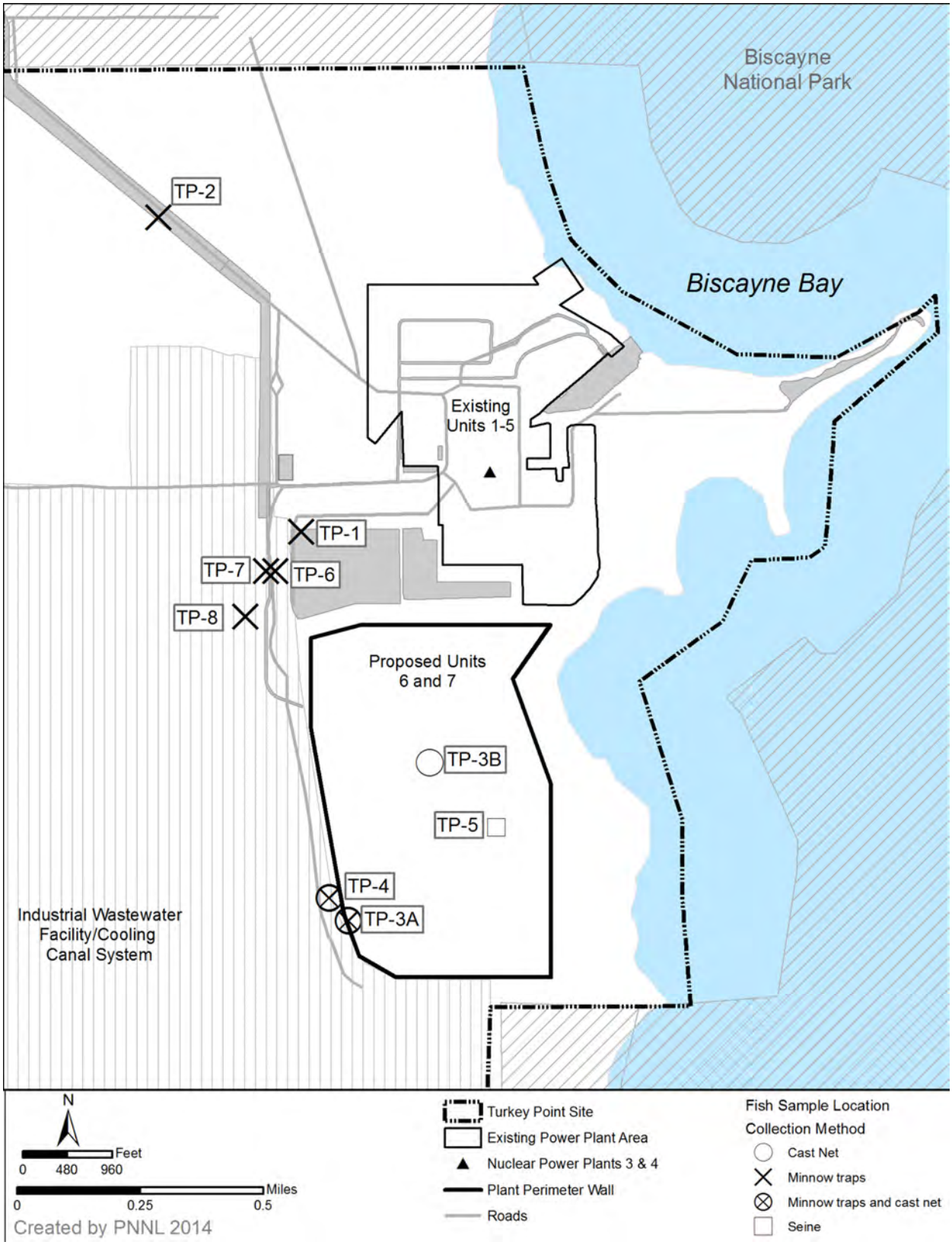


Figure 2-30. 2009 Fish Sampling Locations on the Turkey Point Site (Source: FPL 2009-TN201)

Table 2-18. Fish Species Present in Surface-Water Habitats Inclusive of the IWF on Turkey Point Site in Summer 2009

Common Name	Scientific Name	TP-1	TP-3	TP-4	TP-5	TP-6	TP-7	TP-8	Total	Percent Comp.
Sheepshead Minnow	*Cyprinodon variegatus*	4	70	25	43	87	37	7	273	63.0
Sailfin Molly	*Poecilia latipinna*	20	48	7	0	6	3	6	90	20.8
Goldspotted Killifish	*Floridichthys carpio*	0	3	1	22	15	1	1	43	9.9
Marsh Killifish	*Fundulus confluentus*	15	0	0	0	0	0	0	15	3.5
Gulf Killifish	*F. grandis*	3	0	1	0	0	1	1	6	1.4
Mosquitofish	*Gambusia holbrooki*	4	0	1	0	0	0	0	5	1.2
Gulf Toadfish	*Opsanus beta*	0	0	1	0	0	0	0	1	0.2

Source: FPL 2009-TN201

Table 2-19. Aquatic Species Documented in the Industrial Wastewater Facility (November 2007)

Common Name	Scientific Name
Reptiles	
American crocodile	*Crocodylus acutus*
Fish	
Sheepshead Minnow	*Cyprinodon variegatus*
Killifish	*Fundulus* sp.
Mosquitofish	*Gambusia* sp.
Mullet	*Mugil* sp.
Sailfin Molly	*Poecilia latipinna*
Needlefish	*Strongylura* sp.
Tarpon	*Megalops atlanticus*
Common Snook	*Centropomus undecimalis*
Mollusks	
Lightning whelk	*Busycon contrarium*
Ivory cerith	*Cerithium eburneum*
Lister's tree oyster	*Isognomon radiatus*
Flat tree oyster	*Isognomon alatus*
Giant rams horn	*Marisa cornuarietis*
Eastern melamphus	*Melampus bidentatus*
Florida crown conch	*Melongena corona*
Tellin	*Tellin* sp.
Crustaceans	
Great land crab	*Cardisoma guanhumi*
Fiddler crab	*Uca* sp.
Submerged Aquatic Vegetation	
Mermaid's wineglass (green algae)	*Acetabularia* sp.
Green algae	*Batophora* sp.
Green algae	*Caulerpa* sp.
Widgeon grass	*Ruppia maritima*

Source: Adapted from ER Rev 6 (FPL 2014-TN4058)

persisted in the system since it was isolated from Biscayne Bay in 1973 (FPL 2014-TN4058). Recruitment of fish and invertebrates could also potentially occur from hurricane storm surge overtopping IWF canal berms.

As noted in Section 2.3, the water quality in the IWF varies inter-annually and intra-annually in response to plant operation and meteorological conditions. Rainfall will cause the salinity to decrease, and evaporation from induced evaporation and hot, dry meteorological conditions will cause salinity to increase over time. Water temperatures in the IWF are generally highest during the summer months, and decrease during the winter. During the summer of 2014, elevations of peak water temperature, salinity, and nutrient levels in the IWF were detected above historic background levels. Also during the same period an extensive algal bloom was observed, necessitating consultation with FDEP to approve addition of copper sulfate, hydrogen peroxide and bio-stimulants to attempt to control algal growth, and temporary addition of water from the Floridan aquifer to reduce salinity in the IWF. Water-quality conditions in 2015 continued the trend of increased salinity and nutrient levels, which prompted action by FPL to address water-quality conditions. Additional information about these actions and their implications to IWF water quality is found in Section 2.3.1.1. Given the extended period during which high temperatures (both peak and average), high salinity, and algal blooms occurred, it is likely that the ecosystem within the IWF has changed and is no longer representative of the biodiversity observed in 2007 (Table 2-19) or in 2009 (Table 2-18).

Adult American crocodiles were first observed in the IWF in 1976, and nesting was first documented on the cooling-canal berms in 1978 (Wasilewski and Enloe 2006-TN979). As a result, FPL developed a crocodile management plan that focused on the creation and enhancement of habitat and long-term population monitoring. Because of activities related to the proposed Turkey Point Units 6 and 7, aquatic resources in the canals could be affected by placement of fill to support construction activities, dewatering of excavations, stormwater runoff during construction and operation, and disposal of the “muck” excavated from the proposed Units 6 and 7 construction site along the existing IWF canal berms.

Turkey Point Nearshore Waters

Turkey Point is a narrow peninsula of land east of the Turkey Point facility that extends eastward into Biscayne Bay. The Turkey Point peninsula is the site for the proposed radial collector wells and is adjacent to the existing barge slip and canal. Much of the area consists of previously filled areas and roadways, and adjacent mangrove swamps (FPL 2010-TN272). Environmental studies in the vicinity of the Turkey Point site have included a benthic macroinvertebrate study at three locations near the Turkey Point peninsula and three stations in Card Sound on March 18, 2009 (EAI 2009-TN97), and a seagrass study along 26 transects around the peninsula on August 11 and 12, 2009 (EAI 2009-TN153).

Methods used during the benthic invertebrate sampling study included the collection of three replicate benthic samples at each station using a diver-operated core sampler with a surface area of 225 cm^2. Samples were collected along a single transect line at 250, 500, and 750 ft from shore (EAI 2009-TN97). Summary information shows that crustaceans, mollusks, and polychaetes accounted for 90 percent of the total individuals collected, and the highest abundances were generally observed at the sampling station 250 ft from shore (Table 2-20). Numerically predominant species at the Turkey Point transect stations included the polychaetes

Fabrinicinuda trilobata and *Exogone dispar*, the mollusk *Caecum pulchellum*, and the amphipod *Shoemakerella cubensis* (EAI 2009-TN97).

Table 2-20. Summary of Benthic Invertebrate Abundances near Turkey Point

Classification	Distance from Shore (ft)			Total
	250	500	750	
Crustaceans	207	50	63	**320**
Echinoderms	5	3	0	**8**
Miscellaneous taxa	28	37	20	**85**
Mollusks	79	64	78	**221**
Polychaetes	224	64	47	**335**
Total	543	218	208	**969**

Source: EAI 2009-TN97

On August 11 and 12, 2009, a seagrass survey around the Turkey Point peninsula was conducted by Ecological Associates, Inc. (EAI) under contract to FPL (EAI 2009-TN153). The survey encompassed a total area of approximately 49 ha and included 26 transects surrounding the Turkey Point peninsula. Transects were approximately 300 m long and spaced approximately 50 m apart (EAI 2009-TN153). At each transect, divers recorded the seagrass conditions (species and percent cover) at the shoreward and seaward end of each transect, and at 50 m intervals in between for a total of seven observation locations per transect. At each location, seagrasses were identified to species, and their percent cover was visually estimated. As described in the survey report (EAI 2009-TN153), the Braun-Blanquet method was used to estimate percent cover and species contribution. Two species of seagrass were documented in the study area: turtle grass (*Thalassia testudinum*) and shoal grass (*Halodule wrightii*); turtle grass was the more abundant of the two species (EAI 2009-TN153). Turtle grass coverage was highest in areas immediately surrounding the peninsula and generally decreased with increasing distance from shore. Average Braun-Blanquet coverage was estimated to be 25 to 50 percent. Shoal grass was less abundant and generally more restricted in its distribution; it occurred most often in shallow water near the shoreline (EAI 2009-TN153). Braun-Blanquet coverage was estimated to be <5 percent and was completely absent at most sampling stations. Various species of macroalgae were also observed during the survey, including *Halimeda* spp., *Penicillius* spp., *Udotea* spp., and *Laurecia* spp., and at times approached 100 percent coverage over some sampling locations (EAI 2009-TN153).

Turkey Point Barge-Turning Basin

The barge-turning basin was developed in 1979 and is used for transport of material and large components to the Turkey Point site, and historically for delivery of fuel oil to maintain existing units. The turning basin is approximately 18 ft deep, with entrance channel depths between 8 and 12 ft. The turning basin is 300 ft by 1,200 ft (FPL 2014-TN4058). The turning basin was surveyed in 2008 (FPL 2014-TN4058) for submerged aquatic vegetation, and was found to have sparse, patchy seagrass beds that primarily occur along the northern shore of the basin. FPL documented a total of 170 ft^2 (0.004 ac) of seagrass which was turtlegrass (*Thalassia testudinum*) and shoal grass (*Halodule wrightii*), with patch densities of 5 to 20 percent coverage in several small areas (FPL 2014-TN4058). Green algae (*Caulerpa paspaloides* var. *laxa*) and algae (*Acetabularia calyculus*) were also documented; green algae occurred along the

southern edge of the basin and northeastern shore of the basin in areas of approximately 24 ft^2, and the algae co-occurred with green algae in the same area of the northeastern shore (FPL 2014-TN4058).

Offsite Aquatic Resources

Offsite aquatic resources include Biscayne Bay and its associated park and preserve; FKNMS; Card Sound and Canal; the EMB, Model Lands Basin, and Southern Glades Addition; as well as Everglades National Park and the Crocodile Lake National Wildlife Refuge.

Biscayne Bay, Biscayne National Park, Biscayne Bay Aquatic Preserve

Biscayne Bay and regions encompassing Biscayne National Park and Biscayne Bay Aquatic Preserve are a shallow subtropical saline lagoon that extends the length of Miami-Dade County (Figure 2-28). The eastern edge of the bay is bordered by a series of barrier islands that form the Florida Keys in Monroe County, and (from north to south) Virginia Key, Key Biscayne, Soldier Key, and Boca Chita Key, in Miami-Dade County. The western boundary of the bay is mainland, and the northern boundary of the bay near Miami is highly urbanized. Connection to the Atlantic Ocean is greatest north of Boca Chita where open access to the ocean is present in an area called “the Safety Valve,” and most restricted in the southern bay at Card Sound and Barnes Sound due to the presence of Key Largo and associated barrier islands. The average depth of the bay is approximately 5 ft at mean lower low water; its maximum depth is approximately 13 ft. Salinity is highly variable, ranging from approximately 24 to 44 ppt, and highly influenced by rainfall and the point-source discharges of the existing canal systems. Annual natural water temperatures range from approximately 59°F to 92°F (15°C to 33°C) at the surface (FPL 2014-TN4058). The shallow depths of the bay and maximum spring tidal range of 0.9 m (3 ft) result in a vertically well-mixed system with weak stratification except in Biscayne Bay at the mouths of drainage canals (Wang et al. 2003-TN105).

Biscayne National Park was first established in 1968 as a national monument and was expanded in 1980 to approximately 173,000 ac of water, coastal lands, and 42 islands. Activities such as boating, snorkeling, and recreational and commercial fishing are allowed in the park, and numerous environmental studies are conducted or sponsored by the NPS to assess the condition of natural resources within park boundaries and provide information to support preservation and restoration activities (NPS 2011-TN184). The Biscayne Bay Aquatic Preserve (BBAP) includes 67,000 ac of sovereign submerged lands in Biscayne Bay and is managed by the FDEP‘s Office of Coastal and Aquatic Managed Areas. Waters within the BBAP are designated as an OFW, which affords special protection because of their natural attributes (FPL 2014-TN4058). A portion of the BBAP is located approximately 0.5 mi east of the proposed Units 6 and 7 plant area (FPL 2014-TN4058).

As noted above, Biscayne Bay was hydrologically connected to the Greater Everglades ecosystem through a series of tributaries, sloughs, and groundwater flow, and possessed both estuarine and marine habitats (Browder et al. 2005-TN151). Subsequent development of an extensive canal system has substantially changed the hydrodynamics, resulting in pulsed discharge of freshwater into the bay via point-sources at intervals that are dissimilar in timing and duration to pre-development patterns. As a result, large discharges now occur during the wet season (May through October), and less freshwater reaches the bay during the dry season

(November through April) (Wang et al. 2003-TN105). Freshwater discharge has contributed to bottom scouring, rapid salinity fluctuations, and changes in benthic and nearshore habitats that affect the growth, survival, and reproduction of many species (Browder et al. 2005-TN151).

Biscayne Bay in its present form supports a dynamic assemblage of fish, invertebrates, marine mammals, and extensive seagrass beds. As described by Browder et al. (2005-TN151), at least seven species of seagrass occur in Biscayne Bay, and seagrass has been documented to cover up to 64 percent of the bay bottom. Common seagrass species include turtle grass, shoal grass, manatee grass (*Syringodium filiforme*), widgeongrass (*Ruppia maritime*), and three species of *Halophila*, including *H. johnsonii,* which is Federally protected species (Browder et al. 2005-TN151). Coastal mangrove communities are also present, and provide important habitat for many estuarine fish and invertebrate species. In a study from 1998 to 2005, Serafy et al. (2007-TN215) found that mangrove-lined shorelines of Biscayne Bay were used by subadult and adult Gray Snapper (*Lutjanus griseus*), juvenile Great Barracuda (*Sphyraena barracuda*), and adult Goldspotted Killifish. Species identified by Browder et al. (2005-TN151) of special relevance and utility for monitoring and assessment of Biscayne Bay included pink shrimp (*Farfantenaeus duorarum*), blue and stone crabs (*Callinectes sapidus* and *Menippe mercenaria*), oysters (*Crassostrea* spp.), estuarine fish communities, common bottlenose dolphin (*Tursiops truncatus*), American crocodile, Florida manatee, and wading birds. Representative marine species identified by Robles et al. (2005-TN198) to assess the condition of marine resources in Biscayne National Park included spiny lobster (*Panulirus argus*), Red Grouper (*Epinephelus morio*), Red Drum (*Sciaenops ocellatus*), and Gray Snapper.

During the process of developing the salinity target for western portions of Biscayne Bay, the NPS identified six taxa considered to be highly dependent on estuarine salinities: the American crocodile, the Spotted Seatrout (*Cynoscion nebulosus*), Mojarra (*Eucinostomus* spp.), Silver Perch (*Bairdiella chrysoura*), pink shrimp, and eastern oyster (*Crassostrea virginica*) (NPS 2006-TN183). Additional information about the spatial and temporal distribution, relative abundance, and life history characteristics of 40 fish and invertebrate species in 20 estuaries along the Atlantic coast of North Carolina, South Carolina, Georgia, and Florida (including Biscayne Bay) is provided by Nelson et al. (1991-TN174). Of the 40 species included in the assessment, 20 were either not present or were considered rare in Biscayne Bay, including the blue mussel (*Mytilus edulis*), common ranga (*Rangia cuneata*), *w*hite shrimp (*Litopenaeus setiferus,* formerly *Penaeus setiferus*), Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*), Blueback Herring (*Alosa aestivalis*), and Alewife (*A. pseudoharengus*). Nineteen species were common or highly abundant as adults, spawning adults, juveniles, larvae, or eggs in salinities ranging from 0.5 to >25 ppt (Table 2-21). This list, and the information above, represent a reasonable starting point for identifying ecologically, recreationally, or commercially important species in Biscayne Bay that may be affected by the construction and operation of the new units at Turkey Point, as required by ESRP 2.4.2 (NRC 2000-TN614).

Florida Keys National Marine Sanctuary

The FKNMS was designated on November 16, 1990, and is one of 14 marine protected areas in the National Oceanographic and Atmospheric Administration's (NOAA's) National Marine Sanctuary System. Sanctuary borders encompass 2,900 mi^2 of water surrounding the Florida Keys extending from south of Miami to the Dry Tortugas, excluding Tortuga National Park.

Table 2-21. Relative Abundance of Aquatic Species Commonly Found in Biscayne Bay for Given Salinity Ranges

Common Name	Scientific Name	Adult	Spawning Adults	Juveniles	Larvae	Eggs
Bay scallop	*Argopectin irradians*	Common >25 ppt	Common >25 ppt	Common >25 ppt	Common >25 ppt	Common >25 ppt
American oyster	*Crassostrea virginica*	Common 0.5 - >25 ppt	Common 0.5 - >25 ppt	Common 0.5 - >25 ppt	Common 0.5 - >25 ppt	Common 0.5 - >25 ppt
Hard clam	*Mercenaria* sp.	Common 0.5 - >25 ppt	Common 0.5 - >25 ppt	Common 0.5 - >25 ppt	Common 0.5 - >25 ppt	Common 0.5 - >25 ppt
Pink shrimp	*Penaeus duorarum*	Not present	Not present	Highly abundant 0.5 - >25 ppt	Highly abundant 0.5 - >25 ppt	Not present
Grass shrimp	*Palaemonetes pugio*	Common 0.5 - >25 ppt	Common 0.5 - >25 ppt	Common 0.5 - >25 ppt	Common 0.5 - >25 ppt	Common 0.5 - >25 ppt
Blue crab	*Callinectes sapidus*	Abundant to highly abundant 0.5 - >25 ppt	Common to abundant 0.5 - >25 ppt	Abundant to highly abundant 0.5 - >25 ppt	Abundant 0.5 - >25 ppt	Abundant 0.5 - >25 ppt
Ladyfish	*Elops saurus*	Common 0.5 - >25 ppt	Not present	Common 0.5 - >25 ppt	Common 0.5 - >25 ppt	Not present
American Eel	*Anguilla rostrata*	Common 0.5 - >25 ppt	Not present	Common 0.5 - >25 ppt	Common 0.5 - >25 ppt	Not present
Bay Anchovy	*Alosa mitchilli*	Highly abundant 0.5 - >25 ppt	Highly abundant 0.5 - >25 ppt	Highly abundant 0.5 - >25 ppt	Highly abundant 0.5 - >25 ppt	Highly abundant 0.5 - >25 ppt
Sheepshead Minnow	*Cyprinodon variegatus*	Common 0.5 - >25 ppt	Common 0.5 - >25 ppt	Common 0.5 - >25 ppt	Common 0.5 - >25 ppt	Common 0.5 - >25 ppt
Mummichug	*Fundulus heteroclitus*	Not present	Not present	Not present	Not present	Not present
Atlantic Silverside	*Menidia menidia*	Abundant 0.5 - >25 ppt	Abundant 0.5 - >25 ppt	Abundant 0.5 - >25 ppt	Abundant 0.5 - >25 ppt	Abundant 0.5 - >25 ppt
Gray snapper	*Lutijanus griseus*	Highly abundant 0.5 - >25 ppt	Not present	Highly abundant 0.5 - >25 ppt	Abundant to highly abundant 0.5 - >25 ppt	Not present
Pinfish	*Lagodon rhomboids*	Highly abundant 0.5 - >25 ppt	Not present	Highly abundant 0.5 - >25 ppt	Highly abundant 0.5 - >25 ppt	Not present
Spotted Seatrout	*Cynoscion nebulosus*	Common 0.5 - >25 ppt	Common >25ppt	Common 0.5 - >25 ppt	Common 0.5 - >25 ppt	Common >25 ppt
Spot	*Leiostomus xanthurus*	Common 0.5 - >25 ppt	Not present	Common 0.5 - >25 ppt	Common 0.5 - >25 ppt	Not present
Striped Mullet	*Mugil cephalus*	Common 0.5 - >25 ppt	Not present	Common 0.5 - >25 ppt	Common 0.5 - >25 ppt	Not present
Spanish Mackerel	*Scomberomorus maculates*	Common 0.5 - >25 ppt	Not present	Common 0.5 - >25 ppt	Common >25 ppt	Not present
Gulf Flounder	*Paralichthys albigutta*	Common 0.5 - >25 ppt	Not present	Common 0.5 - >25 ppt	Common 0.5 - >25 ppt	Not present

Source: Adapted from Nelson et al. 1991-TN174.

FKNMS includes all of Card Sound and a slender area of Biscayne Bay to the east of Biscayne National Park. Biscayne National Park's eastern and southern boundaries are FKNMS boundaries as well. Natural features within sanctuary boundaries include extensive seagrass beds, mangrove-fringed islands, and the world's third-largest barrier reef. NOAA estimates more than 6,900 species of marine life are found in the waters of FKNMS (NOAA 2014-TN3201).

Card Sound and Card Sound Canal

Card Sound is a shallow bay south of the Turkey Point site (Figure 2-28) wholly within the FKNMS with limited connection to the Atlantic Ocean. The mangrove forests surrounding Card Sound are part of the longest continuous stretches of mangroves remaining on the east coast of Florida, and they serve as food and refuge for approximately 70 percent of the area's commercially and recreationally important marine species (FPL 2014-TN4058). Both Biscayne Bay and Card Sound are nursery areas for the spiny lobster, and the area from Cape Florida near Key Biscayne south to Card Sound is designated as the Biscayne Bay-Card Sound Lobster Sanctuary by the State of Florida (FPL 2014-TN4058).

In 2008 and 2009, EAI conducted a study in Card Sound near the Turkey Point site to characterize fish and shellfish resources. Sampling was conducted every other week from March 4, 2008 to February 17, 2009, for a total of 26 sampling events at three locations along the western shore of Card Sound near the southern boundary of Biscayne Bay. Trawl samples were used to collect juvenile and adult fish and shellfish; towed nets were used to collect icthyoplankton and shellfish larvae (EAI 2009-TN154). Table 2-22 provides a summary of the baseline aquatic resource sampling results for fish in Card Sound and Card Sound Canal in 2008-2009.

During the fish survey, a total of 4,679 individual fish were captured; the overall catch per unit effort (CPUE) was 7.5 specimens captured per 100 m trawled. Seven species accounted for 90 percent of the total captured; Pinfish were the most numerous (Table 2-22).

During the March 2008 to February 2009 sampling period, a total of 2,063 shellfish were collected with an overall CPUE of 3.3 specimens per 100 m trawl. Four species accounted for 90 percent of the total captured; pink shrimp were the most abundant, followed by other penaeid shrimp (*Farfantepenaeus* spp.), ornate blue crab (*Callinectes ornatus*), and Caribbean spiny lobster (*Panulirus argus*) (Table 2-23).

EAI (2009-TN154) also collected icthyoplankton samples from Card Sound from March 2008 to February 2009. For the assessment of fish egg abundance, a total of 26,277 eggs were collected from 3,991.6 m^3 of water, resulting in an overall density of 6.6 eggs per cubic meter. The majority of fish eggs were unidentified; approximately 12 percent were determined to be herring eggs (EAI 2009-TN154). Fish larvae sampling identified a total of 3,152 fish larvae representing 47 taxa in plankton samples, resulting in an average of 0.8 larvae per cubic meter of water. Larvae of gobies (family Gobiidae) accounted for approximately 22 percent of the total captured, followed by herring and blennies (family Labrisomidae and Chaenopsidae). In all, 10 taxa represented 90 percent of the total numbers collected (Table 2-24). The March 18, 2009 invertebrate study also included collections from three transects in Card Sound near the

southern end of the Turkey Point site (EAI 2009-TN97). Crustaceans were the most numerically abundant taxa, followed by mollusks and polychaetes (Table 2-25). The general conclusion of EAI (2009-TN154) was that the 2008-2009 sampling of Card Sound was comparable to previous studies in Biscayne Bay.

Table 2-22. Fish Species Composing 90 Percent of the Total Catch in Card Sound during 2008-2009 Sampling Events

Common Name	Scientific Name	Total Number Collected	Percentage of Total	Catch per Unit Effort
Pinfish	*Lagodon rhomboides*	919	19.64	1.47
Bluestriped Grunt	*Haemulon sciurus*	591	12.63	0.94
Silver Jenny	*Eucinostomus gula*	577	12.33	0.92
White Grunt	*Haemulon plumierii*	544	11.63	0.87
Fringed Pipefish	*Anarchopterus criniger*	324	6.92	0.52
Scrawled Cowfish	*Acanthostracion quadricornis*	192	4.10	0.31
Gulf Toadfish	*Opsanus beta*	172	3.68	0.27
Gray Snapper	*Lutjanus griseus*	156	3.33	0.25
Planehead Filefish	*Stephanolepis hispida*	152	3.25	0.24
Mojarra	*Eucinostomus* spp.	130	2.78	0.21
Sea Bream	*Archosargus rhomboidalis*	104	2.22	0.17
Striped Burrfish	*Chilomycterus schoepfii*	82	1.75	0.13
Bandtail Puffer	*Sphoeroides spengleri*	81	1.73	0.13
Fringed Filefish	*Monocanthus ciliates*	72	1.54	0.11
Hogfish	*Lachnolaimus maximus*	57	1.22	0.09
Trunkfish	*Lactophrys trigonus*	40	0.85	0.06
Grass Porgy	*Calamus arctifrons*	39	0.83	0.06

Source: Adapted from EAI 2009-TN154.

Table 2-23. Shellfish Species Composing 90 Percent of the Total Catch in Card Sound during 2008-2009 Sampling Events

Common Name	Scientific Name	Total Number Collected	Percentage of Total	Catch per Unit Effort
Pink shrimp	*Farfantepenaeus duorarum*	1,153	55.89	1.84
Penaeid shrimp	*Farfantepenaeus* spp.	354	17.16	0.56
Ornate blue crab	*Callinectes ornatus*	187	9.06	0.30
Caribbean spiny lobster	*Panulirus argus*	172	8.34	0.27

Source: Adapted from EAI 2009-TN154.

Table 2-24. Fish Larvae Composing 90 Percent of the Total Collection in Card Sound during 2008-2009 Sampling Events

Common Name	Scientific Name	Total Number Collected	Percentage of Total	Catch per Unit Effort
Gobies	Family Gobiidae	921	29.22	0.2307
Herring	Family Clupeidae	509	16.15	0.1275
Labrisomid blennies	Family Labrisomidae	313	9.93	0.0784
True blennies	Family Chaenopsidae	257	8.15	0.0644
Hardhead Silverside	*Atherinomorus stipes*	234	7.42	0.0586
Code Goby	*Gobiosoma robustum*	203	6.44	0.0509
Spotted Dragonet	*Diplogrammus pauciradiatus*	132	4.19	0.0331
Sleepers	Family Eoeotridae	117	3.71	0.0293
Gobies	Suborder Gobioidei	86	2.73	0.0215
Herring-like fishes	Order Clupeiformes	71	2.25	0.0178

Source: Adapted from EAI 2009-TN154

Table 2-25. Summary of Benthic Invertebrate Abundances near Card Sound

	Distance from Shore (ft)			
Classification	250	500	750	Total
Crustaceans	234	498	268	**1,000**
Echinoderms	3	16	9	**28**
Miscellaneous taxa	31	4	26	**61**
Molusks	129	132	179	**440**
Polychaetes	27	45	88	**160**
Total	424	695	570	**1,689**

Source: EAI 2009-TN97

Everglades Mitigation Bank, Model Lands Basin, and Southern Glades Addition

The EMB is a 13,000 ac expanse of freshwater and estuarine wetlands west and south of the IWF (Figure 2-29). The EMB is owned and operated by FPL and is used as a commercial mitigation bank with wetland habitat credits that can be purchased to offset regional wetland impacts. The Model Lands Basin and Southern Glades Addition are also located to the west and south of the Turkey Point site. These areas represent a collaborative effort by the Environmentally Endangered Lands Program of Miami-Dade County and the SOR Program of the SFWMD to restore the natural environments of Biscayne Bay and its watershed. This area encompasses approximately 34,000 ac of freshwater and coastal wetlands, excluding the land reservations by RMC South Florida, Inc. and FPL for permitted industrial and/or mitigation uses, as described above (SFWMD 2005-TN217). These areas serve as habitat and refuge for a variety of birds, fish, reptiles, amphibians, and mammals, including numerous Federal and State threatened or endangered species. Key management issues in these locations include the continuing loss of habitat in adjacent areas due to land-use conversion, the presence of invasive and exotic species, and damage associated with unauthorized public use, including the discharge of firearms and solid waste dumping (SFWMD 2005-TN217).

Everglades National Park and Crocodile Lake National Wildlife Refuge

Everglades National Park is located south and west of the Turkey Point site and encompasses 2,353 mi^2 of wetlands, uplands, and submerged lands. The distance from the western border of the park to the boundary of the Turkey Point property ranges from 6 to 13 mi. The park was authorized by Congress in 1934 and established in 1947 to protect the biological resources of the southern Everglades ecosystem. Important ecosystem features of Everglades National Park include sawgrass sloughs, tropical hardwood hammocks, mangrove forests, and numerous lakes, ponds, and bays that sustain many threatened and endangered species (USACE 2010-TN113). Nearly 300 species of fish inhabit the freshwater marshes and marine coastlines of Everglades National Park, and fishing is popular within park boundaries. American alligator (*Alligator mississippiensis*), American crocodile, and sea turtles are found in Everglades National Park. Marine mammals documented within park boundaries include pilot whales (*Globicephala macrorhyncha*), common bottlenose dolphin, and Florida manatee (NPS 2010-TN194).

The 6,600 ac Crocodile Lake National Wildlife Refuge is approximately 10 mi south of the Turkey Point site, and it serves as a refuge for crocodiles and other wildlife requiring mangrove habitats.

2.4.2.2 Aquatic Resources – Transmission Lines and Related Pipeline

This section provides a general description of the proposed transmission lines that would need to be constructed or upgraded to support proposed Units 6 and 7 followed by a summary of the aquatic resources that are or could be present in those areas. Aquatic resources that may occur near the proposed pipeline are expected to be similar to those collocated transmission lines (Clear Sky to Davis and Davis to Miami). Detailed information about the proposed transmission line routes and configurations are provided in Section 2.2.2; additional information is provided in the Section 9 of SCA Rev 1 (FPL 2010-TN272), ER Revision 6, Section 2.2.2 (FPL 2014-TN4058), and the supplemental information about transmission corridor information provided by FPL in 2013 (FPL 2013-TN2941).

East Transmission Corridor

As described in Section 2.2.2, a new 230 kV approximately 19 mi long transmission line would be constructed to connect the proposed new Clear Sky substation to the existing Davis substation, and a new approximately 18 mi long 230 kV line would be constructed to connect the Davis substation to a new 230 kV bay position at the Miami substation. FPL stated (FPL 2014-TN4058) that these transmission lines would be largely collocated in an existing right-of-way or other linear/transportation corridors. Along the Clear Sky to Davis route, streams, waterways, and canals account for about 2 percent of the land cover, and mangrove swamps account for approximately 10 percent of the land use. Streams, waterways, canals, and reservoirs along the Davis to Miami Route account for less than 2 percent of the land use (FPL 2014-TN4058).

West Corridor Options

As described in Section 2.2.2, FPL has outlined two options for the West corridor that connects the Clear Sky, Levee, and Pennsuco substations. The two options differ primarily as to where

the corridor would pass with respect to the Everglades National Park. The first option, termed the West Preferred corridor, passes along a segment of the eastern perimeter of the park. The second option, termed the West Consensus corridor, avoids the park perimeter by passing through lands to the east used mostly for limerock mining. The West Consensus corridor was certified in 2014 as the primary corridor for the location, construction, and operation of electrical transmission lines, and the West Preferred corridor was identified as the backup location (State of Florida 2014-TN3637). Land use associated with these corridors is predominantly related to farming activities. Aquatic habitats along the routes (e.g., streams, waterways and canals) represent between 16 percent and 36 percent of the land use, and vary with respect to the route chosen and transmission line segment (FPL 2013-TN2941).

Aquatic Resources

Table 2-26 lists the fish species that could occur in open water habitats associated with the proposed transmission line and pipeline corridors in Miami-Dade County based on information provided in ER Revision 6 (FPL 2014-TN4058). Based on FNAI findings, FPL believes the only State of Florida fish Species of Special Concern in Miami-Dade County that could potentially occur along the proposed transmission line and pipeline corridors is the Mangrove Rivulus (*Rivulus marmoratus*), although the corridors would not include ideal habitat (mangrove) for the fish (FPL 2014-TN4058). Federally or State-listed species that could potentially occur in transmission line and pipeline corridors include the American alligator and the Florida manatee, which may be found in the canal systems adjacent to the transmission and pipeline corridors. A discussion of these species follows. Because any or all of these species could potentially occur in the aquatic and wetland habitats crossed by the proposed corridors, the review team assumes threatened and endangered species surveys would occur prior to building.

Table 2-26. Fish Species that Could Occur in Open Water Habitats Associated with the Proposed Transmission Line Corridors in Dade County, Florida

Common Name	Scientific Name
Florida Species of Special Concern	
Mangrove Rivulus	*Rivulus marmoratus*
Common Native Freshwater Forage Fish	
Mosquitofish	*Gambusia holbrooki*
Sailfin Molly	*Poecilia latipinna*
Least Killifish	*Heterandria formosa*
Sunfishes	*Lepomis* spp.
Gars	*Lepisosteus* spp.
Common Non-Indigenous Fish	
Peacock Bass	*Cichla ocellaris*
Spotted Tilapia	*Tilapia mariae*
Blue Tilapia	*Oreochromis aureus*
Mayan Cichlid	*Cichlasoma urophthalmus*
Jaguar Guapote	*Cichlasoma managuense*
Oscar	*Astronotus ocellatus*

Source: ER Rev 6 (FPL 2014-TN4058)

2.4.2.3 Aquatic Species and Habitats

Important aquatic species are defined in ESRP 2.4.2 (NRC 2000-TN614) as all life stages that are critical to the structure and function of the local aquatic ecosystem, and include the following:

- rare species, defined as (1) those listed as threatened or endangered or designated as experimental populations or species by FWS or NMFS; (2) species listed as threatened or endangered by State agencies; and (3) Species of Concern as identified by State or Federal agencies
- commercially or recreationally valuable, or subsistence species
- species essential to the maintenance or survival of species that are rare and commercially or recreationally valuable
- species that serve as biological indicators to monitor the effects of the facilities on the aquatic environment
- marine mammals.

Ecologically, Commercially, and Recreationally Important Species

Table 2-27 lists species considered by the review team to be ecologically, commercially, and recreationally important to Biscayne Bay in the vicinity of the Turkey Point site based on the data and information presented above and past studies. These species contribute to the structure and function of Biscayne Bay, and could potentially be affected by the construction and operation of proposed Units 6 and 7. Table 2-27 also includes non-native and invasive species that occur in Biscayne Bay and have the potential to influence ecosystem dynamics. Federally and State-listed species are discussed later in this section. Brief descriptions of the life histories of species presented in Table 2-27 follow. The susceptibility of these species to adverse impacts associated with the construction and operation of the proposed Units 6 and 7 at Turkey Point is discussed in Chapters 4 and 5, respectively. Separate discussions are provided for Federally or State-listed species, and for those species with designated essential fish habitat.

Marine Mammals

The Biscayne Bay stock of common bottlenose dolphins is bounded to the north by Haulover Inlet (north of Miami) and to the south by the Card Sound Bridge, south of the Turkey Point site. Population trend data are not available for the Biscayne Bay stock, but NOAA initiated a photo-identification project for this species in 1990 (NOAA 2011-TN182). Threats to dolphins include coastal pollution, fatal interactions with crab and lobster pots, and entanglement in fishing gear (NOAA 2009-TN175). As discussed below, manatee are also present in Biscayne Bay. Marine mammals may also be sensitive to noise and vibration associated with nearshore construction activities and radial collector well installation.

Table 2-27. Ecologically, Recreationally, and Commercially Important Aquatic Species Likely to Occur at or near the Turkey Point Site

Common Name	Scientific Name	Classification	Designation[a]	Citation
Common bottlenose dolphin	*Tursiops truncatus*	Marine Mammal	Eco	(b)
Common Snook	*Centropomus undecimalis*	Game fish	Rec, Eco	(c)
Tarpon	*Megalops atlanticus*	Game fish	Rec, Eco	(c)
Spotted Seatrout	*Cynoscion nebulosus*	Game fish	Eco, Rec	(d)
Red Drum	*Sciaenops ocellatus*	Game fish	Eco, Com, Rec	(e)
Red Grouper	*Epinephelus morio*	Game fish	Eco, Com, Rec	(e)
Gray Snapper	*Lutjanus griseus*	Forage fish	Eco, Com, Rec	(e)
Mojarras	*Eucinostomus* spp.	Forage fish	Eco	(d)
Silver Jenny	*Eucinostomus gula*	Forage fish	Eco	(d)
Grunts	*Haemulon* spp.	Forage fish	Eco, Com, Rec	(f)
Bluestriped Grunt	*Haemulon sciurus*	Forage fish	Eco, Com, Rec	(f)
Fringed Pipefish	*Anarchopterus criniger*	Forage fish	Eco	(f)
Pinfish	*Lagodon rhomboides*	Forage fish	Eco, Rec	(f)
Sheepshead Minnow	*Cyprinodon variegatus*	Forage fish	Eco	(c)
Killifishes	*Fundulus* spp.	Forage fish	Eco	(c)
Mosquitofish	*Gambusia* sp.	Forage fish	Eco	(c)
Sailfin Molly	*Poecilia latipinna*	Forage fish	Eco, Com	(c)
Needlefish	*Strongylura* sp.	Forage fish	Eco	(c)
Silver Perch	*Bairdiella chrysoura*	Forage fish	Eco	(c)
Pink Shrimp	*Farfantepenaeus duorarum*	Crustacean	Eco, Com	(b, d, f)
Caribbean Spiny lobster	*Panulirus argus*	Crustaceran	Eco, Com, Rec	(e)
Blue Crab	*Callinectes sapidus*	Crustacean	Eco, Rec, Com	(b)
American Oyster	*Crassostrea virginica*	Mollusk	Eco, Rec, Com	(b, d)
Green Sea Urchin	*Lytechinus variegatus*	Echnonderm	Eco	(f)
Turtle Grass	*Thalassia testudinum*	Seagrass	Eco	(g, h)
Shoal Grass	*Halodule wrightii*	Seagrass	Eco	(g, h)
Manatee Grass	*Syringodium filiforme*	Seagrass	Eco	(g, h)
Algae	*Batophora* spp.	Macroalgae	Eco	(g)
Pacific Whiteleg Shrimp	*Litopenaeus vannamei*	Non-indigenous	Eco, Com	(i)
Lionfishes	*Pterois* spp.	Non-indigenous	Eco	(j)
Mayan Cichlid	*Cichlasoma urophthalamus*	Non-indigenous	Eco	(j)
Oscar	*Astronotus ocellatus*	Non-indigenous	Eco	(j)
Asiatic Clam	*Corbicula fluminea*	Non-indigenous	Eco	(k)
Zebra Mussel	*Dreissena polymorpha*	Non-indigenous	Eco	(k)

(a) Eco = ecologically important; Rec = recreationally important; Com = commercially important.
(b) Identified as species of special relevance and utility for monitoring and reporting the state of the Biscayne Bay by Browder et al. (2005-TN151)
(c) Documented in ER Rev 6 (FPL 2014-TN4058)
(d) Used by NPS (2006-TN183) to develop salinity targets for Western Biscayne Bay
(e) Representative marine species identified by Robles et al. (2005-TN198) to assess the condition of marine resources in Biscayne National Park
(f) Numerically abundant in Card Sound (EAI 2009-TN154)
(g) Abundant near Turkey Point site (EAI 2009-TN153)
(h) Common in Biscayne Bay (b).
(i) Non-indigenous crustacean species used in aquaculture (FAO 2012-TN155)
(j) Non-indigenous fish Species of Concern (NPS 2011-TN185)
(k) Non-indigenous mollusk species in freshwater systems (Ogden et al. 2005-TN196)

Game Fish

Examples of game fish common to Biscayne Bay in the vicinity of the Turkey Point site that could be affected by the construction and operation of proposed Units 6 and 7 include Common Snook, Tarpon, Spotted Seatrout, Red Drum, and Red Grouper (Table 2-27). Many of these species have been included in monitoring programs to assess the condition of Biscayne Bay, or were numerically abundant in recent collections near the Turkey Point site and are presented in Table 2-22. Unless otherwise noted, the following life history information was obtained from the Florida Museum of Natural History (FMNH 2012-TN167).

Common Snook (*Centropomus undecimalis*). Common Snook can tolerate a wide range of salinities but cannot tolerate water temperatures below 60°F. The lower lethal limit of water temperatures is 48.2 to 57.2°F for juveniles, and 42.8 to 53.6°F for adults. Primary prey of Common Snook include small fish, crabs, and mollusks (FFWCC 2011-TN159).

Tarpon (*Megalops atlanticus*). Tarpon are common in coastal waters from Virginia to central Brazil, inhabiting coastal waters, bays, estuaries, and mangrove-lined lagoons. Tarpon are also tolerant to a wide range of salinities (0 to 47 ppt) and low dissolved oxygen conditions but prefer water temperatures ranging from 72 to 82°F. Juveniles are planktiverous, and adults are carnivorous, and feed on a variety of smaller fish, shrimp, and crab. Only recreational Tarpon fishing is allowed in Florida (FFWCC 2011-TN159).

Spotted Seatrout (*Cynoscion nebulosus*). The geographical range of Spotted Seatrout is limited to the western Atlantic from Cape Cod, Massachusetts, to southern Florida and the Gulf of Mexico. In Biscayne Bay, adults, spawning adults, juveniles, larvae, and eggs are present in salinities ranging from 0.5 to >25 ppt (Nelson et al. 1991-TN174). During the summer months, seatrout are found in seagrass beds, and they move to deeper pockets of water in estuaries during the cooler months. Migration out of nursery estuaries is rare.

Red Drum (*Sciaenops ocellatus*). The Red Drum is a euryhaline species found along the Atlantic and Gulf of Mexico coasts from Cape Cod, Massachusetts, to Tuxpan, Mexico. Red Drum are found in a variety of habitats, including estuaries, river mouths, bays, and seagrass beds. Adults are generally found in salinities of 30 to 35 ppt, and are tolerant of temperatures ranging from 39 to 83°F. The Red Drum is harvested commercially, is a popular recreational species, and has been used in commercial aquaculture operations.

Red Grouper (*Epinephelus morio*). The Red Grouper is found in the western Atlantic Ocean from North Carolina to southern Brazil, including the Gulf of Mexico and the Caribbean Sea. This species can be found in depths ranging from 16 to over 1,000 ft on both rocky and muddy substrates. Juveniles are generally found in seagrass beds. Predators include larger fish, including sharks and Great Barracuda. Although Red Grouper are fished commercially and recreationally, they are considered overfished in the South Atlantic, and harvests in U.S. waters have decreased by 50 percent over the past 55 years.

Forage Fish

Aquatic areas within FPL property and in Biscayne Bay near the Turkey Point site support a diverse assemblage of forage fish that could be affected by the construction and operation of proposed Units 6 and 7. In addition to providing food for a variety of larger fish, turtles, birds, and marine mammals, many have been used as representative species to assess changes in Biscayne Bay. The following discussion focuses primarily on species common or numerically dominant in areas at or near the Turkey Point site based on the recent investigations discussed above, and those included in monitoring studies as indicator species. Unless otherwise noted, the following life history information was obtained from FMNH 2012 (TN167).

Gray Snapper. Gray Snapper are found in the western Atlantic Ocean from Massachusetts to Bermuda, and are abundant along the Florida coast. Robles et al. (2005-TN198) included this species as a surrogate for assessing the condition of marine resources in Biscayne Bay. Nelson et al. (1991-TN174) noted that Gray Snapper adults, juveniles, and larvae were abundant to highly abundant in Biscayne Bay in salinities ranging from 0.5 to >25 ppt. Young fish are found in nearshore seagrass beds and soft and sand-bottom habitats. Adults tend to remain in the same area for long periods of time. Predators include sharks, barracudas, groupers, moray eels, and other larger fish.

Mojarras (*Eucinostomus spp*.) and Silver Jenny (*E. gula*). Mojarras and Silver Jenny are forage fish common to Biscayne Bay and Card Sound. *Eucinostomus* spp. were identified by NPS (2006-TN183) as an indicator for developing salinity targets for Biscayne Bay; Silver Jenny were numerically abundant in nearby Card Sound during the 2008-2009 sampling by EAI (2009-TN154) and FPL (2014-TN4058). Optimal salinity ranges for Mojarras are considered to be approximately 10 to 20 ppt (NPS 2006-TN183).

Grunts (*Halemulon spp.*), Pipefishes (*Anarchopterus spp.*), and Pinfish (*Lagodon rhomboides*). Grunts, pipefishes, and Pinfish are common in the western Atlantic Ocean from South Carolina to Brazil, and are often found in mangroves, reefs, and seagrass beds. Juvenile grunts are abundant in turtle grass. Bluestriped and White Grunt (*H. sciurus*, *H. plumierii*), Fringed Pipefish (*A. criniger*), and Pinfish were numerically abundant during the 2008-2009 EAI sampling in Card Sound (Pinfish had the highest abundance) (EAI 2009-TN154). Predators include snappers, groupers, Spanish Mackerels, and sharks. Pinfish have also recently been considered as a candidate species for Florida aquaculture given their tolerance for a wide range of environmental conditions (Ohs et al. 2010-TN219).

Sheepshead Minnow, Killifishes (*Fundulus* spp.), Mosquitofish (Genus *Gambusia*), Sailfin Molly, and Needlefishes (*Strongylura* spp.). Sheepshead Minnow, Killifishes, Mosquitofish, Sailfin Molly, and Needlefishes are hardy forage fish that are tolerant of high salinities, and occurrences of these fish in the Turkey Point IWF are documented. Most are not common to Biscayne Bay, but Sailfin Molly are often found in shallow surface waters along the edges of marshes, ponds, and swamps. Silver Perch are found in seagrass beds, tidal creeks, rivers, and marshes, and are similar in appearance to Sand Seatrout (FFWCC 2011-TN159). The NPS (2006-TN183) included Silver Perch as an indicator species for establishing ecological targets for western Biscayne National Park.

Crustaceans and Mollusks

Pink Shrimp (*Farfantepenaeus duroarum*). Pink shrimp is an ecologically, recreationally, and commercially important species in Biscayne Bay. A commercial industry that harvests shrimp for live bait has existed in Biscayne Bay for many years, and collection of shrimp for human consumption is expanding. Juvenile pink shrimp immigrate to Biscayne Bay from offshore spawning areas and are found in seagrass beds near freshwater inputs (Browder et al. 2005-TN151). Nelson et al. (1991-TN174) indicate pink shrimp juveniles and larvae are highly abundant in Biscayne Bay in salinities ranging from 0.5 to >25 ppt; the NPS identified pink shrimp as an indicator species for Biscayne Bay with regard to evaluating and establishing salinity targets, and specified the optimal salinity range for juveniles to be from approximately 10 to 20 ppt (NPS 2006-TN183).

Caribbean Spiny Lobster (*Panulirus argus*). The Caribbean spiny lobster is the most common lobster in Biscayne Bay. In South Florida, spawning occurs from April through October, when water temperatures exceed 23°C (FFWCC 2010-TN162). Juvenile lobsters are found in nursery areas featuring seagrass meadows and algal beds; subadults and adults gradually migrate to offshore reef systems and ledges (NPS 2011-TN184). According to FFWCC (2010-TN4071), commercial landings of Caribbean spiny lobster in Florida have varied without trend since about 1970, with landings ranging from between 4.3 and 7.9 million pounds. Commercial landings are primarily from South Florida in Monroe, Miami-Dade, Collier, Palm Beach, and Broward Counties (FFWCC 2010-TN4071).

Blue Crab (*Callinectes sapidus*). In the western Atlantic, blue crab are found from Nova Scotia to Northern Argentina (FFWCC 2010-TN162). This species is commonly found in the south-central portion of Biscayne Bay, and blue crab represents an important ecological, recreational, and commercial resource. Optimum blue crab hatching takes place in salinities ranging from 23 to 28 ppt, and juveniles use seagrass habitats where salinities range from 2 to 21 ppt (Browder et al. 2005-TN151). Commercial blue crab landings in Florida reached more than 18 million pounds in 1987 and 1996, then dropped to less than 8 million pounds in 2001 and 2002. Landings in 2009 were approximately 5 million pounds (FFWCC 2011-TN2220).

American Oyster (*Crassostrea virginica*). The American oyster is present in south-central Biscayne Bay where suitable conditions are available. The presence of planktonic food and substrate for attachment of veligers is needed for oysters to survive and thrive; optimum salinity is between 12 and 28 ppt (Ogden et al. 2005-TN197; Ogden et al. 2005-TN196). Oyster reef systems are an important part of nearshore estuarine food webs and provide food for other species, substrate and habitat for benthic invertebrates and fish, and the ability to filter 4 to 34 L of water per hour that removes suspended materials (including phytoplankton, suspended organic carbon, and pollutants) from the water column (Ogden et al. 2005-TN196). Dozens to hundreds of species depend directly or indirectly on oyster reef systems for survival (Ogden et al. 2005-TN196). Because this species is sensitive to salinity and turbidity, it has been included in ecosystem conceptual models as an indicator species for water quality and was used as a species of interest by the NPS during the development of ecological targets for western Biscayne National Park (NPS 2006-TN183). Although oysters are capable of surviving in salinities of 4 to 40 ppt, the optimum salinity range for supporting reef systems is believed to be 10 to 20 ppt (NPS 2006-TN183).

Coral

In addition to the marine mammal, fish, and invertebrate species discussed above, coral reef systems are present in Biscayne Bay. These systems generally consist of a limited number of species in comparison to those present at offshore locations composing the Florida reef tract (Lirman et al. 2003-TN1519). Both staghorn (*Acropora cervicornis*) and elkhorn (*A. palmata*) corals are currently Federally threatened reef-building corals found primarily along the Atlantic coast of Florida and the Caribbean and occur in some portions of Biscayne Bay. In 2009, the Center for Biological Diversity Petition requested threatened or endangered listing of 83 species of coral occurring in U.S. waters of the Caribbean and Indo-Pacific (Center for Biological Diversity 2009-TN1518). In a subsequent 90-day finding published on February 10, 2010, NOAA determined that listing actions may be warranted for 82 of the 83 species (75 FR 6616) (TN1516). On August 27, 2014, NOAA listed 20 new coral species as threatened (NOAA Fisheries 2014-TN4022; 79 FR 53851 [TN4097]). Of these, the following are known to occur in the Florida Atlantic region:

- *Acropora cervicornis* (Staghorn coral)
- *Acropora palmata* (Elkhorn coral)
- *Mycetophyllia ferox* (Cactus coral)
- *Dendrogyra cylindrus* (Pillar coral)
- *Montastraea (Orbicella) annularis* (Boulder star coral)
- *Montastraea (Orbicella) faveolata* (Mountainous star coral)
- *Montastraea (Orbicella) franksi* (Star coral).

In its 2011 Status Review Report (Brainard et al. 2011-TN1517), NOAA indicated that all seven species have been reported in Biscayne Bay, and noted that temperature, acidification, disease, predation, land-based sources of pollution, and collection or trade as major threats to all coral species. Hard-bottomed areas near Turkey Point are generally considered a marginal habitat for coral, with fewer species occurring in the western portion of Biscayne Bay than in the central bay, east bay, and offshore locations. This is probably because of the variability in both temperature and salinity that occurs in these areas in comparison to conditions present in the central and eastern bay and offshore oceanic environments (Lirman et al. 2003-TN1519). Thus, the listed species described above are not likely to be present near Turkey Point.

Submerged Aquatic Vegetation

Submerged aquatic vegetation in Biscayne Bay includes a variety of seagrasses and calcareous algae. Seagrass beds play a key role in estuarine community dynamics, providing habitat and food sources to many vertebrate and invertebrate species, stabilizing bottom substrate, acting as nutrient and sediment traps, and contributing to primary and secondary productivity (Robles et al. 2005-TN198). At least seven seagrass species are found in Biscayne Bay, including turtle grass, shoal grass, manatee grass, widgeon grass, and three species of the genus *Halophila*, including Johnson's seagrass, a Federally protected species discussed below. As described by Robles et al. (2005-TN198), the distribution and health of seagrass beds in Biscayne Bay are

influenced by a variety of natural and anthropogenic factors, including sediment depth, water depth, natural precipitation cycles, and light attenuation. In addition, the discharge of freshwater from canal systems and groundwater seepage into Biscayne Bay can influence distribution. For instance, turtle grass is often absent where groundwater seepage is present, and present where it is not (Browder et al. 2005-TN151). The general condition of Biscayne Bay seagrass communities, as reported by Robles et al. (2005-TN198) suggests some areas of the bay have experienced a slow decline in seagrass biomass, while other areas near freshwater canal outputs or areas where dredging has occurred have lost seagrass or experienced a shift to more freshwater-tolerant species, such as *Ruppia* spp. Seagrass studies conducted by EAI in August 2009 near the Turkey Point site found turtle grass and shoal grass were present at varying levels of coverage along all study transects (EAI 2009-TN153). Turtle grass was generally highest in areas immediately surrounding the Turkey Point peninsula, and generally decreased with increasing distance from shore. Shoal grass was much more restricted in distribution, occurring in the shallow-water areas near the peninsula. EAI (2009-TN153) also found that the algae *Batophora* spp. were abundant in the shallower areas along the periphery of the peninsula, and approached 100 percent coverage at some locations over small spatial scales.

Non-Indigenous Species

Non-indigenous species, including those identified by resource managers as exotic, non-native, alien, and introduced, are a growing concern in Florida, because their presence has the potential to alter existing food webs and alter species composition through competition, predation, or disease. As reported by Ogden et al. (2005-TN197), South Florida has one of the largest non-indigenous faunal communities in the world—more than 25 percent of the resident mammals, birds, reptiles, amphibians, and fish are classified as non-native. Non-indigenous species released into aquatic systems via the pet trade have the potential to use the existing canal systems to move into different aquatic environments, including nearshore areas of Biscayne Bay. Species used to support nearshore aquaculture industries may also be introduced intentionally or unintentionally into freshwater or nearshore ecosystems (Fuller and Nico 1999-TN172). An example of this is the introduction of Pacific whiteleg shrimp (*Litopenaeus vannamei*) into Biscayne Bay from commercial aquaculture enterprises (Ogden et al. 2005-TN197; FAO 2012-TN155). Fish Species of Concern to the NPS include the lionfish species (*Pterois volitans*, and *P. miles*) that are now common and increasing in occurrence in the bay, and Oscar (*Astronotus ocellatus*) and Mayan Cichlid (*Cichlasoma urophthalamus*), which are now found in canal systems (NPS 2011-TN185). Canal and freshwater systems are also susceptible to the spread of exotic bivalves, including the Asiatic clam (*Corbicula fluminea*) and zebra mussel (*Dreissena polymorpha*) (Fuller and Benson 1999-TN171; Ogden et al. 2005-TN197). Asiatic clams have not been recognized as a nuisance to existing Turkey Point units (FPL 2014-TN4058). In recent years, the Argentine black-and-white tegu (*Tupanimbis merianae*) has been observed in southeastern Florida and is spreading rapidly in the vicinity of Turkey Point. This egg-eating reptilian omnivore has the potential to affect many species, including alligators and the endangered American crocodile, and is the subject of a multi-agency control effort (FFWCC 2014-TN4048; USGS 2014-TN4049).

Federally or State-Listed Species and Designated Critical Habitat

Based on information provided to FPL by the FWS and NOAA/NMFS (FPL 2010-TN272), information from the State of Florida (FFWCC 2013-TN3075), and examination of life history and distribution information, the review team identified one marine mammal, five species of sea turtles, two other aquatic reptiles, one fish species, and one seagrass species Federally and/or State-listed as threatened or endangered that could occur at or near the Turkey Point site (Table 2-28). The State listings in Table 2-28 reflect changes to threatened species rules that went into effect on November 8, 2010, stating that all Federally listed species that occur in Florida are now included on Florida's list as Federally designated endangered or Federally listed threatened (FFWCC 2013-TN3075). A number of other species included on the NMFS letter to FPL (2010-TN272) are either infrequent visitors to Biscayne Bay or are not reported to occur in the vicinity of the Turkey Point site. For instance, although blue whales (*Balaenoptera musculus*) finback whales (*B. physalus*), humpback whales (*Megaptera novaeangliae*), North Atlantic right whales (*Eubalaena glacialis*), sei whales (*B. borealis*), and sperm whales (*Physeter macrocephalus*) are occasionally sighted in Biscayne Bay, they are more commonly found in open-ocean or coastal environments and would not be present in the shallow waters near Turkey Point. Although the shortnose sturgeon (*Acipenser brevirostrum*) occurs in Florida waters, the southern limits of its range appear to be the St. Johns River near Jacksonville (FFWCC 2010-TN160). Likewise, the Atlantic and Caribbean coral species discussed above that are listed by NOAA may be found at offshore reef systems in Biscayne Bay, but are not known to occur at or near the Turkey Point site (NOAA Fisheries 2014-TN4022; 79 FR 53851 [TN4097]).

Table 2-28. Federally or State-Listed Species, Proposed Species, or Candidate Species Likely to Occur at or near the Turkey Point Site

Common Name	Scientific Name	Classification	Designation[a]
Florida manatee	*Trichechus manatus latirostris*	Marine mammal	Federally Endangered State Endangered
Green sea turtle	*Chelonia mydas*	Turtle	Federally Endangered State Endangered
Hawksbill sea turtle	*Eretmochlys imbricata*	Turtle	Federally Endangered State Endangered
Kemp's ridley sea turtle	*Lepidochelys kempii*	Turtle	Federally Endangered State Endangered
Loggerhead sea turtle	*Caretta caretta*	Turtle	Federally Threatened State Threatened
Leatherback sea turtle	*Dermochelys coriacea*	Turtle	Federally Endangered State Endangered
American alligator	*Alligator mississippiensis*	Reptile	Federally Threatened (SOA)[b] Florida Threatened SOA)[b]
American crocodile	*Crocodylus acutus*	Reptile	Federally Threatened State Threatened
Smalltooth Sawfish	*Pristis pectinata*	Fish	Federally Endangered State Endangered
Johnson's seagrass	*Halophila johnsonii*	Seagrass	Federally Threatened

(a) Federally listed species that occur in Florida are now included on Florida's list as Federally designated endangered or Federally designated threatened FFWCC 2013-TN3075. See also January 9, 2009 letter from Teletha Mincey, NMFS, to FPL (SCA Appendix 10.7.1.3) (TN1897).
(b) SOA = similarity of appearance to threatened American crocodile.

Although the FWS communication identified only the American crocodile as likely to occur near the Turkey Point site, the review team included the American alligator in Table 2-28 because of its similarity in appearance to the American crocodile. The Florida manatee was also included, because it is known to occur in the vicinity of the Turkey Point barge channel, or in the nearby canal systems that discharge into Biscayne Bay. A brief description of the life histories of the species listed in Table 2-28 and a discussion of designated critical habitats, if defined, follow. Biological Assessments for FWS and NMFS are referenced in Appendix F.

Florida Manatee (*Tricechus manatus latirostris*)

The Florida manatee, a subspecies of the West Indian manatee, is a large marine mammal found in coastal and freshwater systems on both coasts of Florida. Manatees are Federally and State-listed as endangered, and their critical habitat includes "all waters of Card [Sound]… between portions of Biscayne Bay, Card Sound adjacent to the Turkey Point site, and the nearby streams, rivers, and canals" (41 FR 41914) (TN275) (Figure 2-31). Manatees have been observed in the barge-turning basin at the northern end of the Turkey Point site and in nearby state canals but not in the IWF (FPL 2014-TN4058). Areas defined by the FWS as "manatee consultation areas" include coastal regions of South Florida and large inland waterbodies such as Lake Okeechobee. Thus, the Turkey Point site would be included in the manatee consultation area (FPL 2012-TN1618). Manatees are general herbivores that are able to feed on a variety of vegetation types. They are tolerant of changes in salinity but sensitive to temperature variations because they lack a thick insulating layer of blubber common to other marine mammals (Smith 1993-TN218). Several anthropogenic activities pose threats to manatees. Deaths are attributable to the management of water-control structures and navigational locks, loss of habitat associated with coastal development (FWS 2001-TN223), and several other activities. During the winter of 2008-2009, researchers reported a disproportionately high number of manatee deaths related to cold stress; 261 carcasses were reported statewide and 1 death was reported in Biscayne Bay (FFWCC 2010-TN161). The number of deaths (51) due to watercraft strikes during the winter of 2008-2009 was also relatively high statewide. Approximately 33 percent and 31 percent of the total deaths occurred in the southeast and southwest regions, respectively (FFWCC 2010-TN161). Annual manatee deaths in Miami-Dade County from 2000 to 2012 ranged from 5 to 22, with the highest mortality observed in 2010. Of the 22 deaths reported in 2010, 1 was attributed to perinatal death, 3 were caused by watercraft, 2 were attributed to natural causes, and 16 were undetermined/unrecovered. FFWCC reported one manatee death in January 2013, the last reporting period available on their website (FFWCC 2014-TN3478). Causes of manatee deaths listed by the FFWCC (FFWCC 2014-TN3478) include collisions with watercraft, entrapment in flood gates and canal locks, cold stress, natural mortality, perinatal death, and undetermined causes.

FPL procedures for protecting manatees from collision during the construction of proposed Turkey Point Units 6 and 7 are described in the SCA Barge Delivery Plan (FPL 2009-TN169); potential construction-related impacts on this species are discussed in Chapter 4 of this EIS. Additional information about this species is found in the FWS Biological Assessment in Appendix F.

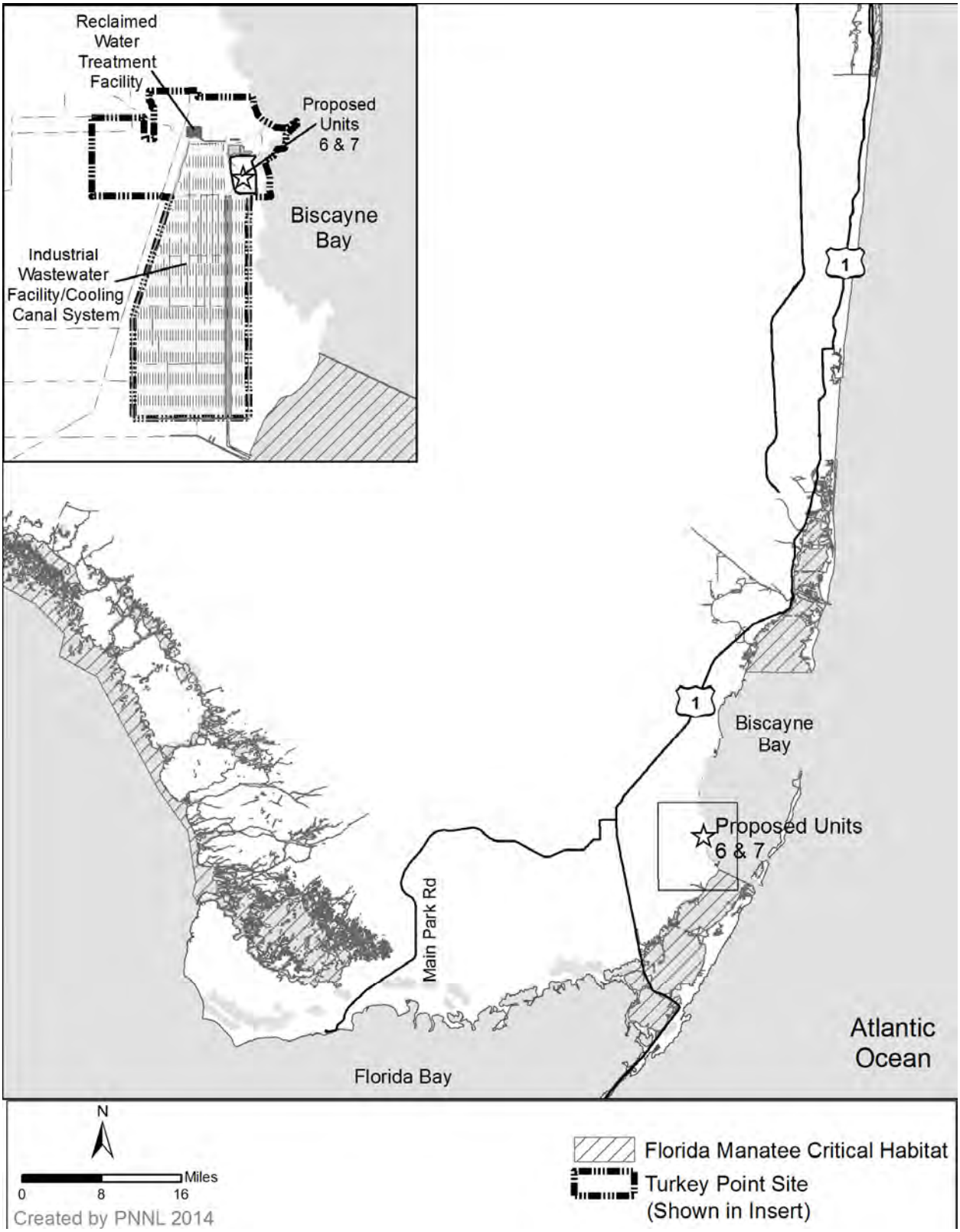


Figure 2-31. Critical Habitat for the Florida Manatee near the Turkey Point Site

Green Sea Turtle (*Chelonia mydas*)

The green sea turtle is the largest of the hard-shelled turtles and unique among sea turtles in that adults are exclusively herbivorous. The species is found in the open ocean and in coastal areas and uses beaches for nesting (NOAA 2010-TN179). Green sea turtles are relatively common in Biscayne Bay and Card Sound; they visit these areas at various times of the year to feed (FPL 2014-TN4058; FDEP 2010-TN156). Green turtles have not been reported in the IWF, but are commonly observed in Biscayne Bay. Nests have occasionally been reported on Elliott Key approximately 7 to 9 mi east and north of the Turkey Point facility (FFWCC 2014-TN3530). NMFS and FWS have joint jurisdiction for sea turtles; NOAA is the lead agency in marine environments, and FWS is the lead for nesting beaches. The green sea turtle was Federally listed under the ESA on July 28, 1978, and the Florida population is currently considered endangered by Federal and Florida resource agencies. Critical habitat was designated in 1998 to include the coastal waters around Culebra Island, Puerto Rico. General threats to green sea turtles that apply to all sea turtle species include loss of habitat associated with anthropogenic or natural stressors, harvest of eggs, and mortality associated with incidental capture or entanglement in fishing nets and gear (NOAA 2010-TN179). Additional information about this species, including information about its occurrence near Turkey Point, is found in the NMFS Biological Assessment in Appendix F.

Hawksbill Sea Turtle (*Eretmochelys imbricata*)

The hawksbill sea turtle is a medium-sized sea turtle most commonly found in coral reef systems, where the ledges and caves provide shelter (NOAA 2010-TN179). Hawksbill turtles were Federally listed under the ESA as endangered in 1970 and are currently listed as endangered by Federal and Florida resource agencies. As described above, NMFS and FWS have joint responsibility for this species. Critical habitat was designated in the coastal waters of Mona and Monito Islands, Puerto Rico, in 1998 (NOAA 2010-TN179). Hawksbill are less common in Biscayne Bay than green or loggerhead turtles, but nests have been recorded along the outer keys of the bay (FDEP 2010-TN156). Hawksbill turtles have not been reported in the IWF. Additional information about this species, including information about its occurrence near Turkey Point, is found in the NMFS Biological Assessment in Appendix F.

Kemp's Ridley Sea Turtle (*Lepidochelys kempii*)

Kemp's ridley sea turtles are the smallest marine turtle in the world; adults weigh less than 100 lb. This species is found primarily in neritic habitats containing muddy or sandy bottoms. Prey items include fish, jellyfish, and mollusks. Kemp's ridley turtles were first Federally listed under the ESA in 1973 and are currently considered endangered by Federal and Florida resource agencies; they are listed as State endangered in Monroe County but not in Miami-Dade County, Florida (FPL 2014-TN4058). Kemp's ridley turtles typically nest in large aggregations called arribadas, but no arribadas occur in Florida. In February 2010, NMFS and FWS were jointly petitioned to designate critical habitat for this species along the Texas coast and marine habitats in the Gulf of Mexico and Atlantic Ocean. This petition is currently under review (NOAA 2010-TN179). Kemp's ridley turtles have been observed in Biscayne Bay (FDEP 2010-TN156) but have not been found in the IWF. Additional information about this

species, including information about its occurrence near Turkey Point, is found in the NMFS Biological Assessment in Appendix F.

Loggerhead Sea Turtle (*Caretta caretta*)

The loggerhead sea turtle is commonly found near the Turkey Point site (FPL 2014-TN4058). The loggerhead's large head and powerful jaws enable the turtle to feed on hard-shelled prey, including whelks and conchs. A circumpolar species, loggerheads occur throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans, and loggerheads make extensive migrations between feeding and nesting grounds. In the southwestern United States, approximately 80 percent of nesting occurs in six Florida counties (NOAA Fisheries 2014-TN4028). Loggerhead turtles are also known to nest on Elliot Key in Miami-Dade County. Suitable beach habitat for nesting apparently does not exist in the vicinity of the Turkey Point site (FPL 2014-TN4058). The loggerhead was first Federally listed under the ESA as threatened throughout its range on July 28, 1978, and the most recent status review was published in 2009 (NOAA 2010-TN179). In 2010, the loggerhead turtle listing was changed to identify nine distinct population segments (DPSs), with four DPSs listed as threatened and five listed as endangered. The loggerhead population in Biscayne Bay is included in the Northwest Atlantic DPS and considered Federally threatened (75 FR 12598) (TN2763). In 2014, NOAA designated critical habitat for the loggerhead sea turtle which includes oceanic areas east of Biscayne Bay, but does not include nearshore areas near Turkey Point (79 FR 39855) (TN4032). Loggerhead turtles are of particular interest to the Biscayne National Park because they are the most common sea turtle observed within park boundaries (NPS 2011-TN195). Loggerhead turtles have not been reported in the IWF, but nests have been reported on Elliott Key approximately 7 to 9 mi east and north of the Turkey Point facility (FFWCC 2014-TN3530). Additional information about this species, including information about its occurrence near Turkey Point, is found in the NMFS Biological Assessment in Appendix F.

Leatherback Sea Turtle (*Dermochelys coriacea*)

The leatherback sea turtle is the largest reptile in the world, reaching an adult weight of 2,000 lb and a total length exceeding 6 ft. This species is unique in that it lacks a hard, bony shell. Leatherback turtles are common in open-ocean environment but also forage in coastal waters, eating soft-bodied prey. Leatherback turtles were listed under the ESA as endangered in 1970 and are currently classified as endangered by Federal and Florida resource agencies. Critical habitat that included the coastal waters adjacent to Sandy Point, St. Croix, in the U.S. Virgin Islands, was designated in 1998; NMFS is also proposing to revise the critical habitat to include areas off the U.S. West Coast (NOAA 2010-TN179). Leatherback turtles have not been reported in the IWF, and nests have been observed on Miami Beach and Key Biscayne (FDEP 2010-TN156). Leatherback turtles have been observed in Biscayne Bay but have not been observed in the IWF. Additional information about this species, including information about its occurrence near Turkey Point, is found in the NMFS Biological Assessment in Appendix F.

American Alligator (*Alligator mississippiensis*)

The American alligator is found in swamps, rivers, streams, lakes, and ponds throughout the southeastern United States where fresh or brackish water is present. Alligators are found in both Biscayne Bay and Card Sound, but are not known or expected to be in the IWF (FPL 2014-TN4058). Alligators are considered Federally threatened because of their resemblance to American crocodiles and are listed as a Species of Concern in the State of Florida. Alligators are opportunistic feeders eating fish, turtles, wading birds, snakes, frog, and small mammals (SREL 2012-TN221). Threats to this species include habitat loss, pollution, and interactions with humans. Alligators can be harvested only by individuals with approved licenses and permits (FFWCC 2012-TN163). Additional information about the potential effects of the proposed action on the American alligator may be found in the FWS Biological Assessment (Appendix F-2).

American Crocodile (*Crocodylus acutus*)

American crocodiles are commonly found in coastal areas throughout the Caribbean Sea in both brackish and saltwater habitats, including ponds, coves, creeks, and mangrove swamps. Crocodiles are opportunistic feeders, eating a variety of fish, snails, crustaceans, crabs, turtles, snakes, birds, and mammals. South Florida is considered the northern edge of their range (FFWCC 2012-TN164). Optimum nesting requirements include the presence of elevated, well-drained substrate near water >1 m deep, salinity ranging from 10 to 20 ppt, and locations that are protected from wind and wave action and free from human disturbance and predators. The use of artificial substrates to promote nesting has contributed to the increase of nests in South Florida and at the Turkey Point site (FPL 2009-TN974). This species was downlisted by FWS from Federally endangered to threatened for the Florida DPS in 2007 (72 FR 13027) (TN274) and is currently State endangered (FFWCC 2011-TN158). The designated critical habitat for American crocodile includes the majority of the Turkey Point IWF and other adjacent canals and aquatic habitats west and south of the Turkey Point site as well as a major portion of the proposed Units 6 and 7 site (Figure 2-32) (41 FR 41914) (TN275). Additional information about the potential effects of the proposed action on the American crocodile may be found in the FWS Biological Assessment (Appendix F-2), and in correspondence with FWS listed in Appendix F.

Crocodiles were first observed at the Turkey Point site in 1976, and nesting was first documented in 1978. FPL subsequently developed a crocodile monitoring plan that described activities for creating and enhancing crocodile habitat, and for monitoring reproductive success, growth, and survival of hatchlings (FPL 2010-TN272). The current plan describes monitoring procedures as well as maintenance procedures for the IWF, including timing the method of vegetation clearing to result in minimal disturbance of nests, hatchlings, and adults (FPL 2014-TN4058). As discussed in Chapter 4, FPL has also developed a threatened and endangered species evaluation and management plan to ensure construction-related effects on listed species are minimized (FPL 2010-TN170). As described in the 2006 Biological Opinion by FWS (FWS 2006-TN832), FPL's 5,900 ac IWF has become particularly important nesting habitat for this species, and nesting activity has increased since it was first documented in 1978. FWS concluded in their Biological Opinion that the crocodile nests within FPL property make up roughly one-third of the annual nest production in all of South Florida (FWS 2006-TN832).

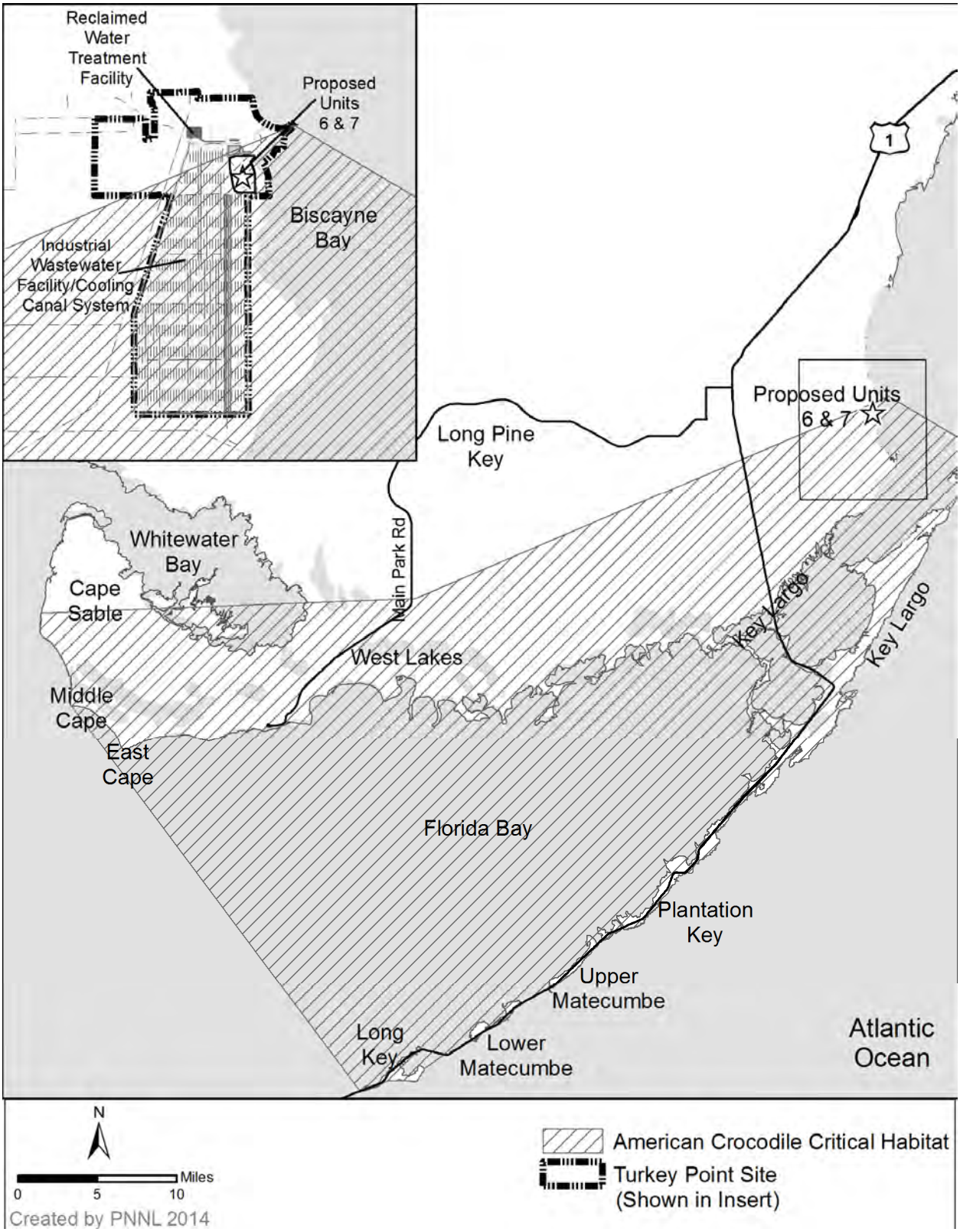


Figure 2-32. Critical Habitat for the American Crocodile near the Turkey Point Site

As requested by the review team, FPL provided crocodile monitoring reports from 2000 to 2015. Table 2-29 summarizes the number of nests observed and hatchlings captured during that time. Successful nests from 2000 to 2015 have ranged from a low of 14 in 2001 to a high of 28 in 2008; hatchlings captured have ranged from 134 in 2004 to 548 in 2009. The general conclusions of the 2009 monitoring report were (1) the record numbers of hatchlings in 2009 may be a result of FPL's efforts or an increase in clutch size of the more mature females, and (2) the population of the crocodiles may be stabilizing as a result of younger reproductive females moving offsite and finding suitable nesting habitat elsewhere (FPL 2009-TN210). FPL attributes the reduction in observed nests and hatchlings captured in 2010 to the record low temperatures recorded in South Florida during the winter of 2009-2010. The cold winter may have caused a delay in successful courtship interactions or prohibited females from storing enough energy to reproduce (FPL 2010-TN211). In 2013 and 2014, 25 successful nests produced 429 and 409 tagged hatchlings, respectively. FPL considers these results encouraging, as the nesting activity observed in the IWF was similar to that observed in the Everglades National Park (FPL 2013-TN3232). However, the 2015 monitoring report described lower observed nesting with only 9 successful nests and 119 tagged hatchlings (FPL 2016-TN4606). FPL attributed the decline in nests and hatchlings to the increased levels of salinity and presence of algae in the CCS.

Table 2-29. American Crocodile Monitoring Results at the Turkey Point Site, 2000−2015

Year	Nests Identified	Hatchlings Captured and Tagged	Citation
2000	17	298	FPL 2000-TN202 RAI 5704 ML11168A043
2001	14	227	FPL 2003-TN168 RAI 5704 ML11168A043
2002	17	291	FPL 2003-TN203 RAI 5704 ML11168A043
2003	17	295	FPL 2003-TN204 RAI 5704 ML11168A043
2004	18	134	FPL 2004-TN205 RAI 5704 ML11168A043
2005	24	282	FPL 2005-TN206 RAI 5704 ML11168A043
2006	24	340	FPL 2006-TN207 RAI 5704 ML11168A043
2007	21	305	FPL 2007-TN208 RAI 5704 ML11180A084
2008	28	510	FPL 2008-TN209 RAI 5704 ML11180A084
2009	24	548	FPL 2009-TN210 RAI 5704 ML11180A084
2010	16	196	FPL 2010-TN211 RAI 5704 ML11180A084
2011	15	268	FPL 2011-TN2471
2012	18	229	FPL 2012-TN2470
2013	25	429	FPL 2013-TN3232
2014	25	409	FPL 2014-TN4607
2015	9	119	FPL 2016-TN4606

With regard to crocodile nest distribution within the IWF, information provided by FPL shows that from 1978 to 2010, the majority of the nesting sites were in the southern end of the canal system (identified as Zones 4 and 5 in yearly monitoring reports) and throughout the return canal. In addition, clusters of nests were observed just south of the proposed location for proposed Units 6 and 7 (Figure 2-33). Nesting information from 2011 to 2015 also shows nests located near the proposed Units 6 and 7 plant area and along the IWF Grand Canal where muck disposal would occur (Figure 2-34).

The primary threats to this species in South Florida include destruction or modification of nesting habitat, changes in nesting behavior or nest location from repeated interactions with humans, dramatic changes in weather patterns or temperature extremes, and fatal encounters with motor vehicles along major highways. Deaths occurring in 2005-2006 on the Turkey Point site resulted in increased signage warning drivers to watch for crocodiles on the roads at all times and to observe posted speed limits. A crocodile death was reported in November 18, 2011. The November 2011 death involved a young crocodile found onsite in the vicinity of the current work on the exploratory UIC well. The cause of death was determined to be physical trauma (NRC 2011-TN4121). Another death was reported on July 25, 2014. The 2014 death involved an adult crocodile discovered inside the intake well for Units 3 and 4 within the IWF. Based on visual evidence of no physical injury or trauma, the crocodile's death was not attributed to plant operations (NRC 2014-TN3718). In both cases, the Federal FWS and the FFWCC were notified. A third dead American crocodile was also reported on an access road outside of the Turkey Point controlled area in July 2014, and was attributed to a vehicle collision. Additional American crocodile deaths were reported inside the Turkey Point controlled area in August of 2015 (NRC 2015-TN4594), November of 2015 (NRC 2015-TN4595), January of 2016 (NRC 2016-TN4596), and February of 2016 (NRC 2016-TN4597). These deaths were not caused by existing Turkey Point plant operations.

Smalltooth Sawfish (*Pristis pectinata*)

The Smalltooth Sawfish is a tropical marine and estuarine fish with a circumtropical distribution. This species is currently Federally endangered. The largest populations in the United States are south and southwest of Florida, from Charlotte Harbor to the Dry Tortugas. Peninsular Florida has the largest number of capture records within U.S. waters and probably contained the largest historic populations (NOAA 2010-TN1724). The preferred habitat of Smalltooth Sawfish is shallow nearshore areas with muddy or sandy bottoms. Limited life history information is available for this species. Smalltooth Sawfish have been observed in Biscayne Bay and Card Sound and at nearshore locations near Turkey Point (FPL 2014-TN4058; FFWCC 2014-TN3530) but have not been observed in the IWF. Primary threats to this species are incidental catch in commercial and recreational fisheries and habitat loss or degradation (74 FR 45353) (TN271). Critical habitat for the Smalltooth Sawfish consists of two units: the 221,459 ac Charlotte Harbor Estuary Unit, and the 619,013 ac coastal habitat of the Ten Thousand Islands/Everglades Unit, both located on the west coast of Florida. No critical habitat for this species has been designated in Biscayne Bay or Card Sound (NOAA 2010-TN179). A complete description of this species, including documented occurrences in Biscayne Bay near the Turkey Point site, is found in the NMFS Biological Assessment in Appendix F.

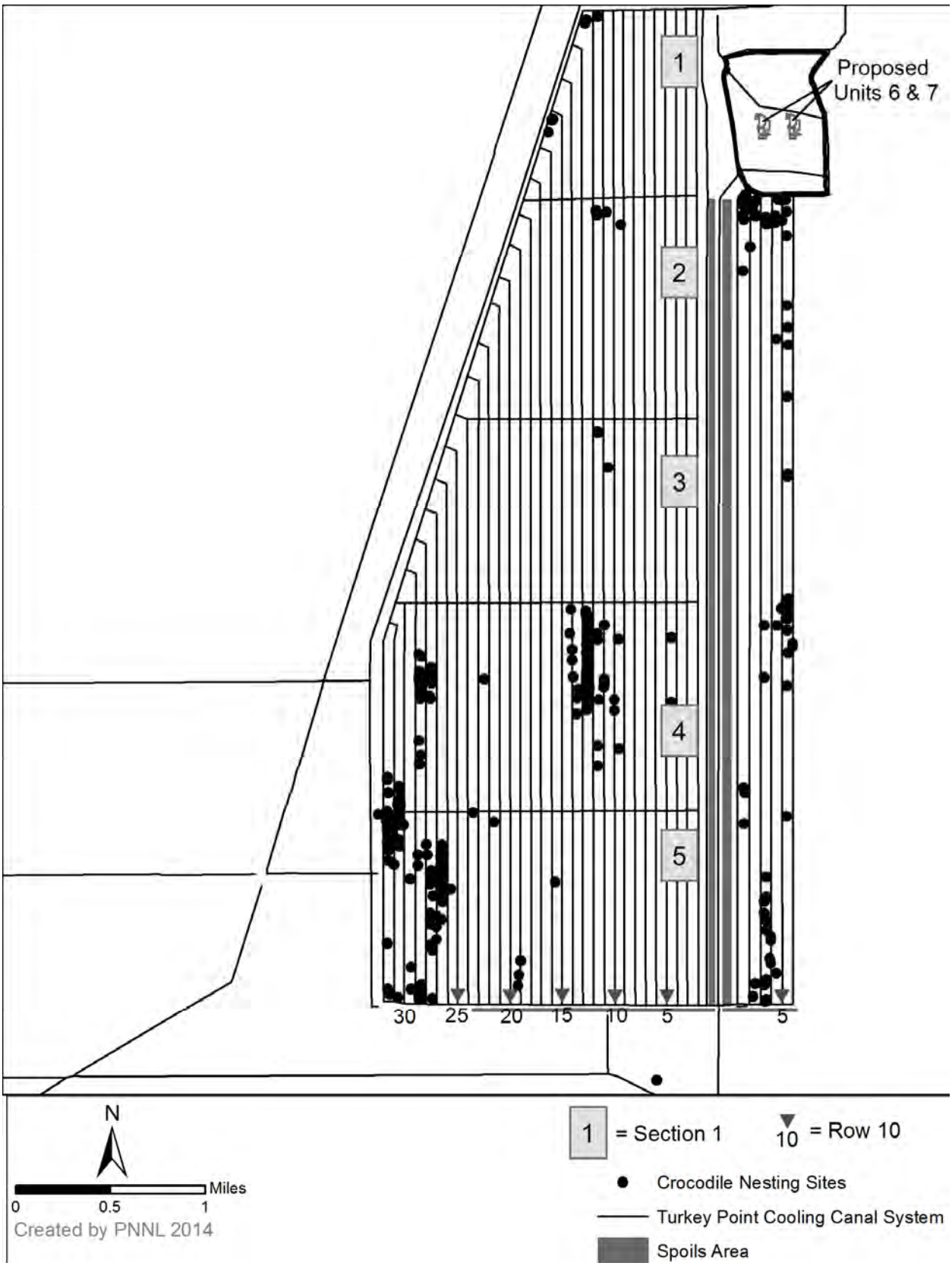


Figure 2-33. Locations of Crocodile Nests in the Turkey Point IWF, 1978−2010

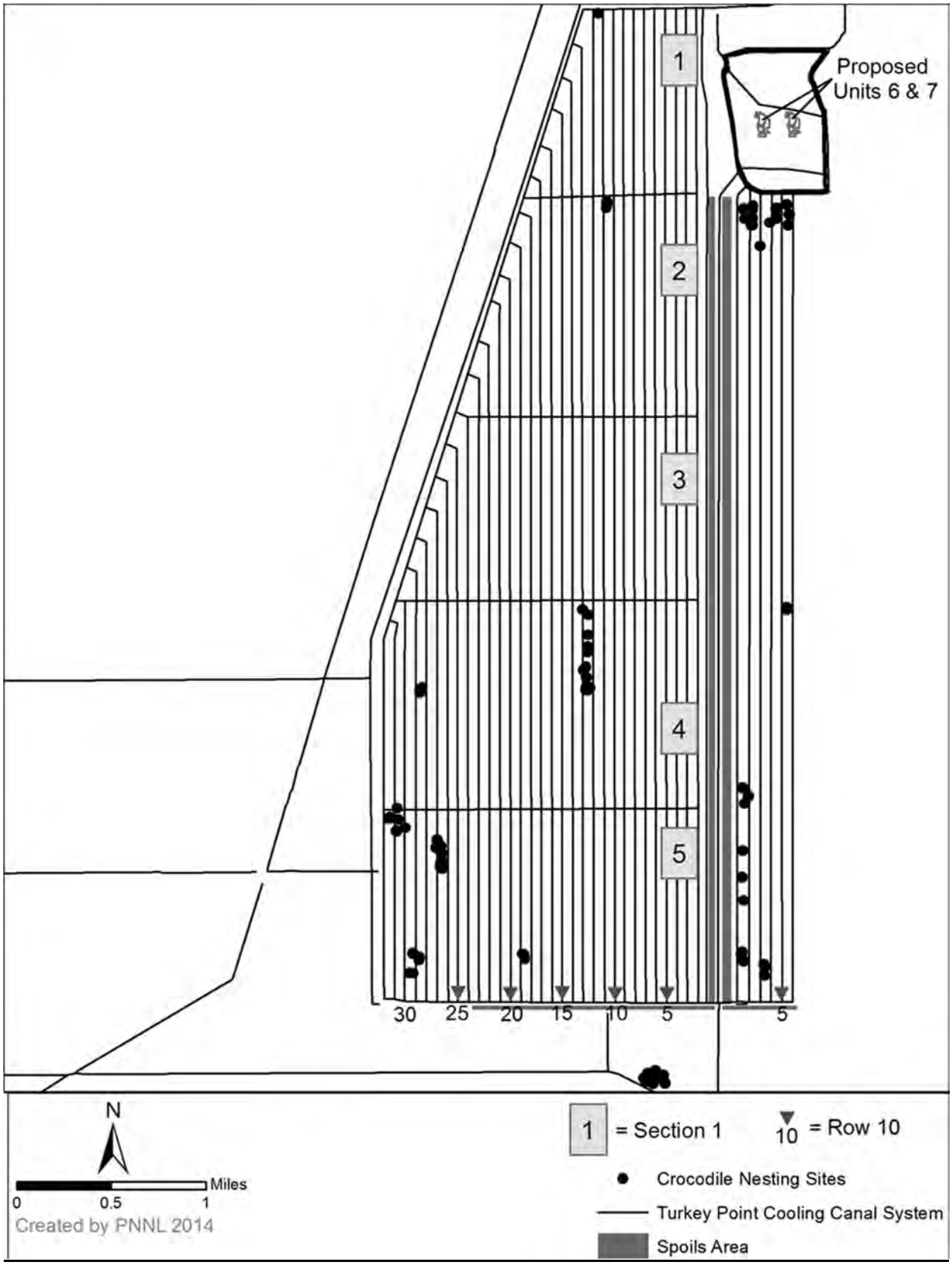


Figure 2-34. Location of Crocodile Nests in the Turkey Point IWF, 2011–2015

Johnson's Seagrass (*Halophila johnsonii*)

Johnson's seagrass is a Federally threatened species that is known to occur near Sebastian Inlet to Virginia Key (NOAA 2007-TN187). This species may occur near Key Biscayne north and east of Turkey Point and to the south in Card Sound, but it has not been observed near the Turkey Point site or in the IWF (FPL 2014-TN4058). Physical habitat requirements for this species are variable, including both shallow intertidal and deeper subtidal zones in water that is clear and deep or shallow and turbid (NOAA 2010-TN180). In tidal channels, this seagrass is found in coarse sand substrates. Johnson's seagrass was not reported to occur near the Turkey Point peninsula by EAI (2009-TN153). Primary threats include propeller and anchor scouring, effects of dredging, overwater structure construction and shading, water pollution, and shoreline development. Critical habitat for Johnson's seagrass designated on April 5, 2000 in Florida includes the central portion of Biscayne Bay extending from Virginia Key north to Miami (65 FR 17786) (TN273).

A Johnson's Seagrass Recovery Plan was prepared in 2002 by the Johnson's Seagrass Recovery Team for NOAA/NMFS (NOAA 2002-TN173). Actions included the identification and protection of populations and habitat, range-side mapping and monitoring, studies to understand life histories, genetic traits, development of management and restoration techniques, and education and outreach. Recovery goals were designed to ensure (1) the present geographic range remains stable or increases for at least 10 years, (2) self-sustaining populations are present throughout the range at distances that allow for stable vegetative recruitment and genetic diversity, and (3) long-term protection on populations and supporting habitat (NOAA 2002-TN173). In 2007, a 5-year review was completed. The major findings suggested that although the populations in the northern range of the species appeared to be stable and self-sustaining, longer-term monitoring data were needed to confirm the status and stability of the population in the southern range (Jupiter Inlet to Biscayne Bay). The final conclusions of the report stated that Johnson's seagrass populations continue to remain vulnerable to natural and anthropogenic stressors, and the species continues to meet the definition of threatened under the ESA because it is still likely to become endangered in the foreseeable future throughout its range (NOAA 2007-TN187).

Federal or State Species of Concern or Proposed for Listing

Information provided to FPL by NMFS (FPL 2010-TN272) includes a list of fish and invertebrate Species of Concern, which are not protected under the ESA but may warrant listing in the future. Table 2-30 lists species likely to occur at or near the Turkey Point site. None of these species are known or expected to occur in the IWF but could occur in nearshore locations in Biscayne Bay and Card Sound. A brief life history description for each follows.

Mangrove Rivulus (*Rivulus marmoratus*)

The Mangrove Rivulus is a small fish that occurs in marine and brackish-water habitats and is able to tolerate a wide salinity range from 0 to 68 ppt (FMNH 2010-TN165). Its diet includes terrestrial and aquatic invertebrates, including mosquito larvae, polychaete worms, and copepods (NOAA 2009-TN176). Along the east coast of Florida, it occurs in marsh habitats above the intertidal zone and is often found in the burrows of great land crabs. This species was once listed as threatened in the Gulf of Mexico but has been downlisted in Florida as a

Species of Special Concern (FFWCC 2011-TN158). Habitat degradation and fragmentation related to the destruction of mangroves are considered the greatest threats to this species (NOAA 2009-TN176). This species has not been reported on the Turkey Point site but is known to occur in the vicinity where suitable habitat is available (FPL 2014-TN4058).

Table 2-30. Federally or State-Listed Species of Concern Likely to Occur at or near the Turkey Point Site

Common Name	Scientific Name	Classification	Designation
Mangrove Rivulus	*Rivulus marmoratus*	Fish	Federal Species of Concern[a] Florida Species of Special Concern[b]
Dusky Shark	*Carcharhinus obscurus*	Fish	Federal Species of Concern[a]
Opossum Pipefish	*Microphis brachyurus lineatus*	Fish	Federal Species of Concern[a]
Sand Tiger Shark	*Carcharias taurus*	Fish	Federal Species of Concern[a]
Speckled Hind	*Epinephelus drummondhayi*	Fish	Federal Species of Concern[a]
Nassau Grouper	*Epinephelus striatus*	Fish	Federal Proposed for Listing[c]
Warsaw Grouper	*Epinephelus nigritus*	Fish	Federal Species of Concern[d]
Ivory Tree Coral	*Oculina varicosa*	Coral	Federal Species of Concern[d]

(a) FPL 2010-TN272
(b) FFWCC 2011-TN158
(c) 77 FR 61559 (TN3238)
(d) NOAA 2013-TN4099

Dusky Shark (*Carcharhinus obscurus*)

The dusky shark is included as a Species of Concern by NMFS (FPL 2010-TN272). This cosmopolitan species occurs in tropical and temperate waters from Nova Scotia to Cuba. Its range includes shallow inshore waters, but adults tend to avoid areas of low salinity and are rarely found in estuaries. Young sharks are found in shallow-water nursery areas from New Jersey to Cape Hatteras (FMNH 2010-TN166). This species has also been documented in the waters within Biscayne National Park (NPS 2011-TN184). Globally, dusky shark populations are considered to be at risk, and the World Conservation Union (IUCN) considers the species "near threatened." An ongoing decline in numbers indicated by low catch rates in the western North Atlantic has prompted a ban on the harvesting of dusky sharks by U.S. commercial fishermen and has led to this regional population being placed on the 2000 IUCN's Redlist of threatened species (FMNH 2010-TN166).

Opossum Pipefish (*Microphis brachyurus lineatus*)

The opossum pipefish is designated by NMFS as a Federal Species of Concern (FPL 2010-TN272). There is evidence of three western Atlantic metapopulations, and the North Atlantic and Caribbean metapopulations are present in waters of the United States. Little is known about population size or variations because this species is difficult to survey (NOAA 2009-TN188). Opossum pipefish has been reported in the waters within Biscayne National Park (NPS 2011-TN184).

Sand Tiger Shark (*Carcharius taurus*)

The sand tiger shark is commonly found in all warm and temperate seas except the eastern Pacific Ocean. Preferred habitats include surf zones, shallow bays (including Biscayne Bay), and around coral or rocky reefs. Increased exploitation of this species along the U.S. East Coast in the 1980s and 1990s reportedly reduced abundance by up to 90 percent from historical populations (NOAA 2010-TN190). This species has not been reported in the waters of Biscayne National Park. A status update by the Southeast Science Center of NMFS in February 2009 concluded that while the population decline was not as severe as previously reported, the sand tiger shark should be retained as a Species of Concern due to low productivity and uncertainty with regard to abundance trends (NOAA 2010-TN190).

Speckled Hind (*Epinepheuls drummondhayi*)

The speckled hind derives its name from the tiny white spots covering its body. Adults are found in offshore rocky habitats in waters up to 1,300 ft deep; juveniles can occur in shallow water (NOAA 2009-TN189). Speckled hind is known to occur in the waters of Biscayne National Park (NPS 2011-TN184), and its distribution is believed to be from the Carolinas to Texas (NOAA 2009-TN189). Direct threats to this species are as bycatch from the deep-water snapper/grouper fisheries off the Atlantic and Gulf coasts, and both recreational and commercial fisheries are regulated in the South Atlantic. Speckled hind are considered a Species of Concern by NMFS, and a review of its status is currently under way (NOAA 2009-TN189).

Nassau Grouper (*Epinephelus striatus*)

The Nassau Grouper is designated as a Federal species proposed for listing under the ESA (77 FR 61559) (TN3238). This species is considered a top-level predator, occurs in water depths of up to 330 ft, and is known to occur in Biscayne Bay. Adults are often found in coral reef or rocky bottom habitats (NOAA 2009-TN191). Fishing pressure in the twentieth century led to the commercial extinction of the species in the U.S. Caribbean by the mid-1980s; Florida populations declined from the 1950s to very low levels in the early 1990s (Sadovy and Eklund 1999-TN200). Currently, Nassau Grouper are considered overfished in Florida, and fishing for this species is prohibited within U.S. waters (NOAA 2009-TN191). This species is a solitary, diurnal predator that is found from inshore water to depths of about 100 m in waters of the South Atlantic Ocean and Caribbean Sea and is known to occur in Biscayne Bay. Nassau Grouper reach maturity at about 5 years of age, and may live several decades, reaching a maximum size of about 39 in (100 cm) (Sadovy and Eklund 1999-TN200). Prey items include a wide variety of fish and invertebrates. This species is primarily gonochoristic (exhibiting separate sexes), and is known to congregate in very large numbers at specific nearshore locations to spawn. Although Nassau Grouper were not reported in the environmental studies sponsored by FPL to support the proposed Units 6 and 7 project, this species has been reported in Biscayne Bay and likely occurs near the Turkey Point site. A complete description of this species, including documented occurrences in Biscayne Bay near the Turkey Point site, is found in the NMFS Biological Assessment in Appendix F

Warsaw Grouper (*Epinephelus nigritus*)

The Warsaw Grouper is NOAA Species of Concern that occurs from North Carolina to the Gulf of Mexico. This large sea bass is generally found near rough, irregular sea bottoms and steep

cliffs at water depths ranging from 180 to 1,700 ft. Juveniles are occasionally found in shallower waters. The reproductive habits of this species are not well understood, but it is assumed that eggs and larvae are pelagic. Warsaw Grouper are believed to reach sexual maturity between 4 and 9 years of age, may live over 40 years, and reach a maximum size of approximately 7.7 ft and 440 pounds. Prey items include fish and crustaceans (75 FR 59690) (TN4100).

Ivory Tree Coral (*Oculina varicosa*)

The ivory tree coral is a NOAA Species of Concern that occurs in the Caribbean, the Gulf of Mexico, Florida, and the Bahamas in water depths ranging from 2 to 152 m. Colonies are generally found on limestone rubble and outcroppings, and soft-bottom sloping habitats. This species is believed to be tolerant of a wide range of temperature and light intensity. The major threats to this species include damage from mechanical fishing gear, including dredges, trawls, and anchors, and climactic changes that create temperature extremes that lead to bleaching and susceptibility to disease (Aronson et al. 2014-TN4101).

Species with Designated Essential Fish Habitat

The Sustainable Fisheries Act of 1996 (16 U.S.C. § 1801 et seq.) (TN1060) amended the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act (16 U.S.C. § 1801 et seq.) (TN1061) to create a program to protect essential fish habitat (EFH) and to identify habitat areas of particular concern (HAPCs). The South Atlantic Fisheries Management Council (SAFMC) and NMFS are responsible for designating EFH for each life stage of Federally managed marine fish and shellfish species. Based on information provided in the *Federal Register* and interagency meetings involving the NRC and Federal and State resource agencies, NMFS identified EFH and HAPCs that could be affected by the construction and operation of proposed Turkey Points Units 6 and 7 in a letter to the NRC (NOAA 2010-TN835). Table 2-31 provides a summary of species included in the EFH Assessment (in Appendix F), the applicable fishery management plan, and EFH habitat designations. A brief discussion of EFH and HAPCs follows.

Table 2-31. Designated Essential Fish Habitat Likely to Occur near the Turkey Point Site

			Essential Fish Habitat Designation[(a)]	
Common Name	**Scientific Name**	**Applicable Fishery Management Plan**	**Mangrove**	**Seagrass and Unconsolidated Bottom**
Gray Snapper	*Lutjanus griseus*	Snapper-Grouper	X	X
Dog Snapper	*L. jocu*	Snapper-Grouper	X	
Mutton Snapper	*L. analis*	Snapper-Grouper		X
Bluestriped Grunt	*Haemulon sciurus*	Snapper-Grouper	X	
White Grunt	*H. plumieri*	Snapper-Grouper		X
Spiny lobster	*Panulirus argus*	Spiny Lobster	X	X
Pink shrimp	*Farfantepenaeus duorarum*	Shrimp Fishery	X	X

(a) Biscayne Bay and Biscayne National Park are also EFH-HAPC for coral, coral reefs, and hard-bottom communities.

Source: NOAA 2010-TN835

Snapper-Grouper Fishery Management Plan

The Snapper-Grouper Fishery Management Plan includes 17 species (SAFMC 1998-TN212). Based on the information described above, five species belonging to this group have designated EFH near the Turkey Point site. Mangrove habitat is identified as EFH for Gray Snapper; seagrass and unconsolidated bottom are identified as EFH for both adult and juvenile Gray Snapper, juvenile Mutton Snapper, and adult White Grunt (NOAA 2010-TN835). EFH for the snapper-grouper group includes coral reef systems, hard-bottom substrates, submerged aquatic vegetation, and artificial reefs and outcroppings from shore to at least 600 ft (2,000 ft for Wreckfish [*Polyprion americanus*]), where annual water temperature is sufficient to maintain adults. EFH also includes spawning areas in the water column above adult habitat and additional pelagic environments. With regard to specific life stages of this group, EFH includes areas inshore of the 100 ft contour and includes macroalgae, seagrass beds, salt and brackish marshes, tidal creeks, mangrove fringes, oyster reefs, shell banks, and soft- or hard-bottom substrates. HAPCs for the snapper-grouper species complex include medium- to high-profile hard-bottom areas and all designated nursery areas (SAFMC 1998-TN212).

Spiny Lobster

As described by NOAA (2010-TN835), both mangrove and seagrass/unconsolidated bottom habitats are EFH for the spiny lobster. EFH for spiny lobster includes nearshore shelf and oceanic waters, shallow subtidal bottom, seagrass habitat, soft sediment, and coral, hard-bottom, sponge, algal and mangrove communities (SAFMC 1998-TN212). Juvenile and adult spiny lobster may be present near the Turkey Point site (EAI 2009-TN154).

Pink Shrimp

The SAFMC's Shrimp Fishery Management Plan includes five species: brown shrimp (*Farfantepenaeus aztecus*), pink shrimp, rock shrimp (*Sicyonia brevirostris*), royal red shrimp (*Pleoticus robustus*), and white shrimp. Of these, the pink shrimp is considered the most common to Biscayne Bay, is expected to occur near the Turkey Point site, and was specifically identified by NMFS as a species with designated EFH near the Turkey Point site (Nelson et al. 1991-TN174; EAI 2009-TN154; NOAA 2010-TN835). Juvenile and adult shrimp are omnivorous bottom feeders; they eat polychaetes, amphipods, nematodes, other small crustaceans, and organic debris or detritus. This species is most commonly found on hard sand and shell bottom habitats. Rates of growth for all penaeid shrimp are highly variable and influenced by water salinity and temperature; low temperatures and high salinity inhibit growth (SAFMC 1998-TN212). EFH for penaeid shrimp includes inshore estuarine nursery areas, offshore marine habitats, and all interconnecting waterbodies. Inshore nursery areas include tidal freshwater, estuarine and marine wetland systems, nearshore mangrove and seagrass habitats, and intertidal and subtidal non-vegetated flats.

Habitat Areas of Particular Concern

HAPCs identified by NOAA (2010-TN835) near the Turkey Point site included mangrove and seagrass habitats described above for the snapper-grouper complex, and Biscayne Bay for

spiny lobster. Biscayne Bay and Biscayne National Park are also EFH-HAPC for coral, coral reefs, and hard-bottom communities.

2.4.2.4 Aquatic Monitoring

This section describes the analysis and evaluation of the proposed aquatic monitoring program. Unless otherwise noted, the summary below was developed from information provided by FPL (2014-TN4058), which also includes information about study design and results. Information is also provided in FPL 2009 (TN201); EAI 2009 (TN97); EAI 2009 (TN153); and EAI 2009 (TN154).

Pre-Application Monitoring

Surveys of onsite surface-water habitats that could be affected by the construction and operation of proposed Units 6 and 7 were conducted in August and November 2007. Survey areas included hypersaline mudflats, remnant canals, channels, dwarf mangrove wetlands, and open water areas within the Turkey Point site. Other than the American crocodile, no Federally or State-listed aquatic or semi-aquatic species were observed within the area proposed for the construction of Units 6 and 7. Florida manatee and Smalltooth Sawfish may occur, however, in nearshore areas of Biscayne Bay adjacent to the Turkey Point site, including the proposed location for the radial collector well system and the equipment barge-unloading facility. During the summer of 2009, fish surveys occurred in areas of the site that would be affected by construction, including two remnant canals, the dead-end canal area where construction laydown would occur, pools within the mangrove areas where buildings and parking areas were planned, a portion of the return canal, shallow flats in the east-central part of the nuclear island, and two locations along the cooling canals within the IWF (FPL 2009-TN201).

Because modifications to the existing barge-turning basin and equipment barge-unloading area were expected to be needed to support construction of the proposed Units 6 and 7, a survey of seagrass presence in that area was conducted in 2008 (FPL 2010-TN272). Manatees have also been observed in this area, necessitating a manatee protection plan, as previously described. In addition to the barge-turning basin seagrass survey, and a seagrass survey around the Turkey Point peninsula (EAI 2009-TN153), a 1-year baseline aquatic characterization study was completed in March 2009 to characterize aquatic biota in Card Sound and the Card Sound Canal and included studies of benthic invertebrates (EAI 2009-TN97) and fish and shellfish (EAI 2009-TN154).

Building, Preoperational, and Operational Monitoring

As described in its ER, FPL (2014-TN4058) does not consider preoperational and operational monitoring to be necessary, however, the State of Florida is requiring pre-building, building, preoperational, and operational monitoring under the conditions of certification (State of Florida 2014-TN3637). Federally listed species occur in the vicinity of the Turkey Point site, and building activities may cause some species to temporarily leave the area. Barge and tug traffic may, but is unlikely to, result in fatal or non-fatal collisions with some species. FPL also states that aquatic species in the regional canals along the roads and corridors for transmission and reclaimed and potable water are common to South Florida. Cooling water for Units 6 and 7 will

primarily be reclaimed water supplied by the MDWASD. A backup source of cooling water will be from subsurface radial wells located on the Turkey Point peninsula. Because Units 6 and 7 will not have a conventional intake to withdraw surface water FPL has determined that additional preoperational or operational monitoring is not required because no aquatic species would be exposed to impingement or entrainment during the procurement of cooling water. Because the cooling water would be discharged into UIC (or deep-injection) wells, FPL has also determined that additional preoperational or operational monitoring is not required because no aquatic species would be exposed to cooling-water discharge from the proposed Units 6 and 7. The review team notes that this statement is unsubstantiated because no published biological studies on the deep-aquifer communities in this area are available.

Building activities would be conducted under stormwater permits requiring the use of Best Management Practices. Additional monitoring may be warranted if required by Federal resources areas with appropriate jurisdiction. The review team's assessment of aquatic impacts related to the building and operation of the proposed units is provided in Chapters 4 and 5, respectively.

Existing Monitoring Programs or Procedures

As part of the SCA submission, FPL provided information about a variety of monitoring programs related to the Turkey Point site in the SCA (FPL 2010-TN272). Programs pertinent to aquatic resources are described below, including the terms and conditions regarding crocodile monitoring and protection related to the operation of Units 3 and 4, as described in FWS 2006-TN832.

Barge Delivery Plan

The Turkey Point Barge Delivery Plan (FPL 2010-TN272) describes the minimum requirements and procedures that would be used during the delivery of major equipment and components needed for the building of proposed Units 6 and 7. The plan supplements an existing operations manual developed for fuel-oil transfer at the existing barge-unloading facilities at the northern end of the Turkey Point site adjacent to Biscayne Bay. Included in the Barge Delivery Plan is a section that describes approved procedures associated with in-water work within the barge-turning basin and entrance channel to protect manatees. The plan requires dedicated observers on all vessels used during in-water work, the maintenance of a logbook detailing sightings, collisions, or injuries to manatees; and the prohibition on movement of work barges, other associated vessels, or any in-water work after sunset or before sunrise, when the potential for spotting manatees is negligible. As described in FPL (2016-TN4579), Turkey Point Unit 2 was converted to synchronous condenser mode in January 2013, and Unit 1 is scheduled for conversion in October 2016. Conversion of these fossil-fuel units is expected to greatly reduce or eliminate the need for fuel-oil deliveries.

Threatened and Endangered Species Evaluation and Management Plan

The FPL Turkey Point Units 6 and 7 Threatened and Endangered Species Evaluation and Management Plan (FPL 2010-TN170) provides a description of the proposed project, and the expected extent of impacts on aquatic, wetland, and terrestrial communities within site

boundaries. The Threatened and Endangered Species Evaluation and Management Plan also describes the American crocodile management program, including the current status of the species, likely effects of the proposed action, proposed mitigation activities, and assessment of potential cumulative effects. Specific activities described in the plan include the following:

- crocodile habitat preservation and creation
- use of exclusion zones at known nest sites
- daytime and nighttime monitoring surveys to document nests in the cooling canals and IWF
- hatchling capture and tagging using microchip technologies
- relocation of hatchlings to low-salinity habitats to improve survival
- recapture, monitoring, and release of individuals to assess growth and survival.

As described in the plan, crocodile monitoring occurs throughout the year, and specific activities are based on known seasons for mating, egg incubation, and hatching. The plan also describes strategies for reducing the risk of vehicle/crocodile collisions during routine maintenance activities onsite and during construction events. Section 7 of the plan describes specific actions that would be taken during preconstruction, construction, and post-construction to ensure minimal disturbance of this species.

Sea Turtle and Smalltooth Sawfish Construction Conditions

In addition to the above plans, NMFS (2006-TN3077) has established procedures to protect sea turtles and Smalltooth Sawfish during nearshore construction activities. Activities to protect these species include training construction personnel in ESA requirements, ensuring siltation barriers do not entangle species, “no-wake” operation of vessels, and potential cessation of construction activities if species are sighted within 50 ft of moving equipment.

American Crocodile Monitoring and Protection Related to Operation of Unit 3 and 4

As described in FWS 2006 (TN832) the terms and conditions regarding American crocodile monitoring and protection are as follows:

- The installation of four warning signs labeled as “Slow Crocodile Crossing” along Bechtel Road near the test canals on the Turkey Point site.
- Distribution of an informational bulletin on the American crocodile to all employees at the Turkey Point site every 6 months that includes photographs of a crocodile, information about hatchlings, and reminders to use caution when driving or conduction actives on the site.
- Inclusion of a presentation on American crocodiles twice a year at monthly safety meetings attended by all plant personnel. The presentations are to be made during the crocodile mating season when the activity of crocodiles at the site is greatest.
- FWS notification if a dead or injured crocodile is found.

2.5 Socioeconomics

This section describes the socioeconomic baseline of the proposed site. It describes the characteristics of the 50 mi region surrounding the Turkey Point site, including population demographics, density, and use to form the basis for assessing the potential social and economic impacts from building and operating the proposed two new nuclear units. There are four counties within the 50 mi region surrounding the Turkey Point site: Miami-Dade, Broward, Monroe, and Collier Counties.

The analytical area is a 50 mi radius circle centered midway between the two new proposed units and includes all of Miami-Dade County and portions of Broward, Collier, and Monroe Counties. Table 2-32 provides population information for each county and Figure 2-35 shows the 50 mi analytical area.

Table 2-32. Population of Counties within 50 Miles of the Proposed Site

County	Resident Population (2000)[a]	Resident Population (2010)[b]	Resident Population (2012)[c]
Miami-Dade County	2,253,362	2,496,435	2,512,219
Broward County	1,623,018	1,748,066	1,761,993
Collier County	251,377	321,520	323,548
Monroe County	79,589	73,090	73,475

(a) USCB 2000-TN470
(b) USCB 2010-TN4087
(c) USCB 2012-TN4098

The main data sources used in this section to describe the current population in the 50 mi region are the United States Census Bureau (USCB) 2008–2012 American Community Survey (ACS) 5-Year Estimates. These were the latest data for which poverty estimates were available at the block group level. Poverty data at the block group level are important for the environmental justice analysis (see Section 2.6). For consistency, the 2008–2012 ACS 5-Year Estimates are used to describe current population throughout the document, referred to as USCB 2012 (TN4098). Population data in the 50 mi region were estimated by overlaying the 2012 census block data on the 50 mi area shown in Figure 2-35, using ArcMap 10 geographic information system (GIS) software (ESRI 2012-TN1469). In addition, the review team analyzed the economic, employment, and population trends for the region using additional U.S. Census data sets and population projections from the Office of Economic and Demographic Research of the Florida Legislature and from the Bureau of Economic and Business Research of the University of Florida.

This section discusses all four counties in the 50 mi region but emphasizes the socioeconomic characteristics of Miami-Dade County, the economic impact area, where the proposed site is located and in which the majority of the demographic and socioeconomic impacts would occur (NRC 2000-TN614). The review team expects the workforce to be principally drawn from Miami-Dade County for two reasons. First, county-to-county worker flow data from the U.S. Census Bureau Longitudinal Employer-Household Dynamics program (USCB 2011-TN4078) show that 79.0 percent of the workers of Miami-Dade County resided in Miami-Dade County, another 12.0 percent resided in Broward County, and only 0.4 percent in each of Collier and

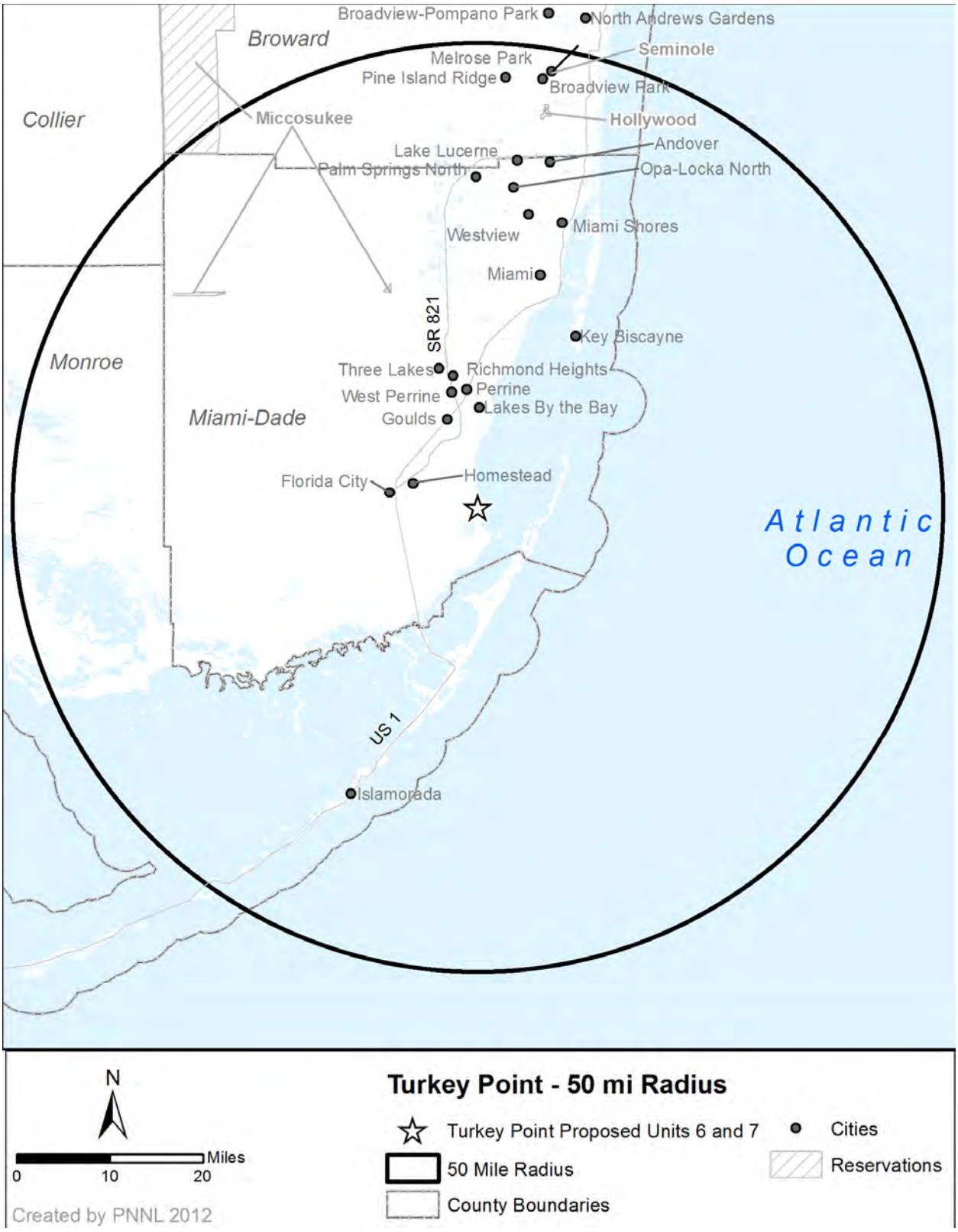


Figure 2-35. Map of South Florida, Showing Counties Potentially Affected by Proposed Units 6 and 7 (Source: ESRI 2012-TN1469)

Monroe Counties (Table 2-33). Because the proposed site is located approximately 40 mi south of the Broward County border, the commute time from Broward County to the proposed site would be longer than the average commute time of workers residing in Broward County (Table 2-33). Second, more than 83 percent of Turkey Point plant's current workforce resides in Miami-Dade County. Another 11.3 percent of the current workforce resides in the three other counties that surround Miami-Dade County and that intersect with the 50 mi region: Broward, Monroe, and Collier. The remaining current workforce resides in counties beyond the 50 mi region surrounding the Turkey Point site (Table 2-33).

Table 2-33. Commuting Characteristics of Workers in the 50-Mile Region

County	Average Commute Time of Workers Residing in County[a]	Percent of Working Residents, by County of Residence, that Commute to Miami-Dade County[b]	Percent of Miami-Dade Workers by County of Residence[b]
Miami-Dade	29 minutes	79.0%	74.5%
Broward	27 minutes	12.0%	14.7%
Monroe	19 minutes	0.4%	0.6%
Collier	23 minutes	0.4%	0.4%

(a) USCB 2012-TN4088
(b) USCB 2011-TN4078

Most of the data and analysis in this section are concerned with Miami-Dade County. In addition, particular attention is given to the Homestead and Florida City area, the nearest small communities where, based on Table 2-34, a considerable share of the building and operations workforce is expected to reside.

Table 2-34. Distribution of Turkey Point Plant Employees

County	City	Total Number of Current Turkey Point Plant Employees in Residence	Percent of Total Number of Employees
Miami-Dade		814	83.3%
	Homestead	*391*	*40.0%*
	Miami	*380*	*38.9%*
	Florida City	*27*	*2.8%*
	Other	*16*	*1.6%*
Broward		63	6.4%
Monroe		47	4.8%
Collier		1	0.1%
Other		52	5.3%
Total		977	100%

Source: FPL 2014-TN4058

The scope of the review of community characteristics is guided by the magnitude and nature of the expected impacts of building, maintaining, and operating the proposed plants and by those site-specific community characteristics that can be expected to be affected by these impacts.

2.5.1 Demographics

Miami-Dade County is the most populous of the three counties—Miami-Dade, Broward, and Palm Beach—that constitute the Miami-Fort Lauderdale-Pompano Beach Metropolitan

Statistical Area (MSA), the seventh most populous MSA in the United States. It is also the most populous county in the State of Florida (USCB 2011-TN472). However, north of the plant along the coast is highly urbanized, while the rest of Miami-Dade County is more agricultural or parkland. Population density is greater in the proximity of the City of Miami, in the northeast portion of the county, and along US-1 and the Florida Turnpike, than in the rest of the county, including the areas to the west and south of Homestead and Florida City.

For historical perspective, Miami-Dade County has grown at a lower rate than the State of Florida as a whole in the last few decades. Although its population roughly doubled between 1970 and 2010, population growth rates have been declining (Table 2-35). In 1992, Hurricane Andrew hit Miami-Dade County and the greatest damage occurred in the Homestead and Florida City area. An estimated 350,000 residents were driven from their homes, most from South Dade (Homestead and Florida City area). An estimated 40,000 did not return to Miami-Dade County (Smith and McCarthy 1996-TN467). An important employer in South Dade, the Homestead Air Force Base, was destroyed by the hurricane and not rebuilt. The location today supports a smaller Air Reserve Base. For the purposes of this analysis, the review team divided the total population within the analytical area into three major groups: residents who live permanently in the area, transient people who may temporarily live in the area but have a permanent residence elsewhere, and migrant workers who travel into the area to work and then leave after their job is done. Transients and migrant workers are not fully characterized by the U.S. Census, which generally captures only resident populations.

Table 2-35. Population Growth in Miami-Dade and Florida, 1970−2030

	Miami-Dade		Florida	
Year	Population	Annual Growth Rate in Decade Prior to Indicated Year	Population	Annual Growth Rate in Decade Prior to Indicated Year
1970	1,267,792	NA	6,789,447	NA
1980	1,625,509	2.5%	9,746,961	3.7%
1990	1,937,194	1.8%	12,938,071	2.9%
2000	2,253,779	1.5%	15,982,824	2.1%
2010	2,496,435	1.0%	18,801,310	1.6%
2020	2,788,100	1.1%	21,149,700	1.2%
2030	3,056,700	0.9%	23,609,000	1.1%

Source: BEBR 2004-TN438 (for years 1970-2000), USCB 2010-TN4087 (for year 2010), and BEBR 2014-TN4077 (for years 2020-2030)

2.5.1.1 Resident Population

The 2012 estimate for the resident population within 50 mi of the center of the proposed Turkey Point site is 3,466,602 (USCB 2012-TN4098).(2) The nearest population concentrations are the cities of Florida City, 8 mi west of the site with a population estimate of 11,313, and Homestead, 9 mi northwest of the site with a population estimate of 59,866 (USCB 2012-TN4098). Both

(2) Estimate obtained using ArcMap 10 and based on census block group data. Block groups were included if they were totally or partially within the 50 mi radius.

communities are on the southern end of the Miami urbanized area that extends from Florida City and Homestead north and northeast to Miami, Fort Lauderdale, and Pompano Beach and crosses Miami-Dade, Broward, and Palm Beach Counties. To the south and southwest of the site lie the Florida Keys in Monroe County. Because the proposed site is located on the coast, much of the 50 mi radius around the site is on the sea and unpopulated. Everglades National Park is another unpopulated area and occupies much of the land between 20 and 50 mi west of the site.

The population for Miami-Dade County projected to 2030 is shown in Table 2-35 with projections for the State of Florida provided for comparison. The sources of projections are the Florida Legislature's Office of Economic and Demographic Research (EDR) and the University of Florida's Bureau of Economic and Business Research (BEBR).(3) BEBR projections are based on U.S. Census data from 2000 and 2010, as well as data from the Florida Department of Health's Office of Vital Statistics.(4) In most Florida counties, migration has typically been the major determinant of population growth (EDR 2011-TN454). The projections in Table 2-35 show that the EDR and BEBR expect the population growth in Miami-Dade County to slow, mainly due to a slowdown in migration.

Table 2-36 shows resident population estimates in the 50 mi radius projected to 2030, by county. Estimates for the 2012 resident population are the 2008–2012 ACS 5-Year Estimates, calculated for the 50 mi radius using GIS to capture the data from the relevant census block groups. To estimate the population in the 50 mi radius in 2015, 2020, 2025, and 2030, the review team compared data from the 2008–2012 ACS survey with data from projections for all four counties included in the 50 mi radius. The review team then calculated the growth rate of the resident population for each county between 2012 and 2015, 2020, 2025, and 2030. These growth rates were applied, by county, to the population in the 50 mi radius.

Table 2-36. Resident Population in the 50-Mile Radius, Projected to 2030, by County

Year	Total 50 mi Radius	Miami-Dade	Broward	Collier	Monroe
2012	3,466,602	2,512,219	931,797	1,025	21,561
2015	3,558,523	2,589,844	946,153	1,078	21,447
2020	3,736,407	2,740,009	973,914	1,184	21,300
2025	3,902,440	2,881,819	998,210	1,285	21,125
2030	4,048,422	3,003,975	1,022,087	1,381	20,979

Source: USCB 2012-TN4098; projections based on BEBR 2014-TN4077

2.5.1.2 Transient Population

Regulatory Guide 4.7 (NRC 1998-TN1008), Section C.4, defines transient populations as people (other than those just passing through the area) who work, reside part-time, or engage in recreational activities in a given area, but are not permanent residents of the area. Under this definition, transients include people in

(3) County projections are done by BEBR under contract to EDR and are made to be consistent with EDR State projections.
(4) For a detailed methodology, see BEBR 2011-TN437.

- workplaces
- places where people reside part-time, such as hotels and motels and seasonal housing
- recreational areas or at special events.

Transient population estimates within 20 mi of the proposed site were obtained based on (1) commuter data from the U.S. Census Bureau Longitudinal Employer-Household Dynamics program (USCB 2011-TN4078) to estimate the number of employees commuting from outside municipalities in the 20 mi radius; and (2) FPL-provided estimates for other transient population based on internet searches, overhead imagery (for counting of parking spaces), and direct phone calls to major recreational facilities and marinas and to lodging facilities, including hotels, motels, and seasonal housing.

The review team estimated the number of commuters from outside municipalities in the 20 mi radius using data from the U.S. Census Bureau Longitudinal Employer-Household Dynamics program (USCB 2011-TN4078). For municipalities partially located within the 20 mi radius commuters were assumed to reside in or outside the 20 mi radius depending on whether the majority of the land area of the municipality was inside or outside the 20 mi radius. The review team reached an estimate of 143,763 transient workers in the 20 mi radius.

For other transient population, FPL's research included the Biscayne National Park, Black Point Park, Black Point Marina, Camp Owaissa Bauer, Coral Castle Museum, Harris Field, Kevs Gate Golf Club, Larry & Penny Thompson Memorial Park, Prime Outlets of Florida City, Southland Mall, Homestead Bayfront Marina/Herbert Hoover Marina and Park, and a list of lodging facilities. From phone call interviews, FPL gathered information about the extent to which visitors were local residents or from out of the affected area (transients). When no information about the number of visitors was available, FPL obtained estimates by counting parking spaces with overhead imagery and assuming two or three occupants per vehicle, depending on the facility. FPL reached an estimate for other transient population of 19,055 (FPL 2014-TN4058). The review team received a detailed explanation of the procedures adopted and found them to be reasonable. The estimate did not, however, include large racing events. The review team met with the City of Homestead representatives who indicated that racing events occur several times a year at the Homestead-Miami Speedway. Large racing events (e.g., NASCAR [National Association for Stock Car Auto Racing]) could add 65,000 to the other transient population, for a total of approximately 85,000 people.

Adding the number of transient employees (143,763) and the number of other transient population (19,055), the total transient population within 20 mi of the proposed site is estimated to be 162,818, with the exception of those days when large events are being held at the Homestead-Miami Speedway (65,000), when the estimate surpasses 220,000.

2.5.1.3 Migrant Labor

The U.S. Census Bureau defines a migrant laborer as someone who is working seasonally or temporarily and moves one or more times from one place to another to perform seasonal or temporary work. Migrant laborers are often agricultural or construction workers.

The 2012 Census of Agriculture provides some information regarding the migrant farm labor population within Miami-Dade County. Of the 9,045 hired farm workers in Miami-Dade County, 1,296 (14.3 percent) were migrant workers. In addition, farms in Miami-Dade County reported 228 migrant contract workers for a total of 1,524 migrant workers in Miami-Dade County (USDA 2012-TN4081).

Turkey Point Units 3 and 4 are currently in operation and function on an 18-month refueling cycle. During each refueling event, between 600 and 1,000 temporary workers are employed during a period of 25 to 35 days (FPL 2014-TN4058). A portion of these are migrant workers who come from outside the economic impact area.

2.5.2 Community Characteristics

Miami-Dade County's economy has been transitioning from mixed service and industrial in the 1970s to one dominated by services, primarily due to the expansion in international trade, the tourism industry, and health services. The Miami-Dade County government projects wholesale trade and retail trade will become stronger economic forces in the local economy. This reflects the county's position as a wholesale center in Southeast Florida, which serves a large international market. The tourism industry remains one of the largest sectors in the local economy (Miami-Dade County 2012-TN462).

The remainder of this section addresses community characteristics including the regional economy, transportation networks and infrastructure, taxes, aesthetics and recreation, housing, community infrastructure and public services, and education.

2.5.2.1 Economy

In 2012, Miami-Dade County's total personal income ranked first in the State of Florida and accounted for 12.7 percent of the State's total personal income reported. The county's per capita personal income was 95 percent of the State average (BEA 2014-TN4075). Miami-Dade County includes highly urbanized and suburban areas surrounding the City of Miami along the Atlantic Coast; rural agricultural areas further south; and portions of the Everglades, including Everglades National Park, in the western half of the county. Near Turkey Point, the non-wetland area centered around the Homestead and Florida City area is primarily agricultural. The region's subtropical climate allows the winter production of green beans, tomatoes, strawberries, and squash for distribution throughout the United States, as well as year-round production of tropical fruits and vegetables such as avocados, passion fruit, malanga, and boniato. Another sector of the agricultural industry is Asian specialties such as Thai guava, Thai basil, Thai eggplant, lemon grass, bitter melon, and various herbs and spices (FPL 2014-TN4058).

Miami-Dade County's economy is largely based on services. Major sectors of current employment include healthcare and social assistance, retail trade, administrative and waste services, accommodation and food service, professional, scientific, and technical services, local government, and real estate, rental and leasing (BEA 2012-TN4074). Table 2-37 shows employment by industry in Miami-Dade County from the Bureau of Economic Analysis (BEA). Workers are most often employed in service sectors such as retail trade, healthcare and social assistance, and in government. Employment in transportation and warehousing and in wholesale trade is affected by the importance of Miami as an international trade center. There were 57,345 full-time and part-time jobs in construction in Miami-Dade County in 2012.

Table 2-37. Employment by Industry, Miami-Dade County, 2012

	Miami-Dade		Florida
Industry	Jobs	Percent of Total	Percent of Total
Total	*1,515,304*	*100.00*	*100 (10,359,941 persons)*
Farm employment	7,444	0.49	0.82
Nonfarm employment	1,507,860	99.51	99.18
Private employment	*1,359,457*	*89.72*	87.90
Forestry, fishing, related activities, and other	2,702	0.18	0.64
Mining	898	0.06	0.19
Utilities	3,270	0.22	0.23
Construction	57,345	3.78	4.77
Manufacturing	41,279	2.72	3.37
Wholesale trade	83,241	5.49	3.49
Retail trade	155,494	10.26	11.11
Transportation and warehousing	87,923	5.80	3.13
Information	23,820	1.57	1.64
Finance and insurance	86,044	5.68	6.12
Real estate and rental and leasing	101,615	6.71	6.49
Professional, scientific, and technical services	104,017	6.86	6.69
Management of companies and enterprises	8,986	0.59	0.95
Administrative and waste services	118,994	7.85	7.85
Educational services	37,971	2.51	1.94
Health care and social assistance	169,064	11.16	11.18
Arts, entertainment, and recreation	28,177	1.86	2.99
Accommodation and food services	117,377	7.75	8.32
Other services, except public administration	131,240	8.66	6.80
Government and government enterprises	148,403	9.79	11.28
Federal, civilian	19,921	1.31	1.28
Military	7,300	0.48	0.94
State and local	121,182	8.00	9.05
State government	17,361	1.15	1.98
Local government	103,821	6.85	7.07

Source: BEA 2012-TN4074

The U.S. Department of Labor Bureau of Labor Statistics (BLS) disaggregates construction workers by occupation type in the Miami-Miami Beach-Kendall Metropolitan Area (Table 2-38). The most common construction occupations in 2013 in this area were construction laborers, carpenters, supervisors, electricians, equipment operators and operating engineers, plumbers, pipefitters and steamfitters, and painters. The top four employers in Miami-Dade County are

Table 2-38. Construction and Extraction Occupation in the Miami-Miami Beach-Kendall Metropolitan Area, 2013

Occupation Title	Employment
Construction and Extraction Occupations	22,510
First-Line Supervisors/Managers of Construction Trades and Extraction Workers	2,780
Brickmasons and Blockmasons	90
Carpenters	3,190
Tile and Marble Setters	300
Cement Masons and Concrete Finishers	720
Construction Laborers	3,750
Paving, Surfacing, and Tamping Equipment Operators	170
Pile-Driver Operators	150
Operating Engineers and Other Construction Equipment Operators	1,240
Drywall and Ceiling Tile Installers	390
Electricians	2,380
Glaziers	340
Insulation, Workers, Floor, Ceiling, and Wall	NR
Painters, Construction and Maintenance	1,170
Pipelayers	380
Plumbers, Pipefitters, and Steamfitters	1,180
Plasterers and Stucco Masons	NR
Roofers	NR
Sheet Metal Workers	770
Structural Iron and Steel Workers	NR
Helpers – Carpenters	NR
Helpers – Electricians	630
Helpers – Pipelayers, Plumbers, Pipefitters, and Steamfitters	200
Helpers, Construction Trades, All Other	90
Construction and Building Inspectors	640
Elevator Installers and Repairers	NR
Hazardous Materials Removal Workers	40
Highway Maintenance Workers	180
Septic Tank Servicers and Sewer Pipe Cleaners	80
Construction and Related Workers, All Other	190
Earth Drillers, Except Oil and Gas	NR

NR = Not Released.

Source: BLS 2013-TN4086

governmental entities: Miami-Dade County Public School District, Miami-Dade County, Federal government, and Florida State government. The largest private employers are Baptist Health South Florida, the University of Miami, American Airlines and Publix Super markets (Beacon Council 2013-TN4076). Table 2-39 lists the largest employers in the county.

Table 2-39. Major Employers in Miami-Dade County, by Number of Employees, 2013

Employer	Private/Public	Number
Miami-Dade County Public School District	Public	33,477
Miami-Dade County	Public	25,502
Federal Government	Public	19,600
Florida State Government	Public	18,300
Baptist Health South Florida	Private	13,376
University of Miami	Private	12,720
Jackson Health System	Public	8,208
American Airlines	Private	9,000
Publix Super Markets	Private	4,604
Florida International University	Public	3,534
Miami-Dade College	Public	2,356
City of Miami	Public	3,656
Carnival Cruise Lines	Private	3,500
Mount Sinai Medical Center	Private	3,000
Miami Children's Hospital	Private	2,800
Sedanos Supermarkets	Private	2,600
Miami V A Health Care System	Public	2,385
Royal Caribbean International/Celebrity Cruises	Private	2,051
Bank of America Merrill Lynch	Private	2,000

Source: Beacon Council 2013-TN4076

The Turkey Point site currently employs approximately 977 employees supporting the operations of the existing Units 1 through 5. In addition, Units 3 and 4 are on 18-month refueling cycles and, during each refueling event, employ an additional 600 to 1,000 outage workers for a period of 25 to 35 days (FPL 2014-TN4058).

Table 2-40 shows the number of workers employed and the unemployment rates for Miami-Dade County and for the State of Florida in 2000, 2010, and 2013. These data show that both the labor force and the number of employed workers in Miami-Dade County grew more slowly than the labor force and number of employed workers in the state. As of 2013, the Miami-Dade unemployment rate was above the unemployment rate for Florida and above the national average: 8.4 percent for Miami-Dade County compared to 7.2 percent for Florida and 7.4 percent for the country as a whole (BLS 2013-TN4085; BLS 2014-TN3674).

Table 2-40. Employment and Unemployment Statistics for Miami-Dade County and Florida, Annual Averages

Place	Year	Labor Force	Employment	Unemployment	Unemployment Rate
Miami-Dade	2000	1,103,485	1,046,900	56,585	5.1%
	2010	1,231,368	1,077,442	153,926	12.5%
	2013	1,287,348	1,179,118	108,230	8.4%
Annualized Growth Rate, 2000-2013		1.19%	0.92%		
Florida	2000	7,869,690	7,569,406	300,284	3.8%
	2010	9,182,506	8,121,770	1,060,736	11.6%
	2013	9,432,295	8,749,590	682,705	7.2%
Annualized Growth Rate, 2000-2013		1.40%	1.12%		

Source: BLS 2013-TN4085

2.5.2.2 Taxes

Several types of taxes would be affected by proposed Units 6 and 7. The following subsections describe major taxes, their structure, and annual dollar yield. Taxes included in this discussion include corporate income taxes, sales and use tax and other taxes on sales and services, and property taxes.

Personal and Corporate Income Taxes

The State of Florida does not levy a personal income tax on individuals. In fiscal year (FY) 2011 (July 1, 2010–June 30, 2011), the State of Florida received $1.87 billion (6.3 percent of its total tax revenue of $29.7 billion) from corporate income and excise taxes (FDOR 2011-TN460). The tax is based on 5.5 percent of the Federal taxable income with specific adjustments for the State of Florida and a $25,000 exemption (FDOR 2012-TN450).

Sales and Use Taxes

The State sales tax rate for Florida is 6 percent of the sale price of taxable goods and services. Non-taxable goods and services include groceries and services provided by Federal, State, County, and city governments and some nonprofit organizations. A 6 percent use tax is also applied to out-of-state purchases imported into the State, but a credit is given for sales taxes paid in another State. In FY 2011, the State of Florida received $19.35 billion (65.2 percent of its total tax revenue) from sales and use taxes (FDOR 2012-TN450). Counties may also impose a discretionary sales surtax on items or services delivered into the county, often only applied to the first $5,000 of sales. In Miami-Dade the surtax is 1 percent (FDOR 2012-TN456). In FY 2011-2012, Miami-Dade's adopted budget in FY 2011-2012 shows $282.7 million in sales and use taxes (Table 2-41).

Table 2-41. Miami-Dade County Adopted Budget Revenues by Major Sources, FY 2011-2012, $Thousands

Revenue Source	FY 2011-2012 General Fund	FY 2011-2012 Proprietary and Other Funds	Total
Property Taxes	957,913	285,089	**1,243,002**
Sales Taxes	120,458	162,245	**282,703**
Misc. State Revenues	83,480	-	**83,480**
Gas Taxes	62,120	-	**62,120**
Utility and Communications Taxes	113,365	-	**113,365**
Fees and Charges	5,892	2,774,738	**2,780,630**
Miscellaneous Revenues	11,677	70,679	**184,356**
State and Federal Grants	-	443,225	**443,225**
Interagency Transfers	-	347,645	**347,645**
Fund Balance/Carryover	110,241	484,371	**594,612**
Total	**$1,567,146**	**$4,567,992**	**$6,135,138**

Source: Miami-Dade County 2012-TN462, Appendix A

Other Taxes on Sales and Services

In FY 2011, the State of Florida received 7.7 percent of its total tax revenues from a Communications Services Tax and 3.9 percent from a Documentary Stamp Tax. The Communications Services Tax is imposed on all communications—cable and direct-to-home satellite services. The State tax rate is 9.17 percent (13.17 percent for direct-to-home satellite) and local taxing jurisdictions may add their own rates. In Miami-Dade County, the rates currently vary between 0.5 percent and 6.72 percent depending on place (FDOR 2012-TN457).

The Documentary Stamp Tax is applied to the value of Florida real property whenever a transfer is made or to written obligations to pay such as bonds and mortgages when documents are executed or delivered in Florida. The rate in Miami-Dade County rate is 60 cents per $100 (or portion thereof) on all documents, plus 45 cents per $100 surtax on documents transferring anything other than a single-family residence (FDOR 2010-TN458).

Property Taxes

Florida does not have a State-level property tax. Private property owners pay property taxes to the county and a local school district and may also pay taxes to special taxing units. Property values are set by the County property appraisers and some exemptions may apply. The tax rate (millage) is set by each taxing unit. County and school district governments may levy taxes up to 10 mills each (1 percent) (FDOR 2012-TN459). For FY 2011-2012, the overall millage rate for Miami-Dade County is 9.7405 mills (Miami-Dade County 2012-TN462).

Miami-Dade County budgeted property taxes for FY 2011-2012 were $1,243,002,000 (Table 2-41). These taxes fund four separate taxing jurisdictions: Countywide, the Unincorporated MSA, the Fire Rescue District, and the Library System. These latter two appear in Table 2-42 under the “proprietary and other funds column.”

Table 2-42 shows Florida’s FY 2010-2011 tax revenues by major sources and Table 2-41 shows Miami-Dade County budgeted revenues for FY 2011-2012.

Table 2-42. Florida Tax Revenues by Major Sources, FY 2010-2011

Revenue Source	$ millions	Share of Total
Sales and Use Tax	19,353.0	65.2%
Communications Services Tax	2,307.1	7.7%
Corporate Income and Excise Tax	1,869.9	6.3%
Documentary Stamp Tax	1,176.8	3.9%
Other Sources	4,984.6	16.9%
Total Revenue Administered Taxes	**29,691.4**	**100%**

Source: FDOR 2011-TN460

Miami-Dade Public School District is a taxing entity separate from Miami-Dade County. The Florida Education Finance Program (FEFP) is the primary mechanism for funding the operating costs of Florida school districts. Funding comes from local, State, and Federal government sources. Local funding is from property taxes on properties located within the school district. State funding is by legislative appropriation and the major source of revenue is the State sales

tax. Federal funding is coordinated by the Florida Department of Education. School districts receive funds from the Federal government directly and through the State as an administering agency. Under FEFP, funding is based on the number of full-time equivalent students, and considers variations in several factors when determining funding for each district: local property tax bases, education program costs, costs of living, and costs for equivalent educational programs due to the student population's density and distribution (FPL 2014-TN4058). As a result of legislative action in 2004, State funding for the Miami-Dade Public School District has declined as a share of total funding from 53.4 percent in 2000-2001 to 28.2 percent in 2009-2010. In the same period, the local portion has risen from 37.2 percent to 54.0 percent (FPL 2014-TN4058). Miami-Dade County Public School District 2011-2012 budget included approximately $3,612 million in new revenues, of which $2,068 million (57.2 percent) were local revenues, $1,556 million of which from local property taxes (M-DCPS 2011-TN1494).

Under Florida law, both real property (land and permanent buildings) and tangible personal property (primarily business equipment) are subject to property tax. FPL pays real property taxes to Miami-Dade County and the Miami-Dade School District. In 2011, taxes were $6.7 million on the nuclear units and $9.2 million on the fossil-fuel units, for a total of $15.9 million. The County received 55 percent of this tax, while the school district received 45 percent of the tax revenue. FPL also paid personal property taxes for the existing units to Miami-Dade County, the Miami-Dade School District, and several special taxing districts. These include the Florida Inland Navigation District, the SFWMD, the Everglades Construction Project, the Children's Trust Authority, and the Library District. In 2011, FPL paid $15.3 million in tangible personal property taxes on its Turkey Point property (FPL 2014-TN4058).

Table 2-43 shows revenues for Homestead. In FY 2012, the City of Homestead had budgeted revenues of almost $156 million. Most of these revenues were associated with proprietary funds, particularly the City of Homestead owned and operated electric utilities, as well as water and wastewater utilities and fees associated with stormwater and solid waste management. Tax revenues are included in Table 2-43 under Property Taxes and other General Fund revenues. In addition to property taxes, these include local option gas taxes, communication service taxes and utility service taxes. About 57 percent of General Fund revenues are budgeted to fund police services.

Table 2-43. City of Homestead Adopted Budget, FY 2012

Revenue Source	Value $
Property Taxes	$10,225,371
Other General Fund Revenues	26,556,523
Electric Utility Revenues	61,811,741
Other Utility Revenues	27,822,562
Other	29,550,045
Total	**155,966,242**

Source: City of Homestead 2012-TN1465

2.5.2.3 Transportation

The Turkey Point site's transportation network includes U.S. and interstate highways, multilane divided State highways, and local streets. The County operates public transportation services including rail, express bus, and buses that have multiple stops. Rail freight service in Miami-Dade County is provided by CSX Corporation. Rail passenger service is provided by Amtrak and TRI-Rail. The county also includes air transportation infrastructure including airports, heliports, and a seaplane base; a seaport for commercial freight and passenger service; and an intermodal transportation hub for air, rail, and ship. The county is also served by private airstrips, heliports (including the FPL corporate and Turkey Point heliports), and seaplane bases (FPL 2014-TN4058).

Roads

The major Federal highways in Miami-Dade County are US-1, which bisects the county from north to south and continues to the Florida Keys south of Miami-Dade County, and Interstates 75 and 95 (I-75 and I-95), which also have a north-south direction. Both of the Interstate highways terminate in Miami. These U.S. and Interstate highways are shown in Figure 2-36. Two of the major State highways in the county are the Florida Turnpike and SR-997.

Florida's Turnpike is a multilane divided toll road that traverses much of Florida, linking I-75 in the interior south of Ocala to Miami. The Homestead extension of Florida's Turnpike terminates at US-1 north of Florida City. SR-997 connects US-1 in Homestead with US-27 northwest, skirting the western fringes of the Miami metropolitan area and terminating in Homestead where the road changes names to Krome Avenue. Krome Avenue continues south and terminates at US-1 south of Florida City. These highways are shown in Figure 2-36.

Access to the Turkey Point site is currently through road SW 344th Street/Palm Drive that intersects both US-1 and SR-997 approximately 8 mi west of the site. SW 344th Street/Palm Drive is a four-lane road that narrows to two lanes as it leads to Turkey Point (at its intersection with SW 137th Avenue/Tallahassee Road). SW 344th Street/Palm also provides access to Homestead-Miami Speedway and Homestead Bayfront Park. The speedway hosts premier motorsports events including NASCAR and IndyCar races, and has parking for more than 30,000 vehicles and 1,300 recreational vehicles (FPL 2014-TN4058). Figure 2-37 shows streets in the vicinity of the site, as well as existing Miami-Dade County traffic count stations. The station near the Speedway on SW 344th Street/Palm Drive west of SW 137th Avenue/Tallahassee Road (9,956) estimated, in October of 2008, an available peak hour capacity of 2,799 trips. Traffic counts and estimated available peak hour capacity for all three traffic count stations are shown in Table 2-44.

In its visit to the site, the review team confirmed the current low use of the roads in the vicinity of site through interviews conducted with local and County authorities and in a driven tour of the roads.

Figure 2-36. Transportation Infrastructure within the 50-Mile Radius of the Site (Source: FPL 2014-TN4058)

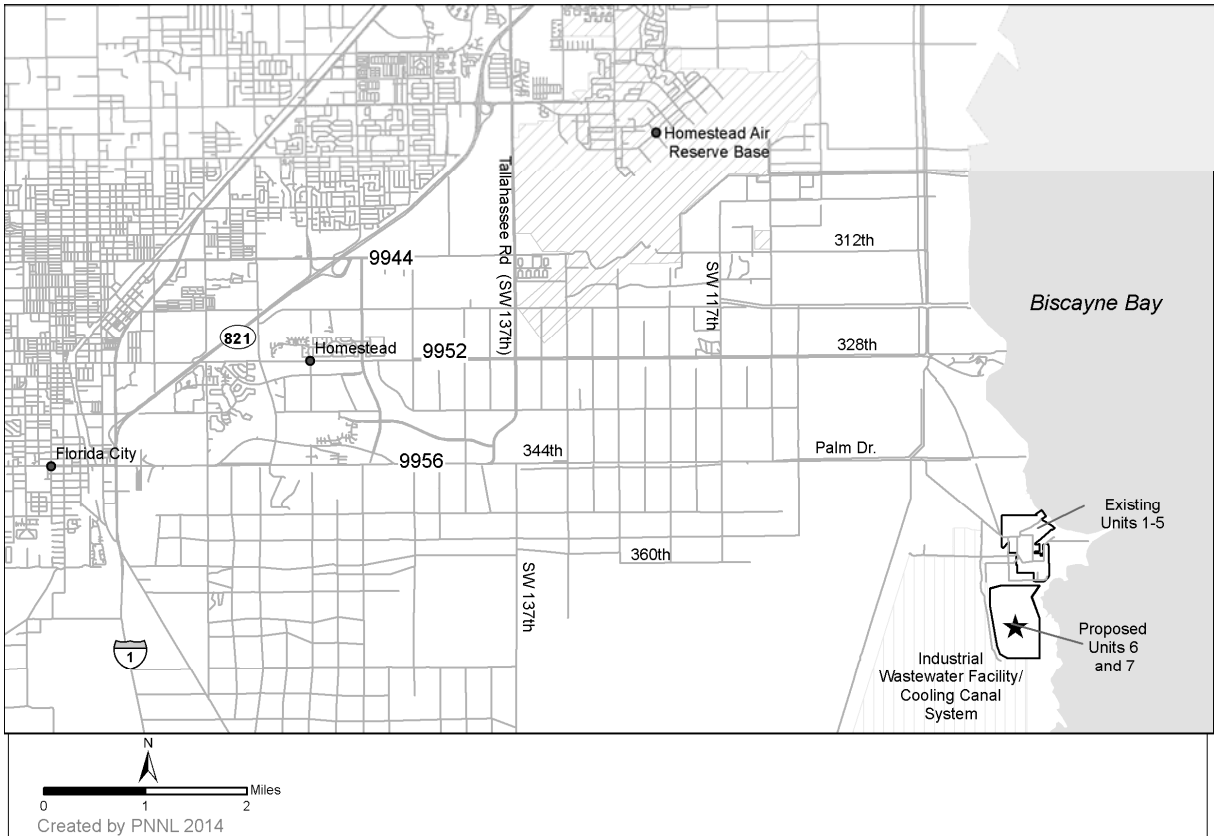


Figure 2-37. Highways, Streets, and Traffic Count Stations in the Vicinity of the Site (Source: Traf Tech 2009-TN1266)

Table 2-44. Available Peak Hour Capacity at Traffic Count Stations, 2008

Traffic Count Station	Location	Peak Hour Capacity	Peak Hour Trips	Available Peak Hour Capacity
9956	SW 344 St. W. of SW 137th Ave/Tallahassee Rd.	3,030	231	2,799
9952	SW 328th St. W. of SW 137th Ave./Tallahassee Rd.	2,600	254	2,346
9944	SW 312th St. E. of Florida Turnpike	3,350	2,061	1,289

Source: Traf Tech 2009-TN1266

Rail

Rail passenger service is provided to Miami by Amtrak and TRI-Rail; neither rail service travels to locations south of Miami. Rail freight service in Miami-Dade County is provided by CSX operating Class 1 rail lines and services the Port of Miami. The rail line terminates in Homestead. There is no rail service to the Turkey Point site.

Waterways

The Port of Miami is in Miami and offers passenger and freight services. The Atlantic Intracoastal Waterway traverses the eastern coastline of Florida and intersects with the Port of Miami. The existing equipment barge-unloading area at Turkey Point is accessed via the

Atlantic Intracoastal Waterway to receive shipments of oil and equipment. Fuel oil is currently delivered to Turkey Point by barge from a terminal at the Port of Miami on Dodge Island.

Air

Miami-Dade County operates five airports including Miami International, a major commercial airport in Miami, and the Homestead General Aviation Airport. Homestead is also host to the Homestead Air Reserve Base, the closest airport to Turkey Point. Miami-Dade has many privately owned heliports, including the FPL Helistop and the FPL Turkey Point Heliport (FPL 2014-TN4058).

2.5.2.4 Aesthetics and Recreation

The Turkey Point site lies in an unincorporated area in Miami-Dade County, Florida, approximately 8 mi east of Florida City and 4.5 mi east of the southeastern municipal limits of Homestead. The Units 1 and 2 emissions stacks are the tallest structures on the site, approximately 400 ft tall. There are some resources in the vicinity (within 6 mi) of the site that, because of their residential or recreational use, could be sensitive to the visual presence of an industrial plant. These resources include residential neighborhoods in Homestead; a portion of Biscayne National Park, including the visitor's center to the north and east; and Homestead Bayfront Park to the north. The privately owned Homestead-Miami Speedway is approximately 5 mi northwest of the Units 6 and 7 proposed site. Although the topography surrounding the site is relatively flat and sparsely populated with trees, there is sufficient vegetation to screen the existing units from area roadways and recreational areas on land. SW 344th Street/Palm Drive and SW 328th Street/North Canal Street provide the best opportunity for the public to view the existing units from roadways. However, trees and scrub growth aid in screening the units, including the emissions stacks, from area roadways. Because of the vegetation, the existing units and emission stacks are not visible from most points in Biscayne National Park and Homestead Bayfront Park. The emission stacks may be visible from some upper level seats in the grand stand at the Homestead-Miami Speedway. The existing units are fully visible from Biscayne Bay. Beyond the 6 mi radius, on land, the existing units are not visible. Over the waters in Biscayne Bay however, the units can be clearly seen (FPL 2014-TN4058). An outdoor light monitoring study conducted in 2008 concluded that light from existing Turkey Point units is visible from several locations surrounding the site such as Homestead-Miami Speedway and Biscayne Bay. Sky glow was observed from urban areas such as Homestead and Miami (FPL 2014-TN4058).

Many public and private recreational opportunities and facilities are present in Miami-Dade County, often close to the City of Miami, including festivals, zoos, botanical gardens, museums, sports venues, beaches, and parks. The Florida Keys are known for sport fishing and other water events. Everglades National Park offers recreational opportunities for camping, hiking, boating, and wildlife viewing. Homestead and Florida City host several festivals throughout the year and offer 21 local parks (FPL 2014-TN4058). Table 2-45 lists major parks and wildlife areas within 50 mi of the Turkey Point site.

Table 2-45. Wildlife Management Areas, National Wildlife Refuges, Preserves, and State Parks within 50 Miles of the Turkey Point Site (2007-2008)

Name	County	Acres	Annual Visitors	Distance to the Site (mi)
Wildlife Management Areas, National Wildlife Refuges, and Preserves (open to the public)				
Big Cypress National Preserve	Broward, Collier, Miami-Dade, and Monroe	720,561	822,864	44
Biscayne National Park	Miami-Dade	172,971	517,442	Adjacent
Cross Key	Monroe	124	NA	15
Crocodile Lake National Wildlife Refuge	Monroe	6,692	NA	12
Everglades National Park	Collier, Miami-Dade, and Monroe	1,508,533	1,074,764	29
Florida Keys Wildlife and Environmental Area	Monroe	3,089	NA	31
Mary Krome Bird Refuge	Miami-Dade	2	NA	10
Tarpon Basin	Monroe	598	NA	21
State Parks				
Bill Baggs Cape Florida State Park	Miami-Dade	432	893,543	20
Curry Hammock State Park	Monroe	1,000	60,544	26
Dagny Johnson Key Largo Hammock Botanical State Park	Monroe	2,421	11,372	12
Indian Key Historic State Park	Monroe	110	18,295	43
John Pennekamp Coral Reef State Park	Monroe	63,836	878,939	17
John U. Lloyd Beach State Park	Broward	311	495,609	47
Lignumvitae Key Botanical State Park	Monroe	10,818	23,416	42
Oleta River State Park	Miami-Dade	1,033	357,178	36
San Pedro Underwater Archaeological Preserve State Park	Monroe	644	712	45
The Barnacle Historic State Park	Miami-Dade	10	31,545	21
Windley Key Fossil Reef Geological State Park	Monroe	32	11,087	36

Source: FPL 2014-TN4058

The Biscayne National Park is adjacent to FPL property and its visitor center and entrance are approximately 2 mi north of the site proposed for Units 6 and 7. The park covers an area of approximately 172,000 ac, 95 percent of which is water. Water areas of the park are just over 2,000 ft to the east of the proposed Units 6 and 7 plant area. Activities accessible to the public include wildlife viewing, snorkeling, scuba diving, canoeing, camping, hiking, and fishing. The park receives approximately 500,000 visitors per year (NPS 2012-TN465).

Also, 1.5 mi north of the proposed site for Turkey Point Units 6 and 7, and just next to Biscayne National Park, is the Homestead Bayfront Park, including a public beach with picnic tables, barbeque grills, shelters, food/drink concession stands, restrooms, showers, and fishing (FPL 2014-TN4058). According to information obtained from a direct call to the park, days with most visitors are on weekends, when an average of 2,000 people visit the park (FPL 2014-TN4058).

The Homestead-Miami Speedway is located 5 mi from the proposed plant area in Homestead and hosts race car and motorcycle events throughout the year, including one of the region's major sporting events, the Grand Prix of Miami, which features an estimated 85,000 spectators over 3 days and capacity for 65,000 seated spectators (FPL 2014-TN4058).

2.5.2.5 Housing

Approximately 83.3 percent of FPL employees (814) reside in Miami-Dade County, of which over 98 percent (798) reside in Homestead (391), Florida City (27), or Miami (380). Another 6.4 percent (63) reside in Broward County and 4.8 percent (47) in Monroe County, and about 5 percent (51) resided in other counties or out of state (Table 2-34).

Table 2-46 provides the number of housing units and vacancies in Miami-Dade County and the Cities of Homestead and Florida City. In 2000, there were a total of 852,278 housing units in Miami-Dade County. This number grew by an estimated 16 percent to reach an estimated 989,364 housing units in 2012. Vacancy rates grew considerably in the same period and were estimated to be 16.5 percent in 2012, compared to the 8.9 percent vacancy rate of 2000. Of the occupied housing units in Miami-Dade County in 2012, 56.8 percent of the units were owner-occupied and 43.2 percent of them were renter-occupied. Of the 163,185 vacant housing units in Miami-Dade County in 2012, 22.0 percent (35,884) were for rent; 11.2 percent (18,325) were for sale; 40.0 percent (66,346) were for seasonal, recreational, and occasional use; and 0.2 percent (290) were for migrant workers; the remaining units were rented or sold but not occupied or for other uses (USCB 2012-TN4089).

Table 2-46. Baseline Housing Information

Place	Total Housing Unit	Occupied	Owner-Occupied	Renter-Occupied	Vacant Housing	Percent Vacant
Miami-Dade County (2000)	852,278	776,774	449,325	327,449	75,504	8.9%
Miami-Dade County (2012)	989,364	826,179	468,997	357,182	163,185	16.5%
Homestead (2012)	22,825	18,567	7,635	10,932	4,258	18.7%
Florida City (2012)	3,390	2,720	1,027	1,693	670	19.8%

Sources: USCB 2012-TN4089 and USCB 2000-TN470

In Homestead and Florida City there were a total of 26,215 housing units in 2012. Approximately 18.8 percent (4,928) of these units were vacant. Of the vacant units, approximately 37.0 percent (1,821) were for rent, 21.8 percent (1,072) were for sale, 8.1 percent (339) were for seasonal or recreational use, and 2.4 percent (118) were for migrant workers; the remaining units were rented or sold but not occupied or for other uses (USCB 2012-TN4089).

There are 9 recreational vehicle parks or campgrounds in Miami-Dade County, including 1,587 spaces with full hookups (water, sewer, and electricity) for private recreational vehicles. Approximately 68 percent of these spaces are in the Homestead and Florida City area (FPL 2014-TN4058).

In 2011, there were 361 hotels/motels with approximately 47,642 rooms available in Miami-Dade County. In the South Dade region, which includes the Homestead and Florida City area, 27 hotels/motels with approximately 1,928 rooms were available in 2011. The average room rate for South Dade in 2011 was $75.76 (FPL 2014-TN4058).

2.5.2.6 Public Services

Water Supply and Waste Treatment

There are five major public water-supply systems in Miami-Dade County, as listed in Table 2-47: the MDWASD, Florida City, Homestead, North Miami, and North Miami Beach systems. MDWASD is the main supplier in the county and includes Homestead among its wholesale customers. It is formed by three water-treatment plants: Alexander Orr, Hialeah Preston, and South Dade. Table 2-47 shows the daily average demand in 2007, facility capacity, and daily demand as percent of capacity for public water suppliers. In the Homestead and Florida City area, the two water systems serve approximately 86,252 people, meeting a daily average demand of 14.80 Mgd with a combined capacity of 20.90 Mgd.

Current water demand from major public suppliers in Miami-Dade County is below capacity. If demand grew at the rate of 33 percent in 20 years, as predicted for total water demand by SFWMD, demand for water from public suppliers would still be below capacity after the 20-year period (from Table 2-47). Current water-management strategies for the Miami-Dade County plan include a more coordinated use of conservation and alternative water-supply projects, such as reverse osmosis plants, and reclaimed wastewater systems. In total, these strategies could provide 98.3 Mgd of additional water supply to Miami-Dade County by the year 2025 (FPL 2014-TN4058).

The major water-supply sources for all of the existing water-treatment systems in Miami-Dade County are the Biscayne and Floridan aquifers. Groundwater from the Floridan aquifer is used to blend brackish water and freshwater at water-treatment plants to extend the water supply (FPL 2014-TN4058). In 2005-2006, the SFWMD analyzed water use by type and projected Miami-Dade total water demand to increase by 33 percent, from 526.22 Mgd in 2005 to 699.1 Mgd in 2025. In 2005, 72 percent of overall demand came from public water utility and domestic self-supply, while thermoelectric power use is approximately one-half of 1 percent. Thermoelectric demand for power use is projected to increase from 2.1 Mgd (four-tenths of one percent of total demand) to 69.8 Mgd (about 10 percent of total demand) from 2005 to 2025, respectively (FPL 2014-TN4058). Table 2-48 shows projected demands for water to 2025.

Table 2-47. Major Public Water Suppliers in Miami-Dade County, 2007

System Name	Population Served	2007 Daily Average Demand (Mgd)	Facility Capacity (Mgd)	Daily Demand as Percent of Capacity, 2007
Total from Major Suppliers, Miami-Dade County	2,621,700	393.03	545.81	72.93
MDWASD	2,250,944	347.81	483.61	71.92
Florida City	15,000	2.33	4.00	58.13
Homestead	71,252	12.47	16.90	73.78
North Miami	97,504	8.50	9.30	91.40
North Miami Beach	187,000	26.93	32.00	84.15

Sources: FPL 2014-TN4058; CDM 2008-TN442

Table 2-48. Miami-Dade County Projected Water Demands, 2005−2025

Selected Categories	2005 (Mgd)	2025 (Mgd)	Percent of Overall Demand in 2005	Percent of Overall Demand in 2025
Public Water Utility and Domestic Self-Supply	380.92	483.10	72.39	69.10
Commercial/Industrial Self-Supply	41.70	41.70	7.92	5.96
Recreational Self-Supply	8.80	15.10	1.67	2.16
Thermoelectric Power Self-Supply	2.1	69.8	0.40	9.98
Agricultural Self-Supply	92.70	90.20	17.62	12.90
Total	**526.22**	**699.10**	**100**	**100**

Source: FPL 2014-TN4058

Reclaimed Water Baseline

The wastewater created in Miami-Dade County is either treated at public wastewater-treatment facilities, or is handled by privately owned and operated septic systems (FPL 2014-TN4058). MDWASD is divided into two wastewater districts, north and south. The proposed new nuclear units would be a served by the MDWASD SDWWTP. Table 2-49 summarizes current treatment capacities and flows.

Table 2-49. Wastewater-Treatment Systems in Miami-Dade County

Selected Categories	Plant Capacity (Mgd)	Daily Average Annual Flow (Mgd)	Flow as Percent of Design Capacity
MDWASD South District	112.5	98.53	88%
MDWASD North District	112.5	91.39	81%
Central District	143	115	80%
City of Homestead	6.0	6.13	102%

Source: FPL 2014-TN4058

The wastewater-treatment facility for Homestead is at 102 percent capacity and Homestead uses the MDWASD system as backup. Homestead's proposed 10-Year Water Supply Facilities Work Plan identifies and details the construction of a 3.45 Mgd high-level disinfectant wastewater-treatment plant upgrade (SFRPC 2008-TN1497). The proposed expanded wastewater-treatment plant would have the capacity to handle 9.45 Mgd, which would provide capacity to satisfy the projected demand through at least 2030 (FPL 2014-TN4058). MDWASD SDWWTP handles Florida City's wastewater and it is currently at 88 percent capacity (FPL 2014-TN4058).

Miami-Dade County is currently assessing the large-scale use of treated wastewater (reclaimed water) for various purposes (e.g., industrial, agricultural). As of 2007, approximately 16.2 Mgd of wastewater were reused in MDWASD's system, mostly for process water and irrigation at the existing wastewater-treatment plants (Miami-Dade County 2007-TN1496). Miami-Dade County is currently expanding its water-reclamation program and evaluating several water-reclamation projects, including a high-level disinfection project and a SDWWTP (Miami-Dade County 2011-TN461). A 2007 reuse feasibility study projected approximately 374 Mgd of wastewater to be

generated by 2025 in Miami-Dade County. In analyzing the feasibility of several bundles of potential projects for the use of reclaimed water in Miami-Dade County, the study concluded that the projects analyzed that were considered technically feasible could use between 25 percent and 33 percent (93.5 Mgd to 123 Mgd) of the projected wastewater generated in 2025 (Miami-Dade County 2007-TN1496). These estimates did not include use of reclaimed water by nuclear facilities.

Police, Fire, and Medical Services

The Miami-Dade County Police Department serves the entire county including all the municipalities. In 2010, 2,980 total sworn officers and 1,383 civilians were employed by the Miami-Dade County Police Department for a total of 4,363 total law enforcement employees (FPL 2014-TN4058). In 2009, the national average was 3.5 law enforcement employees (including civilians) per 1,000 residents (FBI 2009-TN4082). Miami-Dade County has approximately 1.8 law enforcement employees (including civilians) per 1,000 residents. In 2010, 135 total sworn officers and 53 civilians were employed by police departments in the Homestead and Florida City areas for a total of 191 total law enforcement employees. The Homestead and Florida City area has approximately 2.6 law enforcement employees (including civilians) per 1,000 residents (FPL 2014-TN4058). Table 2-50 summarizes the number of law enforcement personnel in Miami-Dade County, Homestead, and Florida City.

Table 2-50. Law Enforcement and Fire Protection in Miami-Dade County and the Homestead and Florida City Area, 2010

Selected Categories	Miami-Dade County	Homestead and Florida City Area
Law Enforcement Personnel	4,363	188
Officers	2,980	135
Civilians	1,383	53
Fire Protection Personnel	3,500	
Active Firefighters	3,500	69
Civilians	0	
Fire Stations	96	

Source: FPL 2014-TN4058

In Miami-Dade County, there are 3,500 total active firefighters and 718 residents per active firefighter (FPL 2014-TN4058). The Homestead and Florida City area is served by Miami-Dade County Fire and Rescue. As of 2010, approximately 69 firefighters were active throughout three fire stations located in the area of Homestead and Florida City (FPL 2014-TN4058). Table 2-51 provides fire protection personnel data for Miami-Dade County as of 2010.

The Insurance Services Office, an advisory organization that serves the property and casualty insurance industry, uses a fire-suppression rating schedule to grade the public fire protection of a city, town, or area. The rating schedule classifies communities from 1 (the most preferred) to 10 (the least preferred). Communities are graded on water distribution, fire department equipment and manpower, and fire alarm facilities, among other things. The overall public protection classification rating for Miami-Dade County is 4, as is the overall public protection classification for the Homestead and Florida City area (FPL 2014-TN4058).

Table 2-51 presents hospital-use data for Miami-Dade County. Miami-Dade County has 10,497 physicians, 31 hospitals, and 8,420 staffed beds. Most (23) of the hospitals located in Miami-Dade County are classified as "General and Surgical" hospitals. Three hospitals are listed as rehabilitation hospitals, while two are long-term acute care hospitals. One hospital specializes in children's general care, and one in eye, ear, nose, and throat care.

Education

The State of Florida divides the school districts by county. The Miami-Dade Public School District (M-DCPS) has a total of 450 schools that supported a 2011-2012 enrollment of 349,945 students (Table 2-52) (Miami-Dade County Public Schools 2012-TN463). Student public school enrollment has consistently decreased since 2002-2003, but there has been a reversal in the last two school years (2010-11 and 2011-12). Annual changes in enrollment between 2002-2003 and 2011-2012 have averaged 3,891 students, or approximately 1 percent of enrollment in the previous year (Miami-Dade County Public Schools 2012-TN463). There are also 272 private schools covering pre-kindergarten through 12th grade where 61,597 students were enrolled in 2007-2008. There are 12 colleges or universities that are accredited to award various certificates and degrees ranging from associate to doctoral and there are also a large number of vocational schools that offer professional and paraprofessional training (FPL 2014-TN4058).

An amendment to the Florida Constitution approved in 2002 set limits to the number or students in core classes (e.g., math, science) in public schools. These limits are shown in Table 2-53 below. Florida law requires that these class sizes be met for core courses by the average district class size in FY 2003-2004 through 2005-2006, by the average school class size in FY 2006-2007 and 2007-2008; and by each individual classroom from FY 2008-2009 onwards (FLDOE 2012-TN1490). Mandated class sizes are met by Miami-Dade County public schools on average, with a very small share of full-time equivalent (FTE) students in classes over the mandated size (Table 2-53).

Currently, portable units are often used by public schools in Miami-Dade County to supplement permanent school facilities. Miami-Dade County's 2012-2013 Work Plan lists capital outlay projects needed to ensure availability of classrooms to accommodate projected school enrollments through 2016-2017 school year. These projects include the addition of 110 classrooms and 2,440 student stations (M-DCPS 2012-TN1493).

In the Homestead and Florida City area, 17 traditional (non-Charter) public schools supported an enrollment of 14,884(5) students in 2011-2012 (M-DCPS 2012-TN1493). FTE students in classes over the mandated size were 123.26 in that same year (FLDOE 2012-TN1490), or less than 0.8 percent of those actually enrolled in that school year. No new student stations or classrooms are proposed for the Homestead and Florida City Area in Miami-Dade County School District's 2011-2012 Work Plan (M-DCPS 2012-TN1493). In addition, there were 8,373 students attending 27 charter schools (M-DCPS 2012-TN1493). There are also 16 private schools covering pre-kindergarten through grade 12 where 2,263 students were enrolled in 2009-2010 (FPL 2014-TN4058).

(5) Full-time equivalent

Table 2-51. Medical Facilities and Personnel in Miami-Dade County, 2006

Facility Name	Staffed Beds	Admissions[a]	Census[b]	Outpatient Visits[c]	Personnel[c]	Service Classification
Aventura Hospital and Medical Center	390	15,956	246	76,540	892	General & Surgical
Coral Gables Hospital	188	NA	NA	NA	NA	General & Surgical
Doctors Hospital	148	6,994	105	61,204	740	General & Surgical
Kindred Hospital South Florida – Coral Gables	53	NA	NA	NA	NA	Other Specialty
Hialeah Hospital	220	NA	NA	NA	NA	General & Surgical
Palm Springs General Hospital	190	NA	NA	NA	NA	General & Surgical
Palmetto General Hospital	190	NA	NA	NA	NA	General & Surgical
Homestead Hospital	116	7,284	86	68,452	631	General & Surgical
Baptist Hospital of Miami	551	NA	NA	NA	NA	General & Surgical
Bascom Palmer Eye Institute – Anne Bates Leach Eye Hospital	22	174	2	186,118	570	Eye, Ear, Nose & Throat
Cedars Medical Center	350	17,933	301	51,153	1,179	General & Surgical
Healthsouth Rehabilitation Hospital	60	NA	NA	NA	NA	Rehabilitation
Jackson Memorial Hospital	1,776	66,192	1,472	626,140	11,193	General & Surgical
Jackson South Community Hospital	233	NA	NA	NA	NA	General & Surgical
Kendall Regional Medical Center	296	16,428	210	80,098	1,217	General & Surgical
Meadowbrook Rehabilitation Hospital of West Gables	60	NA	NA	NA	NA	Rehabilitation
Mercy Hospital	367	19,790	291	93,699	2,065	General & Surgical
Miami Children's Hospital	252	13,297	195	266,010	2,266	Children's General
Miami Jewish Home and Hospital for the Aged	32	NA	NA	NA	NA	General & Surgical
North Shore Medical Center	357	NA	NA	NA	NA	General & Surgical
Pan American Hospital	146	NA	NA	NA	NA	General & Surgical
Select Specialty Hospital of Miami	40	NA	NA	NA	NA	Long-Term Acute Care
Sister Emmanuel Hospital for Continuing Care	29	NA	NA	NA	NA	Long-Term Acute Care
South Miami Hospital	324	21,062	233	180,214	1,813	General & Surgical
University of Miami Hospital and Clinics	40	1,428	24	175,234	757	General & Surgical

Table 2-51. (contd)

Facility Name	Staffed Beds	Admissions[(a)]	Census[(b)]	Outpatient Visits[(c)]	Personnel[(c)]	Service Classification
Veterans Affairs Medical Center	347	6,623	270	542,111	2,402	General & Surgical
Westchester General Hospital	172	5,976	142	22,129	561	General & Surgical
Mount Sinai Medical Center	685	24,319	433	173,691	2,837	General & Surgical
St. Catherine's Rehabilitation Hospital	272	NA	NA	NA	NA	Rehabilitation
Parkway Regional Medical Center	392	NA	NA	NA	NA	General & Surgical
Larkin Community Hospital	122	NA	NA	NA	NA	General & Surgical
Total	**8,420**	**223,456**	**4,010**	**2,602,793**	**29,123**	NA

(a) Total during a recent 12-month period (2005-2006).
(b) Average daily census during a recent 12-month period.
(c) Hospital personnel list does not include doctors that serve patients in the hospital, but are employed by the hospital.

Source: FPL 2014-TN4058

Table 2-52. Public School Statistics in Miami-Dade County and Homestead and Florida City

	Miami-Dade County		Homestead and Florida City	
Grade Levels	Schools	Enrollment	Schools	Enrollment
Elementary	205		10	
Middle Schools	80		4	
K-8 Schools	68		1	
High Schools	73		2	
Other[a]	24		-	
Total	450	349,945	17	14,884

(a) Special and combined schools

Source: Miami-Dade County Public Schools 2012-TN463

Table 2-53. Class Sizes in Miami-Dade County, 2010-2011

Grade Levels	Florida Department of Education Mandated Size[1]	Average Class Size[2]	FTE[a] Over Capacity[2]	FTE[a][3]	Percentage of FTEs over Capacity
Pre-K − 3	18	13.9	909.1	106,354.1	0.9%
4 − 8	22	16.6	656.4	136,193.4	0.5%
9 − 12	25	20.2	630.0	102,828.1	0.6%

(a) FTE stands for full-time equivalent and is a measure of enrollment based on the number of full-time students that it would take to fulfill the number of classes offered

Sources: 1 − FLDOE 2012-TN1490; 2 − FLDOE 2011-TN1491; 3 −FLDOE 2012-TN1492.

2.6 Environmental Justice

Environmental justice refers to a Federal policy established under Executive Order 12898 (59 FR 7629) (TN1450), which requires each Federal agency to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority or low-income populations.[6] The Council on Environmental Quality (CEQ) has provided guidance for addressing environmental justice (CEQ 1997-TN452). Although it is not subject to the Executive Order, the Commission has voluntarily committed to undertake environmental justice reviews. On August 24, 2004, the Commission issued its policy statement on the treatment of environmental justice matters in licensing actions (69 FR 52040) (TN1009). The review team's environmental justice analysis is guided by the NRC's ESRP and the additional guidance document, Revision 1 of *Addressing Construction and Preconstruction Activities*, *Greenhouse Gas Issues*, *General Conformity Determinations*, *Environmental Justice*, *Need For Power*, *Cumulative Impact Analysis*, *and Cultural/Historical Resources Analysis Issues in Environmental Impact Statements* (NRC 2011-TN9).

(6) Minority categories are defined as American Indian or Alaskan Native; Asian; Native Hawaiian or other Pacific Islander; Black races; or Hispanic ethnicity; and "other" may be considered a separate minority category. Low income refers to individuals living in households meeting the official poverty measure.

This section describes the existing demographic and geographic characteristics of the proposed site and its surrounding communities. It offers a general description of minority and low-income populations within the region surrounding the site. The characterization in this section forms the analytical baseline from which potential environmental justice effects would be determined. The characterization of populations of interest includes an assessment of "populations of particular interest or unusual circumstances" (NRC 2000-TN614), such as minority communities exceptionally dependent on subsistence resources or identifiable in compact locations such as American Indian settlements.

2.6.1 Methodology

The review team first examined the geographic distribution of minority and low-income populations within 50 mi of the Turkey Point site. This information was obtained using ArcMap 10 software (ESRI 2012-TN1469) and the 2008–2012 United States Census Bureau American Community Survey Five-Year Summary Files (USCB ACS) to identify minority and low-income populations at the census block group level.(7) The review team also verified its analysis by conducting field inquiries of numerous agencies and groups (see Appendix B for list of organizations contacted).

The first step in the review team's environmental justice methodology was to examine each census block group that is fully or partially included within the 50 mi region surrounding the Turkey Point site to determine for each block group whether it should be considered an environmental justice (EJ) population of interest. If either of the two criteria discussed below was met for a census block group, that census block group was considered an EJ population of interest warranting further investigation. The two criteria are whether

- the minority or low-income population that resides in the block group exceeds 50 percent of the total population for that census block group, or
- the percentage of the minority or low-income population in the census block group is at least 20 percentage points greater than the same minority or low-income population's percentage in the respective state.

The identification of census block groups that meet at least one of the above two criteria is not sufficient for the review team to conclude that a disproportionately high and adverse impact exists. Likewise, the lack of a census block group meeting the above criteria cannot be construed as evidence of no disproportionately high and adverse impacts. To reach an EJ conclusion, the review team conducts an active public outreach and on-the-ground investigation in the region of the proposed site to determine whether any additional EJ populations of interest may exist in the region that are not identified in the census mapping exercise. In addition, starting with the identified populations of interest, the review team must investigate all populations in greater detail to reveal key pathways that may have disproportionately high and adverse impacts on EJ populations of interest. To determine whether disproportionately high and adverse effects may be present, the review team considers the following:

(7) A census block is the smallest geographic area that the U.S. Census Bureau collects and tabulates sample data. A block group is the next level above census blocks in the geographic hierarchy and is a subdivision of a census tract or block numbering area.

- Health Considerations
  1. Are the radiological or other health effects significant or above generally accepted norms?
  2. Is the risk or rate of hazard significant and appreciably greater than that for the general population?
  3. Do the radiological or other health effects occur in groups affected by cumulative or multiple adverse exposures to environmental hazards?
- Environmental Considerations
  1. Is there an impact on the natural or physical environment that significantly and adversely affects a particular group?
  2. Are there any significant adverse impacts on a group that appreciably exceed or [are] likely to appreciably exceed those on the general population?
  3. Do the environment effects occur in groups affected by cumulative or multiple adverse exposure to environmental hazards? (NRC 2007-TN4).

If this investigation in greater detail does not yield any pathways by which EJ populations of interest could be disproportionally affected by adverse impacts, the review team may conclude that there are no disproportionately high and adverse impacts. If the review team finds any potential pathways for disproportionately high and adverse impacts, the review team must characterize the nature and extent of that impact and consider possible mitigation measures that may be used to lessen that impact. The remainder of this section discusses the results of the search for potentially affected populations of interest.

2.6.1.1 Minority Populations

The minority population is expressed in terms of the number and/or percentage of people that belong to minority races or ethnicities in an area. Persons of Hispanic/Latino origin are considered an ethnic minority and may be of any race, including white. The review team considers the aggregate minority population to be the sum of the white Hispanic/Latino and the racial minority populations.

U.S. Census Bureau data (USCB 2012-TN4098) present the Florida population as containing the following:

- 0.3 percent American Indian or Alaskan Native
- 2.5 percent Asian
- 0.1 percent Native Hawaiian or other Pacific Islander
- 15.9 percent Black or African American
- 2.6 percent other single race
- 2.2 percent multi-racial
- 22.5 percent Hispanic ethnicity
- 42.2 percent aggregate minority.

This provides the following threshold values for the second (20 percent) criterion:

- 20.3 percent American Indian or Alaskan Native
- 22.5 percent Asian
- 20.1 percent Native Hawaiian or other Pacific Islander
- 35.9 percent Black or African American
- 22.6 percent other single race
- 22.2 percent multi-racial
- 42.5 percent Hispanic ethnicity
- 62.2 percent aggregate minority.

2.6.1.2 Low-Income Populations

The low-income population is expressed in terms of the number and/or percentage of people that are at or below the poverty level. The share of Florida's total population at or below the poverty level in 2012 was 15.3 percent (USCB 2012-TN4098). Therefore, the low-income threshold level for this analysis is 35.3 percent.

Table 2-54 shows the overall representation of the populations of interest in the 50 mi region surrounding the Turkey Point site and the State of Florida as a whole. Because Hispanics/ Latinos can be of any race, the sum of Hispanics/Latinos and all of the minority race categories will typically be more than the number of aggregate minorities.

Table 2-54. Regional Minority and Low-Income Populations by Block Group Analysis Results

Category	Number of Block Groups	Percent of Total
Total	2,116	100.0
Aggregate Minority	1,681	79.4
Hispanic or Latino	1,219	57.6
American Indian or Alaskan Native	2	0.1
Asian	10	0.5
Native Hawaiian or Other Pacific Islander	0	0.0
Black or African American	440	20.8
Persons Reporting Some Other Race	39	1.8
Two or More Races	4	0.2
Low-Income Population	240	11.3

Source: USCB 2009-TN1462

The review team identified 2,116 census block groups wholly or partially within the 50 mi region. Using the individual comparison criteria (comparing the block group to the State of Florida), GIS analysis found 1,219 block groups with Hispanic groups exceeding either the 20-percentage points or 50 percent criterion, 1,681 block groups with aggregate minority populations, 440 block groups with African-American populations, 10 block groups with Asian populations, and 240 with low-income populations. There were no block groups with Hawaiian and Pacific Islander

populations and only two with American Indian or Alaskan Native populations. Figure 2-38 through Figure 2-41 illustrates the findings of the data.

Further research, phone and field consultations with local organizations (listed in Appendix B), and information in FPL's ER revealed additional information about the existence and location of minority and low-income groups.

There is a Seminole Tribe of Florida Reservation in Hollywood, Broward County, within the 50 mi region. The reservation includes various commercial enterprises, including a hotel and casino, a second casino and a recreational Indian Village area with various tourist attractions (Seminole Tribe of Florida 2012-TN466). Four Miccosukee Indian reservations—Tamiami Trail (Miami-Dade County), Alligator Alley (Broward County), and two at Krome Avenue (Miami-Dade County)—also lie within 50 mi of the site. There are approximately 650 people enrolled in the Miccosukee Tribe. The Tamiami Trail Reservation, which consists of four parcels of land, is 40 mi west of Miami and is now the site of most Tribal operations and the center of the Miccosukee Indian population. One parcel was under a NPS 50-year use permit, which expired on January 24, 2014. The other three parcels were originally dedicated to the Miccosukee by the State of Florida and have since acquired Federal reservation status. These areas are used for commercial development. The Tribe also has a perpetual lease from the State of Florida for 189,000 ac, which is part of the SFWMD's Conservation Area 3A South. The Tribe is allowed to use this land for hunting, fishing, frogging, subsistence agriculture, and to carry on the traditional Miccosukee way of life. Alligator Alley is the largest of the Miccosukee Tribe's reservations, comprising approximately 75,000 ac. This land consists of 20,000 ac with potential for development and 55,000 ac of wetlands. The reservation contains a modern service station plaza, a police substation, and 13,000 ac of land that is leased for cattle grazing. Two reservation areas are located at the intersection of Krome Avenue and Tamiami Trail. One (25 ac) is the site of the Miccosukee Indian gaming facility and the Miccosukee resort and convention center. The second reservation area (less than 1 ac) is the site of the Miccosukee tobacco shop (Miccosukee Tribe of Indians of Florida 2011-TN464; FPL 2011-TN435). Figure 2-38 displays the location of the Miccosukee Tribe's reservation in relation to the 50 mi region.

Migrant agriculture workers are also present and tend to be members of the minority and low-income communities (Hispanic). They are described in further detail in Section 2.6.4 below.

Based on the information above the review team determined that because there are minority and low-income communities in close proximity to the proposed site, impacts on these communities must be considered in greater detail, as discussed in Section 2.6.2. The result of the review team's analyses can be found in Sections 4.5 and 5.5 of this EIS.

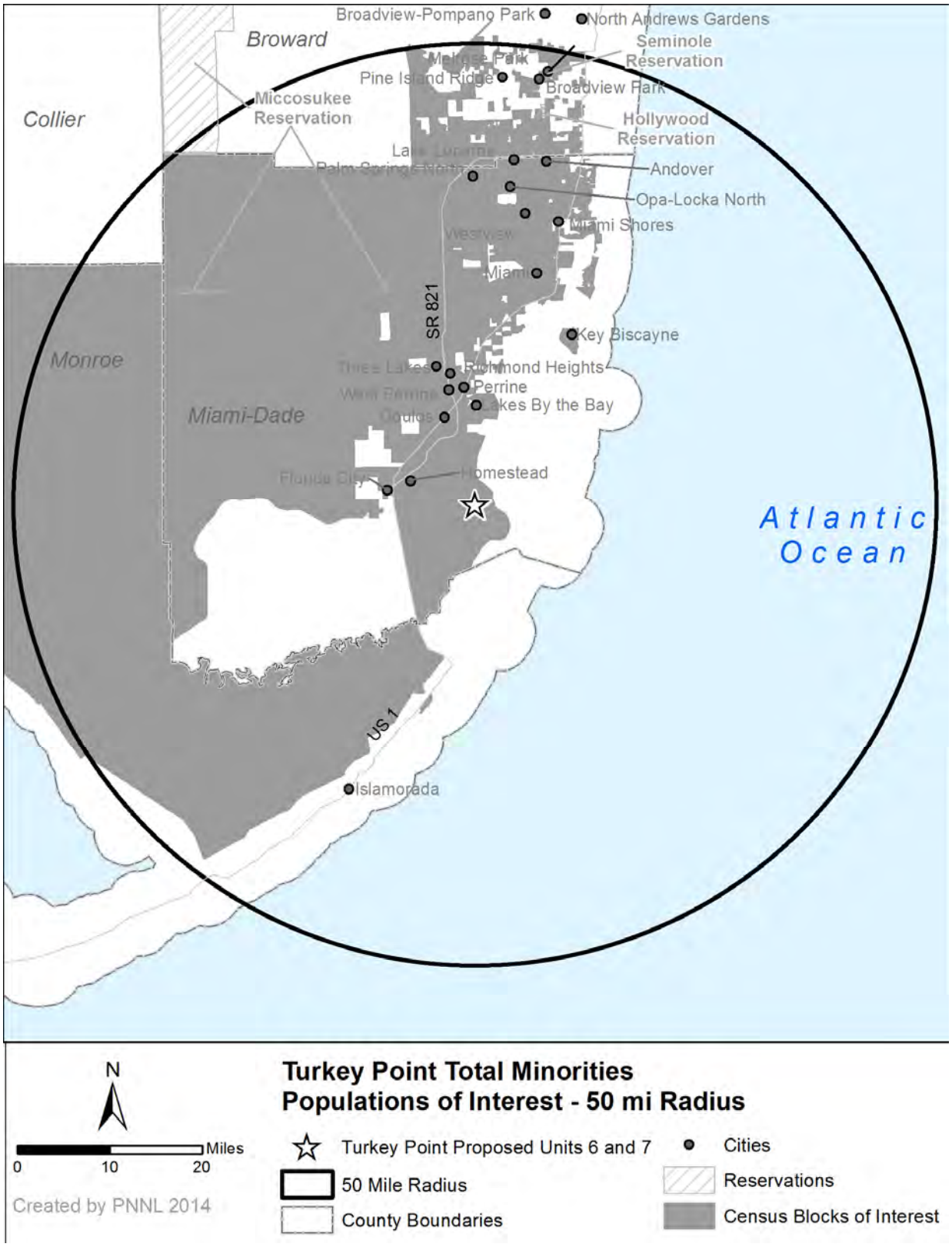


Figure 2-38. Aggregate Minority Populations in Block Groups that Meet the Environmental Justice Selection Criteria

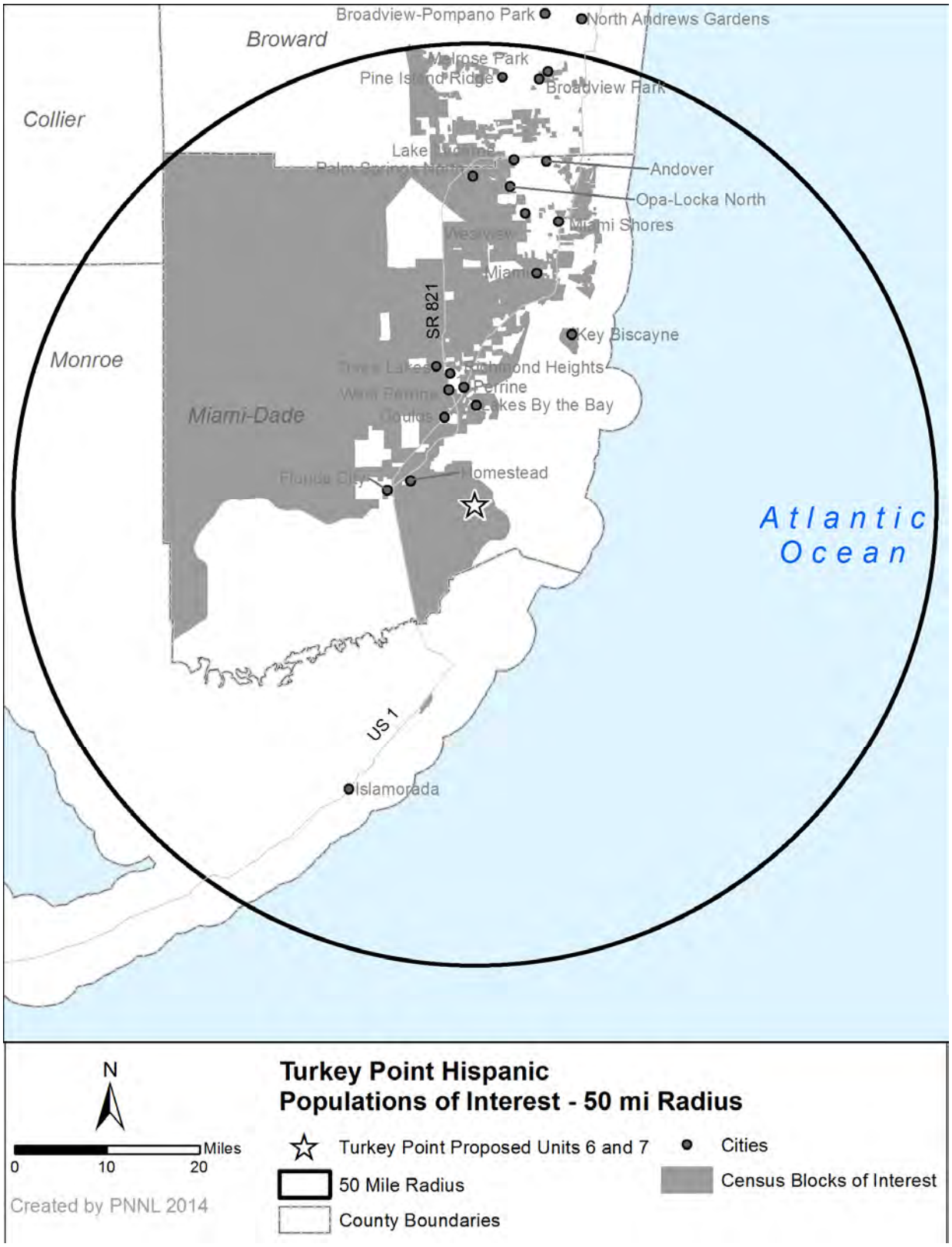


Figure 2-39. Hispanic Populations in Block Groups that Meet the Environmental Justice Selection Criteria

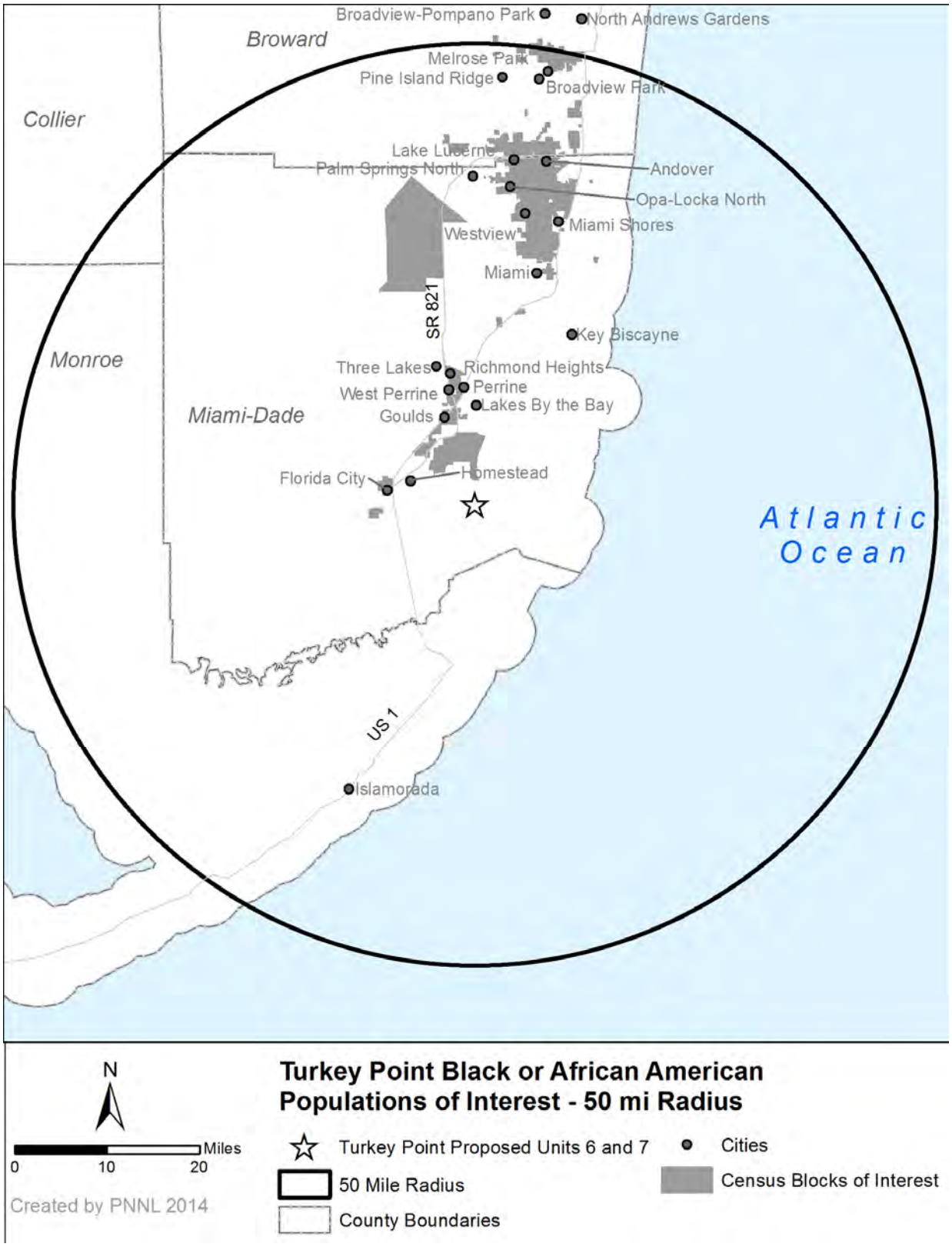


Figure 2-40. African-American Populations in Block Groups that Meet the Environmental Justice Selection Criteria

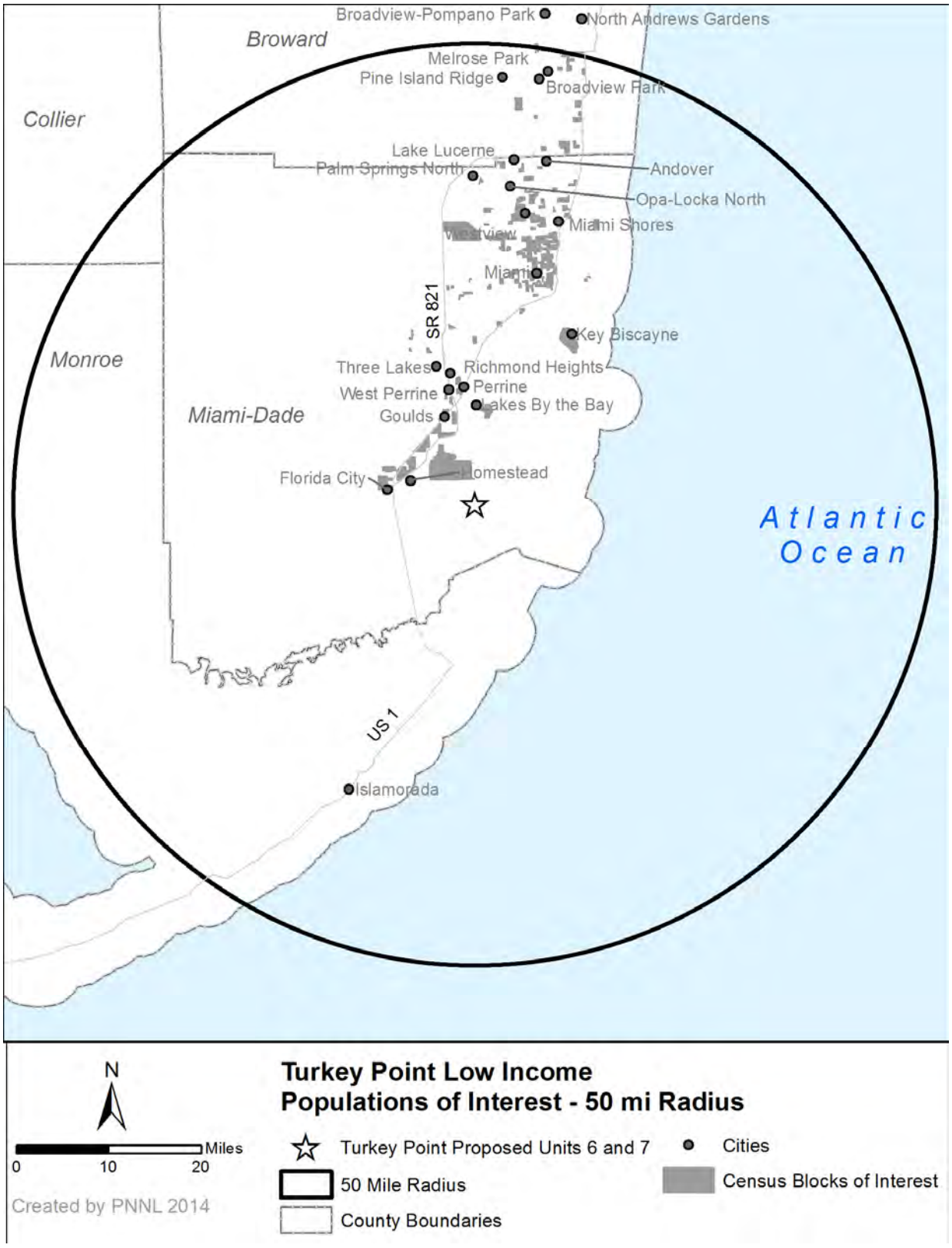


Figure 2-41. Aggregate Low-Income Populations in Block Groups that Meet the Environmental Justice Selection Criteria

2.6.2 Analysis

For each of the identified EJ populations of interest, the review team determined whether any of the populations appeared to have a unique characteristic that could cause a disproportionately high and adverse effect. Examples of unique characteristics include lack of vehicles, sensitivity to noise, close proximity to the plant, or subsistence activities. However, such unique characteristics need to be demonstrably present in the population and relevant to the potential environmental impacts of the plant. If the impacts from the proposed action would adversely affect an identified EJ population of interest more than the general population because of one of these or other unique characteristics, then a determination would be made whether the impact is disproportionately high when compared to the general population. Through phone and field consultations with local organizations and review of FPL's ER, the review team concluded that subsistence activities such as subsistence fishing are typically not conducted by any identified EJ group. The main low-income group identified with potentially unique pathways for exposure to environmental effects was migrant agricultural workers (see discussion in Section 2.6.4).

The review team assesses the impacts on the populations of interest in Sections 4.5.5 and 5.5.4 of this EIS.

2.6.3 Scoping and Outreach

During the development of its ER, FPL interviewed community leaders of the minority populations within the economic impact area. The review team built upon this base and performed additional interviews with local, State, and County officials, business leaders, and key members of minority communities within the economic impact area to assess the potential for disproportionately high and adverse socioeconomic effects that may be experienced by minority or low-income communities during construction and operation of a project with the magnitude of the proposed new Turkey Point Units 6 and 7. The review team also consulted with local Tribal governments in the region and is discussed in Section 2.7. In accordance with NRC guidance, the review team provided advance notice of public hearings for EIS scoping purposes (see Appendix D). These activities did not identify any additional groups of minority or low-income persons not already identified in the GIS analysis of census data.

2.6.4 Migrant Populations

Available information about migrant populations in the area is described in Section 2.5.1.3. Based on phone and field consultations with local organizations (listed in Appendix B), the review team concluded that migrant agricultural workers tend to be Hispanic and spend most of the day outdoors, making them potentially more exposed to air and noise pollution during construction. Although members of this group would also seem to present unique characteristics that could make them disproportionately vulnerable to environmental impacts, they tend to be located in the more rural, agricultural areas of Miami-Dade County and not in proximity to the Turkey Point site.

2.6.5 Environmental Justice Summary

The review team found many low-income, Hispanic, and African-American minority populations that exceeded the percentage criteria established for EJ analyses within the 50 mi region.

Further, the review team identified migrant agricultural workers as being present in the area, of low-income status, Hispanic, and potentially vulnerable to environmental air and noise pollution due to their extended presence outdoors. Therefore, the review team performed additional analyses before making a final EJ determination. The results of the analyses can be found in Sections 4.5.4 and 5.5.4.

2.7 Historic and Cultural Resources

At the outset of the COL review process, and in accordance with Title 36 of the *Code of Federal Regulations* Part 800, Section 8c (36 CFR 800.8(c) (TN513), the review team elected to use the process set forth in NEPA (42 U.S.C. § 4321 et seq.) (TN661), to comply with the obligations imposed under Section 106 of the National Historic Preservation Act (NHPA) (54 U.S.C. § 300101 et seq.) (TN4157). Subsequently, however, and as outlined in letters dated October 23, 2014 (NRC 2014-TN4055; NRC 2014-TN4057; NRC 2014-TN4059) the NRC and USACE determined that the USACE would be the lead Federal agency for Section 106 of the NHPA and for consultation with Federally recognized tribes and cultural resource issues. The USACE followed the consultation process outlined in its Procedures for the Protection of Historic Properties, as set forth in Title 33 of the *Code of Federal Regulations*, Part 325, Appendix C. The NRC served as lead agency for the NEPA review.

For the COL review under NEPA, the review team will use the Section 106 Area of Potential Effect (APE) for the project. The direct-effects APE for the COL review is the area at the power plant site and the immediate environs that may be physically affected by land-disturbing activities associated with constructing and operating two new nuclear generating units. The indirect-effects APE for the Turkey Point site is the area that may be visually and/or auditory affected. The indirect-effects APE is determined by the maximum distance from which the tallest structures associated with proposed Units 6 and 7 can be seen from offsite locations. In the case of the Turkey Point site, the indirect-effects APE was determined to be one-half mile from the facility.

This section discusses the historic and cultural background in the region surrounding the Turkey Point site. It also details the efforts that have been taken to identify cultural resources in the physical and visual APEs and the resources that were identified. A description of the consultation efforts is also provided. The assessments of effects from building and operating the proposed new units are found in Sections 4.6 and 5.6, respectively.

2.7.1 Cultural Background

This section provides an overview and summary of the cultural history of the Turkey Point site and region. The discussion of precontact[8] history is summarized from the cultural resources investigation completed for the Turkey Point site (FPL 2011-TN1512; FPL 2011-TN95). The region around the Turkey Point site has a rich cultural history and a record of significant prehistoric and historic resources with evidence of continuous settlement in the area for more than 12,000 years.

(8) Of or related to the period before contact of an indigenous people with an outside culture.

Prehistoric occupation of the area is typically divided into three periods, as summarized below:

- Paleoindian (12,000-7500 BC) – The prevailing view of Paleoindian culture is that of a nomadic hunting and gathering existence, in which now-extinct Pleistocene megafauna[9] were exploited. Settlement patterns were restricted by the availability of freshwater and access to high-quality stone from which the specialized Paleoindian tool assemblages were made. Most sites of this time period are found near karst sinkholes or spring caverns. The majority of Paleoindian sites in Florida consist of surface finds. The most widely recognized Paleoindian tool in Florida is the Suwannee point, typically found along the springs and rivers of northern Florida. Other points, including Simpson and Clovis points, are found in fewer numbers. Some of these, and other Paleoindian lanceolate points, were hafted by attaching them to an ivory shaft that was, in turn, attached to a wooden spear shaft. Other tools include bifacial and hump-backed unifacial scrapers, blade tools, and retouched flakes.
- Archaic (7500-500 BC) – The Archaic period is divided into Early (7500–5000 BC), Middle (5000–3000 BC), and Late (3000–500 BC). The latter is subdivided into the Preceramic Late Archaic phase (3000-2000 BC) and the Orange phase (2000-500 BC). These phases are defined on the basis of increasingly sedentary settlement patterns and changing diagnostic projectile point typologies. During the Early phase, there is evidence of reduced nomadism and seasonal camp sites, often expressed by the presence of large middens (i.e., refuse piles of archaeological material). The Middle phase is marked by a noticeable change in lithic technology, an increase in overall population, and a shift to a more diverse subsistence base, and particularly a shift to fish and shellfish. The change in lithic technology is more noticeable from the Early to Middle Archaic phases than it is from the Paleoindian period to Early Archaic phase, likely representing a major change in the resources used. The Late Archaic phase is marked by an increased reliance on marine resources, and the first occurrence of pottery at the onset of the Orange phase (2000 BC). The presence of this pottery likely represents a shift to a more sedentary lifestyle with a need for food and material storage. This pottery was molded and fiber-tempered with vegetable fibers. The latter portion of the Archaic period is marked by the appearance of regional ceramics and evidence of increasingly larger village sites and associated middens.
- Formative (500 BC–1513 AD) – Locally, this period is known as the Glades culture, and it is divided into multiple phases based largely on changes in ceramic style. Although the terminus of this period is shown as 1513 AD, occurring with the arrival of Europeans, Glades culture persisted for several centuries beyond that. During the Formative Period, people appear to have become more sedentary and particularly adept at exploiting resources found within their environment, resulting in an overall increase in population growth. There is increased pottery production, showing regional or cultural affiliation. Post-Archaic cultures are distinguished by the use of burial mounds and cultivated plants to supplement wild foods. There is evidence of a decrease in stone tools and an increase in utilitarian tools, such as containers and ornaments fashioned from bone or shell.

The history of the East Coast of Florida from its discovery in 1513 to the end of World War II is summarized from the cultural resources investigation completed for the Turkey Point site (FPL 2011-TN1512; FPL 2011-TN95).

(9) Large-bodied mammals weighing more than 100 pounds from the Pleistocene era.

Official credit for the discovery of Florida by Europeans is credited to Juan Ponce de León, whose voyage of 1513 took him along the east coast of the peninsula. Other Spanish explorers followed, and over the next 50 years the Spanish government and private individuals financed expeditions in hopes of establishing a colony in Florida. Jesuit missions were established in the Central Peninsular Gulf Coast and Glades archaeological regions, but these efforts were abandoned in 1570s. Franciscan mission efforts began in the 1570s but focused predominantly on the northern areas of Florida. Consequently, for the remainder of the initial Spanish Period (up to 1763), the area surrounding the Turkey Point site and vicinity was virtually ignored as the Spanish concentrated their efforts in the northern half of the peninsula. Between 1500 and 1800 possession of Florida changed several times between Spain and Great Britain.

By the beginning of the eighteenth century, the Native American population of South Florida had declined considerably as a result of European colonization resulting in the loss of Tribal lands due to disease, slave raids, and intertribal warfare. Many who survived integrated into the Seminole Tribe, the Seminoles were descendants of Creek Indians who moved into Florida during the early eighteenth century to escape the political and population pressures of the expanding American colonies to the north. Groups of fugitive African-American slaves had also settled among the Seminoles by the early nineteenth century.

In 1821, Spain ceded Florida Territory to the United States as a result of the Transcontinental, or Adams-Onis Treaty. The population of the territory at that time was still centered in the northern area of the state. As more North American settlers moved into the region, conflicts arose with the Seminole people over available land. Pressure was placed on the government to remove the Seminoles from North Florida and to relocate them farther south. The Treaty of Moultrie Creek of 1823 restricted the Seminole people to approximately four million acres of land in the middle of the state. This treaty was unpopular with the Seminoles, because they were reluctant to move from their established homes to an area that they felt could not be cultivated. Equally unpopular among the Seminoles were the later treaties of Paynes Landing of 1832 and Fort Gibson of 1833, which called for Seminole migration to the western territories. These three treaties helped foster Seminole resentment of settlers and outbreaks of hostility that culminated in the Second Seminole War in 1835. At the beginning of the Second Seminole War, the conflict was centered in the central portion of the state, but soon expanded south to the Lake Okeechobee and Everglades regions, and Fort Dallas (located in present day Miami) became a base of operations.

The Second Seminole War had a detrimental effect on new settlement in Florida. To encourage settlement in the middle portion of the territory after the war, the Armed Occupation Act of 1842 (5 Stat. 502-TN4113) offered settlers 160 ac of land at no cost. This Act, plus the end of the Second Seminole War, created a small wave of immigration by settlers to central Florida, most of whom were farmers and cattle ranchers.

The onset of the Civil War disrupted development in Florida. Most of the state did not have daily contact with battles, but Florida contributed troops and supplies to the Confederate Army. Although Florida was not the site of many Civil War battles, Union forces established control of the Florida coastline in 1863. Like the other former Confederate States, Florida suffered economic devastation at the Civil War's end.

In the 1880s, interest in South Florida's resources intensified and outside businessmen saw Florida's potential and began purchasing the land for large projects. As a part of this land acquisition, projects were initiated to drain and reclaim land, and to dig canals between lake systems. This work helped change large portions of Florida from wilderness into an area ripe for investment, which enabled expansion of railroad lines and increased settlement.

The early twentieth century saw rapid and widespread growth in Florida. Large expanses of the Everglades were drained and thousands of miles of railroad tracks were laid at this time. While agriculture, especially the citrus industry, was the main source of Florida's economy, manufacturing and industry grew during the beginning of the century. Tourism, too, increased. The City of Homestead, the closest city to the Turkey Point site, was incorporated during this period, in 1913. The community served as a stop along a new rail line extending to Key West, and quickly became an important agricultural area.

During World War I, several training facilities were set up in the state and protecting the coastlines was a priority at this time. Although the conflict only lasted until November of 1918, the economy was boosted by the war, primarily through shipbuilding and industrialization of port cities. After World War I, Florida experienced unprecedented growth. Many people had relocated to Florida during the war to work in wartime industries or had been stationed in the state as soldiers. Bank deposits increased, real estate companies opened in many cities, and state and county road systems expanded quickly. Earlier land reclamation projects had created thousands of new acres of land to be developed. Real estate activity increased steadily after the war's end and drove up property values. Prices on lots were inflated to appear more enticing to out-of-state buyers. Every city and town in Florida had new subdivisions platted (platting is the splitting of one larger piece of land into several smaller pieces of land) and lots were selling and reselling for quick profits. Southeast Florida, including cities such as Miami and Palm Beach, experienced the most activity, although the boom affected most communities in central and southern Florida.

This boom period began to decline in 1925, and by the time the stock market collapsed in 1929, Florida was already suffering from an economic depression, brought on by a grossly inflated real estate market, two hurricanes, and a fruit fly infestation that devastated the agricultural industry. By 1929, construction activity had halted and industry had dramatically declined. Subdivisions platted several years earlier remained empty and buildings stood on lots partially finished and vacant. As a result of the hard economic times, President Franklin D. Roosevelt initiated several national relief programs. Important New Deal-era programs in Florida were the Works Progress Administration and the Civilian Conservation Corps. Their efforts included the construction or improvement of many roads, public buildings, parks, and airports in Florida, as well as improvement and preservation projects on forests, parks, and agricultural lands.

From the end of the Great Depression until after the close of the post-war era, Florida's history was inextricably bound to World War II and its aftermath. It became one of the nation's major training grounds for the various military branches including the Army, Navy, and Army Air Corps. Up until that time, tourism had been the State's major industry, but tourism ceased as tourist and civilian facilities such as hotels and private homes were placed into wartime service. The influx of thousands of servicemen and their families increased industrial and agricultural production in Florida and also introduced these new residents to the warm weather and tropical

beauty of Florida. At the conclusion of World War II, Florida's economy was almost fully recovered. Tourism quickly rebounded and became the major source of the State's economy. In addition, former military personnel found the local climate amenable and remained in Florida permanently after the war. These new residents greatly increased the population during the late 1940s and 1950s. In 1947, immediately after the war, Everglades National Park was established, thereby increasing tourism to the area.

2.7.2 Historic and Cultural Resources at the Site and in the Vicinity

To identify the historic and cultural resources at the Turkey Point site, the staff reviewed the following information:

- Janus Research, Inc. Technical Report – Preliminary Cultural Resources Report for the Turkey Point 6 and 7 Associated Linear Facilities (FPL 2009-TN1513; FPL 2011-TN95)
- NRC Site Visit and Audit – NRC staff consulted with the Florida State Historic Preservation Office (SHPO) and also conducted an on-the-ground visit to the Turkey Point site in June of 2010 (NRC 2010-TN1457)
- Janus Research, Inc. Technical Report – Cultural Resources Assessment Survey for the Turkey Point Units 6 and 7 Site, Associated Non-Linear Facilities, and Spoils Areas on Plant Property (FPL 2011-TN1512; FPL 2011-TN95)
- FPL letter to NRC dated November 5, 2013 – Proposed Turkey Point Units 6 and 7 COLA ER Supplemental Transmission Corridor Information (FPL 2013-TN2941)
- NRC government-to-government consultation meeting with the USACE and the Seminole Tribe of Florida, June 2015 (USACE and NRC 2015-TN4735)
- NRC government-to-government consultation meeting with the USACE and the Miccosukee Tribe of Indians of Florida, June 2015 (USACE and NRC 2015-TN4736)
- Turkey Point Nuclear Plant COL ER (FPL 2014-TN4058).

The reports by Janus Research, Inc. (FPL 2009-TN1513; FPL 2009-TN1514; FPL 2009-TN1515; FPL 2011-TN1512; FPL 2011-TN95) are available at the Florida SHPO for qualified investigators.

The following sections describe archaeological resources, above-ground resources, and traditional cultural properties that are located within the indirect- and direct-effects APE for the Turkey Point site. The APEs and research methodology have been generally defined by FPL in consultation with the Florida SHPO, included as Appendix 2.5A in the ER (FPL 2014-TN4058).

The direct-effects APE, which includes physical impacts on known resources resulting from the construction and operation of the Turkey Point site and is referred to as the Units 6 and 7 project area, was defined in the ER (FPL 2014-TN4058) and the Janus Research, Inc. report (FPL 2011-TN1512; FPL 2011-TN95) as follows:

- the Units 6 and 7 plant area
- administration and training buildings and a parking area
- radial collector wells

- FPL RWTF and delivery pipelines
- FPL-owned fill source
- equipment barge-unloading area
- heavy-haul road on the site
- spoils areas on the site.

The indirect-effects APE, which takes into account viewshed impacts on above-ground resources and traditional cultural properties, has been defined by FPL in consultation with the SHPO as a 0.5 mi APE from the project site (FPL 2011-TN1512; FPL 2011-TN95; FPL 2014-TN4058).

2.7.2.1 Archaeological Resources

Over the last 30 years, several archaeological investigations have been completed in the area around the proposed project direct-effects APE, as described by Janus Research, Inc. (FPL 2011-TN1512; FPL 2011-TN95). Between 1980 and 2005, five cultural resource studies were conducted within or within the vicinity of the Turkey Point site (not counting the studies conducted for the current project). Files maintained by the Florida Division of Cultural Resources, a department of the Florida SHPO, show that no cultural resources—including archaeological sites, above-ground resources, and traditional cultural properties—have been recorded within or within 100 ft of the APE (FPL 2011-TN1512; FPL 2011-TN95; FPL 2014-TN4058). Prior to 1963, the area surrounding the site was undeveloped and much of it was inundated.

A Phase I archaeological investigation of the above-listed APE areas was conducted for the application for the Turkey Point COL (FPL 2011-TN1512; FPL 2011-TN95). The investigation involved both systematic pedestrian surveys as well as limited subsurface test excavations. No archaeological sites were identified within the APE. Furthermore, both the field investigation and historical and paleoenvironmental research indicate that, in the past, the area was frequently inundated and has a low potential for containing archaeological resources. This assessment received Florida SHPO concurrence, as documented in a letter dated July 10, 2009, from Florida SHPO to FPL (FPL 2014-TN4058, Appendix 2.5A).

2.7.2.2 Above-Ground Resources

Background research for above-ground resources was completed by qualified staff (FPL 2011-TN1512; FPL 2011-TN95). This research included correspondence with the SHPO, a search of the Florida Master Site File database, review of historic aerial photographs and plat maps, a search of Government Land Office records, and a review of local historical site inventories (FPL 2011-TN1512; FPL 2011-TN95; FPL 2014-TN4058). An above-ground resources survey of the direct-effects and indirect-effects APE revealed no structures older than 50 years. This 50-year minimum age is necessary for eligibility of standing structures in the National Register of Historic Places (NRHP).

2.7.2.3 Traditional Cultural Properties

No traditional cultural properties were identified in either the direct- or indirect-effects APE by the Phase I work (FPL 2011-TN1512; FPL 2011-TN95). In a letter to FPL dated July 10, 2012, the Florida SHPO concurred with FPL's conclusion concerning the Turkey Point site (FPL 2014-TN4058). By letters dated December 15, 2009, the Miccosukee Tribe of Indians of Florida, the Muscogee (Creek) Nation of Florida, the Seminole Tribe of Florida, the Poarch Band of Creek Indians, and the Seminole Nation of Oklahoma were contacted by FPL describing the proposed Turkey Point project and requesting input (FPL 2014-TN4058). These five tribes were also contacted by the NRC through letters and phone calls regarding the proposed project to invite them to participate in the identification of historic and cultural properties (see Appendix C). The Seminole Tribe of Florida responded to both the NRC (Seminole Tribe of Florida 2010-TN1452) and FPL (2014-TN4058) stating it had no objection to the findings at that time, but requested that it be kept apprised of the project's status and be informed if cultural resources relevant to the Tribe were discovered during the construction process. By letter dated October 5, 2015, the Seminole Tribe of Florida indicated the presence of a sacred site within the vicinity of the eastern transmission line corridor (Seminole Tribe of Florida 2015-TN4587).

2.7.2.4 Historic and Cultural Resources in Transmission Line Corridors and Offsite Areas

A description of the transmission line corridors, offsite water pipeline corridors, and associated access roads is included in Section 2.2.2. The direct-effects APE for these offsite linear facilities consists of a 200 ft corridor. For purposes of the review team's analysis, a preliminary indirect-effects APE, which only applies to the transmission lines because the other facilities would be at or below the ground surface, was set at 500 ft on either side of the centerline of the alignment, for a total of 1,000 ft. Ultimately, in accordance with NHPA Section 106, the final APE will be determined by the USACE in consultation with the Florida SHPO. A work plan for a Phase I investigation of these facilities and a schedule for this Phase I work, as well as desktop cultural resources investigations have been completed for the proposed transmission lines (FPL 2009-TN1513; FPL 2009-TN1515; FPL 2011-TN95; FPL 2013-TN2941).

A search of the records at the Florida SHPO showed that numerous cultural and historic resources are recorded in the area. For the eastern transmission line corridor, 25 previous cultural resources studies have been conducted within the direct- and indirect-effects APEs. Two archaeological sites, 191 historic structures, 2 bridges, and 13 resources groups occur in or adjacent to the APE. One of the archaeological sites has been determined ineligible for the NRHP, while the other has not been evaluated. Of the 191 buildings, 3 have been listed on the NRHP, 9 have been found ineligible, and the rest of the buildings have not been evaluated for significance. Two of the resource groups—Calle Ocho and the MacFarlane Homestead Historic District—are listed in the NRHP. Three of them have been determined ineligible for the NRHP, and the rest of the 13 groups have not been evaluated (FPL 2009-TN1513; FPL 2011-TN95).

For the original West Preferred transmission line corridor, 25 previous cultural resources studies have been conducted within the direct- and indirect-effects APE. Three archaeological sites, two historic structures, and three resources groups occur in or adjacent to the APE. The two structures and one of the archaeological sites have been found ineligible for the NRHP, while the remaining resources have not been evaluated (FPL 2009-TN1513; FPL 2011-TN95). The

analysis of the revised West Consensus corridor (FPL 2013-TN2941), which includes a small shift in a portion of the transmission line route, shows similar results. Indeed, three resources, an archaeological site and two linear resource groups, occur in both. In addition, the APE for the West Consensus corridor contains three additional archaeological sites (for a total of six archaeological sites). One of these is part of an archaeological zone designated by Miami-Dade County. The other two have not been evaluated for NRHP eligibility. The West Consensus corridor also contains those resources present within the portion of the West Preferred corridor that is identical to the West Consensus corridor, including the two historic structures and the remaining resource group (for a total of three resource groups).

For the remaining offsite linear facilities—the reclaimed wastewater and potable water pipeline corridors and the haul road rights-of-way—a total of 12 cultural resources studies have been conducted in the APE and no cultural resources have been identified (FPL 2009-TN1513; FPL 2011-TN95).

In addition to the desktop research for the transmission line APE, and as documented in the Turkey Point Nuclear Plant COL ER (FPL 2014-TN4058), FPL also conducted a search of records maintained by the National Park Service, Florida Division of Historical Resources, Miami-Dade County, and the City of Homestead for a distance of 1.2 mi from the eastern and western transmission line corridors. The research for the offsite linear facilities identified 359 resources and 16 resource groups located with 1.2 mi of these facilities. Fifty-eight of these resources are archaeological sites, of which six have been destroyed. Forty-two are prehistoric sites, three are historic sites, four are multicomponent prehistoric and historic sites, and nine are unidentified. Site types include prehistoric artifact scatters, prehistoric habitation sites, a quarry, human burial sites, and historic road segments. Fifteen of the sites, 13 prehistoric and 2 multicomponent, contain known human remains (FPL 2014-TN4058).

Most of the archaeological sites are located in the northern portion of the offsite area, near the northern segment of the proposed transmission line. Many of these also occur in the indirect-effects APE. This area falls in unincorporated Dade County west of the developed metropolitan area from Everglades National Park in the south, and north to the area around Pennsuco substation. Other archaeological sites are found in Aladdin City, Florida City, Goulds, Hialeah, Hialeah Gardens, Homestead, Medley, Miami, and Pennsuco. In addition, the northern-most portion of the eastern transmission line is located within the North Bank and West Bank Archaeological zones, and within 500 ft of the South Bank Archaeological Zone, as designated by the City of Miami (FPL 2014-TN4058).

Of the 58 archaeological sites, 3 are ineligible for the NRHP and the rest have not been evaluated, although 5 are noted by the Florida SHPO as potentially eligible. In addition, nine of the sites are listed as significant by the Miami-Dade Historic Preservation Board (FPL 2014-TN4098).

The FPL search of this larger 1.2 mi study area also identified 303 historic structures, one of which has been destroyed, likely by hurricanes. Based on available information, most of the historic structures are residences, although public and commercial buildings are present as well. Four of the structures are listed in the NRHP, and 21 are listed by the Miami-Dade Historic Preservation Board. In addition, one historic cemetery—an early twentieth century African-

American cemetery located in Miami—falls within 1.2 mi of the offsite area. The cemetery is included on a list of significant resources by the Miami-Dade Historic Preservation Board (FPL 2014-TN4058).

There also are 16 resource groups within the 1.2 mi search area. Ten of the groups are linear resources, primarily roads that extend through multiple towns. One of these is listed in the NRHP, three are ineligible for listing, and the remaining six have not been evaluated for significance. Four of the resource groups are historic districts. One is listed in the NRHP and one is listed by the Miami-Dade Historic Preservation Board. The remaining two resource groups consist of a mixed period district and a multiple property submission. Neither has been evaluated for significance (FPL 2014-TN4058).

In addition to the desktop studies, FPL provided a separate work plan that describes the additional work that would be required once a transmission line corridor is selected (FPL 2009-TN1515; FPL 2011-TN95). SHPO has concurred with the adequacy of this work plan, which stipulates coordination with appropriate local government representatives, additional Tribal coordination, development of an unanticipated finds plan (including personnel training), and archaeological and architectural resource surveys. If resources cannot be avoided, including those identified in the desktop study and any additional resources that might be identified during future survey efforts, then appropriate minimization or mitigation measures would need to be developed in coordination with the SHPO.

Consultation with the Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida indicates that construction in the transmission line corridors has the potential to affect cultural resources (USACE and NRC 2015-TN4735; USACE and NRC 2015-TN4736). These resources include both documented and undocumented archaeological resources within the Everglades that may contain human remains, particularly within the West Preferred and West Consensus corridor alignments. The eastern corridor, particularly at the northern end, is sensitive for archaeological resources as well, including sites that may contain human burials. Further, the eastern corridor passes near an area considered sacred to both tribes.

2.7.3 Consultation

In June of 2010, the NRC initiated consultation on the proposed action by writing to the Florida SHPO (NRC 2010-TN1453) and the Advisory Council on Historic Preservation (ACHP) (NRC 2010-TN1454). The NRC received a reply from the Florida SHPO on July 28, 2010 (FDHR 2010-TN1455), which indicated that the office received the cultural resource assessment from FPL and that, for the Units 6 and 7 project area, no historic or cultural resources had been identified to date. The NRC received correspondence from the ACHP on July 8, 2010 (ACHP 2010-TN1456), which summarized NRC's requirements under Section 106 of the NHPA and 36 CFR Part 800 (TN513). In addition, the NRC met with Florida SHPO staff on June 10, 2010, at which time the SHPO concurred with the adequacy of Tribal consulting parties identified by the NRC and the cultural resources survey work performed by FPL to that point, but stressed the need for an inadvertent discovery plan for the treatment of unanticipated resources that might be discovered during construction of the project (NRC 2010-TN1457). The SHPO indicated that, while the proposed Units 6 and 7 project site has a low potential for encountering cultural resources, the routes of the proposed transmission line corridors and

other offsite facilities occur in areas containing historical districts and other sensitive resources. The SHPO also recommended coordination with the Miami-Dade County Office of Historic and Archaeological Resources for the identification and treatment of resources.

The NRC sent a letter to the Miami-Dade County Office of Historic and Archaeological Resources on July 1, 2010 (NRC 2010-TN1458), inviting them to participate as a consulting party (see Appendix C). The Office of Historic and Archaeological Resources responded by letter dated August 12, 2010 (Miami-Dade County 2010-TN1459), acknowledging their willingness to participate in the project, and requesting the opportunity to participate in and provide input on historical resources studies for the project. The NRC also sent scoping letters to the Archaeological and Historical Conservancy, Inc., the Historic Preservation Officer of the City of Miami, the Historic Preservation Administrator of the City of Coral Gables, the Assistant Director, Community Redevelopment Agency of the City of Homestead, and the Director of Planning and Zoning of the City of South Miami (see Appendix C for scoping letters). On July 15, 2010, the NRC conducted public scoping meetings in Homestead, Florida, at which no comments or concerns regarding historic and cultural resources were made.

By letters dated June 24, 2010, the NRC initiated consultations with five Federally recognized tribes—the Miccosukee Tribe of Indians of Florida, the Muscogee (Creek) Nation of Florida, the Seminole Tribe of Florida, the Poarch Band of Creek Indians, and the Seminole Nation of Oklahoma—regarding the proposed COL application (see Appendix C for complete listing). In the letter, the NRC provided information about the proposed action and indicated that review under the NHPA would be integrated with the NEPA process in accordance with 36 CFR 800.8(c) (TN513). The letter also provided the recipients with an opportunity to identify concerns and provide advice on the evaluation of historic properties, including those of traditional, religious, and cultural importance, and to participate in any necessary resolution of adverse effects to such properties. On July 29, 2010, the NRC also conducted follow-up calls to the tribes. The Muscogee (Creek) Nation of Florida, the Poarch Band of Creek Indians, and the Seminole Nation of Oklahoma did not express interest in the project. Additional consultation with the Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida is outlined below.

The Seminole Tribe of Florida responded by letter on September 14, 2010 (Seminole Tribe of Florida 2010-TN1452), stating that the project occurs in its geographic area of interest. The Tribe requested that surveys be conducted in all unsurveyed portions of the project, including transmission line corridors, and that it be kept informed of any future studies or identified cultural resources.

On October 20, 2010, the NRC and the USACE met with the Seminole Tribe of Florida to discuss the Turkey Point project (NRC 2010-TN1460). During the meeting, the NRC presented a summary of the project and a review of NRC's role. The Tribal Historic Preservation Officer (THPO) for the Seminole Tribe of Florida stressed that the THPO's role is limited to review under the NHPA. The THPO also requested participation in the development of any work plans and future studies, and stressed the possibility of encountering both historic resources important to the Tribe as well as deeply buried resources that might be unearthed during construction, particularly in regard to the offsite facilities such as the transmission lines.

In letters dated October 23, 2014 (NRC 2014-TN4055; NRC 2014-TN4056; NRC 2014-TN4057; NRC 2014-TN4059; NRC 2014-TN4060; NRC 2014-TN4061; NRC 2014-TN4062; NRC 2014-TN4065; NRC 2014-TN4066), the NRC provided an update of the status of the COL review to the Florida SHPO, the ACHP, the Miami-Dade County Office of Historic and Archaeological Resources, the Archaeological and Historical Conservancy, Inc., the Historic Preservation Officer of the City of Miami, the Historic Preservation Administrator of the City of Coral Gables, the Assistant Director, Community Redevelopment Agency of the City of Homestead, and the Director of Planning and Zoning of the City of South Miami. The primary purpose of the letters was to inform the agencies that, following discussions between the NRC and the USACE, the NRC and USACE determined that the USACE would be the lead Federal agency for Section 106 of the NHPA for the project and for consultation with Federally recognized tribes. The NRC would continue in its role as lead agency in the production of the draft EIS.

Also in letters dated October 23, 2014 (NRC 2014-TN4063; NRC 2014-TN4064) the NRC informed the Muscogee (Creek) Nation of Florida and the Seminole Tribe of Florida of this change in lead agency for Section 106 of the NHPA. The NRC also informed the Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida of a request for a consultation meeting with the NRC, the USACE, and the tribes prior to the publication of the draft EIS. The Muscogee (Creek) Nation of Florida did not express interest in the project. Additional consultation with the Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida is described below.

On June 23, 2015, the NRC and USACE met with the Seminole Tribe of Florida THPO and the Miami-Dade County archaeologist to discuss the Tribe's concerns about the project, and the status of the USACE's review under Section 106 of the NHPA (USACE and NRC 2015-TN4735). The NRC and USACE held a similar meeting with the Miccosukee Tribe of Indians of Florida THPO and the Miami-Dade County archaeologist on June 24, 2015 (USACE and NRC 2015-TN4736). Consultation among the USACE, SHPO, and the tribes will remain ongoing throughout the duration of the review process for Section 106 of the NHPA.

In a letter dated, October 5, 2015 (Seminole Tribe of Florida 2015-TN4587), the Seminole Tribe of Florida provided comments to the USACE regarding the transmission line corridors. The Seminole Tribe of Florida requested a Phase I cultural resource assessment survey conducted at the appropriate time and the results be provided to the THPO for review and comment. The Tribe requested that protocols be developed prior to any ground-disturbing activities to be followed in the event of unanticipated discovery of human remains. The tribe identified a sacred spring that near the East Preferred corridor and expressed concern that construction of the transmission corridor could affect water flow to the spring. The Tribe also requested that they be consulted when the details for the underground transmission line crossing the Miami River are developed further.

In response to the October 5, 2015 letter from the Seminole Tribe of Florida, and by letter to the USACE dated March 31, 2016 (FPL 2016-TN4581), FPL provided a detailed response reiterating their commitment to develop a work plan to address unanticipated discoveries and future studies that will need to be conducted for the transmission line corridors, as well as detailing the Florida State Conditions of Certification pertaining to further cultural resources studies including a commitment, if practicable to avoid or minimize impacts to resource such as the sacred site..

In a letter date March 7, 2016 (DA 2016-TN4601), the USACE requested comments from the Miccosukee Tribe of Indians of Florida about the proposed project. In this letter, the USACE reiterated its commitment regarding its obligations to Native Americans and their cultural heritage and requested requested comments on the project within 30 days. No response was received. The USACE considers consultation ongoing with the Miccosukee Tribe regarding the transmission lines.

In a letter dated August 2, 2016 (Seminole Tribe of Florida 2016-TN4727) Seminole Tribe of Floridaprovided comments regarding the the Cultural Resources Assessment Survey Work Plan for the Turkey Point facilities. The THPO concured with the recommendation that an Unanticipated Finds plan be developed prior to construction and that this plan address the possible discovery of human remains or archaeological material. Likewise, the THPO agreed that construction personnel, inspectors, managers, etc., should receive training.

The Seminole THPO recommended that the pre-existing dirt roads be subjected a field survey, at a minimum a pedestrian examination of exposed surfaces unless assurance can be made that unimproved dirt roads will not be subject to ground disturbance including exclusion of construction/heavy equipment use. Dirt roads can be vulnerable to severe impacts from vehicle traffic especially during rain events. Since most dirt roads were not subjected to a cultural resource assessment survey before they were established, a walkover survey seems appropriate.

The Seminole THPO believes that a standard archaeological survey should be conducted for new roads or areas of road widening if the road is located within either an area of high or moderate archaeological probability. The Florida Division of Historical Resources Module Three does not say anything about exempting moderate probability zones from survey.

The STOF THPO's comments were provided to FPL on August 8, 2016; FPL stated that it had no concerns with these comments and recommendations. FPL's response was forwarded to the STOF; no further comments were received from the STOF. If the DA permit is issued, it would likely contain the Turkey Point Cultural Resources Assessment Survey Work Plan as special condition of the permit. The USACE's NHPA Section 106 consultation for this project has been completed with the exception of the transmission line consultation with the SHPO and the THPOs for STOF and the Miccosukee Tribe which is ongoing.

2.8 Geology

A summary of the geology of the Turkey Point site is provided in Section 2.6 of the ER (FPL 2014-TN4058). The geology and associated seismological and geotechnical conditions at the Turkey Point site are described in greater detail in Section 2.5 of the FSAR (FPL 2014-TN4069). Both the ER and the FSAR incorporated information obtained from onsite subsurface investigations performed in support of the COL application. The NRC staff also used information from exploratory well EW-1 (FPL 2012-TN1577) drilled by FPL in support of the UIC injection permit, and other publicly available documents on the geology of the site. The NRC staff's description of the geological features and the technical analyses related to safety issues will be presented in the Safety Evaluation Report.

The Turkey Point site lies near the southern end of the Atlantic Coastal Plain physiographic province of North America (Miller 1990-TN550). The site is within the "Coastal Marshes and

Mangroves" subprovince and just east of a higher elevation area called the "Atlantic Coastal Ridge" subprovince (Renken et al. 2005-TN110). The geologic setting is near the eastern edge of the South Florida Basin, where up to 20,000 ft of rock was deposited during the Mesozoic and Cenozoic eras in a shallow sea environment with a slowly subsiding landmass (Pressler 1947-TN2472; Palacas 1978-TN2473).

The carbonate formations underlying southeastern Florida are predominantly limestone with dolomitic limestone and dolomite being common in the lower sections below about 1,000 ft deep (Reese 1994-TN1439). Figure 2-42 shows the generalized geologic formations and corresponding hydrostratigraphy at the Turkey Point site. Aquifers are defined based on their permeability with the productive zones classified as aquifers and the low-permeability intervals classified as confining or semi-confining units. Two major aquifer systems are found within the Cenozoic sediments that underlie the Turkey Point site. The surficial aquifer system (Biscayne aquifer) is separated from the deeper Floridan aquifer system by the low-permeability sediments of the Hawthorn group, which form a confining unit above the Floridan aquifer system. Permeable zones are found in some places in Florida within the Hawthorn confining unit and form local aquifers that are collectively called the intermediate aquifer system. However, these permeable zones and the intermediate aquifer system are not present in southeastern Florida (Miller 1990-TN550).

The uppermost part of the surficial aquifer beneath the Turkey Point site is called the Biscayne aquifer; it is composed of the Miami Limestone, Key Largo Limestone, and Fort Thompson Formation. The Biscayne aquifer is about 110 ft thick at the Turkey Point site (FPL 2014-TN4058). The Floridan aquifer system occurs at a depth of approximately 1,000 ft in the Miami-Dade County area and is separated from the surficial aquifer system by approximately 600 ft of Intermediate Confining Unit (Reese 1994-TN1439). The Floridan aquifer system consists of two main permeable sequences, the Upper Floridan and Lower Floridan aquifers, separated by a less permeable MCU. The Upper Floridan aquifer includes the Suwannee and Ocala limestones and the upper part of the Avon Park Formation. The Floridan aquifer system occurs under confined conditions at the Turkey Point site and throughout southeastern Florida.

The Lower Floridan aquifer includes the lower part of the Avon Park Formation, the Oldsmar Limestone, and the upper part of the Cedar Keys Formation. Much of the Lower Floridan aquifer contains saltwater. An extremely permeable zone called the Boulder Zone is present within a karstic fractured dolomite layer within the Lower Floridan aquifer in southeastern Florida. The Boulder Zone contains water the salinity and temperature of which is similar to modern seawater (Miller 1990-TN550). The top of the Boulder Zone was identified at 3,030 ft below the surface at the Turkey Point site and is separated from the Upper Floridan aquifer by more than 750 ft of low-permeability confining unit (FPL 2009-TN2474). Within the Boulder Zone, seawater is thought to move westward from a connection with the Atlantic Ocean and migrate very slowly upward through the MCU (Meyer 1988-TN2475).

FPL's investigation of the site revealed no features or lineaments associated with faulting on the site and determined that a continuous horizontal stratigraphy is present with no faults or folds related to tectonic deformation within a 25 mi radius (FPL 2014-TN4058).

SERIES	STRATIGRAPHIC UNIT	LITHOLOGY	TOP DEPTH (ft)	THICK-NESS (ft)	HYDRO-GEOLOGIC UNIT	TOP DEPTH (ft)
HOLOCENE	organic muck	organic soil and silt	0	3	Biscayne Aquifer	0 - 3
PLEISTOCENE	Miami Formation	sandy, oolitic limestone	3	25		
	Key Largo Limestone	well indurated, vuggy, coraline limestone	28	22		
	Ft Thompson Formation	poor/well indurated fossiliferous limestone	50	65		
PLIOCENE	Tamiami Formation	sand and silt with calcarenite limestone	115	105		
MIOCENE	Hawthorne Group: Peace River Formation	silty calcareous sand and silt	220	235	Intermediate Confining Unit	140
	Hawthorne Group: Arcadia Formaion	calcareous wackestone with indurated limestone, sandstone and sand	455	555		
OLIGO-CENE	Suwannee Limestone	fine-grained limestone and dolomitic limestone	1010	245	Upper Floridan Aquifer (USDW)	1010
EOCENE	Avon Park Formation	fine-grained limestone and dolomite	1255	(~445)	Middle Floridan Confining Unit	1450
		permeable limestone	(~1700)	(~75)	APPZ (?)	(1700)
		fine-grained limestone and dolomite	(1775)	745	Middle Floridan Confining Unit	1930
	Oldsmar Formation	limestone, dolomitic limestone and dolomite	2580	450		
					Lower Floridan Aquifer	2915
		Boulder Zone	3030	>200	Boulder Zone	3030
PALEO-CENE	Cedar Keys Formation	dolomite and dolomitic limestone	?	?		
		massive anhydrite beds	?	1200 ?	Sub-Floridan Confining Unit	?

(?) denotes uncertainty

Figure 2-42. The Generalized Stratigraphy and Corresponding Hydrogeologic Units at the Turkey Point Site (FPL 2012-TN1577; Reese and Richardson 2008-TN3436; FPL 2014-TN4069)

2.9 Meteorology and Air Quality

The following sections describe the climate and air quality at the Turkey Point site. Section 2.9.1 describes the climate of the region and area in the immediate vicinity of the Turkey Point site, Section 2.9.2 describes the air quality of the region, Section 2.9.3 describes atmospheric dispersion at the site, and Section 2.9.4 describes the meteorological monitoring program at the site.

2.9.1 Climate

The Turkey Point site is located in Miami-Dade County, on the lower east coast of Florida close to the Atlantic Ocean. The climate at this location is best classified as subtropical maritime, and it is characterized as having two principal seasons—a relatively short, dry, and mild winter, and a long warm summer season with abundant rainfall (NCDC 2008-TN540). The Azores-Bermuda high-pressure system dominates the circulation pattern for most of the year causing a tropical air mass to prevail most of the year. Occasional cold continental air masses displace the maritime air during winter.

The closest first-order National Weather Service station is at the Miami International Airport, about 25 mi north of the site. This station represents the general climate at the Turkey Point site. The climatological cooperative observing station at Miami 12° SSW about 16 mi north-northeast of the site is also representative of the site, and is more indicative of the diurnal variation of precipitation and temperature at the site because of its proximity to the coast. However, the Miami 12° SSW site only records daily maximum and minimum temperature and precipitation data. Other sites within 50 mi of the Turkey Point site were also included in the assessment to characterize potential extremes in precipitation, wind, and temperature.

The following climatological statistics are derived from local climatological data collected at Miami International Airport. Temperatures are more variable in the winter than in the summer because of the strong differences in source regions from which the seasonal air mass originates. Daytime maximum temperatures range from about 77°F in January to about 91°F in July and August; nighttime minimum temperatures range from about 60°F in January to about 77°F in July and August. At the Turkey Point site these maximum and minimum averages are moderated due to the ocean's moderating influence. At Miami International Airport the monthly average wind speeds range from about 10 mph in March to about 8 mph in July and August. At Turkey Point site, monthly average wind speeds are slightly lower, averaging about 9 mph in March to about 7.5 mph in July and August. The normal amount of annual precipitation received at Miami International Airport is 58.53 in. The majority (about 53 percent) of the annual rainfall is associated with thunderstorms that frequently occur from June through September. On average during this period, thunderstorms occur on between 12 and 16 days per month. Average precipitation ranges from about 2 in. per month in January and February and peaks at about 8.5 in. per month in August. The only observation of frozen precipitation near the Turkey Point site was a trace (0.05 in.) observed at Homestead, Florida, on January 19, 1977. The Turkey Point site is flat with no topographical features that should cause the climate to deviate significantly from this general regional climate.

Recent improvements in the emissions and the science of climate change have enabled the U.S. Global Change Research Program (GCRP) to estimate regional climate changes in the United States (GCRP 2014-TN3472). The projected change in temperature by 2100, which encompasses the period of the licensing action in the southeastern United States is a regional average increase of between 4°F to 8°F in the annual average temperature. While the GCRP has not incrementally forecasted the change in precipitation by decade to align with the licensing action, the projected change in precipitation in spring and summer rainfall is projected to decline in South Florida during this century (GCRP 2014-TN3472).

Based on the assessments of the GCRP and the National Academy of Sciences' National Research Council, the EPA determined that potential changes in climate caused by greenhouse gas (GHG) emissions endanger public health and welfare (74 FR 66496) (TN245). The EPA indicated that, while ambient concentrations of GHGs do not cause direct adverse health effects (such as respiratory or toxic effects), public health risks and impacts can result indirectly from changes in climate. As a result of the determination by the EPA and the recognition that mitigative actions are necessary to reduce impacts, the effects of GHG on the climate and the environment are already noticeable, but not yet destabilizing. In CLI-09-21, the Commission provided guidance to the NRC staff to consider carbon dioxide and other GHG emissions in its NEPA reviews and directed that it should encompass emissions from constructing and operating a facility as well as from the fuel cycle (NRC 2009-TN539). Further, the President's CEQ (2016-TN4732) has provided guidance on how the Federal government should analyze the environmental effects of GHG emissions and climate change when it describes the environmental effects of a project under NEPA. The review team characterized the affected environment and the potential GHG impacts of the proposed action and alternatives in this EIS. Consideration of GHG emissions was treated as an element of the existing air-quality assessment that is essential in a NEPA analysis. In addition, where it was important to do so, the review team considered the effects of the changing environment during the period of the proposed action on other resource assessments.

2.9.1.1 Wind

Wind at the Turkey Point site is consistent with the dominant influence of the Azores-Bermuda high and the coastal location of the site. The seasonal variation of the prevailing directions shows a predominance of east-southeast winds except in December, January, and February when north-northwesterly winds prevail, and in September, October, and November when easterly winds prevail (FPL 2014-TN4058). The coastal location of the site experiences typical onshore (east-southeast) winds during the day and offshore land-breeze winds during mid-morning hours. However, the review team's analysis of the Turkey Point site data showed that wind reversal was a moderately frequent event and that the dominate wind direction is from the east-southeast regardless of the time of day. Wind direction persistence is generally limited to 4 hours or less; persistence of 8 hours or longer occurs less than 9 percent of the time, and persistence of 12 hours or longer occurs about 3 percent of the time based on the Turkey Point onsite 10 m wind data.

2.9.1.2 Temperature

The period of record for the onsite temperature data does not cover multiple decades. Consequently, it was determined that the average temperature at the Turkey Point site is most likely consistent with the temperature data from the Miami 12 SSW station (period of record 1958–1988) based on its relative proximity to the Turkey Point site and its near-coastal location. Based on data in Table 2.7-4 of the FPL ER (FPL 2014-TN4058) for observations at 13 National Weather Service (NWS) and cooperative observing stations and the climatological record for the Miami International Airport NWS station, the temperature extremes at the site are between 25°F and 97°F. The mean monthly maximum temperature is 83°F and the mean monthly minimum is 66°F.

2.9.1.3 Atmospheric Moisture

The Turkey Point meteorological system does not measure any parameters related to atmospheric moisture. Consequently, the review team determined the relative humidity data for Miami International Airport is representative of the Turkey Point site. Relative humidities for 0700 local standard time (LST) approximate the daily maximum values. Monthly average 0700 LST relative humidities range from about 85 percent in January to about 79 percent in April. Relative humidities for 1,300 LST approximate the daily minimum relative humidity. Monthly average 1,300 LST relative humidities range from a high of about 66 percent in September to a low of about 54 percent in April. Climatological statistics for Miami International Airport indicate that the Turkey Point site could expect heavy fog about 5 days per year. The likelihood of fog is greatest from December through February and least from May through September.

2.9.1.4 Severe Weather

The Turkey Point site can experience severe weather in the form of thunderstorms, tornadoes, and tropical storms. Thunderstorms are the most frequent severe weather events. They occur on average about 73 days per year at Miami International Airport. About three-fourths of the thunderstorms occur in the period of June through September. Fifty hurricanes have made landfall within 100 mi of Turkey Point since 1851 or about three every 10 years. Three of these tropical cyclones have had sustained wind speeds in excess of 155 mph that have tracked within 100 nautical mi of the Turkey Point site; the most recent being hurricane Andrew in 1992 (NOAA 2011-TN541; Jarvinen et al. 1984-TN276). Hurricane Andrew was historic because it was the first time that a hurricane significantly affected a commercial nuclear power plant. The eye of the storm, featuring sustained winds of up to 145 mph and gusts of 175 mph, passed over the Turkey Point site and caused extensive onsite and offsite damage. However, there was no damage to the safety-related systems of Units 3 and 4 except for minor water intrusion and some damage to insulation and paint (NRC 1993-TN542). Tornadoes are the least frequent of these extreme weather events. Using tornado statistics from 1950 through 2003 and the methodology outlined in NUREG/CR–4461, *Tornado Climatography of the Contiguous United States* (Ramsdell and Rishel 2007-TN277), the probability of a tornado striking the nuclear island at the Turkey Point site is about 2×10^{-4}/yr.

2.9.1.5 Atmospheric Stability

Atmospheric stability is a derived meteorological parameter that describes the dispersion characteristics of the atmosphere. It can be determined for the lowest layer of the atmosphere by the difference in temperature between two heights separated by at least 30 m. A seven-category atmospheric stability classification scheme based on temperature differences is set forth in Regulatory Guide 1.23, Revision 1 (NRC 2007-TN278). When the temperature decreases rapidly (<-1.5°C per 100 m) with height, the atmosphere is unstable and atmospheric dispersion is greater. Conversely, when temperature increases with height, the atmosphere is stable and dispersion is more limited. Typically, the atmospheric stability is neutral to unstable during the day and neutral to stable at night. Cloudiness and high winds tend to decrease both stability and instability, thereby resulting in more nearly neutral conditions.

Measurements at the 10 and 60 m levels of the Turkey Point meteorological tower are used to determine atmospheric stability for the Turkey Point site. On an annual basis, the atmosphere at the Turkey Point site is stable about 53 percent of the time, neutral about 28 percent of the time, and unstable about 19 percent of the time. These percentages vary seasonally with more frequent unstable conditions in the spring and winter, and more frequent neutral conditions in the summer and fall (FPL 2014-TN4058).

2.9.2 Air Quality

The discussion of air quality includes the six common “criteria pollutants” for which the EPA has set National Ambient Air Quality Standards (NAAQSs) (ozone [O_3], particulate matter [PM_{10} and $PM_{2.5}$; particulate matter with a mean aerodynamic diameter of less than or equal to 10 microns and 2.5 microns; respectively], carbon monoxide [CO], nitrogen dioxide [NO_2], sulfur dioxide [SO_2], and lead [Pb]). The air-quality discussion also includes heat-trapping GHGs (primarily carbon dioxide [CO_2]), which have been the principal factor causing climate change over the last 50 years (GCRP 2014-TN3472).

Climate change is a subject of national and international interest. The recent compilation of the state of knowledge in this area by the GCRP has been considered in preparation of this EIS. The GCRP report (GCRP 2014-TN3472) synthesizes the work of the Federal government on climate change. Climate-related changes include rising temperatures and sea levels; increased frequency and intensity of extreme weather (e.g., heavy downpours, floods, and droughts); earlier snowmelts and associated frequent wildfires; and reduced snow cover, glaciers, permafrost, and sea ice. GHGs are transparent to incoming short-wave radiation from the sun but opaque to outgoing long-wave (infrared) radiation from the Earth’s surface. The net effect over time is a trapping of absorbed radiation and a tendency to warm the Earth’s atmosphere, which together constitute the “greenhouse effect.”

The Turkey Point site is in southeast Miami-Dade County, Florida, which is part of the Southeast Florida Intrastate Air Quality Control Region. All of the counties (Broward, Miami-Dade, Indian River, Martin, Monroe, Okeechobee, Palm Beach, and St. Lucie) within this control region are in attainment of the NAAQSs (40 CFR 81.310) (TN255). There is one Class I Federal Area where visibility is an important value within 100 mi of the Turkey Point site. This is the Everglades

National Park located approximately 13 mi west of the site of proposed Units 6 and 7 (40 CFR 81.407) (TN255).

2.9.3 Atmospheric Dispersion

As described in Section 2.9.4, the NRC staff visited the meteorological measurement system at the Turkey Point site, reviewed the available information about the design of the meteorological measurement program, and evaluated data collected by the program. Based on this information, the NRC staff concludes that the program provides data that represent the affected environment onsite meteorological conditions as required by 10 CFR 100.20 (TN282). The data also provide an acceptable basis for estimating atmospheric dispersion for the evaluation of the consequences of routine and accidental releases as required by 10 CFR 50.34 (TN249), 10 CFR Part 50 (TN249), Appendix I, and 10 CFR 52.79 (TN251).

2.9.3.1 Short-Term Dispersion Estimates

FPL calculated short-term dispersion estimates for the Turkey Point site using 3 years of onsite meteorological data for the years 2002, 2005, and 2006. These estimates, which were provided in ER Section 2.7.5, were based on distances to the exclusion area boundary (EAB) and outer boundary of the low-population zone (LPZ) in ER Table 2.7-12. The exclusion area and LPZ are defined in 10 CFR 50.2 (TN249). The NRC staff reviewed these data and calculations to determine whether the short-term dispersion estimates were appropriate for use in the EIS design basis accident (DBA). The short-term dispersion estimates for use in the DBA calculations are listed in Table 2-55. They are based on the PAVAN computer code (Bander 1982-TN538) calculations of 1-hour and annual average atmospheric dispersion factor (χ/Q) values from a joint frequency distribution of wind speed, wind direction, and atmospheric stability. These values were calculated for the shortest distances from a release boundary envelope that encloses the proposed Turkey Point Unit 6 or Unit 7 release points to the EAB and to the LPZ. The 50 percent EAB χ/Q value listed in Table 2-55 is the median 1-hour χ/Q, which is assumed to persist for 2 hours. The 50 percent LPZ χ/Q values listed in Table 2-55 were determined by logarithmic interpolation between the median 1-hour χ/Q, which was assumed to persist for 2 hours, and the annual average χ/Q. This approach is consistent with the procedure described in Regulatory Guide 1.145 (NRC 1983-TN279), and the NRC staff concluded that the site-specific short-term dispersion estimates are appropriate for use in the EIS DBA review.

Table 2-55. Atmospheric Dispersion Factors for Proposed Units 6 and 7 Design Basis Accident Calculations

Time Period	Boundary	χ/Q (s/m^3)
0 to 2 hours	Exclusion area boundary	1.89×10^{-4}
0 to 8 hours[(a)]	Low-population zone	5.29×10^{-6}
8 to 24 hours[(a)]	Low-population zone	4.02×10^{-6}
1 to 4 days[(a)]	Low-population zone	2.21×10^{-6}
4 to 30 days[(a)]	Low-population zone	9.39×10^{-7}

(a) Times are relative to the beginning of the release to the environment.

2.9.3.2 Long-Term Dispersion Estimates

Long-term dispersion estimates for use in evaluation of the radiological impacts of normal operations were calculated by FPL using the XOQDOQ computer code (Sagendorf et al. 1982-TN280). This code implements the guidance set forth in Regulatory Guide 1.111 (NRC 1977-TN91) for estimation of χ/Q and atmospheric deposition factors (D/Q) for use in evaluation of the consequences of normal reactor operations. The XOQDOQ model uses the diffusion parameters as specified in Regulatory Guide 1.145 (NRC 1983-TN279). The NRC reviewed the model inputs and distances from the release point to the nearest residence, EAB, school, vegetable garden, and meat animal. No residential milk cows were identified with 5 mi of the Turkey Point site and no dairies within 50 mi. Site-specific meteorological data covering the 3-year period (2002, 2005, and 2006) were used to determine the diffusion estimates.

Table 2-56 summarizes the results of the maximum annual average χ/Q and D/Q predicted by XOQDOQ for the sensitive receptors of interest in the area as a result of routine releases of effluents. The listed maximum values are results for several plume depletion scenarios that account for radioactive decay: no decay, half-life decay of 2.26 and 8 days. Table 2-56 also includes χ/Q and D/Q estimates at the proposed Unit 7 location for releases from proposed Unit 6 for use in estimating Unit 7 construction worker doses after Unit 6 begins operation.

2.9.4 Meteorological Monitoring

There has been a meteorological monitoring program at the Turkey Point site since the early 1970s. The initial measurements were to provide the onsite meteorological information required for licensing of existing Turkey Point Units 3 and 4. Measurements have continued in support of existing Turkey Point Units 3 and 4 operations. The meteorological system was last upgraded to enhance its reliability in 2007 in support of the proposed new Units 6 and 7 Distributed Control System installation (FPL 2014-TN4058). These improvements were directed at improving reliability, maintainability, and communication.

Table 2-56. Maximum Annual Average Atmospheric Dispersion and Deposition Factors for Evaluation of Normal Effluents for Receptors of Interest

Receptor	Downwind Sector	Distance (mi)	No Decay χ/Q (s/m^3)	2.26-Day Decay χ/Q (s/m^3)	8-Day Decay χ/Q (s/m^3)	D/Q (1/m^2)
EAB	W	0.49	1.7×10^{-5}	1.7×10^{-5}	1.6×10^{-5}	1.4×10^{-7}
EAB	SE	0.36	1.7×10^{-5}	1.7×10^{-5}	1.6×10^{-5}	5.2×10^{-8}
Property Boundary	SSE	0.35	3.4×10^{-5}	3.4×10^{-5}	3.2×10^{-5}	1.2×10^{-7}
Residence	N	2.7	1.4×10^{-7}	1.3×10^{-7}	1.1×10^{-7}	7.5×10^{-10}
Satellite School	NW	2.0	5.2×10^{-7}	5.2×10^{-7}	4.3×10^{-7}	2.9×10^{-9}
Meat Animal	NW	4.0	1.3×10^{-7}	1.3×10^{-7}	1.0×10^{-7}	5.8×10^{-10}
Veg. Garden	NW	4.8	9.6×10^{-8}	9.4×10^{-8}	7.2×10^{-8}	3.8×10^{-10}
Unit 7 Reactor	W	0.13	1.6×10^{-4}	1.6×10^{-4}	1.5×10^{-4}	1.0×10^{-6}

The instrument systems are described in Section 6.4 of the FPL ER (FPL 2014-TN4058). The primary meteorological tower (South Dade) is situated about 5.8 mi southwest of the location of proposed Units 6 and 7. The primary meteorological tower instruments include sensors to measure wind speed and direction, temperature, and sigma theta (standard deviation in wind direction) at 10 m and 60 m above ground, precipitation, barometric pressure, and solar radiation. A 10 m backup meteorological tower is located about 0.3 mi northwest of the location of proposed Units 6 and 7. Instrumentation on the backup tower consists of sensors to measure wind speed and direction and sigma theta at 10 m and precipitation near ground level. Table 6.4-4 of FPL's ER (FPL 2014-TN4058) lists the instrumentation in the current measurement system and compares instrument specifications with criteria set forth in NRC guidance and industry standards.

The NRC staff viewed the meteorological site and instrumentation and reviewed the available information about the meteorological measurement program, which included maintenance, calibration, and audit records. The NRC staff then evaluated the data-collection program and then, based on this information, concluded that the program provides data that represent the affected environment onsite wind and stability conditions as required by 10 CFR 100.20 (TN282). The NRC staff did note however, that for certain wind directions the South Dade tower monitoring building interferes with wind data collection, but only for a small percentage of time due to the prevailing wind direction pattern. The data also provide an acceptable basis for making estimates of atmospheric dispersion for the environmental review evaluation of the consequences of routine and accidental releases required by 10 CFR 50.34 (TN249), 10 CFR Part 50 (TN249), Appendix I, and 10 CFR 52.79 (TN251).

2.10 Nonradiological Health

This section describes aspects of the environment at the Turkey Point site and within the vicinity of the site that are associated with nonradiological human health impacts. It provides the basis for evaluation of impacts on human health from site preparation, construction, operation, and decommissioning of proposed Turkey Point Units 6 and 7. Building activities, noise, and the transportation of construction materials and personnel to the Turkey Point site all have the potential to affect the health of the public and/or workers. Operation of proposed Units 6 and 7 has the potential to affect the public and workers at the Turkey Point site through operation of the cooling system, noise generated by operations, electromagnetic fields generated by transmission systems, and transportation of operations and outage workers to and from the Turkey Point site.

2.10.1 Public and Occupational Health

This section describes public and occupational health at the Turkey Point site and vicinity associated with air quality, etiological agents (i.e., disease-causing microorganisms), and occupational injuries.

2.10.1.1 Air Quality

Public and occupational health can be affected by changes in air quality from activities that contribute to fugitive dust, vehicle and equipment exhaust emissions, and automobile exhaust

from commuter traffic (NRC 1996-TN288). The potential impact of these changes on compliance with air-quality standards for the Turkey Point site and Miami-Dade County are discussed in Section 2.9.2. Air-quality measures include particulate matter, such as fugitive dust and selected gaseous pollutants. Particulates can be released into the atmosphere during excavation of muck, backfilling, grading and compacting, concrete batching, and vehicular travel over paved and unpaved roads. Particulates and other emissions can be released by construction equipment and vehicles used for hauling debris, soil, construction equipment, and supplies. Smoke would be released if open burning is conducted during site-clearing and site-preparation activities.

Exhaust emissions during normal plant operations associated with onsite vehicles and equipment as well as from commuter traffic also can affect air quality and human health. Nonradiological supporting equipment (e.g., diesel generators, fire pump engines) and other nonradiological emission-generating sources (e.g., storage tanks) and activities are expected to be a source of pollutant emissions. Diesel generators and supporting equipment would be in place for emergency use only but would be started regularly to verify that the systems are operational.

Recirculating mechanical draft wet cooling is a typical cooling method for power plants that also is associated with air emissions. Unit 5 uses this method, supplied with cooling-tower makeup water from the Upper Floridan aquifer. The blowdown (or draw-off), used principally to control the buildup of minerals in the water, is routed to the IWF. Most of the water typically leaves the plant via the cooling towers by evaporation and aerosolization, often referred to collectively as “drift” (although technically drift generally refers only to the aerosolized portion). The evaporated portion includes gaseous forms of chemicals, including volatile “contaminants of emerging concern,” or CECs (EPA 2012-TN1018), which can be inhaled by plant workers and the public. Aerosol drift results in particulate matter that is formed as the salts and chemicals, including CECs, precipitate. Furthermore, aerosol drift can contain etiological agents, depending on the degree of disinfection used (and as described in the next section). If exposure to any of these hazards is greater than health-based thresholds, such as minimum infective doses for pathogens, particulate matter standards, or minimal risk levels for chemicals, then risks could be considered significant and thus require mitigation such as additional treatment or setback distances from the towers.

As noted in the ER (FPL 2014-TN4058) and SCA (FPL 2009-TN1246), and as illustrated in Figure 2-43, the nearest receptors to proposed Units 6 and 7, as measured from the center of the proposed site area, are as follows:

- The nearest school (day-care center) is 2 mi northwest.
- The nearest transient residence is 2.7 mi north (in Homestead Bayfront Park).
- The nearest known food (meat) animal is 2.7 mi north.
- The nearest permanent residence is 3.9 mi northwest.
- The nearest known vegetable garden is 4.8 mi northwest (not shown).

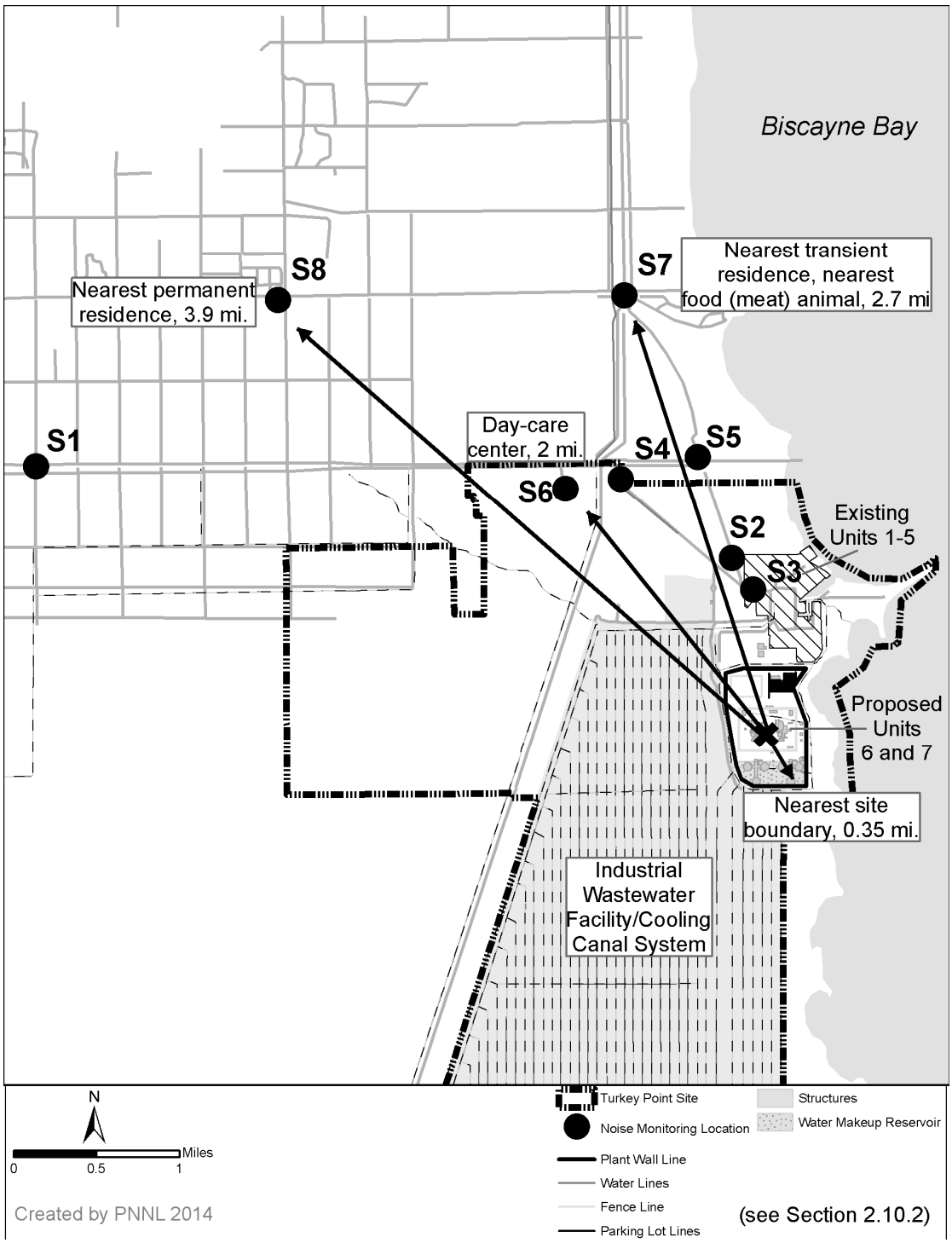


Figure 2-43. Nearest Actual and Potential Receptors

Emissions from nonradiological air pollution sources, including the "criteria pollutants," i.e., sulfur dioxide, particulate matter with aerodynamic diameters of 10 microns or less (PM_{10}), particulate matter with aerodynamic diameters of 2.5 microns or less ($PM_{2.5}$), carbon monoxide, nitrogen dioxide, lead, and ozone, are controlled through compliance with Federal, State, and local regulations. Attainment areas are areas where the ambient levels of criteria air pollutants are designated as being "better than," "unclassifiable/attainment," or "cannot be classified or better than national standards" (depending on the pollutant and other factors). FPL notes that the Southeast Florida Intrastate Air Quality Control Region (AQCR), which includes Miami-Dade County, was in attainment for these pollutants in 2008 (FPL 2014-TN4058). The AQCR was still in attainment in 2011 (40 CFR 81.310) (TN255).

2.10.1.2 Occupational Injuries

In general, occupational health risks to workers and onsite personnel engaged in activities such as building, maintenance, testing, excavation, and modifications are expected to be dominated by occupational injuries (e.g., falls, electric shock, asphyxiation) or occupational illnesses. Historically, actual injury and fatality rates at nuclear reactor facilities have been lower than the average U.S. industrial rates. The U.S. Bureau of Labor Statistics provides reports that account for occupational injuries and illnesses as total recordable cases (TRCs), which includes those cases that result in death, loss of consciousness, days away from work, restricted work activity or job transfer, or medical treatment beyond first aid (BLS 2011-TN668). The State of Florida also tracks the annual incidence rates of injuries and illnesses for electric power-generation, transmission, and distribution workers (BLS 2012-TN669). These records of statistics are used to estimate the likely number of occupational injuries and illnesses for operation of the current units and predict the likely number of cases for the proposed new units.

The average TRC incidence rate for the Turkey Point Units 3 and 4 workforce for 2004 through 2008 was reported to be 0.4 cases per 100 workers (FPL 2014-TN4058). These rates are substantially lower than expected based on data for the industry overall. As seen in Table 2-57, rates of injuries and illnesses per 100 full-time workers for years 2003-2010 in the heavy and civil engineering construction sector—an important sector baseline for assessing building impacts

Table 2-57. Injuries and Illnesses by Industry and Area (per 100 full-time workers per year)

	Heavy and Civil Engineering Construction		Electric Power Generation, Transmission, and Distribution	
Year	U.S.	Florida	U.S.	Florida
2003	4.0	7.0	5.0	3.3
2004	5.9	7.0	4.5	3.3
2005	5.6	5.6	4.0	2.0
2006	5.3	6.3	3.8	3.9[(a)]
2007	4.9	4.9	3.6	2.8
2008	4.2	3.8	3.2	2.1
2009	4.2	3.6	3.5	2.7
2010	3.8	3.4	2.8	2.4

(a) For 2006, data were only available for utilities overall.

(Chapter 4)—ranged from 3.8 to 5.9 for the United States and 3.4 to 7.0 for Florida. While some reduction in TRC incidence rate over time is seen for the United States as a whole, other than the period from 2003 to 2004, there is a clearer and more substantial reduction over time for Florida. For the same years, rates of injuries and illnesses in the electric power-generation, transmission, and distribution sector—an important sector baseline for assessing operational impacts (Chapter 5)—ranged from 2.8 to 5.0 for the United States and 2.1 to 3.9 for Florida. Reductions over time are apparent in this sector for both the United States and Florida.

Fatal injury rate data are available from the above sources for 2003–2007. As seen in Table 2-58, rates of fatal injuries per 100,000 workers for the years 2003–2007 in the United States construction sector ranged from 10.4 to 12.0. As with non-fatal injuries and illnesses, these data show some reduction over time, although the trend is weaker and the change smaller for fatal injuries compared to non-fatal injuries and illnesses. One caveat related to these data is that fatal injury rates in the utility construction sector likely are lower than the rates shown here for the general construction sector. This is based on lower non-fatal injury and illness rates in the utility construction sector compared to the overall construction sector. For example, the non-fatal injury and illness rate for the utility construction sector for 2007 is 4.7 per 100 full-time workers, while the non-fatal injury and illness rate for the general construction sector is 15 percent higher, at 5.4 per 100 full-time workers.

Table 2-58. Fatal Injuries by Industry in the United States (per 100,000 workers per year)

Year	Construction	Utilities
2003	11.7	3.7
2004	12.0	6.1
2005	11.1	3.6
2006	10.9	6.3
2007	10.4	4.0

As seen in Table 2-58, fatal injury rates for utility operations ranged from 3.6 to 6.3 per 100,000 workers. While this range is relatively large, no discernible trend over time is apparent.

Occupational injury and fatality risks are reduced by adherence to NRC and Occupational Safety and Health Administration safety standards, practices, and procedures to minimize worker exposures. Appropriate State and local statutes also must be considered when assessing the occupational hazards and health risks associated with the Turkey Point site. Currently, the Turkey Point site has programs and personnel to promote safe work practices and respond to occupational injuries and illnesses for existing units (FPL 2014-TN4058). Procedures are in place with the objective to provide personnel who work at the Turkey Point site with an effective means of preventing accidents due to unsafe conditions and unsafe acts. They include safe work practices to address hearing protection, confined space entry, personal protective equipment, heat stress, electrical safety, ladders, and chemical handling, storage, and use, as well as other industrial hazards. Personnel are provided training on FPL safety procedures. In addition, FPL requires contractors to develop and implement safety procedures with the intent of preventing injuries, occupational illnesses, and deaths.

2.10.1.3 Etiological Agents

Public and occupational health can be compromised by activities at nuclear power sites that encourage the growth of disease-causing microorganisms (etiological agents). The types of organisms of concern for public and occupational health include enteric pathogens (such as *Salmonella* spp. and *Pseudomonas aeruginosa*), thermophilic fungi, bacteria (such as *Legionella* spp. and *Vibrio* spp.), and free-living amoeba (such as *Naegleria fowleri* and *Acanthamoeba* spp.). These microorganisms could result in potentially serious human health concerns, particularly at high exposure levels (NRC 2013-TN2654). For proposed Units 6 and 7 at the Turkey Point site, exposure could occur from cooling-tower evaporation and aerosol drift and thermal discharges onsite. In contrast to other units at the site, however, as well as to most other nuclear power plants, the thermal discharges would be collected in a common blowdown sump and injected underground via UIC wells. These waste streams thus are not expected to be discharged to waters that have the potential for direct contact by members of the public (FPL 2014-TN4058), and therefore the following information about etiological agents is largely for providing a baseline for the potential aerosol drift and onsite waste-treatment exposure pathways.

Vibrio spp. are a concern for human health because these theromophilic bacteria are commonly found in coastal marine waters such as those at the Turkey Point site and can be associated with filter-feeding shellfish (e.g., oysters). People can be exposed to the bacteria through activities such as swimming, diving, or wading in the water, as well as through consumption of contaminated shellfish. *Vibrio cholera*e causes the disease cholera, which is an acute, diarrheal illness. Other *Vibrio* species do not cause cholera (e.g., *V. vulnificus* and *V. parahaemolyticus*), but exposure to the bacteria can cause watery diarrhea and abdominal cramps as well as skin infections. Cholera and non-cholera illnesses caused by *Vibrio* spp. can be fatal. During 2007-2008, a total of 236 individual vibriosis cases associated with water exposure (recreational or flood water) were reported by 25 states (CDC 2011-TN558). Of these, 74 (31 percent) were hospitalizations, and nine (4 percent) were fatal. During 2005-2006, a total of 189 vibriosis cases associated with water exposure were reported, and during 2003-2004 a total of 142 cases were reported (CDC 2008-TN557). Vibriosis cases were not routinely reported prior to 2003, so data are not readily available for prior years. Nearly all vibriosis patients reported that they were exposed to recreational water in coastal states. The most frequently reported exposure state for all reporting periods was Florida.

Naegleria fowleri is a free-living amoeba that proliferates in warm freshwater and hot springs. Primary amebic meningoencephalitis (PAM) occurs when the amoeba coincidentally enters the nasal passages, travels to the olfactory lobe of the brain, and infects brain tissue. This rare disease is of public health importance because of the high (>99 percent) fatality rate associated with infection. In 2009, three cases of PAM, all fatal, were reported from Madison, Orange, and Polk Counties in Florida (Terzagian 2011-TN998). No data were found on cases from other states for 2009. In 2008, no PAM cases were reported in the United States. In 2007-2008, eight individual cases of PAM were reported in the United States (CDC 2011-TN558). All were fatal, and the largest number of cases, three (38 percent), occurred in Florida. In 2005-2006, five cases of PAM were reported in the United States; all were fatal, but none occurred in Florida (CDC 2008-TN557).

Cryptosporidium is a parasite that can survive outside the body for long periods of time and is very tolerant to chlorine disinfection. It has emerged as the single most important etiologic agent of recreational water-associated outbreaks. In 2007-2008, of 81 outbreaks of acute gastrointestinal illness, 60 (74 percent) were caused by *Cryptosporidium* and resulted in 12,154 cases (CDC 2011-TN558). In 2005–2006, of 48 outbreaks of acute gastrointestinal illness, 31 (65 percent) were caused by *Cryptosporidium* and resulted in 3,751 cases (CDC 2008-TN557).

Legionella is a bacterium that can cause a type of pneumonia called legionellosis, more commonly known as Legionnaires' disease, which is sometimes fatal. Approximately 8,000-18,000 cases of legionellosis occur each year in the United States (CDC 2011-TN558). In 2007-2008, three outbreaks were reported that resulted in 16 cases known to be associated with cooling towers (CDC 2011-TN558). In 2005-2006, three outbreaks also were reported associated with cooling towers, which resulted in 52 cases and 6 deaths (CDC 2008-TN557).

The Florida Department of Health's Food and Waterborne Disease Program is responsible for the surveillance, investigation, reporting, and prevention of food and waterborne diseases within the state. Each year, the program publishes an annual report that summarizes food and waterborne disease outbreaks in the state. Annual reports dating back to 1997 are available from the Florida Department of Health (FDOH 2012-TN667). Table 2-59 summarizes these data and shows total number of waterborne disease outbreaks by organism and location (county) over the 2002–2011 period (2011 data being the most recent data available). From 2002 to 2011 there was a total of 558 reported cases of waterborne disease and 2 organisms were implicated in 58.6 percent of the cases reported—the Norovirus (a virus that causes acute gastroenteritis) and *Cryptosporidium* were blamed for 180 and 147 cases, respectively. *Legionella* was the cause of 36 cases (6.5 percent). An outbreak of "sea bather's eruption," dermatitis caused by exposure to *Linuche unguiculata* (larval thimble jellyfish), occurred in 2005; 24 cases (4.3 percent) were reported. Seven cases (1.3 percent) were associated with *Naegleria fowleri* and 26 cases (4.7 percent) were associated with *Shigella*. In 83 cases (14.9 percent), the cause of the outbreak was listed as "unknown." The vast majority of cases were associated with inadequate treatment, improper treatment, or temporary interruption of treatment of drinking water or recreational water (pools, recreational water slides, whirlpools). In some instances, swimmers were infected by pathogenic microorganisms in freshwater lakes, presumably from human or animal waste contamination. None of the cases was attributed to a heated (thermal effluent) or unheated (sanitary waste) discharge from a steam electric plant. Only one outbreak (10 Legionella cases in Dade County in 2009) occurred in one of the counties (i.e., Dade, Glades, Kissimmee, Martin, Okeechobee, and St. Lucie) in which the proposed and alternative sites would lie.

None of the cases described above or in Table 2-59 have been attributed to a heated (thermal effluent) or unheated (sanitary waste) discharge from a steam electric plant.

Table 2-59. Waterborne Disease Outbreaks in Florida, 2002−2011[a]

Year	Total No. of Outbreaks (and Associated Cases)	Organism/Vector	County	No. of Cases	Exposure Source
2002	11 (43)	Unknown	Hillsborough	43	Not described
2003	3 (88)	Norovirus	Orange	56	Public drinking water
		Norovirus	Polk	10	Freshwater lake
		Norovirus	Polk	22	Freshwater lake
2004	1 (42)	Norovirus	Duval	42	Recreational water slide
2005	3 (73)	Cryptosporidium	Duval	47	Recreational water
		Legionella	Broward	2	Unknown
		Linuche unguiculata (thimble jellyfish)	Nassau	24	Atlantic Ocean
2006	4 (119)	Cryptosporidium	Orange	3	Hotel swimming pool
		Giardia	Orange	55	Swimming pool/waterfall
		Legionella	Volusia	11	Whirlpool/ spa
		Norovirus	Santa Rosa	50	Recreational swimming lake
2007	9 (98)	Cryptosporidium	Collier	8	Condo swimming pool
		Cryptosporidium	Indian River	38	“Interactive water fountain”
		Cryptosporidium	Marion	3	Swimming pool
		Cryptosporidium	Palm Beach	6	“water”
		Naegleria fowleri	Orange	1	Lake water
		Naegleria fowleri	Orange	1	Freshwater
		Naegleria fowleri	Osceola	1	Lake water exposure
		Unknown	Palm Beach	38	Public drinking water
		Unknown	Pasco	2	Recreational water exposure
2008	4 (23)	Cryptosporidium	Sarasota	13	Pool
		Legionella	Orange	5	Hot tub
		Legionella	Orange	3	Hot tub
		Shigella	Hillsborough	2	Freshwater
2009	10 (44)	Cryptosporidium	Orange	8	Swimming pool
		Cryptosporidium	Orange	6	Swimming pool
		Cryptosporidium	Orange	5	“Multiple pools”
		Cryptosporidium	Palm Beach	6	Recreational water, untreated
		Cryptosporidium	Santa Rosa	4	Swimming pool
		Legionella	Dade	10	Private water system
		Legionella	Seminole	2	Shower heads
		Naegleria fowleri	Nassau	1	Freshwater lake
		Naegleria fowleri	Polk	1	Lake
		Naegleria fowleri	Orange	1	Lake
2010	1 (2)	*Shigella*	Orange	2	Recreational water
		Shigella	Dade	22	Public drinking water
2011	3 (26)	*Legionella*	Hillsborough	3	Decorative fountain
		Naegleria fowleri	St. Johns	1	Recreational water, untreated

(a) Cases associated with waterborne chemicals/chemical contamination were not included.

2.10.2 Noise

Any pressure variation that the human ear can detect is considered sound, and noise is defined as unwanted sound. Sound involves three principal components: a noise source, a person or a group of people, and the transmission path. While two of these components—the noise source and the transmission path—are easily quantified by direct measurements or through predictive calculations, the effect of noise on humans is difficult to determine because of the varying responses of humans to the same or similar noise patterns. The perception of sound (noise) by humans is very subjective and, just as for odors and taste, it is very difficult to predict a

response from any particular individual to these levels. To help predict responses, several metrics and tools have been developed. Sound is described in terms of amplitude (perceived as loudness) and frequency (perceived as pitch). Sound pressure levels are typically measured by using the logarithmic decibel (dB) scale. A-weighting (denoted by dBA) is widely used to account for human sensitivity to frequencies of sound (i.e., less sensitive to lower and higher frequencies and most sensitive to sounds between 1 and 5 kHz), which correlates well with a human's subjective reaction to sound. Several sound descriptors have been developed to account for variations of sound with time. L_{90} is the sound level exceeded 90 percent of the time, called the residual sound level (or background level) or fairly steady lower sound level on which discrete single sound events are superimposed. The equivalent continuous sound level (L_{eq}) is a sound level that, if it were continuous during a specific time period, would contain the same total energy as a time-varying sound. (Unless designated otherwise, all sound levels are instantaneous or L_{eq} values measured over short [e.g., 1- to 5-minute] time periods.) In addition, human responses to noise differ depending on the time of the day (e.g., higher sensitivity to noise during nighttime hours because of lower background noise levels). The day-night average sound level (L_{dn} or DNL) is a single dBA value calculated from hourly L_{eq} over a 24-hour period, with the addition of 10 dBA to sound levels from 10 p.m. to 7 a.m. to account for the greater sensitivity of most people to nighttime noise. Generally, a 3-dBA change over existing noise levels is considered to be a "just noticeable" difference, and a 10-dBA increase is subjectively perceived as a doubling in loudness and almost always causes an adverse community response.

Sources of noise related to proposed Units 6 and 7 at the Turkey Point site would be those associated with heavy equipment during the construction phase and with mechanical draft cooling towers, cooling pumps, transformers, transmission lines, and other electrical equipment, and the public address system during operation. The Turkey Point site is located on 9,460 ac in unincorporated southeast Miami-Dade County, Florida, approximately 25 mi south of Miami, 8 mi east of Florida City, 9 mi southeast of the City of Homestead, and bordered by Biscayne Bay to the east (FPL 2014-TN4058). There are no residential areas or public roads on the Turkey Point site. The rural surroundings and enclosure of noise-generating equipment in facilities help to mitigate onsite noise perceived by offsite receptors.

An ambient noise-monitoring survey was performed in June 2008 to assess the existing ambient noise in areas adjacent to the current Turkey Point units (FPL 2014-TN4058). Monitoring sites were chosen to characterize the noise levels at or near a variety of locations. These locations are depicted in Figure 2.7-16 of FPL's ER (FPL 2014-TN4058) and in a baseline noise study report (FPL 2009-TN1246). The locations are identified below by a location description, the distance and direction from Unit 1 (not the proposed units), and the site code used in the noise study:

- Onsite, next to Unit 5, northwest, sites S2 and S3
- Site boundaries, 1.3 and 1 mi north, sites S4 and S5
- Day-care facility, 1.6 mi northwest, site S6
- Homestead Bayfront Park entrance, 2.1 mi north, site S7
- Nearest permanent private residence, 3.6 mi northwest, site S8
- Homestead-Miami Speedway, 5 mi west-northwest, site S1.

Distances from the proposed Units 6 and 7 will differ from distances from the existing units, as described in Section 4.8. Also, note that the site boundaries used for the noise survey (1.3 and 1 mi north; sites S4 and S5) differ from the boundaries used for air quality in Section 2.10.1.1 and illustrated in Figure 2-43 (0.35 mi south-southeast and 1.6 mi north) for two reasons. First, the shorter distance noted for air quality (0.35 mi) is for the physically closest boundary to the proposed units, which borders Biscayne Bay to the south-southeast where there are no residences currently and likely none in the future, while for the noise survey the receptors are the potential nearest future residences north of the site on the other side of the existing units. Second, the longer distance noted for air quality (1.6 mi north) is measured from the center of the area that would be used for proposed Units 6 and 7, while the two baseline noise survey site boundaries (S4 and S5) are measured from Unit 1 (an existing unit). In other words, this latter location for noise (S5), at 1 mi north of the existing site, is the same location as the longer air-quality distance, at 1.6 mi north of the proposed site. This location also is considered the nearest site boundary at which a future residence could reasonably be expected to be located.

Section 5.3.4 of NUREG–1555 (NRC 2000-TN614) notes that, based on U.S. Department of Housing and Urban Development (HUD) regulations for exterior noise standards (24 CFR 51.101(a)(8)) (TN1016), no further analysis is needed if the L_{dn} is below 60 to 65 dBA. While the noise survey did not calculate an L_{dn} for each of the sites noted above, it did measure both daytime and nighttime averages (L_{eq}s), which can be used to approximate the L_{dn}, as described below.

The baseline daytime L_{eq} measurements for the monitoring locations within and adjacent to the Turkey Point site boundary ranged from a low of 44 dBA to a high of 67.6 dBA, depending on the site, while the nighttime L_{eq} measurements for these sites ranged from a low of 47 dBA to a high of 67 dBA. These monitoring sites are closest to Unit 5, which had an audible contribution. Also contributing to the observed sound levels were transient noise sources such as traffic, birds, insects, and wind.

The baseline daytime L_{eq} measurements for the monitoring locations beyond the site boundary ranged from a low of 46 dBA to a high of 67 dBA. The contributing audible noise sources to the highest observed noise levels the nearest residence were transient noises that included traffic, birds, insects, and wind. The nighttime L_{eq} measurements beyond the site boundary ranged from a low of 41 dBA to a high of 56 dBA. The contributing audible noise sources to the highest observed noise levels were transient noises that included insects, wind noise, and traffic.

The baseline noise report indicates that audible sound from the Turkey Point site does not reach the current nearest residences (the transient residences in Homestead Bayfront Park, 2.1 mi north of Unit 1, near site S7) and the nearest permanent private residence (3.6 mi northwest of Unit 1, site S8). A residence could be assumed to be located in the future at the Turkey Point boundary (1.3 mi north of the existing units, or 1.6 mi north of the proposed units, site S5). The two daytime average L_{eq}s for this location are 43.9 and 44.3 dBA. The two nighttime average L_{eq}s are 47.3 and 48.5 dBA. Adding 10 dBA to the nighttime L_{eq}s as described above and averaging all values (after converting the values to linear sound pressure level values) results in an L_{dn} of approximately 55.1 dBA, which is less than the 60 to 65 dBA acceptance range noted above.

Occasional activities associated with current operations at the Turkey Point site would have peak noise levels in the range of 100 to 110 dBA. As illustrated in Table 2-60, noise strongly lessens with distance. A decrease of 10 dBA in noise level is generally perceived as cutting the loudness in half. At a distance of 50 ft from the source, these peak noise levels would generally decrease to the 80 to 95 dBA range and at distance of 400 ft, the peak noise levels would generally be in the 60 to 80 dBA range. For context, the sound intensity of a quiet office is 50 dBA, normal conversation is 60 dBA, busy traffic is 70 dBA, and a noisy office with machines or an average factory is 80 dBA (Tipler and Mosca 2008-TN1467).

Table 2-60. Construction Noise Sources and Attenuation with Distance

Source	Noise Level (dBa) (peak)	Noise Level (dBa) Distance from Source			
		50 ft	100 ft	200 ft	400 ft
Heavy trucks	95	84-89	78-83	72-77	66-71
Dump trucks	108	88	82	76	70
Concrete mixer	105	85	79	73	67
Jackhammer	108	88	82	76	70
Scraper	93	80-89	74-82	68-77	60-71
Dozer	107	87-102	81-96	75-90	69-84
Generator	96	76	70	64	58
Crane	104	75-88	69-82	63-76	55-70
Loader	104	73-86	67-80	61-74	55-68
Grader	108	88-91	82-85	76-79	70-73
Dragline	105	85	79	73	67
Pile driver	105	95	89	83	77
Forklift	100	95	89	83	77

Source: Golden et al. 1979-TN3873

In addition to the HUD noise level described above, regulations governing noise associated with the activities at the Turkey Point site are generally limited to worker health. Federal regulations governing construction noise are found in 29 CFR Part 1910 (TN654), *Occupational Health and Safety Standards*, and 40 CFR Part 204 (TN653), *Noise Emission Standards for Construction Equipment*. The regulations in 29 CFR Part 1910 (TN654) address noise exposure in the construction environment, and the regulations in 40 CFR Part 204 (TN653) generally govern the noise levels of compressors. Turkey Point would be covered by Section 21-28 of the Miami-Dade County Code of Ordinances ("Noises; unnecessary and excessive prohibited"), although based on the L_{dn} assessment above, noise levels at the nearest receptors would not trigger this ordinance (Miami-Dade Code of Ordinances 21-28-TN1017). The State of Florida does not have noise regulations covering rural areas that would be applicable to the Turkey Point site.

2.10.3 Transportation

The transportation network surrounding the Turkey Point site is shown in Figure 2-6 and Figure 2-36. This network includes U.S. and Interstate highways, multilane divided State highways, local streets, rail service, airports, and waterways. This network is summarized below and is described in more detail in Section 2.5.2.3.

The major Federal highways in Miami-Dade County are US-1, which bisects the county from north to south and continues south to the Florida Keys, and I-75 and I-95, which also have a north-south direction but terminate in Miami. Two of the major State highways in Miami-Dade County are Florida's Turnpike and SR-997. Florida's Turnpike is a multilane, divided toll road that traverses much of Florida, linking I-75 in the interior south of Ocala to Miami. The Homestead extension of Florida's Turnpike terminates at US-1 north of Florida City. SR-997 connects US-1 in Homestead with US-27, which fringes the western edge of metropolitan Miami and terminates in Homestead, becoming Krome Avenue. Krome Avenue continues south and terminates at US-1 south of Florida City.

The existing access road for the Turkey Point site is SW 344th Street/Palm Drive. SW 344th Street/Palm Drive intersects US-1 and SR-997. It is a four-lane road that narrows at its intersection with SW 137th Avenue/Tallahassee Road to two lanes as it leads to the Turkey Point site. Access to the site and proposed Units 6 and 7 plant area from US-1 could also be made using SW 328th Street/North Canal Drive, which parallels SW 344th Street/Palm Drive to the north. This road is linked to SW 344th Street/Palm Drive by cross streets such as the four-lane SW 137th Avenue/Tallahassee Road and the two-lane SW 117th Avenue. Access to the site from Florida's Turnpike could be made via the exit at SW 312th Street/Campbell Drive or via the Turnpike terminus at US-1. SW 312th Street/Campbell Drive is a four-lane road that parallels SW 344th Street/Palm Drive to the north. A connecting road is SW 137th Avenue/ Tallahassee Road. This intersection should be minimally affected by construction and operations personnel. Most personnel are expected to come from the west and south (as opposed to the north) of the Turkey Point site and only a small number would be expected to commute to/from the site via this intersection. This intersection should be minimally affected by construction and operations personnel, who are expected to come from the west and south (as opposed to from the north) of the Turkey Point site.

Rail passenger service is provided to Miami by Amtrak and TRI-Rail; both have service to connecting rail lines across the United States. Neither rail service travels to locations south of Miami. Rail freight service in Miami-Dade County is provided by CSX operating Class 1 rail lines. The CSX line services the Port of Miami and has an intermodal terminal in Miami. The rail line terminates in Homestead. The nearest rail crossing to Turkey Point is at SW 320th Street and is approximately 11 roadway mi to the plant entrance. There are no rail systems within 5 mi of the Turkey Point site.

An equipment barge-unloading area exists at the Turkey Point site and is accessed via the waterway to receive shipments of oil and equipment.

2.10.4 Electromagnetic Fields

As described in Section 2.2.2, eight 230 kV transmission lines currently connect the existing Turkey Point units to the transmission system by way of two corridors, one proceeding to the north and one to the west. Transmission lines generate both electric and magnetic fields, referred to collectively as electromagnetic field (EMF) (NRC 2013-TN2654). Public and worker health can be compromised by acute and chronic exposure to EMF from power transmission systems, including switching stations (or substations) onsite and transmission lines connecting the plant to the regional electrical distribution grid. Transmission lines operate at a frequency of

60 Hz (60 cycles per second), which is referred to as extremely low frequency. In comparison, television transmitters have frequencies of 55 to 890 MHz and microwaves have frequencies of 1,000 MHz and greater (NRC 2013-TN2654).

Electric shock resulting from direct access to energized conductors or from induced charges in metallic structures is an example of an acute effect from EMF associated with transmission lines. Objects near transmission lines can become electrically charged by close proximity to the electric field of the line. An induced current can be generated in such cases, where the current can flow from the line through the object into the ground. Capacitive charges can occur in objects that are in the electric field of a line, storing the electric charge, but isolated from the ground. A person standing on the ground can receive an electric shock by coming into contact with such an object because of the sudden discharge of the capacitive charge through the person's body to the ground. Such acute effects are controlled and minimized by conformance with National Electrical Safety Code criteria and adherence to the standards for transmission systems regulated by the FDEP (Fla. Admin. Code 62-814 2008-TN644).

Long-term or chronic exposure to power transmission lines has been studied for a number of years. These health effects were evaluated in NUREG–1437, *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS) (NRC 2013-TN2654) for nuclear power in the United States, and are discussed in the ER (FPL 2014-TN4058). The GEIS reviewed human health and EMF and concluded:

The chronic effects of EMFs associated with nuclear plants and associated transmission lines are uncertain. Studies of 60 Hz EMFs have not uncovered consistent evidence linking harmful effects with field exposures. EMFs are unlike other agents that have a toxic effect (e.g., toxic chemicals and ionizing radiation) in that dramatic acute effects cannot be forced and longer-term effects, if real, are subtle. Because the state of the science is currently inadequate, no generic conclusion on human health impacts is possible.

2.11 Radiological Environment

Turkey Point Unit 3 began operation in 1972 and Unit 4 in 1973. FPL has conducted a Radiological Environmental Monitoring Program (REMP) around the Turkey Point site since 1969 (AEC 1972-TN999). The NRC published in the *Federal Register* on April 3, 2012, a final Environmental Assessment and Finding of No Significant Impact (77 FR 20059) (TN1001) and on June 15, 2012 the final approval of the licensing amendments for the approximately 15 percent extended power uprates of Turkey Point Units 3 and 4 (NRC 2012-TN1438). In addition to the REMP and the Offsite Dose Calculation Manual (ODCM) description in the Annual Radiological Effluent Release Report, ODCM Appendix A discusses a supplemental REMP sampling program agreed-upon by the State of Florida Department of Health and FPL to address the extended power uprates. This supplemental sampling program is being performed to provide additional data for the REMP (FPL 2011-TN119). The sampling under this supplemental program provides additional data, including data from sampling in the discharge canal.

The American crocodile inhabits the CCS used by Turkey Point Units 3 and 4. Units 3 and 4 discharge radioactive liquid effluent to the CCS, thus exposing the crocodiles to this effluent. In

addition, the crocodiles are exposed to gaseous radioactive effluents from Turkey Point Units 3 and 4. The exposure pathways for the radiological effluents from Turkey Point Units 6 and 7 are discussed in Section 5.9. The cumulative radiological impacts are discussed in Section 7.8.

Currently, radiological releases are summarized in the annual reports entitled *Turkey Point, Units 3 and 4, Annual Radioactive Effluent Release Report* and *Turkey Point, Units 3 and 4, Annual Radiological Environmental Operating Report*. The limits for all radiological releases are specified in the Turkey Point ODCM, and these limits are designed to meet Federal standards and requirements. The REMP includes monitoring of the aquatic environment (fish, invertebrates, and shoreline sediment), atmospheric environment (airborne radioiodine, gross beta, and gamma), terrestrial environment (vegetation), and direct radiation. The NRC staff reviewed these annual reports for calendar years 2002 through 2015.(10) These reports show that doses to individuals around the Turkey Point site were a small fraction of the limits specified in Federal environmental radiation standards (10 CFR Part 20 [TN283], 10 CFR Part 50, Appendix I [TN249], and 40 CFR Part 190 [TN739]).

FPL is also undertaking a groundwater monitoring program as delineated in the *FPL Turkey Point Power Plant Groundwater, Surface Water, and Ecological Monitoring Plan* (SFWMD 2009-TN149). In this plan, FPL commits to monitoring tritium as a "tracer suite" for tracking the movement of CCS plume. In Section 2.2.1 of the plan, the SFWMD states:

> "The FDEP's drinking water standard for concentrations of tritium in groundwater is 20,000 pCi/L. The Agencies and FPL recognize that the concentrations of tritium from the CCS water are expected to fall below the regulatory standard used to identify the potential for human health concerns. Accordingly it is mutually understood tritium is being monitored only as a potential tracer for identifying contributions of CCS water as a source. According to the FDEP, pursuant to Chapter 62-520 and 62-550, F.A.C., the presence of tritium below 20,000 pCi/L in water does not represent a public health and safety issue."

The NRC's Lessons Learned Task Force Report (NRC 2006-TN1000) made recommendations regarding potential unmonitored groundwater contamination at U.S. nuclear plants. In response to that report, FPL began additional groundwater sampling in various onsite locations that may be sources of groundwater contamination around the Turkey Point site. The ODCM discusses the groundwater sampling program for tritium (FPL 2011-TN119). However, a drinking water pathway does not exist from groundwater at the Turkey Point site (FPL 2009-TN100).

As discussed in Section 2.3, a sampling site from a deep excavation location, once part of a canal but now isolated from the CCS, in the Biscayne Bay bottom has measured tritium concentrations greater than 4,000 pCi/L (Miami-Dade County 2016-TN4510). As stated above,

(10) (FPL 2003-TN1380; FPL 2003-TN1380; FPL 2004-TN1381; FPL 2005-TN1382; FPL 2006-TN1383; FPL 2007-TN1384; FPL 2008-TN1385; FPL 2009-TN100; FPL 2010-TN1388; FPL 2011-TN119; FPL 2012-TN1389; FPL 2013-TN2578; FPL 2014-TN3662; FPL 2015-TN4407; FPL 2016-TN4617 and FPL 2003-TN1369; FPL 2003-TN1370, Rev 1.; FPL 2004-TN1371; FPL 2005-TN1372; FPL 2006-TN1373; FPL 2007-TN1375; FPL 2008-TN1376; FPL 2008-TN1377, Rev 1; FPL 2009-TN101; FPL 2010-TN1378; FPL 2011-TN267; FPL 2012-TN1379; FPL 2013-TN2579; FPL 2014-TN3661; FPL 2015-TN4408; FPL 2016-TN4618).

tritium in the CCS water acts as a tracer to indicate the movement of the CCS water. In addition, as previously stated, the EPA drinking water standard sets a maximum tritium limit of 20,000 pCi/L. Thus, this concentration measurement of tritium does not present a safety or health issue.

2.12 Related Federal Projects and Consultation

The staff reviewed the possibility that activities of other Federal agencies might affect the issuance of COLs to FPL. Any such activities could result in cumulative environmental impacts and the possible need for another Federal agency to become a cooperating agency for preparation of the EIS (10 CFR 51.10(b)(2) [TN250]). As discussed in Chapter 1, the USACE and the NPS are cooperating agencies in the preparation of this EIS.

The CERP is a congressionally approved long-term Federal effort to restore the Everglades and South Florida ecosystem. The plan is supported by Federal, State, Tribal, and local government agencies, including the USACE and the SFWMD. The goal of CERP is to capture, store, and redirect freshwater for environmental restoration of the entire Everglades ecosystem (USACE 2010-TN113).

Federal lands within a 50 mi radius of the Turkey Point site include Biscayne National Park, Everglades National Park, FKNMS (Florida Keys National Marine Sanctuary), Crocodile Lake National Wildlife Refuge, and Big Cypress National Preserve.

Several state parks exist within the 50 mi radius, including Dagny Johnson Key Largo Hammock Botanical State Park, The Barnacle Historic State Park, Bill Baggs Cape Florida State Park, John Pennekamp Coral Reef State Park, Lignumvitae Key Botanical State Park, San Pedro Underwater Archaeological Preserve State Park, Indian Key Historic State Park, Windley Key Fossil Reef Geological State Park, Oleta River State Park, and John U. Lloyd Beach State Park.

The Tribal reservation for the Federally recognized Seminole Tribe of Florida Reservation in Hollywood, Broward County, is within 50 mi of the Turkey Point site. Four Miccosukee Indian reservations—Tamiami Trail (Miami-Dade County), Alligator Alley (Broward County), and two at Krome Avenue (Miami-Dade County)—also lie within 50 mi of the site. Under Section 102(2)(C) of NEPA, the NRC is required to “consult with and obtain the comments of any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved.” During the course of preparing this EIS, the NRC consulted with various Federal, State, and local agencies and Tribal contacts. Appendix F provides a list of consultation correspondence.

3.0 SITE LAYOUT AND PLANT DESCRIPTION

The site of proposed Turkey Point Nuclear Power Plant (Turkey Point) Units 6 and 7 is located in Miami-Dade County, Florida, approximately 25 mi south of Miami. Florida Power & Light Company (FPL) applied to the U.S. Nuclear Regulatory Commission (NRC) for combined construction permits and operating licenses (COLs) for proposed Turkey Point Units 6 and 7. FPL has also applied for a Department of the Army authorization to conduct activities that result in alteration of waters of the United States, including jurisdictional wetlands.

This chapter describes the key characteristics of the proposed plant that are used to assess the environmental impacts of the proposed action; the information is drawn primarily from FPL's Environmental Report (ER) (FPL 2014-TN4058), its Final Safety Analysis Report (FSAR) (FPL 2015-TN4502), and supplemental documentation from FPL (FPL 2010-TN272; FPL 2011-TN42; FPL 2011-TN303; FPL 2011-TN495; FPL 2012-TN2582). The supplemental documentation consists primarily of responses to NRC requests for additional information, FPL's Site Certification Application (SCA) to the State of Florida, and SCA amendments and responses to comments. As noted in Chapter 1 of this environmental impact statement (EIS), the State of Florida approved FPL's SCA, subject to final Conditions of Certification, on May 19, 2014 (State of Florida 2014-TN3637).

Whereas Chapter 2 of this EIS describes the existing environment at the proposed site and its vicinity, this chapter describes the physical aspects of the proposed nuclear plants. This chapter also describes the physical activities involved in building and operating the plants. The environmental impacts of building and operating the plants are discussed in Chapters 4 and 5, respectively. This chapter is divided into four sections. The external appearance and layout of the proposed plants are described in Section 3.1. The major plant structures are described in Section 3.2, and those structures that routinely interface with the environment are distinguished from those that minimally interface with the environment, or that interface temporarily with the environment. Activities involved in building or installing each of the plant structures are described in Section 3.3. Operational activities of the plant that interface with the environment are described in Section 3.4.

3.1 External Appearance and Plant Layout

The 9,460 ac Turkey Point site currently contains five power-generating stations. Units 1 and 2 are 400 MW(e) natural-gas/oil steam electrical generating units. Unit 1 has been in service since 1967; FPL plans to convert it to operate as a synchronous condenser in late 2016. Synchronous condenser mode provides voltage stability for the regional transmission system, but it does not provide electrical generation capacity. Unit 2 was placed in service in 1968; it has already been converted to operate in synchronous condenser mode (FPL 2016-TN4579). Two pressurized water reactors and associated facilities (Units 3 and 4) are located on the site. Unit 3 has been in service since 1972 and Unit 4 has been in service since 1973. The NRC approved a power uprate for Units 3 and 4 that was completed by FPL in 2013 (NRC 2012-TN1438; FPL 2014-TN3360). The net power output of Units 3 and 4 together increased from a nominal 1,400 MW(e) to 1,632 MW(e) as a result of the uprate (FPL 2000-TN3947; FPL 2014-TN3360). Unit 5 is a natural-gas combined-cycle unit rated to produce 1,150 MW(e); it began

operating in 2007. These existing units occupy approximately 195 ac. Units 3 and 4 on the Turkey Point site rely on a system of canals, which occupy approximately 5,900 ac on the Turkey Point site, to provide cooling during operation (Figure 3-1). The canals are used as a closed-loop cooling system, and they are permitted as an industrial wastewater facility (FPL 2014-TN4058). Mechanical draft cooling towers are used to dissipate heat from Unit 5. Water from the Upper Floridan aquifer is withdrawn to provide makeup water to Unit 5. Blowdown water from the cooling towers is sent to the cooling canals of the industrial wastewater facility (FPL 2014-TN4058).

Proposed Turkey Point Units 6 and 7 would be located on the Turkey Point site directly south of the existing units (Figure 3-1). The site would be extensively modified to raise the land surface from its current elevation of approximately 1 ft North American Vertical Datum 1988 (NAVD88) (Zilkoski et al. 1992-TN1232) to the building floor elevation for the proposed reactors of 26 ft NAVD88 (FPL 2015-TN4502). The finished grade elevation would be slightly lower at 25.5 ft NAVD88 (FPL 2015-TN4502). The center lines for the power blocks of the two units would be separated by 850 ft (FPL 2015-TN4502).

All systems and structures directly supporting power generation by proposed Turkey Point Units 6 and 7 would be built as new independent facilities, including a separate cooling system and a separate substation (Clear Sky) to connect Units 6 and 7 to the existing Turkey Point substation. The proposed Units 6 and 7 would not use the existing industrial wastewater facility cooling canals for plant cooling. The proposed new facilities would also include nuclear administration and training buildings, parking areas, an expanded equipment barge-unloading area, and security buildings (FPL 2014-TN4058).

The proposed reactor design for Turkey Point Units 6 and 7 is the AP1000 pressurized water reactor. FPL proposed a closed-cycle wet-cooling system for both the circulating-water system (CWS) and the service-water system (SWS). Reclaimed water from the Miami-Dade Water and Sewer Department (MDWASD) would supply makeup water for the CWS. When reclaimed water is not available in sufficient quantity or quality, CWS makeup water would be saltwater pumped from radial collector wells in the subsurface sediment of Biscayne Bay. MDWASD would also supply potable water for the SWS as well as other plant systems (demineralized water, fire protection, sanitary, and other miscellaneous water uses) (FPL 2014-TN4058). FPL proposed that liquid effluents would be discharged to a deep aquifer via onsite injection wells.

The AP1000 reactor design does not rely on either the reclaimed water supply or the radial collector wells to shut down safely. The NRC does not require a backup water supply, such as the radial collector wells, for normal power operation. However, FPL has proposed a backup water system in its ER and it is considered part of the proposed project.

The containment vessel, shield building, and auxiliary building make up the “nuclear island,” which is one of five principal structures of the standard Westinghouse Electric Company, LLC (Westinghouse 2011-TN261) AP1000 pressurized water nuclear power reactor proposed for Turkey Point Units 6 and 7. The other four principal structures of an AP1000 unit are the turbine, diesel-generator, radwaste, and annex buildings. The footprint area of each new unit is adjacent to, but separate from, the other. The area to be used for the proposed two power-generating units, including cooling towers, makeup water reservoir, switchyard, and associated facilities, is approximately 218 ac. Each new reactor unit would be supported by three

mechanical draft cooling towers, each approximately 67 ft high and 246 ft in diameter. A conceptualization of proposed Turkey Point Units 6 and 7 superimposed on the site is shown in Figure 3-2.

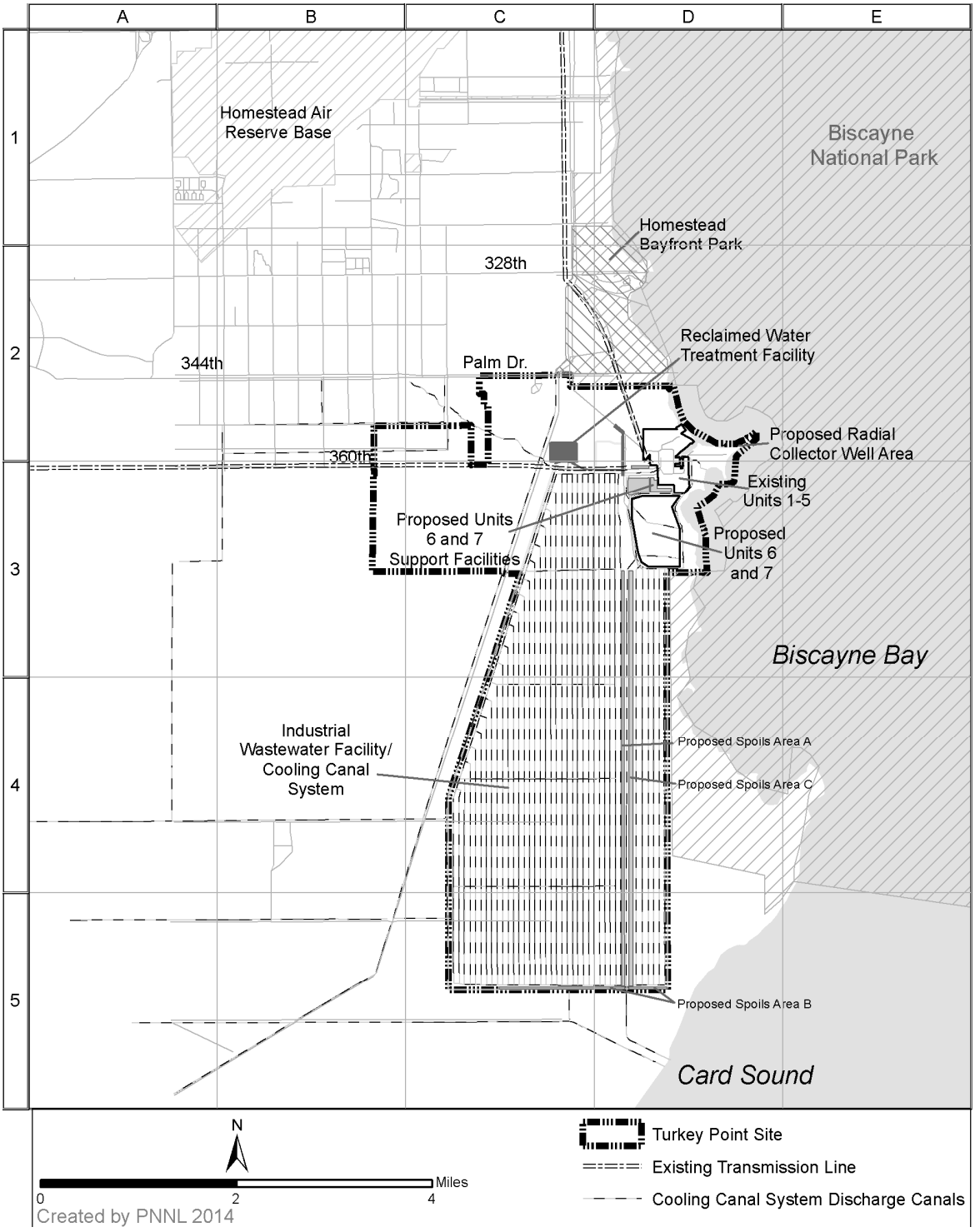


Figure 3-1. Location of Proposed Units 6 and 7 on the Turkey Point Site

Figure 3-2. Conceptualization of Proposed Units 6 and 7 Superimposed on the Turkey Point Site (FPL 2014-TN4058)

3.2 Proposed Plant Structures

This section describes each of the major plant structures: the reactor power system, structures that would interface with the environment during operation, and the balance of plant structures. In Chapter 4, all plant structures needed for operation are considered in the assessment of impacts of activities related to building and installing those structures. Only the structures that interface with the environment are relevant to the operational impacts discussed in Chapter 5.

3.2.1 Reactor Power-Conversion System

FPL has proposed building and operating two Westinghouse AP1000 reactor steam electric generating units at the Turkey Point site. An applicant or licensee intending to construct and operate a plant based on the AP1000 standard design may do so by referencing the rule certifying that design, which is set forth in Appendix D of Title 10 of the *Code of Federal Regulations* (CFR) Part 52 (TN251). As mentioned in Section 1.1.5 of this EIS, the standard Design Control Document (DCD) for the AP1000 standard reactor design referenced in the application is DCD Revision 19 (Westinghouse 2011-TN261), which amends the standard AP1000 DCD previously incorporated into 10 CFR Part 52, Appendix D (DCD Revision 15) (71 FR 4464) (TN258). NRC issued the design certification amendment final rule, based on Revision 19 of the DCD, in the *Federal Register* on December 30, 2011 (76 FR 82079) (TN248). DCD amendment review documents are available at http://www.nrc.gov/reactors/new-reactors/design-cert/amended-ap1000.html.

Figure 3-3 is an illustration of the reactor power-conversion system. Each AP1000 reactor is connected to two steam generators that transfer heat from the reactor core, converting feed water to steam that drives high-pressure and low-pressure turbines, thereby creating electricity. Steam that has passed through the turbines is condensed back to water that is heated and pumped back to the steam generators, repeating the cycle. The AP1000 design has a thermal power rating of 3,400 MW(t), and a design gross-electrical output of approximately 1,200 MW(e). The estimated station and auxiliary service load is 108 MW(e) for each proposed new unit at the Turkey Point site, for a net electrical output of 1,092 MW(e) per unit (FPL 2014-TN4058).

3.2.2 Structures with a Major Environmental Interface

The review team (the NRC staff, its contractor staff, and USACE staff who reviewed the ER and determined impact levels) divided the plant structures into two primary groups: (1) those that interface with the environment and (2) those that are internal to the reactor and associated facilities but do not take material from or release material to the environment outside the facilities. Examples of environmental interfaces are withdrawal of water from the environment at radial collector wells, release of water to the environment through deep-injection wells, and release of excess heat to the atmosphere. The interaction of structures with the environment are considered in the review team's assessment of the environmental impacts of facility construction and preconstruction, and facility operation in Chapters 4 and 5, respectively. The power-production processes that would occur within the plant itself and that do not affect the environment are not discussed further in this EIS because they are not relevant to a review under the National Environmental Policy Act of 1969, as amended (NEPA) (42 U.S.C. § 4321 et seq.) (TN661). However, such internal processes are considered in the Westinghouse AP1000 design certification documentation and in NRC safety reviews of the FPL COL application. This section describes only those structures that have a significant plant-environment interface.

The remaining structures are discussed in Section 3.2.3, to the extent that they may be relevant to the review team's consideration of construction and preconstruction impacts in Chapter 4. Figure 3-4 illustrates the Turkey Point site layout with a grid overlay to reference the locations of various plant structures and activity areas as they are described in the following sections.

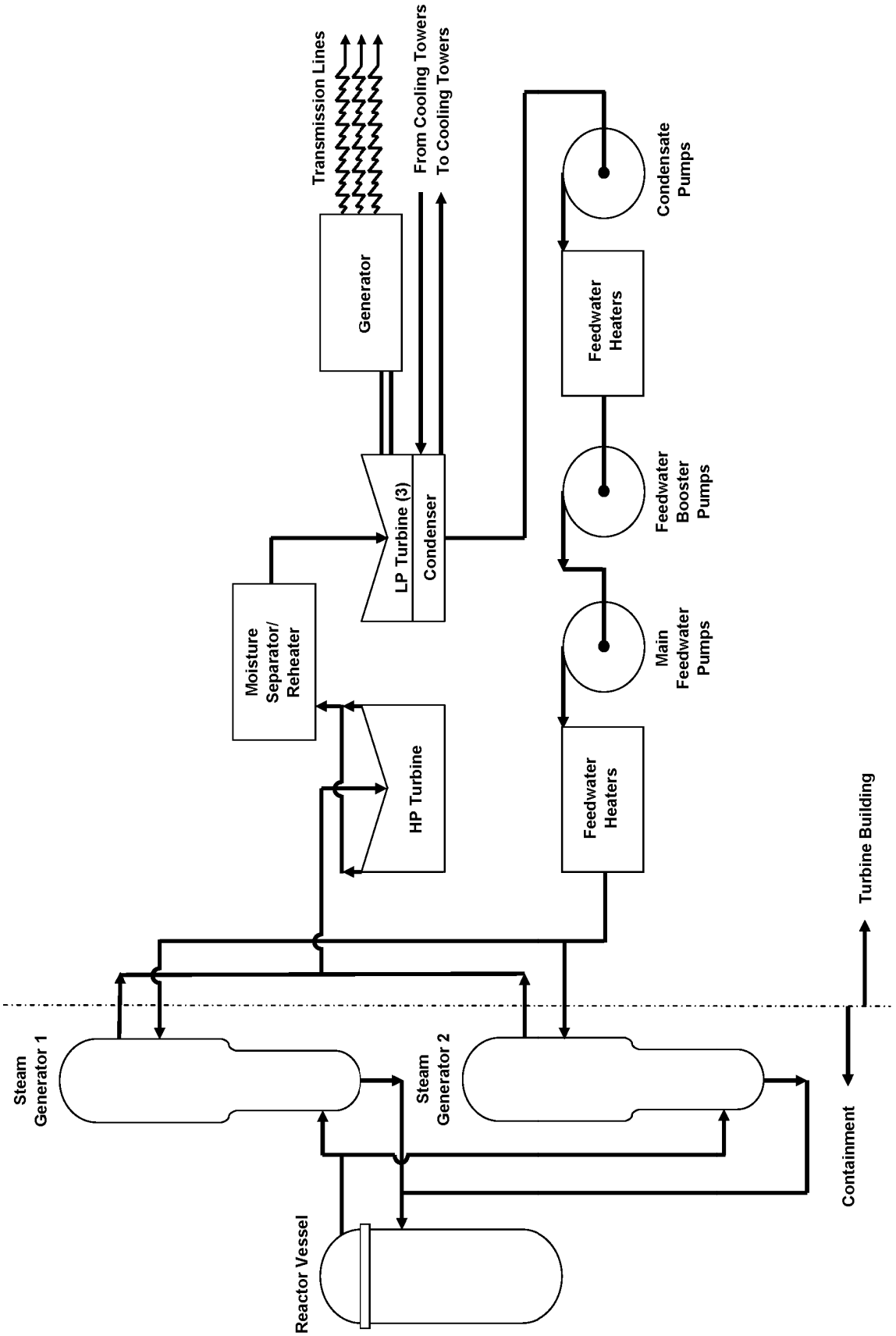


Figure 3-3. AP1000 Power-Conversion Diagram (FPL 2014-TN4058)

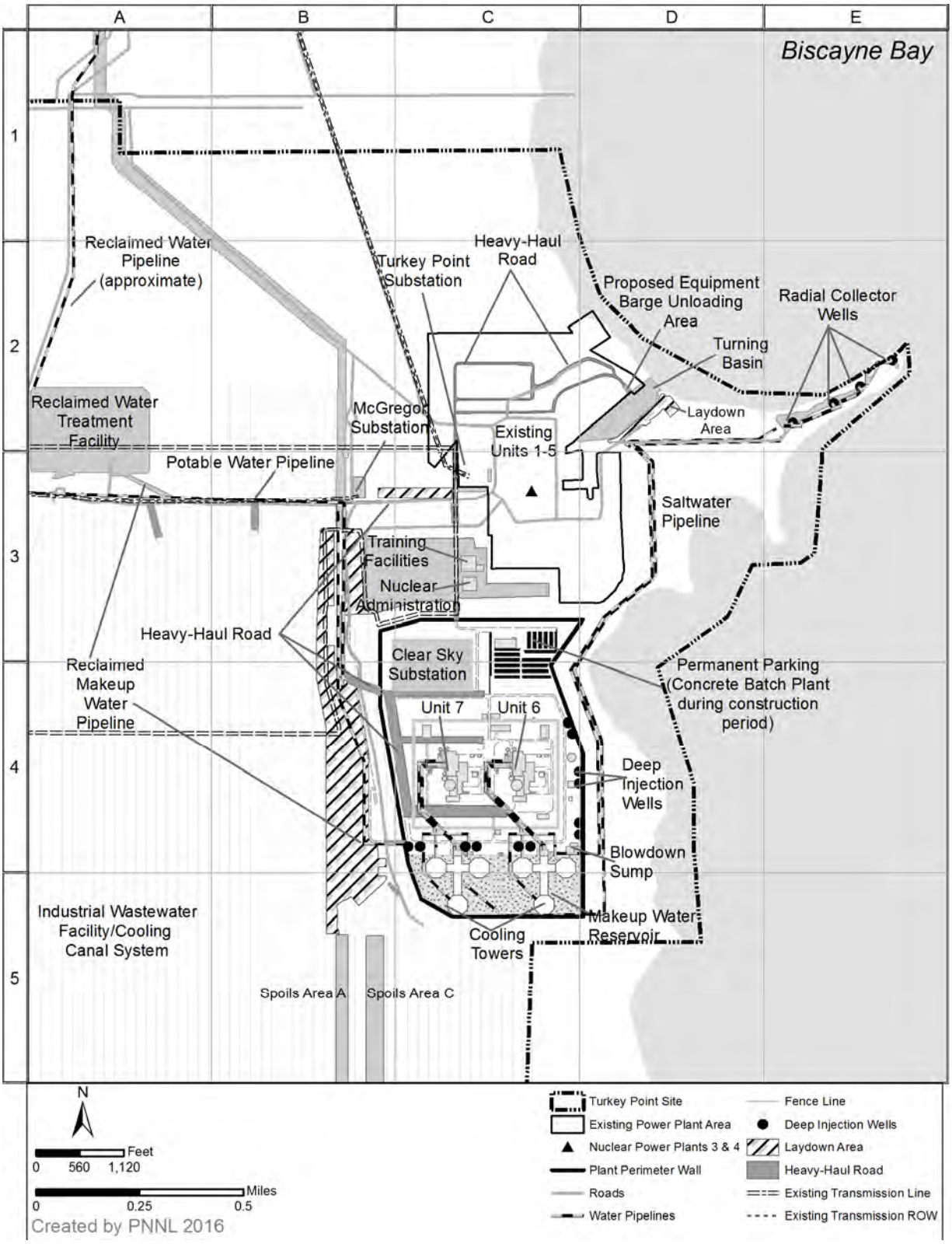


Figure 3-4. Site Layout for Proposed Turkey Point Units 6 and 7 and Associated Facilities

3.2.2.1 Landscape and Stormwater Drainage

Landscaping and the stormwater-drainage system would affect the recharge to the subsurface and the rate and location at which precipitation drains into adjacent waterbodies. Impervious surfaces hamper recharge to aquifers beneath the site.

As illustrated in Figure 3-4, the new reactor units, including cooling towers, makeup water reservoir, new substation, and associated facilities, would be built on a filled "island" enclosed by a stabilized earth perimeter wall on the north, east, and west sides and a reinforced concrete wall on the south side. The elevation of the top of the retaining wall would be 20 ft NAVD88 on the north, 21.5 ft on the east and west, and 24 ft on the south side where the wall encloses the makeup water reservoir. Within the filled portion of the perimeter wall, the ground surface would be raised to approximately 26 ft NAVD88 to meet the design requirements for the elevation of the AP1000 units, and would slope away from the reactor buildings to an elevation of 19 ft NAVD88 at the perimeter retaining wall. The modified ground surface and surrounding areas (about 162 ac) would be graded to direct stormwater runoff to catch basins, storm drains, or swales. The makeup water reservoir is not included in the runoff area because it is designed to retain up to 18 in. of precipitation. Stormwater from the main plant area would then be released to the canals of the adjacent existing industrial wastewater facility. Stormwater runoff from the laydown area west of the main plant area (about 46 ac) and from the administration and training buildings and parking lot north of the main plant area (about 32 ac) would also drain into the industrial wastewater facility (FPL 2014-TN4058; FPL 2015-TN4502; FPL 2011-TN303; FPL 2011-TN495).

The approximately 44 ac area of the reclaimed water-treatment facility would have a separate stormwater-management system. Because the treatment facility would be built on an area raised by fill to an elevation of about 14 ft NAVD88, the raised area would be graded and paved to direct stormwater to one of two retention ponds built on the raised area. The retention ponds would have the capacity to retain the first inch of precipitation and associated sediment. The retention pond outlets would drain over riprap aprons to the surrounding wetlands; each pond would also have an emergency spillway that would also drain over a riprap apron to the surrounding wetlands (FPL 2014-TN4058; FPL 2012-TN2582; FPL 2011-TN303; FPL 2011-TN495).

3.2.2.2 Cooling System

The cooling system generally represents the largest interface between a nuclear plant and the environment. Cooling water is typically obtained from a surface-water source, heat in the cooling water is typically rejected to the atmosphere, and blowdown and liquid effluents are typically discharged to the environment. For the proposed Turkey Point Units 6 and 7, FPL's primary source of cooling water would be reclaimed water from the MDWASD. However, because reclaimed water supply can vary in quantity and quality, the secondary source of cooling water would be saltwater extracted from Biscayne Bay subsurface sediment through radial collector wells built on the Turkey Point peninsula, east of the existing units (Figure 3-4, grid reference E2). FPL describes its approach to managing cooling-water supplies in the following way:

> Reclaimed water from the Miami-Dade Water and Sewer Department (MDWASD) would supply makeup water for the circulating-water system of Units 6 & 7. When reclaimed water cannot supply the quantity and/or quality of water needed for the circulating-water system, additional makeup water would be saltwater supplied from radial collector wells. The circulating-water system would be designed to accommodate 100 percent supply from reclaimed water, saltwater, or a combination of the two sources. The ratio of water supplied by the two makeup water sources would vary based on the availability of reclaimed water from the MDWASD (FPL 2014-TN4058).

A portion of the makeup water would be returned to the environment through deep-injection wells completed in the Boulder Zone (FPL 2014-TN4058). The Boulder Zone is an extremely permeable zone within a karstic fractured dolomite layer within the Lower Floridan aquifer in southeastern Florida. The Boulder Zone contains water the salinity and temperature of which is similar to modern seawater (Miller 1990-TN550). The remaining portion of the water would be released to the atmosphere via evaporative cooling through mechanical draft cooling towers. This section describes the components of the proposed cooling system based on the information provided by FPL in its ER (FPL 2014-TN4058) and FSAR (FPL 2015-TN4502).

Cooling-Water Source Structures

Reclaimed Water Source Structures

Reclaimed water from MDWASD would be piped from the MDWASD South District Wastewater Treatment Plant to the reclaimed water-treatment facility at the Turkey Point site (FPL 2014-TN4058). The reclaimed water-treatment facility would be located west of the proposed units and occupy approximately 44 ac (Figure 3-4, grid reference A2). The reclaimed water-treatment facility would house pumps, several types of filters, and clarifiers to reduce concentrations of iron, magnesium, oil and grease, total suspended solids, nutrients, and silica in the water to prepare it for use in the CWS (FPL 2014-TN4058).

The treated reclaimed water would be stored in a makeup water reservoir occupying 37 ac immediately south of proposed Units 6 and 7 (Figure 3-4, grid reference C5). The makeup water reservoir would have reinforced concrete walls and a concrete slab floor. The walls would extend to a height of 24.0 ft NAVD88 from the slab floor elevation of -2 ft NAVD88. Water would be withdrawn as needed to provide makeup water to the cooling-tower basins for each unit.

Saltwater Source Structures (Radial Collector Wells)

The source structures for the saltwater system would be four radial collector wells located on the Turkey Point peninsula (Figure 3-4, grid reference E2). Each radial collector well would consist of a central reinforced concrete caisson with several laterals (horizontal collector lines) extending out from the caisson. The laterals would extend horizontally up to 900 ft beneath Biscayne Bay. They would be installed approximately 25 to 40 ft below the sediment surface (FPL 2014-TN4058). Plan view and cross-section schematics of a typical radial collector well are shown in Figure 3-5 and Figure 3-6, respectively. Saltwater from the radial wells would be pumped directly to the cooling-tower basins as needed to provide makeup water.

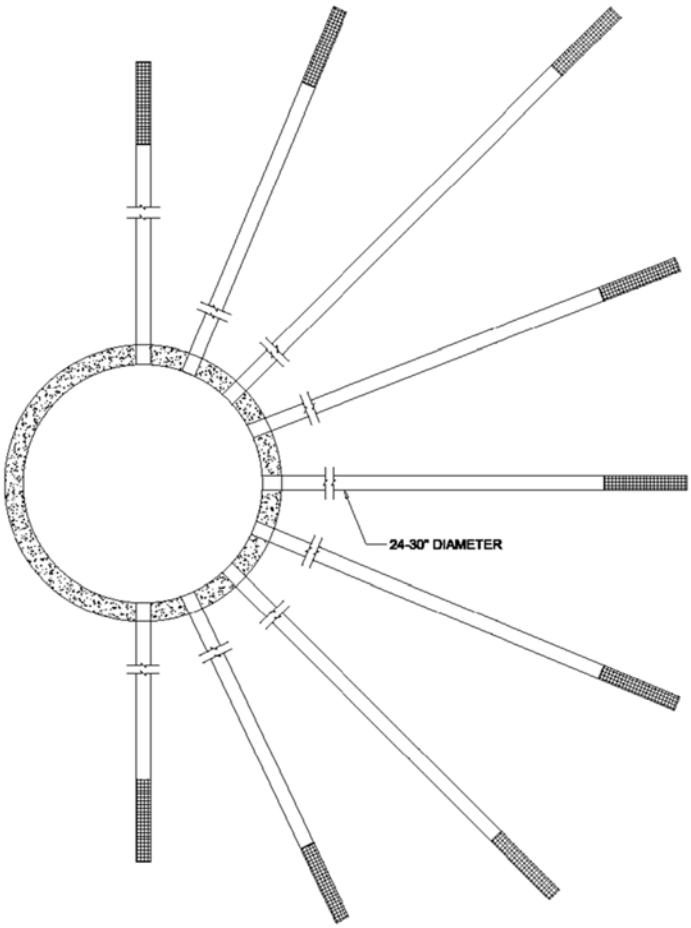


Figure 3-5. Plan View of a Typical Radial Collector Well System (FPL 2014-TN4058)

Deep-Injection Wells

Liquid effluents from proposed Turkey Point Units 6 and 7 would be transported via pipeline to deep-injection wells (FPL 2014-TN4058) and discharged to the Boulder Zone, a highly permeable geologic unit containing saltwater approximately 2,900 to 3,500 ft below grade. The deep-injection wells would be permitted by the Florida Department of Environmental Protection underground injection control program (FPL 2014-TN4058). A total of 12 deep-injection wells and 6 dual-zone monitoring wells are proposed. Six injection wells and three monitoring wells would be located along the east perimeter wall, and the other six injection wells and three monitoring wells would be located along the south wall dividing the filled area from the makeup water reservoir (Figure 3-7). Each injection well would be a 24 in. diameter steel well casing extending up to 3,500 ft below grade. A typical injection well steel casing would be lined with 18 in. diameter glass-fiber-reinforced plastic, with a nonhazardous corrosion inhibitor in the annulus between the two. The annulus would be pressurized using a positive-seal packer located at the base of the casing and the pressure would be continuously monitored for leaks during operation. Its upper section would be reinforced with additional steel casings of increasing diameter as shown in the typical injection well cross section in Figure 3-8. The monitoring wells would be installed to a depth of approximately 1,900 ft below grade in the aquifers overlying the Boulder Zone (FPL 2014-TN4058).

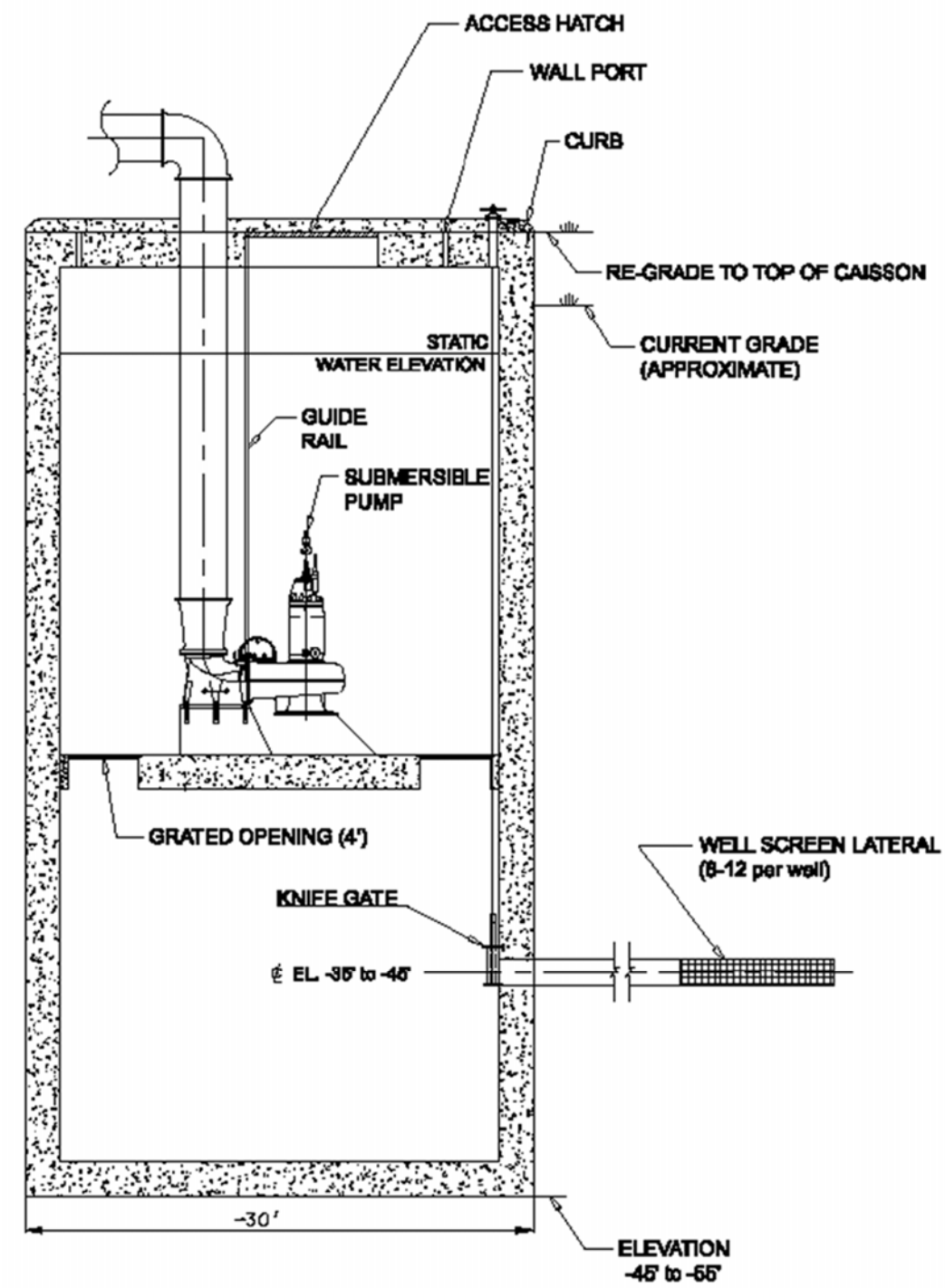


Figure 3-6. Cross-Section View of a Typical Radial Collector Well System (FPL 2014-TN4058)

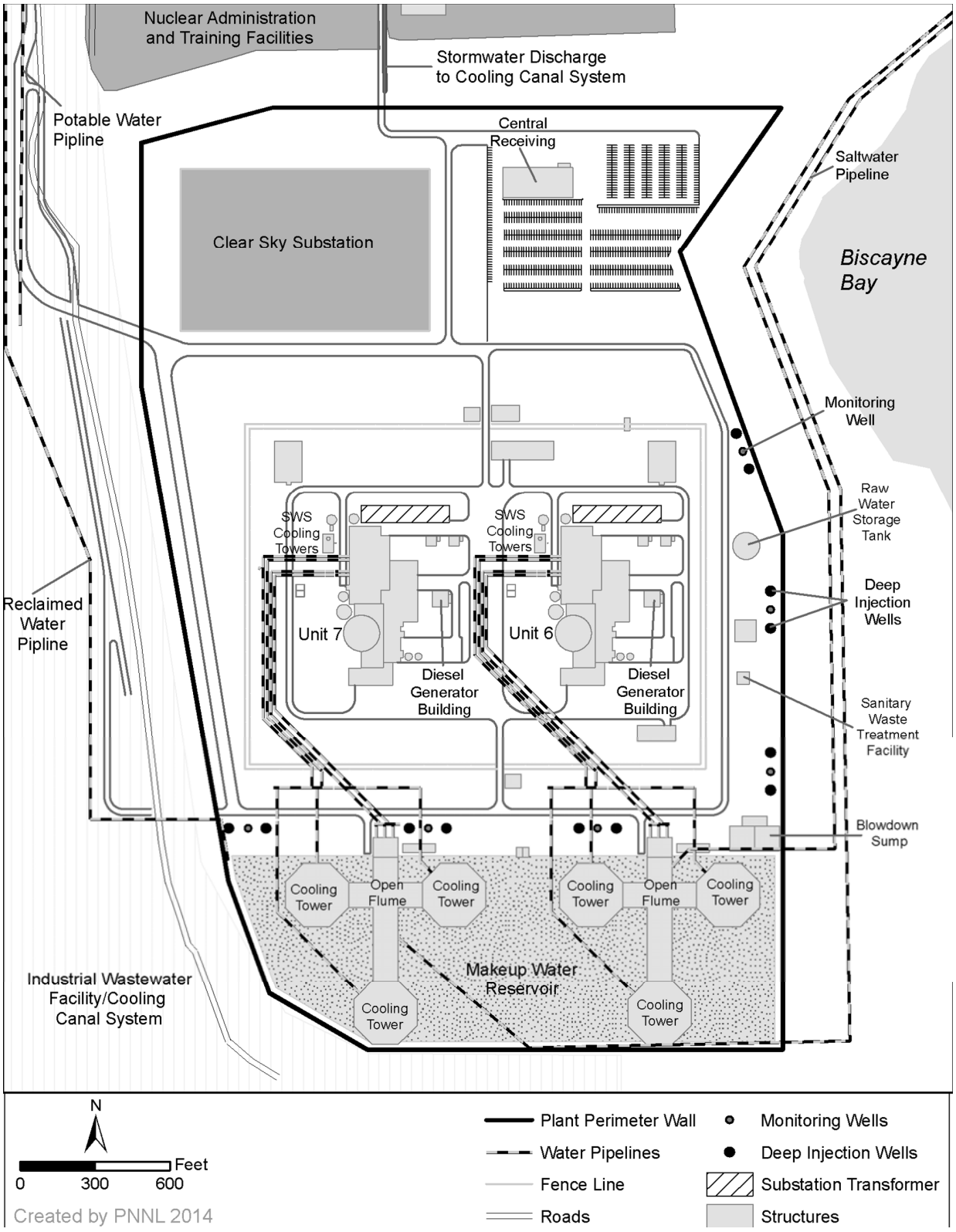


Figure 3-7. Turkey Point Proposed Units 6 and 7 Layout Detail

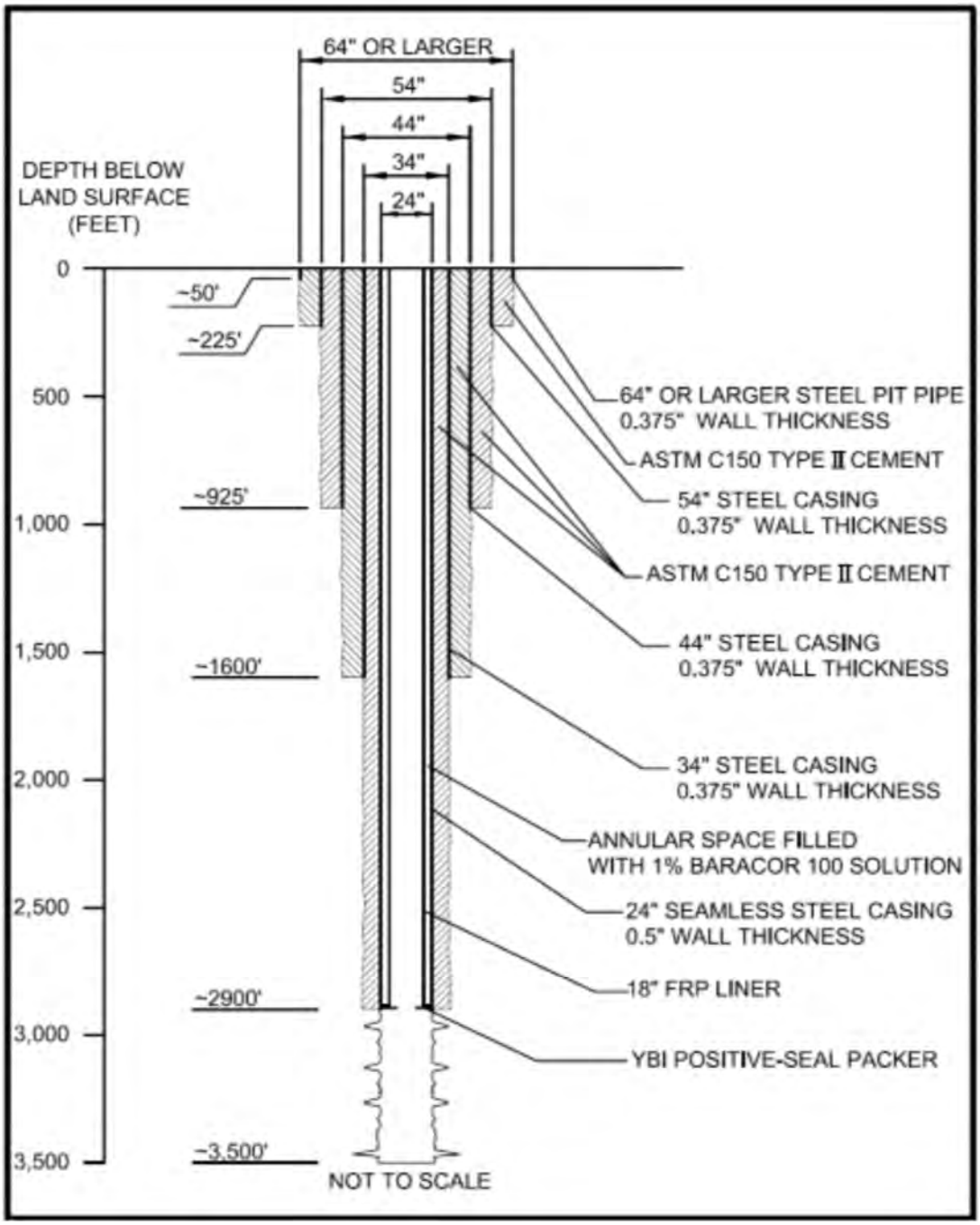


Figure 3-8. Cross-Section View of a Typical Injection Well Design (FPL 2014-TN4058)

As noted in Section 2.3.1.2, FPL drilled an exploratory well, EW-1, to determine the subsurface characteristics of the site. This well and associated dual-zone monitoring well DZMW-1 are located on a berm of the industrial wastewater facility outside and to the southwest of the main plant area for proposed Turkey Point Units 6 and 7 (FPL 2012-TN1577). FPL has obtained a permit to convert EW-1 to an operating deep-injection well for operational testing, and for later injection of construction wastewater from Units 6 and 7 (FDEP 2013-TN4784). FPL has also requested a modification to the permit to allow injection of hypersaline water pumped from

proposed groundwater extraction wells for remediation of the hypersaline plume associated with the industrial wastewater facility (see Section 2.3.1.1) (FPL 2016-TN4785, FDEP 2016-TN4625, FDEP 2016-TN4787).

Cooling Towers

Proposed Turkey Point Units 6 and 7 would use closed-cycle wet-cooling towers to dissipate heat from both the CWS and the SWS. As described in Section 3.1, each unit uses three cooling towers for the CWS. The CWS cooling towers would be mechanical draft towers, octagonal in shape, approximately 67 ft high and 246 ft in diameter, with fiberglass-reinforced plastic structural members and casings (FPL 2014-TN4058). In each tower, fans would blow air across water sprayed through fine nozzles, removing heat from the water and rejecting that heat to the atmosphere. The six towers would be located south of the reactor units within the perimeter wall of the makeup water reservoir (Figure 3-7). Each new unit would also have one cooling tower for the SWS, located adjacent to the AP1000 turbine building. These would also be mechanical draft cooling towers, each divided into two cells.

3.2.2.3 Other Structures with a Permanent Environmental Interface

Many of the structures and features needed to support the proposed Units 6 and 7 would have a permanent environmental interface on or off the Turkey Point site. These include local transportation facilities, buildings, parking lots, fill source areas, spoils disposal areas, and the transmission system.

Roads

An existing road network on the Turkey Point site would provide access to and between the existing facilities. To support the building of the proposed Turkey Point Units 6 and 7, approximately 3.3 mi of existing paved roads would be improved, and approximately 7 mi of unpaved roads would be paved to provide access to the site (FPL 2010-TN272). As stated in the SCA:

> The improvements to existing paved roadways consist of widening from two lanes to four lanes the following:
>
> - SW 328th Street/North Canal Drive from SW 137th Avenue/Tallahassee Road to SW 117th Avenue (approximately 2 mi);
> - SW 344th Street/Palm Drive from SW 137th Avenue/Tallahassee Road West to SW 137th Avenue/Tallahassee Road East (approximately 0.3 mi); and
> - SW 117th Avenue from SW 328th Street/North Canal Drive to SW 344th Street/Palm Drive (approximately 1 mi).
>
> The improvements to existing unpaved roadways consist of the following:
>
> - SW 359th Street will be improved to three lanes from SW 137th Avenue/ Tallahassee Road to SW 117th Avenue; and to four lanes from SW 117th Avenue to the proposed Units 6 and 7 construction parking areas and site (approximately 5 mi). This segment will require a bridge over the L-31E Canal.

- SW 137th Avenue/Tallahassee Road will be improved to three lanes from SW 344th Street/Palm Drive south to SW 359th Street (approximately 1 mi).
- SW 117th Avenue will be improved to four lanes from SW 344th Street/Palm Drive south to SW 359th Street (approximately 1 mi) (FPL 2010-TN272).

In addition, a heavy-haul road would be created between the barge-unloading facility and the building site, which would disturb approximately 5 ac. The heavy-haul road would be 2 mi long and 24 ft wide, and would include new heavy-haul bridges across the existing discharge and return cooling canals (FPL 2014-TN4058).

Rail Lines

No rail line currently provides access to the site. FPL does not plan to add a rail line.

Barge-Unloading Facility

An existing canal connects the Turkey Point site with the Florida Intracoastal Waterway. The existing Turkey Point barge-unloading facility, used for unloading fuel oil for Unit 1, would be enlarged to accommodate the larger barges used to deliver components for the proposed units (Figure 3-4, grid reference D2) (FPL 2014-TN4058). An area approximately 90 ft by 150 ft would be excavated on the northwest edge of the existing barge-turning basin resulting in a total disturbed area of 130 ft by 250 ft or 0.75 ac (FPL 2014-TN4058). This area includes a concrete apron for unloading equipment and components for the proposed units. The expansion of the barge-unloading facility would require dredging a 4,356 ft^2 (0.1 ac) area in the turning basin (FPL 2011-TN42). Excavated and dredged materials would be placed in the designated spoils areas (FPL 2014-TN4058).

Spoils Areas

Spoils areas would be established to allow dewatering and storage of muck, soils, and woody debris that were cleared, grubbed, or excavated during site preparation for Units 6 and 7 facilities. Three long, narrow spoils areas would be established on the berms of the industrial wastewater facility south of Units 6 and 7 (Figure 3-1, grid reference D3, D4, D5). Spoils Areas A and C would be located on the western and eastern sides, respectively, of the main return canal. Spoils piles in Areas A and C would be up to 5 mi long. Spoils Area B would be located along the southern edge of the industrial wastewater facility; it would be approximately 1.8 mi long. The available footprint areas for Spoils Areas A, B, and C are 77, 18, and 116 ac, respectively, providing capacity to store approximately 2 million cubic yards of material. The berms along the main return canal and the southern cooling canal vary from 100 ft to 220 ft wide, and their top elevation is approximately 6 ft NAVD88. The width of the spoils piles would depend upon the available width remaining between the berm access road and the far edge of the berm. The final elevation of the spoils piles would be approximately 16 to 20 ft NAVD88, or 10 to 14 ft above the current berm elevation (FPL 2014-TN4058; FPL 2011-TN1042).

Fill Source (Borrow) Areas

FPL estimates that 13 to 14.4 million cubic yards of fill would be needed to build proposed Units 6 and 7 and associated facilities (including transmission system and access roads), with the majority of the fill (almost 11 million cubic yards) needed on the Turkey Point property (Table 3-1). Borrow areas would supply the quantities of fill material needed to raise the elevation of the proposed Units 6 and 7 main plant site as well as the locations for associated facilities such as the reclaimed water-treatment facility, laydown areas, roads, and parking areas. Although some material excavated during site preparation could be suitable for reuse as fill, most fill material would come from offsite borrow areas. FPL proposes to obtain the offsite fill from established regional sources. A number of fill sources in the region could meet the needs of FPL at the Turkey Point site.

To provide context for the potential impacts of fill mining, the review team considered the Atlantic Civil, Inc. mine located about 10 mi west of the Turkey Point site as a viable commercial fill source (USACE 2013-TN3473). The review team also considered a rock mine in the Lake Belt region as another viable commercial source of fill. This allowed the review team to consider a nearby location with limited capacity and a more distant site with extensive capacity. The Atlantic Civil rock mine is located about 10 mi west of the FPL site; it is a complex of quarries, fill areas, and mitigation areas occupying approximately 3,200 ac (SFWMD 2010-TN3553; SFWMD 2014-TN3554). Atlantic Civil was issued a Department of the Army permit (SAJ-1995-6797) to expand an existing 71.2 ac quarry by 494.2 ac over the next 20 years. With the additional permitted acreage, the area available for excavation will be 565.4 ac (USACE 2013-TN3473). If this area was mined to the maximum depth allowed by its Department of the Army permit (67.2 ft), approximately 53 million cubic yards of material could be mined at this location.

An alternative source of fill would be rock mines in the Lake Belt region in northwest Miami-Dade County approximately 40 road miles northwest of the Turkey Point site. The USACE issued project-specific permits to several companies including to Cemex Construction Materials Florida for its FEC Quarry, named for the Florida East Coast (FEC) Railway that serves the quarry. The FEC Quarry and rail center are located near the intersection of the Florida Turnpike and Okeechobee Road (USACE 2010-TN3555; SFWMD 2010-TN3556). Other permitted quarries in the Lake Belt region include White Rock Quarries (North and South), Tarmac America, Florida Rock Industries, and APAC-Southeast, Inc. (USACE 2010-TN3559; USACE 2010-TN3560; USACE 2010-TN3561).

Table 3-1. Volume of Fill Needed for Turkey Point Units 6 and 7 and Associated Facilities

Plant Area	Volume of Category II Fill Needed
Reactors, Cooling Towers, Clear Sky Substation	7.8 million cubic yards
Reclaimed Water-Treatment Facility	1.6 million cubic yards
Laydown Areas	0.7 million cubic yards
Nuclear Administration and Training Facilities	0.6 million cubic yards
Transmission Access Roads and Tower Pads	2.0−3.0 million cubic yards
Access Roads	0.4−0.7 million cubic yards

Source: FPL 2014-TN4058

Sanitary Waste-Treatment Plant

FPL plans to build a new sanitary waste-treatment plant to support proposed Units 6 and 7. It would be sized to serve the operational workforce of both units (approximately 800 workers) as well as the workforce expected to be onsite during an outage (approximately 600 to 1,000 temporary workers). The plant would be sized to also treat sanitary waste from existing Units 1 through 5. The treatment plant would be located east of the location of the proposed Units 6 and 7 (Figure 3-7). FPL plans to use portable sanitary facilities until the permanent system is operational (FPL 2014-TN4058).

Effluent from the sanitary waste-treatment plant would be discharged to the blowdown sump where it would be mixed with cooling-tower blowdown before being discharged to the Boulder Zone through the deep-injection well system.

Power Transmission System

In Section 3.7 of its ER, FPL described the power transmission system that would connect proposed Turkey Point Units 6 and 7 to the grid that distributes power to the FPL service territory. Existing transmission system voltages range from 69 kV to 500 kV; existing transmission lines serving the area of the proposed Units 6 and 7 are 230 kV lines. The proposed Clear Sky substation, a new 230 kV/500 kV switchyard/substation, would be constructed within the perimeter wall for Units 6 and 7, just northwest of the new units (Figure 3-4, grid reference B4,C4). Once the Clear Sky substation is completed, it would be fenced off to limit access; the switchyard is considered to minimally interface with the environment during normal operation.

Underground transmission lines on the site are proposed to connect Units 6 and 7 to the 230 kV section of the new Clear Sky substation. Two 230 kV/500 kV autotransformers are proposed to be located in the 500 kV section of the substation; these would connect the 230 kV section of the substation to the 500 kV transmission lines.

FPL proposes to connect the proposed Clear Sky substation to the existing FPL transmission system with two new 500 kV lines and three new 230 kV lines (Table 3-2). The two new 500 kV lines would terminate at the Levee substation. One of the new 230 kV lines would share a corridor with the 500 kV lines as far as Levee, but it would bypass the Levee substation and continue on another 9 mi to terminate at the Pennsuco substation. As described in Section 2.2.2, FPL considered two transmission line corridor options for the Clear Sky to Pennsuco lines, the West Preferred Corridor and the West Consensus Corridor. The West Consensus Corridor would be similar to the West Preferred Corridor in length (Figure 2-5), but its width would vary between 1,000 ft and 5,000 ft (FPL 2013-TN2941). Another new 230 kV line would connect the Clear Sky substation to the Davis substation and would continue north to the Miami substation. These new transmission line routes are shown in Figure 2-5. The third new 230 kV line would supply an alternate feed of offsite power to the existing Turkey Point substation serving existing Units 1, 2, 3, 4, and 5, providing a path for offsite power between the substations in the event of loss of transmission at either substation (FPL 2014-TN4058).

The existing Turkey Point substation would need to be expanded by 0.9 ac to add two new 230 kV line terminals and to enlarge an existing relay vault building. The Levee substation would need to be expanded by 2.3 ac to connect the two proposed new 500 kV lines and to accommodate a stormwater-retention system. The Pennsuco substation would need to be expanded by 2.42 ac to connect the proposed new 230 kV line as well as install a stormwater-retention system. The Davis substation would need to be expanded by 1.12 ac to add two new 230 kV terminals and other equipment. The Miami substation would be modified and upgraded, but would not require additional area for expansion (FPL 2014-TN4058).

The State of Florida has approval authority over transmission line corridors under the Florida Power Plant Siting Act (Fla. Stat. 29-403.501 2011-TN1068). As a part of the State certification process, FPL performed a route study and corridor selection in which it defined the study area, delineated candidate routes, and evaluated the routes for land-use constraints.

Table 3-2. Summary of New Transmission Lines for Proposed Turkey Point Units 6 and 7

Corridor	Route	Size (kV)	Total Length (mi)	Length within Existing Corridor (mi)	Length of New Corridor Proposed (mi)	Corridor Width (ft)
West Preferred Corridor	Clear Sky – Levee 1 and 2	Two 500 kV	43	30	13	330[(a)]
	Clear Sky – Pennsuco, Clear Sky to Levee portion	One 230 kV				
	Clear Sky – Pennsuco, Levee to Pennsuco portion	One 230 kV	9	9	0	170
East Corridor	Clear Sky – Turkey Point	One 230 kV	0.4	0	0.5	Varies, 150 to 2,200
	Clear Sky – Davis		19	19	0	
	Davis – Miami		18	0	18	
Total Transmission Corridors			89.5	58	31.5	

(a) In the new portion of the West Consensus Corridor, widths vary from 1,000 to 5,000 ft.

Sources: FPL 2014-TN4058; FPL 2013-TN2941

Specific information about the proposed transmission line corridors, including options, is presented in Chapter 2 (Section 2.2.2.1). Figure 2-5 shows the locations of the proposed transmission lines and associated substations. As shown in Table 3-2, most of the new lines would occupy existing FPL-owned right-of-way.

Structures associated with the transmission line corridors are support towers and access roads. The 230 kV transmission lines would be supported by single-pole concrete structures that are gray/white in color. Structure heights would be approximately 80 to 90 ft depending on span length and other appropriate design factors. The substation pulloff towers would be galvanized steel or concrete. The 500 kV transmission towers would be 140 to 160 ft tall, made of concrete, galvanized lattice steel, or tubular steel. Tower spans would vary between 900 and 1,000 ft, although FPL states that the distance might vary with site-specific conditions; e.g., to avoid and minimize impacts on wetlands or cultural resources. If tower structures are tubular steel, similar structures with larger gauge steel would be used where the transmission lines turn light angles (15 degrees or less), and three-pole structures with supports would be used where the lines turn heavy angles (55 to 90 degrees).

The transmission lines would be designed to meet or exceed the clearance-to-ground requirements of the National Electrical Safety Code (NESC) (IEEE 2007-TN1087), and to keep the electric field at the conductor surface below corona inception. The electric-field-induced current from transmission lines would be required to meet the allowable NESC code (IEEE 2007-TN1087) and State (Fla. Admin. Code 62-814-TN644) requirements.

3.2.2.4 Other Structures with a Temporary Environmental Interface

Temporary plant-environment interfacing structures include a concrete batch plant and dewatering systems.

Concrete Batch Plant

A concrete batch plant would be located north of Turkey Point Units 6 and 7 in the area that will ultimately become the parking lot for the operating workforce (Figure 3-4, grid reference C4). This area would house the equipment and facilities needed for delivery, materials handling and storage, and preparation of concrete. Water for the concrete batch plant would be supplied by Miami-Dade County (FPL 2014-TN4058). Wastewater from the batch plant would be discharged to the industrial wastewater facility (FPL 2014-TN4058).

Dewatering Systems

Dewatering is expected to be a localized activity associated with excavation. Dewatering systems would be installed for the excavation for the nuclear island. Surface water and groundwater seepage would be removed and discharged to the cooling canals of the industrial wastewater facility (FPL 2014-TN4058).

3.2.3 Structures with a Minor Environmental Interface

The structures described in the following sections would have minimal environmental interface during plant operation.

3.2.3.1 Nuclear Island and Other Reactor Buildings

Each AP1000 nuclear island would consist of a containment building, a shield building, and an auxiliary building. The foundation for the nuclear island would be an integral basemat that supports these buildings. The steel containment vessel would be completely surrounded by the shield building and the auxiliary building. The containment foundations would be approximately 40 ft below grade. The construction materials would be concrete and steel. The tallest building would be the shield building at approximately 229 ft above the plant grade of 25.5 ft NAVD88. The auxiliary building would be rectangular, approximately 254 ft by 116 ft, and rise to a height of approximately 81 ft above grade.

Annex Building

The annex building would be a 285 ft by 132 ft concrete-and-steel structure that would rise to a height of approximately 83 ft above grade and provide personnel access to the plant and house plant-support systems and equipment.

Turbine Building

The turbine building would be a metal-sided 310 ft by 156 ft rectangular structure rising 146 ft above grade. The turbine building would have a drain system that discharges to a wastewater-retention basin connected to the blowdown sump. Prior to discharge to the blowdown sump, wastewater would flow through an oil separator to remove oils and through a radiation detector so that water could be isolated if radiation were detected (FPL 2014-TN4058). The turbine building would also include a vent system for the condenser and turbine.

Radioactive-Waste Facility

The radwaste building would be a steel-framed structure that rises approximately 36 ft above grade (FPL 2014-TN4058). It would house the holding and processing systems for low-level liquid radioactive waste and solid radioactive waste. It also would house the collection and processing system for gaseous radioactive waste. Radioactive-waste management is described in more detail in Section 3.4.3. Packaged solid wastes and liquid mixed wastes would be stored in the radwaste building until shipment offsite for further processing or disposal. The environmental interfaces for the radioactive waste-treatment facility would be liquid effluent discharges to the blowdown discharge line, gaseous effluent venting, and solid-waste handling for offsite shipment.

Diesel-Generator Building

Diesel generators would be installed on the site to provide a backup source of power when the normal power source is disrupted. Combustion emissions would be released to the atmosphere from the generators only during emergency operations and periodic testing. Two diesel generators would be located in the AP1000 diesel-generator building, which is a steel-framed, one-story structure. Ancillary diesel generators would be located in the AP1000 annex building (FPL 2014-TN4058).

3.2.3.2 Cranes and Footings

A crane on a concrete footing would be used to erect Units 6 and 7. Other cranes may be used for materials handling and erection. The tallest crane could reach up to 460 ft (FPL 2014-TN4058).

3.2.3.3 Pipelines

Nine miles of new 72 in. diameter pipeline would be laid to convey water from the MDWASD South District Water Treatment Plant to the proposed reclaimed water-treatment facility at the Turkey Point site. For 6.5 mi, the MDWASD reclaimed water pipeline would follow existing transmission corridors. Approximately 2.5 mi of pipeline would be outside of existing rights-of-way (FPL 2014-TN4058).

Approximately 10 mi of new 30 in. diameter pipeline would convey potable water from an existing MDWASD supply line at the intersection of SW 288th Street and SW 137th Avenue/ Tallahassee Road to Units 6 and 7. The potable water pipeline route would be within existing road rights-of-way and would result in no additional land disturbance (FPL 2015-TN4442). Within Units 6 and 7, MDWASD potable water would supply all other plant water needs outside

of the CWS (the SWS, sanitary and potable water, demineralized-water system, fire protection, and equipment/floor washdown) (FPL 2014-TN4058). The locations of the MDWASD reclaimed and potable water pipelines are shown in Figure 2-5.

Pipelines would also convey treated reclaimed water from the reclaimed water-treatment facility to the makeup water reservoir and from the reservoir to the Units 6 and 7 cooling towers, saltwater from the radial collector wells to the cooling-tower basins, wastewater from various systems to the blowdown sump, and from the blowdown sump to the injection wells (FPL 2014-TN4058). The locations of these structures and the pipeline routes are shown in Figure 3-4 and Figure 3-7.

3.2.3.4 Support and Laydown Areas

Multiple construction-support and laydown areas would be established to support fabrication and erection activities and might be maintained as laydown areas for future maintenance and refurbishment of the plant. The largest laydown area would be 46 ac located west of the main plant area (Figure 3-4, grid reference B3, B4, B5). A smaller 6 ac laydown area would be located near the barge-unloading facility. A 3 ac laydown area would be located north of the proposed nuclear administration and training facilities near the existing Turkey Point and McGregor substations. This laydown area would be used for the transmission system (Figure 3-4, grid references D2 and B3) (FPL 2014-TN4058).

3.2.3.5 Parking

Parking areas would be created to support the construction workforce and some parking would be retained for the operating workforce once plant installation is completed. Temporary parking areas would be in the vicinity of the plant, support, and laydown areas identified in Figure 3-4. A permanent parking area would replace the concrete batch plant north of Turkey Point Unit 6 (Figure 3-7) and would have a finished elevation of 23 ft NAVD88 (FPL 2015-TN4502).

3.2.3.6 Miscellaneous Buildings

A variety of small miscellaneous buildings would exist throughout the site to support worker, fabrication, building, and operational needs (e.g., shop buildings, support offices, warehouses, guard houses). Most of these buildings would be temporary and would be removed after the plant begins operation.

3.3 Construction and Preconstruction Activities

The NRC's authority is limited to construction activities that have a reasonable nexus to radiological health and safety or common defense and security (72 FR 57416) (TN260). Examples of construction (defined in 10 CFR 50.10(a) [TN249]) activities for safety-related structures, systems, or components include pile driving, subsurface preparation, placement of backfill, concrete, or permanent retaining walls within an excavation; installation of foundations; or in-place assembly, erection, fabrication, or testing of specified structures, systems, or components.

Other activities related to building the plant that do not require NRC approval (but may require a Department of the Army permit) may occur before, during, or after NRC-authorized construction

activities (as defined by 10 CFR 50.10(a) [TN249]). These activities are termed "preconstruction" in 10 CFR 51.45(c) (TN250) and are typically regulated by local, State, Tribal, or Federal agencies other than the NRC. Preconstruction includes activities such as site preparation (e.g., clearing, grading, and installation of erosion control, and other environmental mitigation measures), erection of fences, excavation, erection of support buildings or facilities, building service facilities (e.g., roads, parking lots, rail lines, transmission lines, sanitary-treatment system, potable water system), and procurement or fabrication of components occurring at other than the final, in-place location at the site. Further information about the delineation of construction and preconstruction activities is presented in Chapter 4 of this EIS.

This section describes the structures and activities associated with building Turkey Point Units 6 and 7. Table 3-3 provides general definitions and examples of activities that would be performed in building the new units. This section characterizes the activities for the principal structures to provide the requisite background for the assessment of environmental impacts; it is not a complete discussion of every activity or a detailed engineering plan.

Table 3-3. Definitions and Examples of Activities Associated with Building Turkey Point Units 6 and 7

Activity	Definition	Examples
Clearing	Removing vegetation or existing structures from the land surface.	Cutting vegetation in an area to be used for construction laydown.
Grubbing	Removing roots and stumps by digging.	Removing stumps and roots of trees or shrubs removed from the construction laydown area.
Grading	Reforming the elevation of the land surface to facilitate operation of the plant and drainage of precipitation.	Leveling the site of the reactors and cooling towers.
Hauling	Transport of material and workforce along established roadways.	Driving on new access road by construction workforce.
Paving	Laying impervious surfaces, such as asphalt and concrete, to provide roadways, walkways, parking areas, and site drainage.	Paving the parking area.
Shallow excavation	Digging a hole or trench to a depth reachable with a backhoe. Shallow excavation may not require dewatering.	Placing pipelines; setting foundations for small buildings.
Deep excavation	Digging an open hole in the ground. Deep excavation requires equipment with greater vertical reach than a backhoe. Deep excavation generally requires dewatering systems to keep the hole from flooding.	Excavating for the basemat for the reactor.
Excavation dewatering	Pumping water from wells or pumping water directly to keep excavations from flooding with groundwater or surface runoff.	Pumping water from reactor building deep excavation.
Dredging	Removal of substrates and sediment in navigable waters, or wetlands.	Enlarging the barge-unloading facility to accommodate larger barges.
Spoils placement	Placement of construction (earthwork) or dredged material in an upland location.	Placing muck removed from the proposed Units 6 and 7 plant area in the spoils areas established on the cooling canal berms.
Erection	Assembly of all modules into their final positions, including all connections between modules.	Using a crane to assemble reactor modules.

Table 3-3. (contd)

Activity	Definition	Examples
Fabrication	Creating an engineered material from the assembly of a variety of standardized parts. Fabrication can include conforming native soils to some engineered specification (e.g., compacting soil to meet some engineered fill specification).	Preparing concrete for pours; laying rebar for the basemat.
Vegetation management	Thinning, planting, trimming, and clearing vegetation.	Maintaining the switchyard free of vegetation.
Filling a wetland or waterbody	Discharge of dredge and/or fill material into waters of the United States, including wetlands.	Placing fill material into wetlands to bring it to grade with the adjacent land surface.

3.3.1 Major Activity Areas

Construction and preconstruction activities for proposed Turkey Point Units 6 and 7 would occur within the boundaries of FPL property, with the exception of the new transmission lines described in Sections 2.2.2 and 3.2.2.3, pipelines for reclaimed and potable water from the MDWASD, offsite road improvement areas, and the offsite fill source (borrow) areas. Access roads for Units 6 and 7 would enter the property from the northwest. The radial collector wells would be at the east end of the Turkey Point property. The following sections briefly describe FPL's proposed construction and preconstruction activities associated with the structures described in Sections 3.2.2 and 3.2.3.

3.3.1.1 Landscape and Stormwater Drainage

Preparing to build and operate proposed Turkey Point Units 6 and 7 would involve clearing, excavating, filling, and grading land for the main reactor buildings and support facilities and additional space for material and equipment laydown areas. The site surface would be significantly altered to allow the proposed reactors to be built on the Turkey Point site. The details of the alterations are discussed in the following sections. After the site alterations and facilities are complete, a stormwater-drainage system of catch basins, storm drains, and swales would be created around the facilities to direct site stormwater away from the operational areas. Stormwater runoff would be directed to the cooling canals of the industrial wastewater facility (FPL 2014-TN4058). EIS Section 3.2.2.1 provides a description of the drainage system.

The separate stormwater-management system for the reclaimed water-treatment facility would involve grading and paving of the filled area, excavation of the retention ponds, lining of the ponds, and placement of riprap around the outlets to protect receiving areas from erosion (FPL 2011-TN303; FPL 2011-TN495).

3.3.1.2 Main Plant Area, Cooling Towers, and Makeup Water Reservoir

FPL describes the preparation of the site for constructing the proposed units as follows:

> Significant earthwork would be required to establish finish grades at the Units 6 and 7 plant area, especially to raise the power block (i.e., Nuclear Island) to its required finished-floor elevation of 26.0 feet NAVD 88. Approximately 7.8 million cubic yards of general area (Category II) backfill would be required to raise the

> existing grade elevation of approximately –1.0 feet NAVD 88 to the finished grade elevation adjacent to the power block of 25.5 feet NAVD 88. Also, backfilling around the major power block Seismic Category I (safety-related) embedded structures would require approximately 130,000 cubic yards of safety-related (Category 1) engineered structural backfill. (FPL 2014-TN4058; FPL 2011-TN42)

As described in Section 3.2.2.2, the new reactor units, Clear Sky substation, and permanent parking facilities would be built on a filled "island" enclosed by a mechanically stabilized earth perimeter wall on three sides and a reinforced concrete wall on the south side. Prior to placing backfill to raise the site elevation, the existing soil on the site would need to be removed. Sheet pile would be installed around the area to be excavated prior to soil removal to minimize the impact of the excavation on the cooling canals of the industrial wastewater facility. The existing soil, or muck, would be removed to the top of the Miami Limestone Formation at approximately -3 ft NAVD88 and replaced with fill. Removal of the existing soil and emplacement of fill would be coordinated to minimize groundwater inflow (FPL 2014-TN4058). Once the main plant site (excluding the makeup water reservoir and cooling-tower area) has been "demucked" and filled to establish a dry working surface at 0 ft NAVD88, a mechanically stabilized earth perimeter wall would be constructed along the north, east, and west sides of the area to a height of 20 to 21 ft NAVD88. The area would be filled to approximately 0 ft NAVD88. Near the center of the demucked area within the earthen perimeter wall, deep excavation, temporary dewatering, fill placement, and large-scale fabrication and erection activities would be involved in building the AP1000 units. Construction of the reactor containment and auxiliary buildings would involve excavation to the top of the Fort Thompson Formation, approximately -35 ft NAVD88. To minimize groundwater flow into the excavation, a diaphragm wall would be constructed around the area to be excavated. The wall would extend into the Key Largo Formation to about -60 ft NAVD88 or into a confining layer of the aquifer, thus sealing off the excavation from lateral groundwater inflow. The bottom of the deep excavation would be sealed off from vertical groundwater inflow by a grout plug approximately 25 ft thick. The diaphragm wall and grout plug would be left in place once building is complete (FPL 2014-TN4058).

Building the diesel-generator facility and other modular reactor buildings would involve fabrication and erection. Pipelines would be installed before the entire area was backfilled and brought to final grade.

3.3.1.3 Reclaimed Makeup Water Reservoir and Cooling Towers

The 37 ac makeup water reservoir and cooling-tower area would also be stabilized by placing sheetpile into the Miami Limestone; it would then be demucked to the Miami Limestone surface but not backfilled. Excavated spoils would be placed in the designated spoils disposal areas. Other than temporary local dewatering for the cooling-tower foundations, dewatering would not be needed because the surface would be sealed by concrete (placed underwater if necessary) to exclude groundwater seepage. A concrete slab would be poured to bring the reservoir floor elevation to -2 ft NAVD88. The reservoir walls would be reinforced concrete extending to 24 ft NAVD88 (FPL 2014-TN4058). Building the cooling towers would involve fabrication and erection activities in addition to the shallow excavation and possible dewatering discussed above.

3.3.1.4 Excavation Dewatering

Dewatering systems would be installed in the deep excavations if required. At a minimum, FPL expects to install drainage sumps at the bottom of the excavations to facilitate the removal of water that collects there, but these would be temporary—in place until the diaphragm wall and grout plug were completed and functional. Dewatering would also likely be necessary for the excavations associated with the cooling towers. It would be minimized by pressure grouting the limestone into which the excavation would occur. Some deeper excavations for piping (for example beneath the condenser) are also expected to involve dewatering. FPL estimated that the maximum dewatering rate would be 1,200 gpm (1.73 Mgd), and would occur for 1 year. Once the grouting and excavation phases are completed, the expected dewatering rate would be 200 gpm or less during foundation construction (FPL 2014-TN4058). Water from the excavations would be pumped to the cooling canals of the industrial wastewater facility (FPL 2014-TN4058).

3.3.1.5 Radial Collector Wells

Installation of radial collector wells on the Turkey Point peninsula would involve excavation to a depth of greater than 40 ft and fabrication of the central caisson followed by horizontal drilling to install the lateral collector wells. Lateral collector wells would extend up to 900 ft from the central caisson beneath Biscayne Bay (FPL 2014-TN4058).

3.3.1.6 Deep-Injection and Monitoring Wells

The 12 deep-injection wells would be installed to between 2,900 and 3,500 ft below ground surface using standard deep-well injection drilling and completion techniques. Six dual-zone monitoring wells would be installed by standard drilling and completion techniques to approximately 1,900 ft below land surface. One zone would be used to monitor the deepest underground source of drinking water in the area and one zone would be open to a monitoring zone beneath the deepest underground source of drinking water. As noted in Section 3.2.2.2, exploratory well EW-1 was converted to a permitted deep-injection well that could be used to dispose of wastewater from construction-related activities. All injection and monitoring well installation methods would be stipulated and permitted by the Florida Department of Environmental Protection in accordance with its underground injection control program (FPL 2014-TN4058).

3.3.1.7 Spoils Disposal

FPL has indicated that the organic soil or “muck” on the proposed building site would be removed and disposed of in several locations on the berms alongside the main return canal and southern canal of the industrial wastewater facility, as described in Section 3.2.2.3 and shown in Figure 3-1. Prior to placement of spoils material, part of the surface would be excavated, and small containment berms would be created to form a shallow excavation in which to place the spoils. Material that is removed from the excavations and is not suitable for reuse would be placed in these areas for dewatering and disposal. FPL has indicated that measures such as berms, riprap, sedimentation filters, and detention ponds would be used to control drainage from the spoils piles to the industrial wastewater facility (FPL 2014-TN4058; FPL 2011-TN1042).

3.3.1.8 Roads

Building the heavy-haul road and the site-access roads would involve clearing and grading of land along the proposed routes to allow the roads to be widened and improved (Figure 3-4) (FPL 2014-TN4058). Drainage ditch installation, culvert installation, and fill placement would be needed, and new and upgraded roadways would be paved. Improvements to SW 359th Street would include a bridge to be installed over the L-31E Canal (FPL 2010-TN272). Four other new bridges would be built to serve Units 6 and 7, including two where the heavy-haul route crosses the industrial wastewater facility. Installation of the bridges may involve excavation for footings and fabrication of bridge components. Temporary bridges would be installed and used until the permanent bridges were completed.

3.3.1.9 Barge-Unloading Facility

Expanding the barge-unloading facility would involve excavation, dredging, and installing sheet piles to isolate the excavation from the barge-turning basin. Turbidity curtains would be used to isolate the area from Biscayne Bay and the National Park (FPL 2014-TN4058).

3.3.1.10 Reclaimed Water-Treatment Facility

Building the reclaimed water-treatment facility would involve shallow excavation (demucking), significant earthwork to raise the elevation of the site above the 100-year flood elevation, fabrication, and erection on a raised, graded area. FPL has indicated that 1.6 million cubic yards of fill would be needed to raise the approximately 44 ac site to its final grade elevation of about 14 ft NAVD88 (FPL 2011-TN42; FPL 2011-TN303).

3.3.1.11 Sanitary Waste-Treatment Plant

Building the sanitary waste-treatment plant would involve shallow excavation and limited fabrication and erection. The facility would be designed in accordance with industry standards and in compliance with Florida Department of Environmental Protection discharge requirements for deep-injection well disposal under the provisions of Underground Injection Control Rule in Fla. Admin. Code 62-528 (TN556) (FPL 2014-TN4058).

3.3.1.12 Pipelines

Pipelines would be installed between the MDWASD South District Wastewater Treatment Plant and the reclaimed water-treatment facility at the Turkey Point site (FPL 2014-TN4058). Pipelines would also be installed in several areas on the site including from the reclaimed water-treatment facility to the makeup water reservoir, from the radial collector wells to the cooling-tower basins, and from the blowdown collection sump to the injection wells. New pipelines would also be installed for the potable water system. The potable water line would include approximately 10 mi of new pipeline, most of it along existing roads or corridors, but approximately 2.5 mi would involve new land disturbance (FPL 2014-TN4058). The reclaimed water pipeline would include approximately 9 mi of new pipeline, approximately 2.5 mi of which would be in a new pipeline corridor.

Pipelines would generally be buried in trenches in areas outside the Turkey Point Units 6 and 7 perimeter wall, but some pipelines would be above ground within the plant area. Offsite pipelines would be buried; installation would involve the clearing of land along the pipeline corridor, shallow excavation (trenching), and backfilling.

3.3.1.13 Concrete Batch Plant

Erecting the temporary concrete batch plant would occur on graded fill in the northeastern part of the plant area (within the perimeter wall) (Figure 3-4).

3.3.1.14 Construction-Support and Laydown Areas

Establishing and preparing laydown areas would be necessary for staging of activities. Prior to and during construction and preconstruction, materials would be brought to the site and stored in laydown areas. FPL expects to clear and grade laydown areas in various locations near the proposed Turkey Point Units 6 and 7 (Figure 3-4). Some filling would be necessary to bring laydown areas to appropriate grade. Support and laydown areas would be graded relatively level and covered with crushed stone or gravel. Normally only limited vegetation is allowed in laydown areas.

3.3.1.15 Parking

Parking areas would be filled if necessary, graded, and paved.

3.3.1.16 Miscellaneous Buildings

Excavation for shallow foundations would be needed prior to fabrication and erection of miscellaneous buildings. In most cases, fill would be needed to create a stable base and to bring the area up to an appropriate final grade.

3.3.1.17 Switchyard and Substation Expansions

Excavation, backfilling, and grading would be needed for the proposed Clear Sky substation, which would be built within the Units 6 and 7 plant perimeter wall. Electrical switching structures would be erected and the switchyard would be fenced. The existing Levee and Pennsuco substations would both be expanded; substation expansions would involve excavation, filling, grading, fencing, and creation of stormwater-retention areas. The Davis and Miami substations would not be expanded, but bringing new lines into these substations would involve limited excavation and installation activities within the existing footprints (FPL 2014-TN4058).

3.3.1.18 Transmission Lines

Installation of transmission lines would involve the removal of trees and shrubs along portions of the transmission line corridor and access roads, movement of construction equipment, and shallow excavation for the foundations of the transmission line towers. Dewatering may be needed to build footings for transmission towers. Some tower footings and access roads would need filling, and bridges to access berms would be needed to install new towers located at the industrial wastewater facility (FPL 2014-TN4058; FPL 2011-TN42).

3.3.1.19 Cranes and Crane Footings

Fabrication of footings and erection of cranes would be necessary to build the larger plant structures.

3.3.2 Summary of Resource Parameters During Construction and Preconstruction

Table 3-4 provides a list of the significant resource commitments associated with construction. The values in the table combined with the affected environment described in Chapter 2 provide the basis for the construction and preconstruction impacts assessed in Chapter 4. These values were stated in the ER and the review team has confirmed that the values are reasonable.

Table 3-4. Summary of Parameters and Resource Commitments Associated with Construction and Preconstruction of Proposed Units 6 and 7

Resource Areas	Value	Parameter Description	Reference
All Resource Areas	123 mo (10 yr)	Duration of construction and preconstruction activities for two AP1000 units	FPL 2014-TN4058; FPL 2015-TN4502
Land Use, Terrestrial Ecology, Cultural and Historic Resources (Site and Vicinity)	591 ac	Disturbed area footprint onsite; 6 ac temporarily disturbed for reclaimed water pipeline, 585 ac permanently disturbed of which 218 ac is main plant area.	FPL 2014-TN4058, FPL 2014-TN3569
	128 ac	Disturbed area offsite but in vicinity (road improvements); 128 ac permanently disturbed	
Land Use, Terrestrial Ecology, Cultural and Historic Resources (Offsite, Transmission Lines)	2,213 ac	Total area for MDWASD water pipelines to site; none permanently disturbed	FPL 2014-TN4058
	5,373 ac	Total area for the preferred transmission line corridors, access road corridors, and substations; approximately 376 ac permanently disturbed for access roads and 6 ac permanently disturbed at substations	
Hydrology – Groundwater	-60 ft NAVD88	Maximum excavation depth (to install diaphragm wall)	FPL 2014-TN4058
	-35 ft NAVD88	Maximum excavation depth (containment and auxiliary buildings)	
Hydrology-Surface Water, Socioeconomics	565 gpm (0.8 Mgd)	Construction water use; source would be potable water supply of existing Turkey Point units	FPL 2014-TN4058
Hydrology-Surface Water, Hydrology-Groundwater	1,200 gpm (1.73 Mgd)	Maximum construction wastewater and dewatering discharge rate to the cooling canals of the industrial wastewater facility	FPL 2014-TN4058

Table 3-4. (contd)

Resource Areas	Value	Parameter Description	Reference
Socioeconomics, Transportation	3,950 workers	Peak construction and preconstruction workforce	FPL 2014-TN4058
	3,983 workers	Peak workforce during construction period (includes 33 operations workers)	
Terrestrial Ecology, Socioeconomics	460 ft (crane)	Height of tallest structure or equipment during construction and preconstruction	FPL 2014-TN4058
Terrestrial Ecology, Nonradiological Health, Socioeconomics	100 dBA	Noise level 100 ft from construction source	FPL 2014-TN4058
	80 dBA	Noise level 400 ft from 100 dBA source	FPL 2010-TN272 FPL 2014-TN4058
	124 dBA	Peak construction noise at source	
	90 dBA	Peak construction noise level 50 ft from source	
	75 dBA	Noise level 200 ft from source	
	65 dBA	Noise level 400 ft from source	
	64 dBA	Peak construction noise level at nearest permanent private residence	

3.4 Operational Activities

The operational activities considered in the review team's environmental review are those associated with structures that interface with the environment, as described in Section 3.2.2. Examples of operational activities include withdrawing water for the cooling system, discharging blowdown water and sanitary effluent, and discharging waste heat to the atmosphere. Activities within each AP1000 unit are discussed by FPL in the FSAR portion of its application (FPL 2015-TN4502) and are reviewed by the NRC as part of its safety review and will be documented in its Safety Evaluation Report.

The following sections describe the operational activities, including operational modes (Section 3.4.1), plant-environment interfaces during operations (Section 3.4.2), and the radioactive and nonradioactive waste-management systems (Sections 3.4.3 and 3.4.4). The values of resource parameters likely to be encountered during operations are summarized in Section 3.4.5.

3.4.1 Description of Operational Modes

The operational modes for proposed Turkey Point Units 6 and 7 considered in the assessment of operational impacts on the environment (Chapter 5 of this EIS) are normal operating conditions and emergency shutdown conditions. These are considered the conditions under which maximum water withdrawal, heat dissipation, and effluent discharges occur. Cooldown,

refueling, and accidents are considered alternative modes to normal plant operation. During these alternative modes, water intake, cooling-tower evaporation, water discharge, and radioactive releases may change from normal operating or emergency shutdown conditions.

3.4.2 Plant-Environment Interfaces during Operation

This section describes the operational activities related to structures that have an interface to the environment.

3.4.2.1 Stormwater-Management System

FPL's stormwater-management system for Turkey Point Units 6 and 7 and associated facilities would be designed to handle a 25-year, 72-hour design storm event. As described in Section 3.2.2.1, the stormwater-drainage system around the proposed Turkey Point Units 6 and 7 facilities (within the plant perimeter wall) would direct stormwater to catch basins that would discharge to the cooling canals of the industrial wastewater facility. Runoff from the laydown area west of the main plant site, and from the nuclear administration and training facility area north of the main plant site, would also discharge to the industrial wastewater facility. The reclaimed water-treatment facility stormwater-drainage system would consist of graded surfaces draining to two stormwater-management basins; the basins would discharge to the surrounding wetland. The stormwater-management basins would be designed to handle the design storm event and to meet Miami-Dade County and South Florida Water Management District (SFWMD) design criteria for detention volumes. Runoff from any areas that could be contaminated with oil would be sent through oil/water separators and then discharged (FPL 2011-TN495; FPL 2011-TN303).

3.4.2.2 Circulating-Water System

Cooling-Water Sources

Reclaimed Water

As noted in Section 3.2.2, FPL proposes to use reclaimed water from the MDWASD as the primary source of water for the condenser cooling system for the operation of proposed Turkey Point Units 6 and 7. The reclaimed water would be provided and used in accordance with Fla. Admin. Code 62-610 (TN1269). It would receive secondary treatment and high-level disinfection before leaving the MDWASD South District Wastewater Treatment Plant. Under normal operating conditions with both units using 100 percent reclaimed water, the delivery rate from MDWASD South District Wastewater Treatment Plant to the reclaimed water-treatment facility would be approximately 50,481 gpm (FPL 2014-TN4058). Treated reclaimed water would be pumped to the makeup water reservoir at a rate of 40,686 gpm. From the makeup water reservoir, the normal flow rate to the CWS would be 38,400 gpm. Up to 2,286 gpm of reclaimed makeup water could be pumped directly to the blowdown sump if alternative dilution was needed to manage effluent constituents.

Saltwater (Radial Collector Wells)

Under conditions when reclaimed water cannot be obtained in sufficient quantity and/or quality for the CWS, radial collector wells approximately 25 to 40 ft below the bottom of Biscayne Bay would supply the water needed. Under normal operating conditions for both units using 100 percent saltwater from the radial collector well system, the pumping rate would be approximately 86,400 gpm (FPL 2014-TN4058). Saltwater would be pumped directly to the cooling-tower basins and would not go into the makeup water reservoir. Higher delivery rates would be necessary when using saltwater because saltwater is limited to fewer cycles of concentration to maintain appropriate dissolved solids concentrations in the circulating-water (1.5 cycles of concentration using saltwater vs 4 cycles of concentration using reclaimed water) (FPL 2014-TN4058).

Water-Treatment Facilities

Reclaimed water from MDWASD for the CWS would be delivered to a reclaimed water-treatment facility on the Turkey Point site (Figure 3-4, grid reference A-2). The reclaimed water would have received high-level disinfection by MDWASD prior to delivery to the site. The FPL reclaimed water-treatment facility would reduce concentrations of iron, magnesium, oil and grease, total suspended solids, nutrients, and silica in the water to prepare it for use in the CWS (FPL 2014-TN4058; FPL 2015-TN4502). This water would also be treated to prevent biofouling in the pipelines supplying raw water to the cooling towers. The treated water would be stored in the proposed makeup water reservoir. Water would be withdrawn from the reservoir as needed to provide makeup water to the cooling-tower basins for each unit.

Prior to being used in the CWS cooling towers, reclaimed water or saltwater from the radial collector wells would receive additional treatment to maintain a noncorrosive, nonscale-forming condition and limit biofouling within the system (FPL 2014-TN4058). Chemicals including biocides, antiscalants, and dispersants would be injected by a local chemical feed system into the piping of the CWS as necessary to maintain proper concentrations. The chemicals used in the CWS and the concentrations in the blowdown water are discussed in Section 3.4.4.2 under nonradioactive waste streams.

Cooling Towers

Waste heat is a byproduct of normal power generation at a nuclear power plant. FPL proposed that Turkey Point Units 6 and 7 would each have three closed-cycle wet-cooling towers to dissipate heat from the CWS to the atmosphere. The CWS cooling towers are designed to dissipate a heat load of 7.63×10^9 Btu/hr (1.53×10^{10} Btu/hr for both units) (FPL 2014-TN4058). Each unit would also have one SWS cooling tower, which, during normal operation, is expected to dissipate a heat load of 103×10^6 Btu/hr through one of its two cells. If increased cooling capacity were needed, such as during plant cooldown, both cells would be used to dissipate a maximum heat load of 346×10^6 Btu/hr (692×10^6 Btu/hr maximum for both units) (FPL 2014-TN4058).

Excess heat in the cooling water would be transferred to the atmosphere by evaporative and conductive cooling in the cooling tower. In addition to evaporative losses, a small percentage of

water would be lost in the form of droplets (drift) from the cooling towers. Water lost to evaporation and drift is considered consumptive use because the water is not available for reuse. The CWS normal and maximum evaporation rates would both be 28,800 gpm. The SWS normal and maximum evaporation rates would be 366 and 1,248 gpm, respectively. The combined drift rates for both new units would be 7 gpm for the CWS and 1 gpm for the SWS (FPL 2014-TN4058). These evaporation and drift rates are independent of the makeup water source, meaning consumptive losses are similar whether reclaimed water or saltwater is used for cooling.

3.4.2.3 Injection Wells

Cooling-tower blowdown water and other plant wastewater would be discharged to the deep Boulder Zone via Class I industrial injection wells. Cooling-tower blowdown water is the cooling water that does not evaporate or drift from the towers, but is routed back to the cooling-tower basin at the base of each tower. Because evaporation of water from the cooling tower increases the concentration of dissolved solids in the cooling water, a portion of the blowdown water would be removed and replaced with makeup water from the makeup water system on a continual basis. FPL plans to maintain the chemical concentration factor for the CWS cooling tower between one and a-half and four cycles of concentration. As noted previously, the CWS would be operated at four cycles of concentration when using reclaimed water as the source of cooling water and at one and a-half cycles of concentration when using saltwater from the radial collector wells (FPL 2014-TN4058). The blowdown water from each cooling tower would collect in a basin at the base of the tower. Time spent in the basin allows for settling of suspended solids, and chemical treatment if needed, prior to discharging to the blowdown sump and eventually to the Boulder Zone through deep-injection wells. The estimated concentrations of chemical constituents in the blowdown are discussed in Section 3.4.4.2, Liquid-Waste Management.

In addition to blowdown water from the cooling towers, wastewater from the sanitary waste-treatment plant, wastewater-retention basin, and liquid radioactive waste-treatment system would be discharged to the Boulder Zone via the injection wells. These internal liquid-waste–management systems are described further in Sections 3.4.3.2 and 3.4.4.2. Up to 10 injection wells would be used during normal operations, leaving 2 available as backup wells. The maximum injection rate of 58,922 gpm (85 Mgd) would occur when saltwater is used for cooling; the normal injection rate when saltwater is used for cooling would be 58,175 gpm (84 Mgd). The normal and maximum injection rates when 100 percent reclaimed water is used for cooling would be 12,461 gpm (18 Mgd) and 12,914 gpm (18.6 Mgd), respectively.

3.4.2.4 Other Environmental Interfaces during Operation

Water Systems Other Than CWS

Potable water from MDWASD would be used for plant potable-water, service-water, demineralized-water, and fire-protection systems. Under normal conditions operation of the proposed units would call for 936 gpm, and under maximum conditions 2,553 gpm to meet these needs (FPL 2014-TN4058). Potable water delivered to the proposed units by MDWASD would not need additional treatment for use as potable water and for fire protection. The

potable water used in the service-water and demineralized-water systems would need additional treatment to meet the criteria for use in these systems .

Chemistry in the SWS would be controlled by the turbine island chemical feed system. The system would inject chemicals into system piping to maintain a noncorrosive, nonscale-forming condition and limit the formation of biological film. Here again, the chemicals used are generally classified as biocides, antiscalants, and dispersants.

Potable water from the MDWASD would feed the demineralized-water system. The water would receive additional filtration and demineralization to produce the highly purified water used for various plant systems. Demineralization processes would include reverse osmosis to reduce dissolved solids, salts, and organic elements. The water would then be treated to remove dissolved carbon dioxide and most of the remaining ions through electrodeionization (FPL 2014-TN4058).

Power Transmission System

As noted in Section 3.2.2.3, transmission lines and corridors are considered to interface with the environment during plant operation, because there are potential continuing impacts from electric fields, noise, and corridor inspection and maintenance. Regular inspection of the structures, insulators, and access areas would be performed by FPL using trucks and aircraft (either airplanes or helicopters). Corridor maintenance includes controlling woody vegetation and maintaining access roads. FPL has established procedures for maintenance of transmission line corridors using both chemical (herbicides or growth regulators) and mechanical (trimming, mowing) means of vegetation control. Growth regulators and herbicides would be required to be used in a manner meeting Federal, State, and local regulations (FPL 2014-TN4058).

3.4.3 Radioactive Waste-Management System

Liquid, gaseous, and solid radioactive waste-management systems would be used to collect and treat the radioactive materials produced as byproducts of operating the proposed Turkey Point Units 6 and 7. These systems would process radioactive liquid, gaseous, and solid effluents to maintain releases within regulatory limits and to levels as low as is reasonably achievable. Waste-processing systems would be designed to meet the design objectives of 10 CFR Part 50 (TN249), Appendix I ("Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion 'As Low as is Reasonably Achievable' for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents"). The radioactive waste-management systems would not be shared between existing Units 3 and 4 and proposed Units 6 and 7. Radioactive materials in the reactor coolant would be the primary source of gaseous, liquid, and solid radioactive wastes from operation of the two new AP1000 units. Radioactive fission products build up within the fuel as a consequence of the fission process. These fission products would be contained in the sealed fuel rods, but small quantities could escape the fuel rods into the primary coolant loop. Neutron activation of the primary coolant loop would also add radionuclides to this coolant.

The Offsite Dose Calculation Manual (ODCM) for the Turkey Point site describes the methods and parameters used for calculating offsite radiological doses from liquid and gaseous effluents (FPL 2013-TN3944). The ODCM also describes the methodology for calculation of gaseous

and liquid monitoring alarm/trip set points for release of effluents from the existing Turkey Point units. Operational limits for releasing liquid and gaseous effluents are also specified in the ODCM to ensure compliance with NRC regulations.

The systems used for processing liquid waste, gaseous waste, and solid waste are described in the following sections. A more detailed description of these systems for proposed Turkey Point Units 6 and 7 is provided in Chapter 11 of the AP1000 DCD (Westinghouse 2011-TN261). Solid radioactive wastes produced from operating proposed Turkey Point Units 6 and 7 would be both dry and wet solids.

3.4.3.1 Liquid Radioactive Waste-Management System

The liquid radioactive waste-management system would control, collect, process, handle, store, and dispose of liquid radioactive waste generated as a result of normal operations and anticipated operational occurrences, including refueling operations. The liquid radioactive waste-management system would be managed using several process trains consisting of tanks, pumps, ion exchangers, filters, and radiation monitors, and is shown in DCD Figure 11.2-1 (Westinghouse 2011-TN261). Normal operations would include processing of (1) borated, reactor-grade wastewater, (2) liquids collected through floor drains and other liquid wastes with potentially high suspended solid contents, (3) detergent wastes, and (4) chemical wastes. The liquid radioactive waste-management system would comply with Regulatory Guide 1.143 (NRC 2001-TN1134) regarding liquid radwaste-treatment systems.

In addition, the radioactive waste-management system could handle effluent streams that typically do not contain radioactive material, but that may, on occasion, become radioactive (e.g., steam generator blowdown as a result of steam generator tube leakage). With two exceptions, liquid effluents processed through this system would become part of the liquid radioactive waste-management system effluent discharge. The exceptions are steam generator blowdown that is normally returned to the condensate system after processing and reactor coolant that can be degassed prior to reactor shutdown and returned to the reactor coolant system.

As stated in DCD Section 11.2.1.2.4 (Westinghouse 2011-TN261), the liquid radioactive waste-management system effluent would be stored in monitoring tanks prior to discharge. Liquid radioactive effluent would be discharged to the deep-injection wells. The discharge would be monitored and administratively controlled to ensure that it meets the requirements of 10 CFR Part 20, Appendix B, Table 2 Column 2 (10 CFR Part 20) (TN283). The radiological impacts from liquid effluents are evaluated in Section 5.9.

3.4.3.2 Gaseous Radioactive Waste-Management System

The gaseous radioactive waste-management system functions to collect, process, and discharge radioactive or hydrogen-bearing gaseous wastes. The system is a once-through, ambient-temperature, activated-carbon delay system (Westinghouse 2011-TN261). Radioactive isotopes of iodine and the noble gases xenon and krypton are created as fission products within the fuel rods during operation. Some of these gases escape to the reactor coolant system through cladding defects. Some of these gases are released to the environment through the

gaseous radioactive waste-management system or plant ventilation. In addition, various gaseous activation products, such as argon-41, are formed directly in the reactor containment during operation. The gaseous radioactive waste-management system is typically active only when monitored gaseous concentrations reach a given threshold. Waste gas flows through a guard bed that removes iodine, oxidizing chemicals, and moisture. From the guard bed, waste gas flows through two delay beds containing activated carbon, which dynamically adsorbs and desorbs the gases, delaying them long enough for significant radioactive decay to occur. The gaseous system can only delay noble gases, not collect them. If noble gases monitored in the coolant reach a threshold value, then the reactor coolant is diverted to the liquid radioactive waste-management system where the noble gases can be collected using the degasifier.

Radioactive gaseous effluents from the system described above are discharged through the plant vent or the turbine building vent. The plant vent provides the release path for containment venting releases, auxiliary ventilation releases, annex building releases, radioactive waste building releases, and gaseous radioactive waste system discharge (Westinghouse 2011-TN261). The turbine building vents provides the release path for the condenser air removal system, gland seal condenser exhaust, and the turbine building ventilation (Westinghouse 2011-TN261). These releases would be ongoing and there would be no holdup in the gaseous waste-management system and no batching of releases, as would be the case for the liquid effluents. The radiological impacts from gaseous effluents are evaluated in Section 5.9.

3.4.3.3 Solid Radioactive Waste-Management System

The solid radioactive waste-management system would treat, temporarily store, package, and dispose of dry or wet solids. The process flow of the solid radioactive waste-management system is illustrated in Figure 11.4-1 of the AP1000 DCD (Westinghouse 2011-TN261). Solid radioactive waste could be either dry or wet solids, and the source could be an operational activity, maintenance, or another function. Non-fuel solid wastes would be generated from separating and treating radioactive material from gases and liquids and from removing contaminated material from various reactor areas. Solid wastes would consist of spent ion-exchange resins, deep-bed filtration media, spent filter cartridges, dry active wastes, mixed wastes, reactor components, equipment, and tools removed from service, as well as contaminated protective clothing, rags, and other trash generated from plant design modifications, operations, and maintenance activities. The system would have a 60-year design objective and be designed to handle both normal and anticipated operational occurrences. The packaged wastes would be temporarily stored in the auxiliary and radwaste buildings prior to being shipped to a licensed disposal facility. As discussed in ER Section 3.5.3, if additional temporary radwaste storage were needed, then onsite facilities could be constructed for temporary storage of low-level waste (FPL 2014-TN4058). The solid radioactive waste-management system releases no gaseous or liquid effluent directly to the environment. Instead, this system discharges effluent through the liquid and gaseous waste-management systems.

As shown in Table 11.4-1 of the AP1000 DCD, excluding spent fuel, the per unit annual total expected volume of solid waste (wet and dry) to be shipped would be approximately 1,964 ft^3/yr and the per unit annual total maximum volume of solid waste (wet and dry) to be shipped could be approximately 5,717 ft^3/yr. In addition, by combining the results of Tables 11.4-5 and 11.4-9

of the AP1000 DCD, the per unit maximum total activity of radioactive material is estimated to be approximately 33,670 Ci/yr (Westinghouse 2011-TN261).

Solid wastes may be shipped to a waste processor for volume reduction before disposal at a licensed disposal facility. Wet solid wastes include spent resins and sludge from powdered resins and filter backwashing. Spent resins and filters would typically be dewatered before packaging for shipment to a licensed offsite processing or disposal facility.

The storage and transportation of used reactor fuel is discussed in Chapter 6.

3.4.4 Nonradioactive Waste-Management Systems

The following sections describe the nonradioactive waste-management systems proposed for the Turkey Point site, including systems for solid waste, liquid waste, gaseous waste, hazardous waste, and mixed waste.

3.4.4.1 Solid-Waste Management

The expected nonradioactive solid-waste streams during operational activities include water-treatment wastes, laboratory wastes, trash, spent filters, sanitary sludge, and debris from cooling-basin forebay and catch basin screens.

Solid waste generated during operation would be segregated and recycled to the extent practicable, and the balance of the waste would be disposed of in an offsite permitted landfill. FPL would institute a waste-minimization program during operation to promote pollution prevention, recycling, and reuse (FPL 2014-TN4058). Typical solid nonradioactive and nonhazardous wastes generated during operation may include office paper, aluminum cans, laboratory waste, glass, and metals. Recyclable materials such as paper, scrap metal, and batteries would be recycled by a commercial recycler to the extent practicable. The remaining solid wastes would be collected by a licensed waste hauler and disposed of in a municipal landfill. None of these solid wastes would be burned or disposed of onsite. FPL estimates that during operation, Units 6 and 7 would generate an average of 1,000 tons of dry solid waste annually (FPL 2014-TN4058).

Solid wastes from the plant water systems would include debris removed from the cooling-basin forebay screens, backwashed solids from the reverse osmosis membranes, spent resin from the demineralized-water deionization process, spent filters, and sludge from the reclaimed water-treatment facility. The reclaimed water-treatment facility is estimated to produce 435 tons of sludge per day when reclaimed water provides 100 percent of the cooling-tower makeup water (FPL 2014-TN4058). Solid waste from the plant water systems and debris from the catch basin screens would be disposed in an offsite permitted landfill. Waste sludge from the sanitary waste-treatment plant would be managed by a licensed waste transportation and disposal contractor and disposed of in a permitted landfill.

3.4.4.2 Liquid-Waste Management

The expected nonradioactive liquid-waste streams include cooling-tower blowdown, water-treatment wastes, discharge from floor and equipment drains, effluents from the sanitary-treatment system, and stormwater runoff.

Within each power plant, the turbine building drain system would collect discharges from the floor and equipment drains, the fire-protection water system, and the demineralized-water users and direct the combined flow to the oil/water separator. Turkey Point Units 6 and 7 are predicted to produce about 1,550 gal/yr of waste oil. The collected oil would be temporarily stored in the waste oil storage tank and ultimately disposed offsite, most likely following the current practice at Turkey Point Units 1 through 5, which is to recycle the waste oil for heat reclamation (FPL 2014-TN4058).

The plant design consolidates the nonradioactive liquid effluent streams from the CWS, the sanitary waste-treatment plant, and the wastewater-retention basin into the blowdown sump for discharge into the Boulder Zone via deep-injection wells (FPL 2014-TN4058). Deep-injection well discharge would be subject to the provisions of the Underground Injection Control Rule in Fla. Admin. Code 62-528 (TN556) and the conditions of the Underground Injection Control Permit (FPL 2014-TN4058).

Chemicals that would likely be added to the plant CWS, SWS, demineralizer water system, steam generator blowdown system, and reclaimed water-treatment facility include a biocide (sodium hypochlorite), pH adjusters (sulfuric acid, lime, carbohydrazide, hydrazine), proprietary scale inhibitors, a proprietary dispersant (high stress polymer), a coagulant (ferric chloride), and oxygen scavengers (sodium bisulfite, morpholine) (FPL 2014-TN4058).

The cooling-water system would use closed-cycle cooling, with a chemical concentration factor between 1.5 (for 100 percent saltwater cooling) and 4.0 (for 100 percent reclaimed water cooling). When operating with any combination of saltwater and reclaimed water, the concentration factor would remain between these limits (FPL 2014-TN4058).

The expected levels of constituents in the discharge to the deep-injection wells are summarized in Table 3-5. The table shows the expected concentrations for the two limiting operating conditions, i.e., when the plant uses 100 percent reclaimed water and when the plant uses 100 percent saltwater from the radial wells. All other operating conditions, and therefore the expected concentration of each constituent, lie between these limiting conditions. The concentrations for the constituents within reclaimed water listed in Table 3-5 were reported in the FPL ER Rev. 6 (FPL 2014-TN4058) and were based on sampling performed from 2007 through 2011 at the SDWWTP. After implementation of advanced treatment at the SDWWTP in FY 2013 (Miami-Dade County 2014-TN4758) additional sampling was performed to determine the concentrations of the constituents, heptachlor, ethylbenzene, tetrachloroethylene, and toluene in treated wastewater (NRC 2015-TN4773). Concentrations determined through this sampling were below laboratory method detection limits, as indicated in the footnotes to Table 3-5.

Table 3-5. Expected Constituents and Concentrations Discharged to the Deep-Injection Wells

Constituent Name	Concentration Using 100% Reclaimed Wastewater (mg/L)	Concentration Using 100% Saltwater (mg/L)
Ammonia as N	Not Calculated	Not Calculated
Biochemical oxygen demand	Not Calculated	Not Calculated
Boron	No Data	8.65
Bromide	No Data	166
Hexavalent chromium	0.065	No Data
Fluoride	2.46	0.00162
Alkalinity, total as $CaCO_3$	72	149
Nitrate as N	16.1	4.19
Sulfate	484.0	4,272
Total organic compounds	118	7
Total dissolved solids	2,721	39,506–53,168
Total suspended solids	33.6	13.3
Phosphorous	0.73	1.05
Phosphate	2.40	1.110
Aluminum	3.02	(a)
Antimony	0.0245	(a)
Arsenic	0.0131	(a)
Barium	1.86	0.1214
Beryllium	0.0933	(a)
Cadmium	0.00718	0.00107
Chromium	0.0653	0.00441
Copper	0.0433	0.0144
Iron	1.63	0.281
Lead	0.112	0.00496
Nickel	0.088	0.0260
Selenium	0.0359	0.019
Silver	0.0163	(a)
Zinc	0.646	10.8
Calcium	355	787
Magnesium	63	2,615
Manganese	0.379	0.0400
Sodium	426	19,164
Silica as SiO_2	26.4	15.4
Chloride	1,247	30,009
Nitrite as N	4.02	0.0966
Conductivity (µmhos/cm)	5,577	23,027–31,639
pH (standard units)	7.89	7.89
Total residual chlorine	2	No Data
Thallium	0.00620	(a)
Mercury	0.00653	(a)

Table 3-5. (contd)

Constituent Name	Concentration Using 100% Reclaimed Wastewater (mg/L)	Concentration Using 100% Saltwater (mg/L)
Heptachlor	0.000023[(b)]	No Data
Ethylbenzene	[(a) (b)]	No Data
Toluene	0.00174[(b)]	No Data
Tetrachloroethylene	0.00359[(b)]	No Data

(a) Constituent concentration was below the method detection limit.
(b) Constituent concentrations were below method detection limits in South District Wastewater Treatment Plant effluent samples collected in March 2013, July–August 2013, October 2013, and March 2014 (NRC 2015-TN4773).
mg/L = milligrams per liter.

Sources: FPL 2014-TN4058, NRC 2015-TN4773

Stormwater runoff would flow overland and ultimately reach the existing industrial wastewater facility, i.e., the closed-loop system of canals used for cooling, which would need a new or modified industrial wastewater permit. Runoff from paved areas and transformer areas would pass through oil/water separators prior to discharge to the industrial waste facility (FPL 2011-TN303). Any stormwater discharges during operation would need to comply with all applicable provisions of the National Pollutant Discharge Elimination System Permit No. FL0001562 upon modification, as well as any subsequent modifications, amendments, and/or renewals (FPL 2010-TN1231; FPL 2010-TN272; FPL 2010-TN1520).

During operation, the Units 6 and 7 sanitary drain systems would connect the restrooms and locker room facilities outside of radiologically controlled areas to the sanitary waste-treatment plant. For each new unit, the sanitary waste-treatment plant would be designed to process 25,000 gpd during normal operations and 50,000 gpd during plant shutdowns (FPL 2014-TN4058). The sanitary waste-treatment plant would also service Turkey Point Units 1 through 5 and the FPL reclaimed water-treatment facility. The sanitary waste-treatment plant would generate about 1,300 gpd of residual sludge with a 1.5 to 2 percent biosolids content and would comply with all Florida Department of Environmental Protection effluent restrictions (FPL 2014-TN4058).

FPL also plans to construct and operate a fleet vehicle maintenance facility, which would generate waste oil, waste coolant, and potentially solvent from the solvent wash tank. The maintenance facility would be served by a local septic tank (FPL 2014-TN4058).

3.4.4.3 Gaseous Waste Management

Gaseous emissions would be produced by the combustion of diesel fuel in the diesel engines that would power the two fire pumps, the four 4,000 kW standby generators, and the four 35 kW auxiliary ancillary generators. Based on four operating hours per month for each engine, the estimated annual emissions from these 10 engines would be 1,220 lb of particulates, 12.7 lb of sulfur oxides, 12,296 lb of carbon monoxide, and 23,660 lb of hydrocarbons and nitrogen oxides (FPL 2014-TN4058). These emissions would be subject to the requirements of the Prevention of Significant Deterioration Permit, when issued. The Florida Prevention of Significant Deterioration Program implements the Federal Clean Air Act requirements for the prevention of significant deterioration of air quality (see http://www.dep.state.fl.us/air/emission/psd.htm).

Each of these diesel engines would have an associated fuel oil storage tank. The four tanks for the 4,000 kW standby generators would each hold 60,000 gal, the four tanks for the 35-kW ancillary generators would each hold 650 gal, and the two tanks for the fire pumps would each hold 240 gal. Each of the four standby generators would also have an associated 1,300-gal fuel oil storage day tank. Total estimated hydrocarbon emissions from these tanks is 26 lb/yr due to volatilization of the diesel fuel (FPL 2014-TN4058).

Small amounts of volatile organic compounds would also be generated from the use of common building maintenance materials such as paints, adhesives, and caulk; from mechanical maintenance materials such as oils and solvents; and periodically from activities such as asphalt resealing.

3.4.4.4 Hazardous- and Mixed-Waste Management

Hazardous waste generated during operation could include waste industrial cleaning products, petrochemical products, water-treatment chemicals, used antifreeze, and small quantities of additional regulated substances, such as laboratory chemicals. Petroleum wastes could include waste gasoline, diesel fuel, oils, solvents, and grease. Rags or other materials contaminated with these substances could also be considered hazardous waste. FPL estimates that Units 6 and 7 would generate approximately 4,800 lb of nonradioactive hazardous solid waste annually (FPL 2014-TN4058).

All transportation, storage, and disposal of regulated hazardous wastes would be in accordance with applicable regulations of the Resource Conservation and Recovery Act of 1976, as amended (RCRA) (42 U.S.C. § 6901 et seq.) (TN1281). All hazardous wastes would be collected and stored onsite until being transported offsite by a licensed and permitted RCRA waste hauler, and treated or disposed of offsite at a RCRA-permitted facility (FPL 2014-TN4058).

Mixed wastes contain both hazardous and low-level radioactive waste. Small amounts of mixed solid waste could be generated during maintenance, refueling, and laboratory activities. The AP1000 design includes a solid-waste–management system that is designed to collect and store mixed wastes generated during normal plant operation. The packaged waste would be stored in the auxiliary and radwaste buildings until it is shipped offsite to a licensed disposal facility (FPL 2014-TN4058).

Although the DCD estimates that an AP1000 unit would generate approximately, 25 ft^3/yr of mixed waste, FPL anticipates that little to no mixed waste would be generated during operation (FPL 2014-TN4058). FPL expects Units 6 and 7 to each produce about 7.5 ft^3/yr of solid mixed waste for disposal (FPL 2014-TN4058). Any mixed waste from Units 6 and 7 would be handled and managed in a manner consistent with FPL's current operations by a third-party contractor and in accordance with the applicable Federal and State regulations (FPL 2014-TN4058).

3.4.5 Summary of Resource Parameters During Operation

Table 3-6 summarizes the operational parameters that are relevant to assessing the environmental impacts of operating proposed Turkey Point Units 6 and 7.

Table 3-6. Resource Parameters Associated with Operation of Proposed Turkey Point Units 6 and 7

Resource(s)	Value	Description
Hydrology-Surface Water, Hydrology-Groundwater	50,481 gpm (72.7 Mgd)	Normal MDWASD reclaimed wastewater supply to Turkey Point reclaimed wastewater-treatment facility (actual supply would fluctuate)
	40,686 gpm (58.6 Mgd)	Normal and maximum water supply from reclaimed wastewater-treatment facility to makeup water reservoir[(a)]
	38,400 gpm (55.3 Mgd)	Normal and maximum CWS makeup flow rate (100% reclaimed water)
	86,400 gpm (124.4 Mgd)	Maximum saltwater supply from radial collector wells to makeup water reservoir
	86,400 gpm (124.4 Mgd)	Normal and maximum CWS makeup flow rate (100% saltwater)
Hydrology-Surface Water, Meteorology-Air Quality	28,800 gpm	Normal CWS evaporation rate
	28,800 gpm	Maximum CWS evaporation rate
	366 gpm	Normal SWS evaporation rate
	1,248 gpm	Maximum SWS evaporation rate
Meteorology-Air Quality, Terrestrial Ecology	7 gpm	Normal and maximum CWS drift rate
	1 gpm	Normal and maximum SWS drift rate
Hydrology-Surface Water, Hydrology-Groundwater	29,230 gpm	Normal consumptive water use (100% reclaimed water)
	30,112 gpm	Maximum consumptive water use (100% reclaimed water)
	29,174 gpm	Normal consumptive water use (100% saltwater)
	30,056 gpm	Maximum consumptive water use (100% saltwater)
Hydrology-Groundwater	12,461 gpm (17.944 Mgd)	Normal discharge flow rate to injection wells (100% reclaimed water)
	12,914 gpm (18.596 Mgd)	Maximum discharge flow rate to injection wells (100% reclaimed water)
	58,175 gpm (83.772 Mgd)	Normal discharge flow rate to injection wells (100% seawater)
	58,922 gpm (84.848 Mgd)	Maximum discharge flow rate to injection wells (100% seawater)
Terrestrial Ecology, Meteorology-Air Quality	67 ft	CWS cooling-tower height
Terrestrial Ecology	229 ft	Tallest building height
Socioeconomics	806 workers	Normal operating workforce for two units
	1,000 workers	Maximum workforce during refueling outages occurring every 18 months, lasting approximately 30 days
Terrestrial Ecology, Nonradiological Health, Socioeconomics	88 dBA	CWS cooling-tower sound level at 3 ft
	73 dBA	CWS cooling-tower sound level at 200 ft
	65 dBA	CWS cooling-tower sound level at 400 ft
Uranium Fuel Cycle, Need for Power	1,200 MW(e)	Gross-electrical output per unit
	108 MW(e)	Station and auxiliary service load
	1,092 MW(e)	Net electrical output per unit
	93 percent	Expected annual capacity factor

(a) The 40,686 gpm treated reclaimed water supplied to the makeup water reservoir is used for CWS makeup flow (38,400 gpm) and for effluent dilution if needed (2,286 gpm). Any excess treated reclaimed water from the reclaimed water-treatment facility would be used by potential future users other than Units 6 and 7.

Source: FPL 2014-TN4058

4.0 CONSTRUCTION IMPACTS AT THE TURKEY POINT SITE

This chapter examines the environmental issues associated with building proposed Units 6 and 7 at the Florida Power & Light Company (FPL) Turkey Point Nuclear Power Plant (Turkey Point) site as described in the application for combined construction permits and operating licenses (COLs) submitted to the U.S. Nuclear Regulatory Commission (NRC) by FPL (2011-TN127). As part of its application, FPL submitted an environmental report (ER) (FPL 2014-TN4058), which discusses the environmental impacts of building, operating, and decommissioning proposed Turkey Point Units 6 and 7 and a Final Safety Analysis Report (FPL 2011-TN128), which addresses safety aspects of construction and operation.

On June 30, 2009, FPL submitted a Site Certification Application (SCA) to the State of Florida Department of Environmental Protection for the proposed Turkey Point Units 6 and 7 and ancillary facilities (FPL 2010-TN1231). The SCA process provides a certification that encompasses all licenses and permits needed for affected Florida State, regional, and local agencies. It also includes any regulatory activity that would be applicable under these agencies' regulations for proposed Turkey Point Units 6 and 7 (FDEP 2013-TN2629). On May 19, 2014, the State of Florida issued final Conditions of Certification to FPL authorizing construction, operation, and maintenance of proposed Turkey Point Units 6 and 7 and associated facilities (State of Florida 2014-TN3637). The final Conditions of Certification issued are binding and subject to the requirements listed in State of Florida (2014-TN3637). The NRC staff is aware that on April 20, 2016, a Florida court issued an opinion in which it ruled that the Florida Siting Board should have considered whether to require FPL to bury a portion of the transmission lines, and that the record was inadequate to support certain mitigation measures associated with transmission lines in the East Everglades (State of Florida 2016-TN4781). Although the opinion remands the Conditions of Certification to the Florida Siting Board for consideration of the possibility of burying a portion of the transmission lines and reconsideration of the specified mitigation measures, the NRC staff understands that the court's opinion is not yet final as of this writing (October 3, 2016). Accordingly, for the purposes of the FEIS evaluation of impacts, the NRC staff considers the transmission line route and conditions reviewed and approved by the Florida Siting Board as the most current information regarding the transmission line and associated potential mitigation measures. Even if the Conditions of Certification are revisited, the NRC staff considers it reasonable to expect that Conditions of Certification similar to or no less effective than those originally issued will be in place before construction and operation of the proposed units begins. As discussed in Section 3.3 of this environmental impact statement (EIS), the NRC's authority related to building new nuclear generating units is limited to construction "…activities that have a reasonable nexus to radiological health and safety and/or common defense and security" (72 FR 57416) (TN260). The NRC has defined "construction" according to the bounds of its regulatory authority. Many of the activities required to build a nuclear power plant are common to all major industrial construction projects (e.g., clearing and grading, excavation, and erection of support buildings), but do not involve radiological health and safety or common defense and security and, therefore, are not construction as defined by the NRC. Such activities are referred to as "preconstruction" activities in Title 10 of the *Code of Federal Regulations* (CFR) 51.45(c) (TN250). The NRC staff evaluates the direct, indirect, and cumulative impacts of the construction activities that would be authorized with the issuance of a

COL. The environmental effects of preconstruction activities are included as part of this EIS in the evaluation of cumulative impacts.

The U.S. Army Corps of Engineers (USACE) is a cooperating agency on this EIS consistent with an updated Memorandum of Understanding (MOU) (USACE and NRC 2008-TN637). The NRC and USACE concluded that entering into a cooperative agreement on the preparation of this EIS is the most effective and efficient use of Federal resources in the environmental review of impacts associated with building proposed Turkey Point Units 6 and 7. The goal of this cooperative agreement is to develop one EIS that provides all of the environmental information and analyses needed by the NRC to make a license decision and to provide information needed by the USACE to perform analyses, draw conclusions, and make a permit decision in its Record of Decision documentation. To accomplish this goal, the environmental review described in this EIS was conducted by a joint NRC/USACE review team. The review team was composed of NRC staff, its contractors' staff, and USACE staff.

The USACE needs information to perform analyses to determine whether the proposed action is (1) the least environmentally damaging practicable alternative (LEDPA) pursuant to Section 404 of the Clean Water Act, and (2) not contrary to the public interest pursuant to 33 CFR § 320.4 (TN4127). To perform the public interest review, the USACE considers the following public interest factors: conservation, economics, aesthetics, general environmental concerns, wetlands, historic and cultural resources, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply, water quality, energy needs, safety, food and fiber production, and mineral needs.

On June 20, 2009, the USACE received an application for a Department of the Army (DA) permit pursuant to Section 404 of the Federal Water Pollution Control Act (Clean Water Act) (33 U.S.C. § 1251 et seq.) (TN662) and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403) (TN4768). The USACE evaluation of the application will consider both construction and preconstruction activities.

Many of the impacts the USACE must address in its LEDPA analysis are the result of preconstruction activities. Also, most of the activities conducted by a COL applicant that would require a DA permit would be related to preconstruction. On June 20, 2009, FPL submitted an DA permit application to the USACE for a permit to conduct the following activities that result in alterations of waters of the United States, including jurisdictional wetlands: (1) discharge of dredge and fill into waters of the United States associated with construction of the nuclear reactor site, the reclaimed water facility, the transmission line and pipeline corridors, access roads, and radial collector wells; (2) the dredging of navigable waters of the United States associated with construction of the barge-unloading area.

While both the NRC and the USACE must meet the requirements of the National Environmental Policy Act of 1969, as amended (NEPA) (42 U.S.C. § 4321 et seq.) (TN661), both agencies also have mission requirements that must be met in addition to the NEPA requirements. The NRC's regulatory authority is based on the Atomic Energy Act of 1954, as amended (42 U.S.C. § 2011 et seq.) (TN663). The USACE's regulatory authorities over the proposed action are Section 404 of the Clean Water Act (CWA) (33 U.S.C. § 1344) (TN1019), which prohibits the discharge of dredged or fill material into waters of the United States without a permit from the USACE;

Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403) (TN4768), which prohibits work in navigable waters of the United States without a permit from the USACE; and Section 14 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 408) (TN4769), which prohibits modification, alteration, or construction upon or adjacent to a Federal project. Therefore, an applicant may not commence preconstruction or construction activities in jurisdictional waters, including certain wetlands, without a DA permit from the USACE. The permit would typically be issued after the USACE's evaluation of and public feedback in the form of public comments on its environmental review. Because the USACE is a cooperating agency under the MOU for this EIS, the USACE's Record of Decision of whether to issue, issue with modifications, or deny a DA permit will not be made until after public comment on the draft EIS has been received and considered and the final EIS has been issued. The USACE will conclude its CWA Section 404(b)(1) Guidelines and public interest analyses in its Record of Decision.

The collaborative effort of the NRC and the USACE in presenting their discussion of the environmental effects of building the proposed project, in this chapter and elsewhere, must serve the needs of both agencies. Consistent with the MOU, the NRC and the USACE staffs collaborated in (1) the review of the COL application and information provided in response to Requests for Additional Information (RAIs; developed by the NRC and the USACE) and (2) the development of the EIS. NRC regulations (10 CFR 51.45(c)) (TN250) require that the impacts of preconstruction activities be addressed by the applicant as cumulative impacts in its ER. Similarly, the NRC's analysis of the environmental effects of preconstruction activities on each resource area would be addressed as cumulative impacts, normally presented in Chapter 7. However, because of the collaborative effort between the NRC and USACE in this environmental review, the combined impacts of construction activities that would be authorized by the NRC with its issuance of a COL and the preconstruction activities are presented in this chapter. For each resource area, the NRC also provides an impact characterization solely for construction activities that meet the NRC's definition of construction at 10 CFR 50.10(a) (TN249). Thereafter, the assessment of the impacts of 10 CFR 50.10(a) (TN249) construction activities, the assessment of the combined impacts of construction activities, and the assessment of the combined impacts of construction and preconstruction activities are used in the description and assessment of cumulative impacts in Chapter 7 of this EIS.

For most environmental resource areas (e.g., aquatic ecology), the impacts are not the result of either solely preconstruction or solely construction activities. Rather, the impacts are attributable to a combination of preconstruction and construction activities. However, for most resource areas, the majority of the impacts would occur as a result of preconstruction activities such as clearing and grading the site.

This chapter is divided into 12 sections. In Sections 4.1 through 4.10, the review team evaluates the potential impacts on land use, water use and quality, terrestrial and aquatic ecosystems, socioeconomics, environmental justice, historic and cultural resources, meteorology and air quality, nonradiological health effects, radiological health effects, and nonradioactive waste. The review team has assigned an impact category level—SMALL, MODERATE, or LARGE—of potential adverse impacts for each resource area using the definitions for these terms established in Chapter 1. In some resource areas the impacts may be considered beneficial (e.g., in the socioeconomic area where the impacts of taxes are analyzed), and are stated as such. The review team's determination of the impact category

levels is based on the assumption that the mitigation measures identified in the ER or activities planned by various State and County governments, such as infrastructure upgrades (discussed throughout this chapter), are implemented. Failure to implement these upgrades might result in a change in the impact category level. Possible mitigation of adverse impacts, where appropriate, is presented in Section 4.11. A summary of the construction impacts is presented in Section 4.12. The technical analyses provided in this chapter support the results, conclusions, and recommendations presented in Chapters 7, 9, and 10 of this EIS.

The review team's evaluation of the impacts of building proposed Turkey Point Units 6 and 7 draws on information presented in FPL's ER, supplemental documents, the USACE's permitting documentation, and other government and independent sources.

4.1 Land-Use Impacts

This section provides information about the land-use impacts associated with preconstruction and construction of proposed Units 6 and 7. Topics discussed include land-use impacts at the site and in the vicinity and land-use impacts associated with building the transmission lines and other offsite facilities.

4.1.1 The Turkey Point Site and Vicinity

This section covers land-use impacts of construction and preconstruction activities for proposed Units 6 and 7 on the Turkey Point site, as well as offsite facilities other than transmission lines within the vicinity, including the proposed makeup-water systems and fill borrow areas.

Other associated temporary and permanent facilities would be built completely within the Turkey Point site boundaries, and would therefore be unlikely to affect nearby land uses. Development of the entire project, including proposed Units 6 and 7 and ancillary structures such as the radial collector wells (RCWs), reclaimed wastewater-treatment facilities, pipelines, access roads, and transmission lines would be consistent with local zoning and applicable local land-use plans.

Road improvements just off of the Turkey Point site would not affect areas now used for parks or recreational uses, or any other existing development. The offsite road improvements would also not disturb areas planned for future development.

Section 4.1.1.1 below addresses land-use impacts resulting from building the project facilities proposed for the FPL Turkey Point site. Section 4.1.1.2 addresses land-use impacts from building the proposed reclaimed wastewater pipelines northward into the City of Miami. Section 4.1.1.3 addresses land-use impacts from building multiple proposed construction equipment access roads entering the site from the west. Note that the analyses for the pipelines in Section 4.1.1.2 and the access roads in Section 4.1.1.3 encompass both the offsite and onsite portions of these linear facilities.

4.1.1.1 Onsite Land-Use Impacts

FPL proposes to build the proposed Units 6 and 7 power blocks and most of the associated infrastructure, including the mechanical draft cooling towers, makeup-water reservoir, substation, underground injection control (UIC or deep-injection) wells, and various small associated buildings, on a presently vacant 218 ac island referred to from here on as the plant

area. In addition, a temporary concrete batch plant would be built and operated in the northeastern part of the plant area (as shown in Figure 3-4, grid 3C) and a new substation designated as the Clear Sky substation would be built in the northwestern part of the plant area. Building proposed Units 6 and 7 would permanently occupy the entire 218 ac plant area (FPL 2014-TN4058).

While most support buildings would be situated within the 218 ac plant area, certain support facilities would have to be built on other FPL lands on the Turkey Point site. These include nuclear administration and training buildings, an equipment barge-unloading area, RCWs, a reclaimed wastewater-treatment facility (RWTF), security buildings, onsite segments of a heavy-haul road, several pipelines, transmission lines, bridge and access road improvements, and spoils areas (see Figure 3-4). Table 4-1 quantifies proposed land disturbances on the FPL Turkey Point site using the Florida Land Use, Cover, and Forms Classification System (FLUCFCS). The review team is assuming that all of the land-use impacts listed in Table 4-1 are permanent.

FPL stated that most of the land on which the proposed facilities would be built has been previously disturbed during development and operation of Units 1 through 5 (FPL 2014-TN4058). Most other land needed for building and operating proposed Units 6 and 7 is undeveloped land adjacent to land currently used for power generation and associated uses, such that using it for construction and operation of proposed Units 6 and 7 would not result in substantial changes in land uses or disturbance of existing land uses. Of note, Units 6 and 7 are proposed to be constructed on an area known colloquially as “Mud Island.” This area is predominantly a mudflat, which is a special aquatic site according to the 404(b)(1) Guidelines. Special aquatic sites have special ecological characteristics that significantly influence or positively contribute to the general overall environmental health or vitality of the entire ecosystem of a region. See 40 CFR Sections 230.3 (g-1), 230.10(a)(3), and 230.42. The USACE will consider this designation during the review of the DA permit application.

FPL would be required to conduct site-preparation and site-development activities for proposed Units 6 and 7 in accordance with applicable Federal, State, and local regulations (ER Section 4.1.1.2) (FPL 2014-TN4058). FPL would be required to acquire the necessary permits and authorizations (see Appendix H) and implement environmental controls such as stormwater-management systems, fugitive dust control, and spill-containment controls before initiating earth disturbance. Building activities that could potentially affect land use include clearing, grubbing, grading and excavating, filling, dewatering, and stockpiling soils. FPL’s proposed project includes implementing standard dust-control measures and stabilizing, contouring, and re-vegetating permanently disturbed lands (ER Section 4.1.1.2) (FPL 2014-TN4058).

Because the RCWs would be built on previously disturbed land, they would not disturb surface land on any previously undeveloped property. Building the laterals (horizontal collector lines) extending underground from the collection caisson under Biscayne Bay would not require surface land disturbance in offsite areas.

Table 4-1. Summary of Proposed Disturbance on the FPL Turkey Point Site in Acres

FLUCFCS Level 2 Code	100	200	300	400	500	600	700	800
Project Element	Urban and Built-Up Land	Agriculture	Range-land	Upland Forest	Water	Wetlands	Barren Lands	Transp., Communications, and Utilities
Plant Area					8.7	194.2	15.4	
Western Laydown Areas					15.3	16.9	19.6	0.2
Training Parking						7.5	1.6	0.02
Nuclear Admin. Parking						18.7	3.4	0.7
Heavy-Haul Roads					0.2		0.2	4.8
Transmission Laydown Area					0.02	0.3		2.6
Equipment Barge-Unloading Area					0.02			0.7
Spoils Area A, B, and C				4.4	1.1	0.0	202.5	3.4
Radial Well Collector Area							3.3	
Radial Collector Well Laydown Area							2.7	
Radial Collector Well Delivery Pipelines					0.2	4.0	9.2	
FPL Reclaimed Wastewater-Treatment Facility				7.8	3.4	32.5		0.3
Treated Wastewater Delivery Pipelines					0.5	3.5	0.3	1.3

Source: Adapted from FPL 2014-TN4058

Zoning and Consistency with Land-Use Plans

As noted in Section 2.2, the project area has been zoned by Miami-Dade County in the Interim Use District (GU). Nuclear reactors are a permitted use in the Interim Use District (GU) following approval by the County of an Unusual Use application. Miami-Dade County issued Unusual Use Resolution Z-56-07 (Miami-Dade County 2007-TN1085) in 2007 authorizing development of proposed Units 6 and 7 and ancillary structures and equipment in accordance with the Interim District zoning. The Resolution requires protective measures related to protection and mitigation of biological and water resources, which would limit the effects on land uses and resources in the vicinity. For example, Condition 20 of the Resolution requires that impacts on any Miami-Dade County-designated Natural Forest Community (NFC), as a result of any FPL transmission line corridor improvement, be minimized and consistent with County NFC standards and requirements (Section 4.3) (Miami-Dade County 2007-TN1085). Impacts on biological and water resources are discussed in greater detail in Sections 4.2 and 4.3.1, respectively. Impacts on trees are discussed in Section 4.3.1.1.

Miami-Dade County separately issued Resolution Z-1-13 in 2013 authorizing development of the proposed RCW system and reclaimed water-treatment facilities, both proposed for siting within the project area (Miami-Dade County 2012-TN3638).

Mineral Resources

As stated in Section 2.2.1.1, there are no known oil or gas wells nor any mining activities located within or directly adjacent to the Turkey Point site boundary. Therefore, the review team expects that there would be no impacts on oil, gas, or mineral resources from onsite project development activities.

Agriculture and Prime or Unique Farmland

No part of the FPL Turkey Point site is used for agriculture. Agricultural land does, however, compose approximately 5 percent (around 2,860 ac) of land use within the 6 mi vicinity of the FPL Turkey Point site (Table 2-3). Most of this land is concentrated west-northwest of the site. As indicated in Section 2.2.1.6, no prime farmland or unique farmland, as defined in the Farmland Protection Act (7 U.S.C. § 4201(b)) (TN708), occurs anywhere on the Turkey Point site or in the vicinity. Therefore, the review team expects that there would be no impacts on agricultural land uses or on prime or unique farmland from onsite project development activities.

Coastal Zone Consistency

The Florida Coastal Management Act (Fla. Stat. 28-380-TN1147) authorizes the Coastal Zone Management Section of the Florida Department of Environmental Protection (FDEP) to certify consistency with the Florida Coastal Management Program for all Federal licenses, permits, activities, and projects when such activities affect land or water use. Section XXIII of the Conditions of Certification issued to FPL for Units 6 and 7 by the FDEP constitutes the State's concurrence that the project is consistent with the Florida Coastal Management Program.

Comprehensive Everglades Restoration Plan

Building Units 6 and 7 is not expected to substantially interfere with the objectives or implementation of the Comprehensive Everglades Restoration Plan (CERP). As discussed in Section 7.3.1 of this EIS, one CERP element involves restoring wetlands adjacent to Biscayne Bay and Biscayne National Park through the re-establishment of natural sheet flow and runoff patterns. Even though some of the pipelines and eastern corridor transmission lines do cross wetlands near the western shore of Biscayne Bay, these crossings follow existing rights-of-way and therefore use of the crossings to build pipelines or transmission lines is not expected to further fragment habitats or permanently alter surface flow patterns. Furthermore, many of the proposed wetland mitigation activities discussed in Section 4.3.1.6 would beneficially further the objectives of CERP. One wetland mitigation element FPL has proposed is to purchase credits in the Everglades National Park "Hole-in-the-Donut" in-lieu fee project, where the National Park Service (NPS) is restoring wetlands on abandoned agricultural land within Everglades National Park. Additionally, FPL is proposing to buy credits in the Everglades Mitigation Bank and proposing permittee-responsible mitigation for the enhancement of more than 800 ac of wetlands on FPL's Turkey Point site property. This too would benefit the objective of restoring wetlands close to the Biscayne Bay shoreline.

4.1.1.2 Pipelines

Reclaimed Wastewater Pipelines: As described in Section 2.2.2, FPL would build reclaimed wastewater pipelines in a corridor of approximately 9 mi long connecting proposed Units 6 and 7 and the Miami-Dade Water and Sewer Department (MDWASD) South District Wastewater Treatment Plant (SDWWTP) to the north (Figure 2-5) (FPL 2014-TN4058). For about 6.5 mi, the pipelines would be collocated with the existing Clear Sky to Davis transmission line right-of-way and adjacent road and canal rights-of-way, described below. The pipelines would then diverge from the existing right-of-way for another 2.5 mi. Current land uses within the corridor are listed in Table 4-2, and consist primarily of tree nurseries, streams and waterways, mangrove swamps, mixed wetland hardwoods, roads and highways, sanitary waste treatment, and solid waste disposal, of which approximately 10 percent (approximately 13 ac, as shown in Table 4-1) would be at least temporarily disturbed by building the pipelines and associated right-of-way (FPL 2014-TN4058). Building the pipelines would involve trenching beneath or along an existing access road on the west side of the corridor, resulting in vegetation changes and temporary habitat disruption (FPL 2014-TN4058). FPL proposes to grade the disturbed portions of the corridor to the contours of the surrounding landscape and revegetate or return these areas to previous land uses (FPL 2014-TN4058). FPL proposes to use environmental Best Management Practices (BMPs) to minimize impacts on adjoining sensitive habitats (FPL 2014-TN4058).

The portion of the pipeline route not already planned for roadway improvements is the north-south section along SW 137th Avenue/Tallahassee Road from SW 288th Street to SW 328th Street/North Canal Drive. For this portion of the route, primary land uses that would be disturbed are agriculture and wetlands as shown in Figure 2-9 and Table 4-2. Habitat and wetlands impacts are addressed in Section 4.3.1 of this EIS. Impacts on agriculture would be minimal as discussed in Section 4.1.1.1.

Table 4-2. Major Land-Use Acreages along the Reclaimed Water Pipeline to the FPL Reclaimed Wastewater-Treatment Facility (FPL 2014-TN4058)

Level 3	FLUCFCS Land-Use Category	Acres	% of Total
Reclaimed Wastewater Pipeline			
100	Urban and Built-Up Land	0.6	0.4
200	Agriculture	13.6	10.2
300	Rangeland	1.6	1.2
400	Upland Forest	0.3	0.2
500	Water	1.7	1.3
600	Wetlands	41.7	31.2
700	Barren Land	1.7	1.3
800	Transportation, Communications, and Utilities	72.6	54.3
	Total	133.7	100.00

(a) Due to rounding, table values may not exactly sum to the total acres and percentages.
FLUCFCS = Florida Land Use, Cover, and Forms Classification System.

Source: Adapted from RAI Letter 150211 (FPL 2015-TN4442)

The pipeline route is not expected to adversely affect mineral resources, agricultural operations, or prime or unique farmlands.

Potable Water Pipelines: Potable water pipelines would be built within the rights-of-way for other construction activities and would not result in additional land dedication or disturbance (FPL 2015-TN4442). Construction of these pipelines would not conflict or interfere with adjoining land uses.

4.1.1.3 Access Roadways

As described in Section 3.3.1 of this EIS, FPL would have to upgrade several roadways to allow heavy equipment to access the site. The proposed improvements include widening three existing roadways and building new roadways that follow the routes of existing unpaved roads (FPL 2014-TN4058). Approximately 128 ac of land would be used to complete the upgrades. Existing land uses in the areas of the proposed roadway improvements are listed in Table 4-3 (FPL 2014-TN4058). Because the proposed access road upgrades primarily involve land off of the Turkey Point site, the land uses are not tallied as part of the onsite land uses presented in Table 4-1 but are instead tallied separately and presented only in Table 4-3.

The proposed improvements for the existing paved roadways consist of widening roads from two lanes to four lanes on SW 328th Street/North Canal Drive, SW 344th Street/Palm Drive, and SW 117th Street, for a total roadway length of approximately 3.25 mi.

The proposed new roadways include the following:

- SW 359th Street at two locations, three lanes between SW 137th Avenue/Tallahassee Road and SW 117th Avenue (approximately 2 mi) and four lanes between SW 117th Avenue and proposed Units 6 and 7 (approximately 3 mi), and building a bridge over the L-31E Canal.

Table 4-3. Major Land-Use Acreages in Areas of the Access Road Improvement (FPL 2014-TN4058)

Access Road	Urban and Built-Up Land	Agriculture	Upland Forest	Water	Wetlands	Barren Land	Transportation, Communications, and Utilities	Total Acres[(a)]	% of Total
SW 117th Ave N		0.04		1.6	0.2		6.9	8.7	6.8
SW 117 Ave S				0.0	6.5		1.2	7.7	6.0
SW 137 Ave	0.6			1.7	3.5		1.6	7.4	5.8
SW 328 St.	0.5	7.3		2.1	4.0		10.6	24.5	19.2
SW 344 St.	0.6						1.0	1.7	1.3
SW 359 Ave E			0.8	1.9	31.6	6.9	5.6	46.8	36.7
SW 359 Ave W				0.1	27.8		3.1	31.0	24.3
Total Acres	1.8	7.3	0.8	7.3	73.6	6.9	30.0	127.7	100.0
% of Total[(a)]	1.4	5.7	0.6	5.7	57.6	5.4	23.5	100.0	

(a) Due to rounding, table values may not exactly sum to the total acres and percentages.

Adapted from FPL 2014-TN4058 Table 2.2-7.

- Three lanes at SW 137th Avenue/Tallahassee Road between SW 344th Street/Palm Drive and SW 359th Street (1 mi); and four lanes at SW 117th Avenue between SW 344th Street/Palm Drive and 359th Street (1 mi).
- The new paved roadway for SW 359th Street from SW 137th Avenue/Tallahassee Road to the Turkey Point site would also serve as the access road for the new transmission lines along its route. A South Florida Water Management District (SFWMD) canal crosses the L-31E Canal along the SW 359th Street route with FPL-owned property on either side.

Other improvements to existing intersections as well as development of two new intersections are proposed to accommodate traffic to and from proposed Units 6 and 7. FPL's proposed improvements include signalization and/or traffic-control personnel assigned to the intersection, depending on the peak traffic period and flow (FPL 2014-TN4058).

An existing FPL-owned right-of-way extends for approximately 5 mi from the Turkey Point site toward the west (SW 359th Street) and along portions of SW 117th Avenue south of SW 344th Street/Palm Drive. This right-of-way would accommodate a portion of the proposed roadway improvements. For the remaining 4 mi of roadway improvements, alignments are proposed to occur along the existing paved and unpaved roads, including private roads, including roads owned by FPL and other roadways to which FPL proposes to obtain access (FPL 2014-TN4058).

Roadway improvements would be located in unincorporated Miami-Dade County and within incorporated areas of the City of Homestead. The roadway corridor would run through lands zoned as follows (FPL 2014-TN4058):

- Agricultural District
- Interim District
- Planned Unit Development.

With the exception of SW 359th Street, all proposed roadways have been designated as roads by Miami-Dade County. FPL may be required to obtain easements or encroachment permits, including an easement from the SFWMD for the crossing of the L-31E Canal.

In its ER, FPL states that roadway design standards and construction would follow the requirements of the Miami-Dade County Public Works Department and the Florida Department of Transportation (FPL 2014-TN4058). Roadway development activities would include installing silt fences, removing vegetation, improving drainage, removing unsuitable soils, installing road base materials, and laying asphalt and striping. The shoulders would be appropriately sloped and surface-water runoff would be managed with the installation of swales and culverts at suitable locations.

Issues raised by Miami-Dade County in both the EIS scoping and the State certification process concerned potential impacts on existing land uses, including agriculture, open space, and recreational land uses, of the construction of new transmission line access roadways or improvement of roadways now not open to the public. Miami-Dade County has recommended conditions to the FDEP for inclusion with the site certification to address these issues (State of

Florida 2012-TN1248). The access roads are not expected to adversely affect mineral resources or prime or unique farmlands.

Considering the conditions and practices noted above, building and using the proposed access roads are not likely to interfere with adjacent land uses.

4.1.1.4 Fill Material – Sources and Transportation

FPL proposes to obtain the offsite fill from established regional sources. A number of fill sources in the region could meet the needs of FPL at the Turkey Point site.

To provide context for the potential impacts of fill mining, the review team considered the Atlantic Civil, Inc. mine as a viable commercial fill source. It is located south of Southwest 360th Avenue and east of US-1 and Card Sound Road (USACE 2013-TN3473). The review team also considered a rock mine in the Lake Belt Area as another viable commercial source of fill. This allowed the review team to consider a nearby location with limited capacity and a more distant site with extensive capacity. The Atlantic Civil rock mine is located about 10 mi west of the FPL site. The USACE has issued a permit for this location to expand the mine by approximately 494 ac over the next 20 years. The rock mine expansion described in the permit would occur in approximately 238 ac of jurisdictional wetlands that had been filled and farmed. The majority of this land has been used to raise corn and other row crops (approximately 158 ac). An additional 16 ac are wetlands dominated by exotic species (USACE 2013-TN3473). The review team assumes that SW 359th Street would be improved between the Turkey Point site and the rock mine to facilitate hauling the fill material to the site. Land-use effects of roadway improvements would be similar to those discussed above.

An alternative source of fill would be rock mines in the Lake Belt Area. The USACE signed a Record of Decision (ROD) for rock mining in the Lake Belt Area, and has issued a project-specific permit to Cemex Construction Materials Florida for its FEC Quarry. The quarry is named for the Florida East Coast (FEC) Railway that serves the quarry. The quarry and rail center are located approximately 40 mi north of the Turkey Point site. Portions of the FEC Quarry have been in use for some time. Discharge of dredged or fill material into more than 1,346 additional acres were permitted under a permit issued by the USACE in 2010 (USACE 2010-TN3555). Mines in the Lake Belt Area operate under the conditions of the Lake Belt Mitigation Plan. Under this plan, mine operators are required to document the wetland habitat that will be affected by clearing and mining activities. The operator is then required to perform the mitigation identified in the Lake Belt Mitigation Plan. The Cemex mine would not be operated solely to provide fill material to the FPL site. Therefore, only a portion of the preconstruction and construction impacts resulting from conversion of wetlands and farmland to mining would be considered directly attributable to the Turkey Point Units 6 and 7 project if this mine were to be used as the fill source for the project. The review team assumes fill material would be hauled over existing rail lines to a location near Homestead and then trucked to the FPL site using the roads FPL has proposed to improve to facilitate movement of fill material to the site.

Land-use changes resulting from conversion of wetlands and farmland to mining would be limited and would occur with or without FPL obtaining fill materials for the Turkey Point Units 6 and 7 project.

4.1.2 Transmission Line Corridors and Associated Offsite Areas

This subsection addresses the land-use impacts caused by the development of the preferred transmission line corridors and offsite substations.

4.1.2.1 Transmission Line Corridors

The land uses potentially affected by building the proposed transmission lines are presented by corridor in Table 4-4 (first the East corridor then the West corridor). While the table indicates the potentially affected land uses that exist along the corridors, the actual ground disturbance to build the transmission lines would affect only a small portion of the indicated land.

The transmission lines built in the East corridor from the Clear Sky substation (to be built within the plant area) to the Davis substation would traverse a mostly rural landscape composed mostly of agricultural lands with some wetlands and other naturally vegetated lands. They would traverse a mostly urban landscape from the Davis to Miami substations, but most of this segment would be built following existing roadways. A portion of the East corridor passes close to the western boundary of Biscayne National Park. A short segment of the East corridor (less than 2,000 ft in length) passes just inside the park boundary (FPL 2014-TN4058). Because the corridor already exists and would not be widened, its use would not constitute a new encroachment into the park.

The transmission lines built in the West corridor, regardless of whether the West Preferred or West Consensus corridor is used, would traverse a rural, mostly agricultural landscape as well as an area of limerock mining just east of Everglades National Park. Short segments of the West Preferred and West Consensus corridors abut the western perimeter of Everglades National Park along a canal levee. On March 16, 2016, the NPS signed a Record of Decision transferring approximately 260 ac of land along the western perimeter of the park to FPL for transmission line use in exchange for receipt from FPL of approximately 360 ac of land comprising an unused transmission line right-of-way traversing the eastern part of the park (NPS 2016-TN4532). As a result, no part of either the West Preferred or West Consensus corridors would encroach into Everglades National Park.

FPL worked to minimize land-use impacts from the transmission lines by using the Florida corridor selection process. Under that process, the State approves a corridor and the applicant chooses a specific right-of-way within the approved corridor. The objective of this process is to select a corridor balancing land use, socioeconomic, environmental, engineering, and cost considerations for certification by the State. Finalized siting plans and permitting conditions that would be imposed by the various affected State and local agencies would minimize impacts within the corridors. Engineering considerations and costs are likely to suggest designs that favor collocation with existing transmission lines in existing corridors. The siting criteria include land-use considerations to minimize potential disruption to such areas as national, state, and county parks; wildlife refuges; estuarine sanctuaries; landmarks; and historical sites. FPL states in its application that it attempted to select corridors that would allow collocation with existing

Table 4-4. Major Land-Use Acreages within the Proposed Transmission Line Corridors

Transmission Line Route	Urban and Built-Up Land	Agriculture	Range-land	Upland Forest	Water	Wetlands	Barren Land	Transportation, Communications, and Utilities	Total
East Corridor									
Clear Sky – Davis	9.4	418.3	76.1	1.1	17.7	71.7	1.6	38.9	634.9
Davis – Miami	483.0	13.6	19.2	2.1	16.7			465.4	1000.0
West Corridors									
Clear Sky – Levee Preferred	8.5	848.9	89.3	67.3	401.3	1,346.6	69.9	198.9	3,030.6
Clear Sky – Levee Consensus[(a)]		835.4	67.1	18.4	15.1	2,700.0	59.3		3,695.3
Levee – Pennsuco	86.93	0	0	0	1.77	169.41	19.42	34.76	312.3

(a) Does not include urban and built-up land as well as transportation, communications, and utilities; and streams and waterways acreages.
Source: Adapted from FPL 2014-TN4058 and FPL 2015-TN4442.

linear features, such as existing farm roads, canals, railroads, other existing FPL transmission line corridors, or highway or roadway or rail rights-of-way. The proposed corridors for the new transmission lines to serve proposed Units 6 and 7 would be built within Miami-Dade County; they are described in Section 2.2.3 and shown in Figure 2-5. The land uses along these proposed transmission line corridors are identified in Table 4-4 (FPL 2014-TN4058).

Miami-Dade County Unusual Use Resolution Z-56-07 Condition 20 (Miami-Dade County 2007-TN1085) states that "except as expressly pre-empted by State law, impacts on Miami-Dade County-designated NFC as a result of any FPL transmission line corridor improvement shall be minimized and consistent with the NFC standards and requirements of Chapter 24, Miami-Dade County" (Section 4.3).

As described in Section 2.2.2.1 of this document, the connection between proposed Units 6 and 7 and the proposed new Clear Sky substation would be an underground line, which would use only land within the 218 ac island comprising the plant area. For this reason, no new construction land-use impacts would be anticipated.

As described in Section 2.2.2.1, FPL proposes to build the new transmission lines originating from a proposed new onsite substation (Clear Sky substation, located within the 218 ac plant area) and connecting to the existing Levee substation (500 kV circuits), and to the existing Turkey Point, Davis, and Pennsuco substations (230 kV circuits) (Table 2-4 and Figure 2-5). Two major corridors are proposed – the West and the East corridor, with several transmission lines proposed within these corridors.

As part of the West Preferred corridor alignment, two access corridors would be established to provide access to the transmission line corridor and right-of-way. No transmission structures are proposed to be built in these access corridors, only access roads or improvements to existing roadways. The two access corridors (see Section 2.5.3, Figure 2-34) are the Tamiami Trail Corridor (U.S. Highway 41 [US-41]) and the Krome Avenue Corridor (State Route 997 [SR-997]) (FPL 2014-TN4058). Existing land uses for the transmission line access corridors are presented in Table 4-5.

Local communities have raised concerns about the visual impacts and potential indirect blight impacts as a result of the transmission lines (State of Florida 2011-TN1261; State of Florida 2012-TN1248; State of Florida 2011-TN1260). The NPS has also expressed concern about aesthetics and land-use effects of the location of transmission lines near Everglades National Park (NRC 2010-TN516). The State of Florida Siting Board considered the transmission lines and their environmental impacts, and issued Conditions of Certification in which the Siting Board approved the proposed transmission lines. Although the Florida Siting Board did not consider whether the transmission lines should be installed underground in certain areas, it did consider and impose a variety of other mitigation measures as part of the Conditions of Certification. The NRC staff is aware that on April 20, 2016, a Florida court issued an opinion in which it ruled that the Florida Siting Board should have considered whether to require FPL to bury a portion of the transmission lines, and that the record was inadequate to support certain mitigation measures associated with transmission lines in the East Everglades (State of Florida 2016-TN4781). Although the opinion remands the Conditions of Certification to the Florida Siting Board for consideration of the possibility of burying a portion of the

Table 4-5. Major Land-Use Acreages within Transmission Line and Substation Access Corridors

Transmission Line Corridor	Urban and Built-Up Land	Agriculture	Rangeland	Upland Forest	Water	Wetlands	Barren Land	Transportation, Communications, and Utilities	Grand Total
West Preferred									
Tamiami Ave.					2.7	3.1		4.7	10.5
Krome Ave.					85.3	200.2		79.2	364.7
Subtotal	**0.0**	**0.0**	**0.0**	**0.0**	**88.1**	**203.3**	**0.0**	**83.9**	**375.2**
West Consensus									
88th St.	2.1		0.8	12.0	0.0	18.3	0.3		33.5
L-31 Canal					11.4	4.7	21.0		37.1
NW 12th St.	13.3	6.5	0.1	0.4					20.2
Tamiami Trail						19.6			19.6
Subtotal	**15.4**	**6.5**	**0.8**	**12.3**	**11.4**	**42.6**	**21.4**	**0.0**	**110.4**
Substation									
Davis (East)		1.1							1.1
Levee (West)						1.8		0.5	2.3
Pennsuco (West)	2.4								2.4
Subtotal	**2.4**	**1.1**	**0.0**	**0.0**	**0.0**	**1.8**	**0.0**	**0.5**	**5.9**

(a) Due to rounding, table values may not exactly sum to the total acres and percentages.

Source: Adapted from FPL 2014-TN4058.

transmission lines and reconsideration of the specified mitigation measures, the NRC staff understands that the court's opinion is not yet final as of this writing (October 3, 2016). Accordingly, for the purposes of the FEIS evaluation of impacts, the NRC staff considers the transmission line route and conditions reviewed and approved by the Florida Siting Board as the most current information regarding the transmission line and associated potential mitigation measures. Even if the Conditions of Certification are revisited, the NRC staff considers it reasonable to expect that Conditions of Certification similar to or no less effective than those originally issued will be in place before construction and operation of the proposed units begins.

FPL has indicated that it plans to use existing rights-of-way within the West and East corridors to the extent practicable, to limit the areas of new disturbance (FPL 2014-TN4058). Building new transmission structures, tower pads, conductors, and access roads would result in vegetation loss and temporary habitat disruption. Land used for structure pads and access roads would be permanently converted to transmission line use. FPL has indicated that it would restore the areas between the towers along the transmission line alignment after construction and make these areas available, upon approval by FPL, for joint uses that do not jeopardize the safe and reliable operation of the transmission lines (FPL 2014-TN4058). Although the proposed transmission line corridors and associated access road routes cross agricultural land and some prime and unique farmland, the transmission lines could be constructed in a manner that does not interfere with current or future agricultural uses of the affected land or substantially degrade soil properties

FPL has further indicated that it routinely uses standard industry construction practices, environmental BMPs, and mitigation measures to ensure adverse environmental effects of construction are avoided, minimized, or mitigated (FPL 2014-TN4058). The following environmental protection and impact mitigation measures identified by FPL would also reduce land-use effects of construction within transmission line rights-of-way (FPL 2014-TN4058):

- use of restrictive land-clearing processes in forested wetland areas (right-of-way clearing and preparation)
- use of turbidity screens and erosion-control devices in areas of wetlands and water resources (access road/structure pad construction)
- use of existing access roads for ingress and egress to rights-of-way where available (access road/structure pad construction)
- use of standard industry construction practices for foundation and structure excavation and construction (line construction).

FPL would also be required to comply with applicable laws, regulations, and permit requirements. Standard industry construction practices that FPL proposes to use include erosion-control devices, matting to reduce compaction caused by equipment, use of wide-track vehicles when crossing wetlands, and restoration activities after the transmission lines are built. Impacts on wetlands are addressed in more detail in Section 4.3.1 of this EIS.

Based on information provided by FPL and the review team's independent review, the review team concludes that new and expanded transmission line corridor development impacts may

potentially be noticeable to the public, including users of nearby national park lands, and affect existing land uses. This is because of the amount and extent of land that may be affected by new and expanded transmission line corridor development, and the extensively developed urban areas and sensitive national park lands adjacent or close to areas where some of the expanded transmission line corridor development activities would take place.

4.1.2.2 Substations

Upgrading and expanding offsite substations, in addition to the onsite Turkey Point substation expansion would require approximately 6.75 total ac of additional property for the expansions. Specific details for each substation are presented below.

- Improvements at the existing Levee substation would require expansion to include approximately 2.33 ac of additional land to accommodate a new bay with two 500 kV line terminals. The affected land comprises approximately 0.52 ac of existing electric power facility land (FLUCFCS Code 831) already designated by FLUCFCS for the Levee substation, plus approximately 1.81 ac of adjoining land designated as exotic wetland hardwoods (FLUCFCS Code 619). Construction activities would include filling, grading, and placing rock in the expansion area for construction of a new bay and associated equipment, and construction of a new stormwater-retention system.
- Improvements at the existing Pennsuco substation would require expansion to include approximately 2.42 ac of land currently mapped by FLUCFCS as being used for rock quarry uses (FLUCFCS Code 163) to accommodate the addition of a stormwater-retention system and installation of new equipment. Because work would be confined to a small area directly adjoining an existing substation, the review team does not expect that it would adversely affect quarry operations.
- Improvements at the existing Davis substation would require expansion to include approximately 1.12 ac of land currently used for tree nurseries (FLUCFCS Code 241), to accommodate the addition of two new 230 kV line terminals and installation of equipment to control power flow for the line connecting to the Miami substation.
- Improvements at the existing Turkey Point substation would be expansion by approximately 0.88 ac of land already designated by FLUCFCS as electric power facility land (FLUCFCS Code 831).
- Improvements at the existing Miami substation would take place within the footprint of the existing substation and not require any expansion or change in land use.

Work to carry out the proposed substation expansions would have to meet all environmental regulatory requirements. It could interfere with adjacent land uses or affect agricultural land or prime or unique farmland.

4.1.3 Summary of Land-Use Impacts

The review team evaluated potential land-use impacts from construction and preconstruction activities related to building the proposed Units 6 and 7 and associated facilities on the Turkey Point site and vicinity, in the region, in the proposed offsite transmission line corridors, and in offsite rights-of-way for roads and pipelines. The proposed activities in the project area would

be compatible with existing and reasonably foreseeable land uses elsewhere on the Turkey Point site. Mitigation proposed by FPL and required by Miami-Dade County would ensure compatibility with regional land-use plans and land uses outside the site boundaries.

Building the transmission lines and other offsite facilities, including improving substations, installing pipelines, and building and improving access roads may interfere with existing offsite agricultural and open space land uses. Local communities have raised concerns about visual impacts and potential indirect blight impacts resulting from installation of the proposed new transmission lines. These issues were raised and considered in the State permitting process for the transmission lines. Miami-Dade County recommended an extensive list of conditions related to land use through the State certification process (State of Florida 2012-TN1248), and many of these conditions became Conditions of Certification, including the following:

- securing access to transmission line rights-of-way
- using pole designs that reduce visual effects and limit conflicts with tree canopy maintenance
- planting trees
- using design measures for compatibility with MetroRail
- using design measures for compatibility with pedestrian and bicycle pathways and trails.

Because the Conditions of Certification would be enforceable under state law, the review team considers actions specified by those conditions to be reasonably foreseeable mitigation. In addition, the review team expects that FPL would use BMPs when building any project facilities, including the transmission lines, as required by the State and County. These practices are designed to reduce the effects on surrounding lands.

Based on information provided by FPL and the review team's independent evaluation, the review team concludes that the land-use impacts of the construction and preconstruction activities would be MODERATE. This conclusion accounts for the location of the new plant facilities close to Biscayne National Park and the passage of the transmission lines close to Everglades National Park and to urban areas. However, considering the position of the new facility within an already established industrial setting and the mitigation required under the state Conditions of Certification, any conflicts with land-use objectives for the affected park areas would not be destabilizing.

The Limited Work Authorization (LWA) rule (72 FR 57416) (TN260) specifically states that site-preparation work, as well as building transmission lines, pipelines, heavy-haul roads and other offsite facilities are not included in the definition of NRC-authorized construction. NRC-authorized construction would be limited to activities necessary to develop safety-related structures on the Turkey Point site, a subset of the total development activities analyzed above for land-use impacts. All NRC-authorized construction would take place on property owned by FPL on a site zoned for use by energy-generating facilities. The proposed safety-related facilities would be constructed in an area of the Turkey Point site close to only undeveloped lands or lands already used by existing FPL power-generation facilities. Based on this analysis,

the NRC staff concludes that the land-use impacts from NRC-authorized construction would be SMALL, and no further mitigation would be warranted in regard to the NRC action.

4.2 Water-Related Impacts

Water-related impacts involved in building a nuclear power plant are similar to impacts associated with building any large industrial construction project. Prior to initiating building activities including any site-preparation work, FPL would be required to obtain the appropriate authorizations regulating alterations to the hydrological environment. The authorizations, permits, and certifications potentially required from Federal, State, regional, and local agencies are listed below. Additional detail regarding the items listed is contained in Appendix H.

- Clean Water Act (CWA) (33 U.S.C. § 1251 et seq.) (TN662) Section 401 is at 33 U.S.C. § 1341 (TN4764) certification. This certification is issued by the FDEP as part of Florida's Power Plant Siting Act (PPSA) Certification (Fla. Stat. 29-403.501 2011-TN1068) and ensures that the project does not conflict with State water-quality standards. This certification is required before the NRC can issue a COL to FPL. State of Florida's final Conditions of Certification include conditions identified by the SFWMD to ensure that water use is consistent with State standards. The Conditions of Certification are binding on FPL (State of Florida 2014-TN3637). If a DA permit is issued, the 401 Water Quality Certification would be required in addition to a Coastal Zone Consistency Determination, both of which are provided by the State of Florida.
- Department of the Army Permit. Authorization from the USACE would be required under CWA Section 404 (33 U.S.C. § 1344) (TN1019) for the discharge of dredge or fill material into waters of the United States associated with the site-preparation activities and construction of the nuclear power plant and its associated components. Authorization would also be required under Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403) (TN4768) for the construction of structures or work in, under, or over navigable waters of the United States associated with the construction of the nuclear power plant and its associated components. The USACE will conclude its Clean Water Act Section 404(b)(1) Guidelines and public interest analysis for this permit decision in its Record of Decision. Furthermore, Section 14 of the Rivers and Harbors Act (33 U.S.C. § 408) (TN4769) requires authorization for any components of the project that would in any way impair the usefulness of a USACE Civil Works Project; a separate 408 review will be conducted to ensure there will be no inconsistency with the intended use that was authorized by Congress.
- Clean Water Act (33 U.S.C. § 1251 et seq.) (TN662) Section 402 is at 33 U.S.C. § 1342 (TN4765) National Pollutant Discharge Elimination System (NPDES) permit. This permit would regulate limits of pollutants in liquid discharges to surface water. The U.S. Environmental Protection Agency (EPA) has delegated the authority for administering the NPDES program in Florida to the FDEP. The NPDES permits are part of PPSA certification. A stormwater pollution prevention plan (SWPPP) for construction would also be required.
- Water-use permit. Consumptive use of surface water and groundwater would require a permit from the FDEP or the water-management district.
- Groundwater well drilling and operating permits. Construction of water wells would require a permit from the SFWMD.

- FDEP Class I Industrial Waste UIC Permits (Fla. Admin. Code 62-528-TN556). UIC wells are required to be constructed, maintained, and operated so that the injected fluid remains in the injection zone, and the unapproved interchange of water between aquifers is prohibited. Class I injection wells are monitored so that if migration of injection fluids were to occur it would be detected before reaching the underground source of drinking water (USDW).

4.2.1 Hydrological Alterations

Hydrologic alterations during building of proposed Turkey Point Units 6 and 7 may occur as a result of the following:

- clearing land and building infrastructures, such as roads, water lines (including reclaimed water), sewer lines, transmission lines, and stormwater-drainage systems, etc.
- modifications to the barge-turning basin
- dewatering foundation excavations of the nuclear island and discharge to the industrial wastewater facility (IWF) and its associated cooling canals
- construction of the RCWs and UIC wells
- demucking of the nuclear island and spoils disposal
- discharge of fill into wetlands.

The primary water resources that could be affected by building activities related to proposed Turkey Point Units 6 and 7 are listed below and discussed in the following subsections:

- Biscayne Bay
- Biscayne aquifer
- Floridan aquifers and Boulder Zone
- IWF (cooling canals)
- Offsite and adjacent areas.

4.2.1.1 Biscayne Bay

Hydrological alterations to Biscayne Bay during building of proposed Turkey Point Units 6 and 7 may occur as a result of (1) stormwater runoff, (2) building activities in the barge-turning basin, and (3) interactions between the IWF cooling canals and Biscayne Bay during dewatering of excavations. Concerning the potential effect of direct surface drainage from spoils disposal piles on Biscayne Bay during building of proposed Turkey Point Units 6 and 7, the review team is unaware of any reason that would preclude the use of engineering design solutions to prevent drainage into the C107 Canal, which would be the only potential direct surface-water pathway into Biscayne Bay. Seepage originating in the cooling canals and moving through the berms and the upward movement of groundwater that originated in the cooling canals does provide a pathway from the IWF to Biscayne Bay.

Stormwater Runoff

As discussed in Section 3.3.1.1, stormwater runoff from the plant area and the laydown area during building activities would be directed to the cooling canals of the IWF. Table 2-10, in the Local Site Drainage subsection of Section 2.3.1.1, provides annual discharge volumes from the building areas within the site as computed by the review team. As discussed in FPL's Stormwater Management Plan (FPL 2011-TN303), all stormwater runoff from the RWTF area, except the equipment area runoff would be routed to stormwater-management basins before being released to its surrounding wetland area. The review team determined that the building within the plant area and laydown area would not detectably alter the amount of runoff entering the cooling canals (which the review team currently estimate to have an average annual runoff of 1,163 ac-ft [Table 2-10]) because the area to be disturbed for the proposed units already drains into the cooling canals. While in Section 2.3.1.1 the review team acknowledges a hydrologic connection between the IWF and Biscayne Bay exists, it is reasonable to postulate that if the IWF is not altered by the construction of the plant there will be no associated changes to the Biscayne Bay.

Barge-Turning Basin

There is an existing barge-turning basin on the eastern edge of the Turkey Point plant property. As discussed in Section 3.3.1.11, the barge-turning basin would be enlarged by dredging a 4,356 ft^2 (0.1 ac) area to accommodate large barges for delivery of reactor components (reactor vessel, steam generators, steam turbines, the electric generator, and transformers). Sheet piles and curtain walls would be installed to separate the excavation area from the barge-turning basin and to prevent turbid waters from entering Biscayne Bay.

The review team examined the information provided in the ER (FPL 2014-TN4058). FPL would be required to comply with requirements of Section 10 of the River and Harbors Appropriation Act of 1899 (33 U.S.C. § 403) (TN4768), the USACE public's interest review (33 U.S.C. § 320.4) (TN424), and FDEP permits. FPL would also use BMPs to minimize the effect of disturbance of bottom sediment. Since the required permits, certifications, and the SWPPP that are protective of the environment would be implemented, and the preconstruction activities would result in temporary and localized impacts, the review team concluded that the effect on Biscayne Bay water quality of enlarging the turning basin would be minimal.

Dewatering and the Cooling-Canal System

As discussed in Sections 3.2.2.4 and 3.3.1.5, water removed during dewatering of the plant excavations would be routed to the IWF. FPL (2014-TN4058) estimated that a maximum of 1,000 gpm of groundwater would be pumped for up to 13 weeks at each of the two deep excavation pits of proposed Units 6 and 7 during the initial excavation and grouting phase. This would be followed by a 24-month period of pumping at up to 200 gpm at each plant excavation. Because the start of plant excavation would be staggered, the total maximum dewatering flow rate into the IWF is expected to be 1,000 gpm for 6 months, followed by 1,200 gpm for 6 months, followed by 400 gpm for 18 months and then 200 gpm for 6 months. However, taking a conservative approach, FPL's analysis assumed that the maximum dewatering flows would be 1,200 gpm for 1 year followed by 400 gpm for a period of about 24 months. The review team

compared these conservative flow estimates to the volume capacity of the approximately 4,370 ac IWF cooling canals and found that, with no evaporation or infiltration of the added water, the level of the cooling canals would increase less than 6 in. during 12 months of dewatering inflow at 1,200 gpm. If evaporative losses were considered, any increase in IWF water level would be reduced further. This potential increase in volume and hydraulic head due to the addition of dewatering flows from the excavations is minimal and would cause a negligible change in the hydraulic head and groundwater fluxes from the IWF. The effect of these hydrological alterations on the IWF is minimal.

4.2.1.2 Biscayne Aquifer

Hydrological alterations to Biscayne aquifer during building of proposed Turkey Point Units 6 and 7 may occur as a result of (1) installation and testing of RCWs, (2) excavation of fill material from the Biscayne aquifer, (3) extraction of groundwater during dewatering of the plant excavations, (4) installation of the UIC wells and associated monitoring wells, and (5) increased use of potable water.

Installation and Testing of Radial Collector Wells

Installation of the RCWs would involve installation of pipelines and caissons on the Turkey Point peninsula and drilling of lateral collector wells in the Biscayne aquifer beneath Biscayne Bay. Design details are discussed in EIS Section 3.2.2.2. The pipeline and caisson excavation would require limited extraction of groundwater over a period of several months. Groundwater inflow to excavations would be controlled by sheet piles if needed. Extracted water would be discharged to the IWF (FPL 2012-TN126). Drawdown should be localized and confined to the area around the wells. FPL has stated that, if needed, the drilling area would be isolated and drawdown would be minimized through the use of sheet piling technology or the equivalent (FPL 2012-TN126). Drilling of the RCW laterals and initial test pumping of the wells would result in extraction of small amounts of groundwater compared to the volume that would be extracted during RCW operation, which is discussed in EIS Section 5.2.

Excavation of Fill Material

As discussed in EIS Section 3.2.2.3, up to about 14.4 million cubic yards of fill material would be needed to raise the ground-surface elevation of the proposed plant area and facilities associated with proposed Units 6 and 7. FPL has not made a final determination regarding the source of the fill material for the FPL site; however, FPL has indicated that it would use commercial fill sources in the vicinity of the Turkey Point site.

To provide context for the potential impacts of fill mining on the Biscayne aquifer, the review team considered the Atlantic Civil mine as a viable commercial fill source located south of SW 360th Avenue and east of US-1 and Card Sound Road in Sections 28, 29, 32, and 33 Township 57 South and Range 39 East, Florida City Florida (USACE 2013-TN3473). The review team also considered a rock mine in the Lake Belt Area as another viable commercial source of fill. This allowed the review team to consider a nearby location with limited capacity and a more distant site with extensive capacity.

The Atlantic Civil rock mine is located about 10 mi west of the FPL site. The USACE has issued a permit for this location to expand the mine by 494.2 ac over the next 20 years. The rock mine expansion described in the permit would occur in 238.4 ac of jurisdictional wetlands that had been filled and farmed. The majority of this land has been used to raise corn and other row crops (158.3 ac). An additional 16.3 ac are wetlands dominated by exotic species would be mined (USACE 2013-TN3473). The review team assumed that SW 359th Street would be improved between the Turkey Point site and the rock mine to facilitate hauling the fill material to the site.

An alternative source of fill would be rock mines in the Lake Belt Area. On January 22, 2010, the USACE signed an ROD for rock mining in the Lake Belt Area, and has issued a project-specific permit to Cemex Construction Materials Florida for its FEC Quarry. The quarry is named for the Florida East Coast (FEC) Railway, which serves the quarry. The quarry and rail center are located approximately 40 mi north of the Turkey Point site.

Portions of the FEC Quarry have been in use for some time. Discharge of dredged or fill material into over 1,346 additional acres was permitted under a permit issued by the USACE in 2010 (USACE 2010-TN3555). Mines in the Lake Belt Area operate under the conditions of the Lake Belt Mitigation Plan. Under this plan, mine operators are required to document the wetland habitat that will be affected by clearing and mining activities. The operator is also required to perform the mitigation identified in the Lake Belt Mitigation Plan.

The Cemex mine would not be operated solely to provide fill material to the FPL site. Therefore, if this mine were to be used as the fill source, only a portion of the preconstruction and construction land use impacts resulting from conversion of wetlands and farmland to mining would be considered directly attributable to the proposed Turkey Point Units 6 and 7 project.

Extraction of Groundwater during Dewatering of the Plant Excavations

Because of the high permeability of some sediments in the Biscayne aquifer, FPL would control inflow of groundwater to the excavations by placing a low-permeability grout curtain around each of the excavations and injecting grout into the sediments below the plant excavation. The review team determined that FPL would take additional measures to reduce groundwater inflow if needed, such as additional grouting or sheet piles. FPL (2014-TN4058) estimated that a maximum of 1,000 gpm of groundwater would be pumped for up to 13 weeks at each of the two deep excavation pits during the initial excavation and grouting phase, followed by a 24-month period of pumping at up to 200 gpm at each plant excavation. In their analysis, FPL conservatively assumed that the maximum dewatering flows would be 1,200 gpm for 1 year followed by 400 gpm for a period of about 24 months.

The review team determined that groundwater removed during excavation and building of the plants would come from the Biscayne aquifer, the IWF cooling canals, and Biscayne Bay. As discussed in Section 2.3, hypersaline water from the cooling canals has already migrated downward into the Biscayne aquifer beneath the cooling canals and also beneath the “mud island” location of the proposed plants (FPL 2012-TN3439). Therefore, groundwater removed during dewatering will contain some hypersaline groundwater that has migrated downward from the cooling canals. Dewatering of the excavations will create a hydraulic gradient toward the

excavations. However, the review team determined that groundwater from the inland portions of the Biscayne aquifer is unlikely to move toward the excavations because the IWF and the L31-E Canal create sources of recharge that will replace water removed from the aquifer.

Installation of the UIC Wells and Associated Monitoring Wells

Construction of the UIC wells and associated deep monitoring wells requires drilling through the Biscayne aquifer and setting cemented well casings at each well location in order to reach the target formations. Saline fluids, drilling mud, and cuttings will be circulated to the surface. Additional information about the deep-well drilling activities is provided in Chapter 3. Potential impacts and safeguards are discussed in Section 4.2.3.

4.2.1.3 Floridan Aquifers and Boulder Zone

Hydrological alterations to Floridan aquifers and Boulder Zone during building of proposed Turkey Point Units 6 and 7 may occur from the installation of UIC wells and associated monitoring wells, and from the use of one or more of the wells for construction-related wastewater disposal while building the plants.

UIC Well Installation

As discussed in Chapter 3, 10 UIC wells, 2 backup wells, and 6 dual-zone monitoring wells would be built to support the UIC disposal of blowdown and other wastewater during plant operation. The UIC wells would be drilled to more than 3,000 ft below ground surface and completed in the Boulder Zone of the Lower Floridan aquifer. As planned, each monitoring well would have separated completions in the Middle Confining Unit of the Lower Floridan aquifer and in the lowest overlying USDW aquifer (described in Section 2.3). Monitoring would be placed between each pair of UIC wells for a total of six monitoring wells that would provide samples of groundwater in the deepest USDW aquifer and in the confining zone below the deepest USDW. The review team determined that drilling and completing these wells creates a potential for movement of water between aquifers. There is also a possibility of leaks from surface tanks or pits used to hold drilling fluids and saline water removed from the wells. However, construction of the UIC wells is regulated through FDEP Class I Industrial Waste Underground Injection Control Permits (Fla. Admin. Code 62-528-TN556). These regulations specify approved construction techniques, and testing and monitoring requirements to ensure that groundwater quality is not adversely affected by construction of the wells.

UIC Well Use During Construction

FPL (2014-TN4058) has stated that one of the UIC wells could be used to dispose of construction-related and sanitary wastewater in accordance with the UIC permit from the State of Florida. Injection volume restrictions and monitoring requirements of the UIC permit (Fla. Admin. Code 62-528-TN556) would apply. The volume and injection flow rate of this waste is expected to be less than the rates during operation of proposed Units 6 and 7 and would be bounded by use during operations, as discussed in Section 5.2.

4.2.1.4 IWF (Cooling Canals)

Hydrological alterations affecting the IWF (cooling canals) that would be associated with the building of proposed Turkey Point Units 6 and 7 may occur as a result of (1) increased stormwater runoff, (2) demucking of the plant area and muck/spoils disposal, and (3) dewatering from excavation.

Stormwater Runoff

Engineered fill would be used to raise the ground surface in the power block area to 25.5 ft NAVD88 (Zilkoski et al. 1992-TN1232). Raising the grade level in the plant area would permanently change the drainage pattern in the area. As described in Section 3.2.2.1, the stormwater-drainage system around the proposed Turkey Point Units 6 and 7 facilities (within the plant perimeter wall) would direct stormwater to catch basins that would discharge to the IWF. Runoff from the laydown area west of the main plant site, and from the nuclear administration and training facility area north of the main plant site, would also discharge to the IWF. Stormwater runoff from the RWTF area, however, would be routed to two stormwater-management basins, before being released to its surrounding wetland area.

FPL has indicated that environmental control measures such as berms, riprap, sedimentation filters, and detention ponds would be used to control stormwater runoff from the spoils piles to the IWF (FPL 2014-TN4058; FPL 2011-TN1042).

Demucking of Nuclear Island and Muck/Spoils Disposal

As discussed in Section 3.2.2.3, approximately 5 ft of earthen material would be excavated from the plant area and disposed of in spoils disposal areas. Spoils disposals areas would be established at three locations (Figure 3-1): one along the side of the main return canal on the south end of the IWF and one each along the east and west sides of the main return canal. Section 3.3.1.9 discusses BMPs to control drainage from the spoils disposal areas.

The review team independently estimated the volume and depth of spoils on the cooling-canal berms based on information in EIS Figure 3-1. The review team estimated the total length of berms to be used for spoils disposal as approximately 53,400 ft; the average width was estimated to be 165 ft ranging from approximately 95 ft to 250 ft, which provides a maximum disposal area of approximately 210 ac, which would result in complete coverage of the berms by spoils disposal. However, because of the need for structural components and an access road, the review team estimated the actual disposal area available would be half that, or 105 ac.

The review team estimated the volume of spoils disposal based on an excavation area of 219 ac and excavation depth to 5 ft (EIS Section 3.3.1.3), which produces approximately1.8 million cubic yards of material. Based on the spoils volume, the review team estimates the average spoils disposal thickness to be 10 ft over the disposal area. Because the spoils are to be disposed of in a trench, the average elevation of the disposed material would increase by less than 10 ft. However, because the spoils would be mounded, the maximum depth would likely be greater than 10 ft. According to EIS Section 3.2.2.3, the maximum elevations of the spoils piles would be 16 to 20 ft NAVD88 (North American Vertical Datum of 1988) and the height above the berm would be 10 to 14 ft, which agrees with the review team's independent estimate.

A potential concern is pore-water drainage from the spoils piles to the cooling canals during the muck-disposal period. While not a water body regulated for water quality, there is concern related to the potential impact on Federally protected crocodiles, which nest on the cooling-canal berms at several IWF locations and the potential to affect Biscayne Bay water quality from muck disposed of along the southern boundary of the IWF. Round 2 of the Florida SCA review (July 2010) (FPL 2010-TN3664) reports nutrient concentrations measured from muck pore-water samples. The drainable pore-water content is estimated to be 8 to 12 percent by volume. For the total 1.8 million cubic yards (1.38 million cubic meters) of muck to be excavated, the review team computed the maximum drainage volume to be 1.65×10^5 m^3. For the evaluation of the potential maximum impact, the review team made several assumptions: (1) the volume of pore-water drainage was added to the IWF over the pre-construction period (69 months [5.75 years] [FPL 2014-TN4058]), which results in an average pore-water discharge rate of 9.021×10^{-4} m^3/s; (2) the nutrient concentrations in the pore-water drainage were represented by average concentrations reported in the Round 2 SCA documentation (FPL 2010-TN3664); and (3) the constituents were conservative (no loss except by dilution). The average nutrient concentration measured in the muck pore water for total Kjeldahl nitrogen (TKN) was 5.10 mg/L (Round 2 SCA) (FPL 2010-TN3664). For total phosphorus (TP), the geometric mean concentration in the muck pore water was 0.174 mg/L (Round 2 SCA) (FPL 2010-TN3664). Using the estimated average discharge rate and the concentrations, the review team computed the daily load of TKN to be 0.398 kg/d and the daily load of TP to be 0.0136 kg/d.

Using water and mass-balance methods, the review team calculated the concentrations of TKN and TP within the cooling canals from pore-water drainage of spoils piles. To compute the mass balance, the review team first calculated a water balance using the cooling-canal storage information from the *Cooling Canal System Modeling Report* (Golder 2008-TN1072) and the FPL 2012 *Uprate Report* (FPL 2012-TN3439). The water balance data from the FPL 2012 uprate was averaged by month and repeated over a 9-year period to provide inflows and outflows to the cooling canals for use in the mass-balance calculations. Figure 4-1 shows the review team's computed cooling-canal volumes for this period.

Using the computed TKN and TP loads to the cooling canals, the review team computed the maximum incremental concentration increase from pore-water drainage into the cooling canals would be 8.6 µg/L for TKN and 0.29 µg/L for TP. The response curve for TKN is shown in Figure 4-2 as an example of the type of response computed from pore-water drainage. The response curve for TP would have an identical shape but the concentration axis would be rescaled by the ratio 0.29/8.6. The incremental concentration decreased following the end of the pre-construction period when the pore-water discharge to the IWF has reduced to a very small level. For reference, the FDEP limit for TP concentration is 10 µg/L. Note that the actual spoils disposal rate to the disposal areas would be small because the excavation would be done over a period of several years.

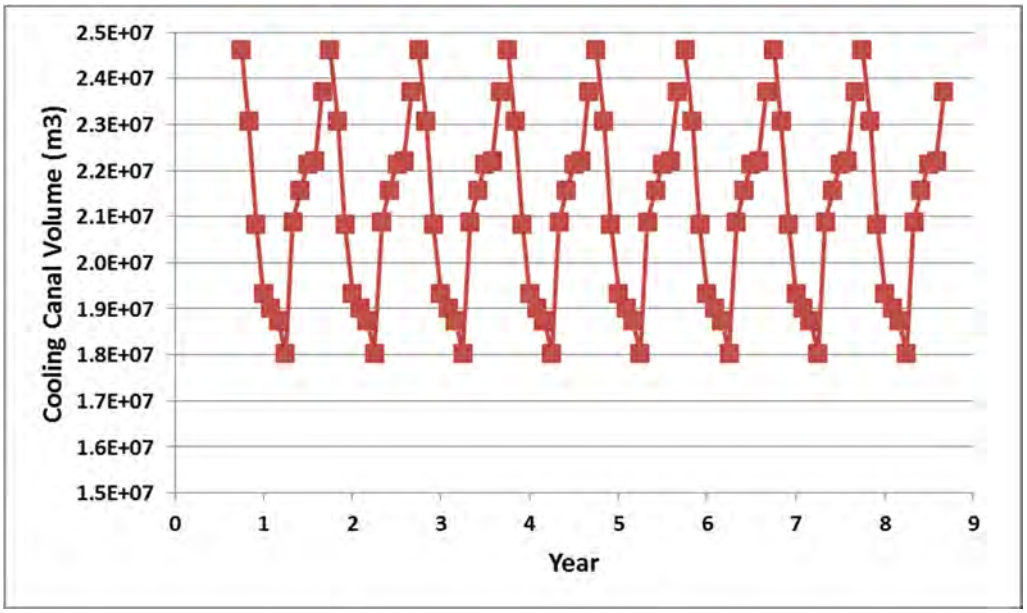


Figure 4-1. Cooling-Canal Volumes Calculated by the Review Team Using Estimated Monthly Fluxes from the FPL Uprate Report 2012 (FPL 2012-TN3439). ***The review team used monthly averages to estimate the repeating seasonal variation in volume. A break in the line occurs between December and January of each year.***

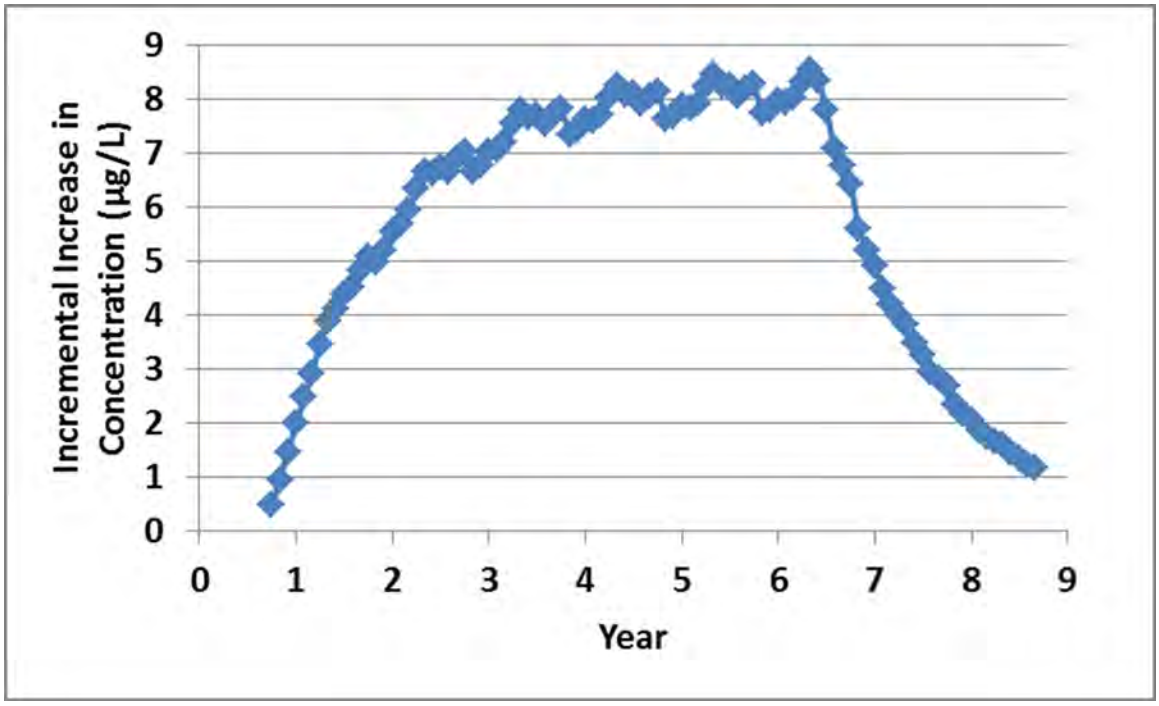


Figure 4-2. Concentrations of TKN Using Estimated Monthly Fluxes from the FPL Uprate Report 2012 (FPL 2012-TN3439). ***Hydrologic conditions are those used to estimate the cooling-canal volumes shown in Figure 4-1.***

Dewatering from Excavation (Water Quality)

As discussed previously regarding alterations to the IWF from the dewatering discharge, the expected volume of water going from the excavations to the IWF is small in comparison to the total volume of the IWF cooling canals. The total dewatering volume produced at the maximum expected dewatering rate of 1,200 gpm (1.7 Mgd) for 1 year is a small percentage of the 4,200-million–gallon volume of the IWF (about 15 percent). After the first year, a maximum dewatering rate of 400 gpm was conservatively predicted to continue for about 24 months (FPL 2014-TN4058). Also, according to FPL (2014-TN4058), the recirculating water in the IWF is 2,747 Mgd so that the maximum dewatering discharge is approximately 0.06 percent of the recirculating water already sent to the IWF. The water quality of the dewatering discharge would be similar to the aquifer water quality, and it would have no greater effect on the water quality of the IWF than does the existing groundwater influx. Consequently, the review team finds the hydrologic alterations on water quality from discharging of dewatering flows to be minimal.

4.2.1.5 Offsite/Adjacent Areas

According to ER Section 3.3.1, offsite activities will be conducted for building transmission lines, pipelines, and road improvement areas (FPL 2014-TN4058). Hydrological alterations of offsite/adjacent areas during building of proposed Turkey Point Units 6 and 7 may occur as a result of (1) building activities related to pipelines and transmission lines and (2) stormwater runoff.

Pipelines and Transmission Lines

As discussed in Section 3.3.1.14, installation of offsite pipelines would require land clearing along the pipeline corridor, shallow excavation (trenching), and backfilling. Potential erosion would be controlled using turbidity screens, erosion-control devices, and BMPs. FPL would obtain an NPDES permit from the FDEP that would include the SWPPP with controls and practices to minimize storm-produced discharges. Localized, short-term, building-related dewatering of shallow excavations associated with pipelines and other utilities would result in limited extraction of groundwater from the Biscayne aquifer, primarily within the footprint of the Turkey Point site boundaries and along the reclaimed water pipeline corridor. Once final designs are submitted, these dewatering activities would require approval from the FDEP and the SFWMD. Consequently, the review team considers the hydrologic alterations due to pipeline building to be minimal.

During installation of the proposed new transmission lines, hydrologic alterations to offsite surface waterbodies could occur. No surface or groundwater would be used in the installation of these lines. In either of the alternative routes proposed, the lines would cross numerous water bodies and wetlands. The review team identified no conditions to suggest that erosion and sedimentation control could not be achieved through the application of BMPs.

Stormwater Runoff

As discussed in Section 3.3.1.8, improvements to roads will require drainage ditch installation, culvert installation, fill placement, road paving, and bridge installation. Requirements of the

Miami-Dade County Public Works Department and the Florida Department of Transportation would be followed. Potential erosion would be controlled using turbidity screens, erosion-control devices, and BMPs. The review team discussed stormwater management with SFWMD experts and they identified no unique conditions at the Turkey Point site to suggest that standard BMPs would not be adequate to mitigate stormwater impacts during construction of Units 6 and 7.

4.2.2 Water-Use Impacts

The impacts of building a nuclear power plant on water use are similar to impacts that would be associated with the development of any large industrial site. This section includes identification of the proposed activities associated with building proposed Turkey Point Units 6 and 7 that could affect water use, and analysis and evaluation of proposed practices to minimize adverse impacts on water use by those activities.

4.2.2.1 Surface-Water-Use Impacts

FPL has indicated that surface water would not be used as a source of water supply for construction and preconstruction activities for proposed Turkey Point Units 6 and 7. Water needed for construction and preconstruction would be obtained through the existing potable water supply from Miami-Dade County.

Therefore, the NRC staff concludes that the impacts on surface-water use during construction and preconstruction activities for the proposed Turkey Point Units 6 and 7 would be SMALL, and no mitigation would be warranted. Also, because NRC-authorized construction activities represent only a portion of the above analyzed activities, the NRC staff concludes that the impacts of NRC-authorized construction activities would be SMALL, and no mitigation measures would be warranted.

4.2.2.2 Groundwater-Use Impacts

The review team determined that groundwater removed from the Biscayne aquifer through dewatering during excavation and building of the plant foundations would be recharged by nearby surface-water features including the cooling canals, Biscayne Bay, and the L-31E Canal. Some recharge would also come from infiltration of rainfall in the area. The nearest municipal water-supply wells located in the Biscayne aquifer are approximately 7 mi inland. Because of the layered nature of sediments within the Biscayne aquifer, it is possible that some groundwater could move from the inland portion of the aquifer through deeper permeable layers and be captured by excavation dewatering. However, the review team determined that the total volume of groundwater that could be captured from the inland aquifer is a very small percentage of the volume removed during dewatering. Therefore, excavation dewatering would have at most small impact on groundwater users.

Groundwater would be removed from the saline portion of the Biscayne aquifer during RWTF excavation activities. However, relatively small volumes would be removed over a limited time period and no groundwater users are within the area where detectable water table drawdown is expected. Therefore, the dewatering would result in, at most, small impact on groundwater users.

The maximum increased demand for municipal potable water from MDWASD, which is sourced almost entirely from the Biscayne aquifer, is estimated to be 0.814 Mgd for building-related activities and 0.514 Mgd to supply the increased population of construction workers and their families (FPL 2014-TN4058). The total maximum increase in demand of 1.328 Mgd represents less than 0.4 percent of the 349.5 Mgd that MDWASD is permitted to pump each year from the Biscayne aquifer (SFWMD 2012-TN4114). However, the review team expects that the actual rate of water use for building activities will usually be significantly lower and may be offset by using stormwater runoff and water produced from dewatering the excavations. Therefore, increased demand for municipal water for building the plants would have at most a small impact on groundwater users.

The review team determined that groundwater alterations during the building of the proposed plant would not interfere with either the Administrative Order (AO; FDEP 2014-TN4144) or the Consent Agreement (CA; Miami Dade County v. Florida Power & Light 2015-TN4505) activities associated with controlling the IWF salinity and mitigating the hypersaline plume that has extended beyond the site. One well on Mud Island was used as part of the initial freshening efforts soon after the beginning of the algae bloom. This well is open to the Biscayne aquifer, and water from this well is ineffective at lowering salinity in the canals because its salinity is greater than the dilution target for the canals. The location of hypersaline mitigation wells to be drilled is not precisely known at this time. The remediation may be complete before any building activities related to Units 6 and 7 begin, but if the activities overlap in time, ample space at the site exists to support both activities. Site preparation (including dewatering, which is limited by grout barriers) and building activities would only result in very shallow and localized changes in the quality of the Biscayne aquifer.

Based on the information provided by FPL and the review team's independent evaluation, the review team concludes that the water-use impacts of construction and preconstruction activities would be SMALL, and mitigation beyond the State of Florida's final Conditions of Certification (State of Florida 2014-TN3637) for proposed Units 6 and 7 are likely not to be required. Based on the preceding analysis and because NRC-authorized construction activities represent only a portion of the analyzed activities, the review team concludes that the impacts of NRC-authorized construction activities would be SMALL. The review team also concludes that mitigation beyond the FDEP final Conditions of Certification would not be warranted.

4.2.3 Water-Quality Impacts

Building activities related to proposed Turkey Point Units 6 and 7 may affect the quality of surface water and groundwater as discussed below.

4.2.3.1 Surface-Water-Quality Impacts

Surface-water quality of nearby water bodies could be affected by stormwater runoff from the site during preparation and building of the facilities. Dredging for the equipment barge-unloading area for the barge slip could affect surface-water quality by producing turbidity plumes that could enter Biscayne Bay.

The FDEP requires FPL to develop a SWPPP (FPL 2014-TN4058) in accordance with the guidelines and specifications in the *State of Florida Erosion and Sediment Control Designer and Reviewer Manual* (HydroDynamics 2007-TN3678). The plan would be developed prior to initiation of site-disturbance activities and would identify stormwater BMPs, including erosion and sediment-control measures to be used during site-preparation activities (FPL 2014-TN4058). Because the transport of sediment in the stormwater runoff from the disturbed area would be minimized by the use of BMPs and controlled by a stormwater-retention basin (in the case of the RWTF), the effects on offsite water quality are expected to be minor.

Section 3.2.2.3 discusses the excavation needed to expand the equipment barge-unloading area. Sediment and soils disturbed during excavation of the equipment barge-unloading area would be largely contained by a curtain wall. Because the curtain wall is likely not watertight, tidal exchange would flush some turbid water into the barge canal and possibly into Biscayne Bay; however, the impact would be minor, localized, and temporary.

Section 3.2.2.3 states that muck spoils would be disposed on the berms of the IWF. Pore-water drainage from spoils piles at disposal area B along the C-107 Canal has the potential to enter Biscayne Bay via the C-107 Canal and Card Sound. To evaluate the potential impact on water quality from spoils pore-water drainage, the review team calculated the maximum incremental increase of concentration from a discharge into Card Sound. The review team computed the portion of the disposal area that lies adjacent to the C-107 Canal to be approximately 5 percent of the total disposal area. The review team's calculation also included the duration of muck excavation and disposal of spoils of 69 months (5.75 years), which is the duration of the preconstruction period (EIS Section 3.3.2). For the disposal area and duration, the review team estimated a discharge rate of 4.53×10^{-5} m^3/s. Pore-water concentrations in the muck slated for excavation and disposal are 5.1 mg N/L for TKN and 0.17 mg P/L for TP (FPL 2010-TN3664). Using the USACE Hydrologic Engineering Center River Analysis System (HEC-RAS) water-quality model (USACE 2014-TN4128) and available bathymetry for Biscayne Bay and Card Sound (NOAA 2014-TN3665), the review team made a mass-balance analysis to estimate the maximum increment increase in concentration in Card Sound. The analysis assumed the discharge was directly to Card Sound and that there were no other inflows to or tidal exchange with Card Sound. The only volume into which the discharge would be diluted was that of Card Sound. Using the discharge rate, concentrations, and flow and mass-balance approach, the review team computed the maximum incremental increase in concentration as 2.91×10^{-7} mg/L for TKN and 1.43×10^{-8} mg/L for TP. Because any inflow to Biscayne Bay from Card Sound would be subject to additional dilution by tidal exchange, concentrations in Biscayne Bay would be even smaller due to mixing from tidal exchange.

The review team determined that minimal surface-water quality alterations during the building of the proposed plant would not interfere with either the AO (FDEP 2014-TN4144) or the CA (Miami Dade County v. Florida Power & Light 2015-TN4505) activities associated with controlling the IWF salinity and mitigating the hypersaline plume that has extended beyond the site. Building activities associated with Units 6 and 7 would not change the salinity in the IWF. The increase in nutrients in the IWF from drainage of muck from Mud Island is expected to be minimal and could be controlled via BMPs.

Based on information provided by FPL and the review team's independent evaluation, the review team concludes that the impacts of construction and preconstruction activities on surface-water quality at the site would be temporary and SMALL, and no further mitigation, other than the BMPs discussed, would be warranted. Based on the preceding analysis and because NRC-authorized construction activities represent only a portion of the analyzed activities, the review team concludes that the impacts of NRC-authorized construction activities on surface-water quality would also be temporary and SMALL, and no mitigation other than BMPs would be warranted.

4.2.3.2 Groundwater-Quality Impacts

Dewatering of the site during construction would result in discharge to the cooling canals of the IWF. The maximum dewatering discharge to the cooling canals is estimated to be 1,200 gpm from dewatering (EIS Section 3.3.1.5). The recirculation rate of the cooling canals is 2,747 Mgd (EIS Section 2.3.1.1), so that the dewatering discharge rate is 0.062 percent of the recirculating flow rate and 15 percent of the IWF capacity over the 1 year of expected dewatering at that rate. The inflow from dewatering would be balanced by additional groundwater outflow from the unlined bed of the cooling canals so that the increase in water-surface elevation would be less than 1 ft (FPL 2012-TN126). The review team's review of this analysis confirms this conclusion based on the information provided by Golder Associates, Inc. (Golder 2008-TN1072). Consequently, the impact of the discharge of dewatering effluent from construction of the plant foundation to the cooling canals would not be detectable in the cooling canal system. The increase in seepage from the cooling canals to the underlying groundwater system would be offset by the removal of groundwater from the excavations and the groundwater in this area has already been affected by years of cooling canal seepage. Therefore, the staff determined that the impacts on the groundwater quality beneath the cooling canals would be minor.

The review team determined that activities related to the construction of injection wells and monitoring wells related to the proposed wastewater injection into the Boulder Zone at proposed Units 6 and 7 would have negligible effects on groundwater quality in the surficial Biscayne aquifer and the deeper Floridan aquifer system. Construction of the UIC wells is regulated by FDEP Class I Industrial Waste Underground Injection Control Permits (Fla. Admin. Code 62-528-TN556). These regulations specify approved construction techniques and testing and monitoring requirements to ensure that groundwater quality is not adversely affected by construction of the wells. For example, drilling of the first deep well (EW-1) required that shallow monitoring wells be placed at each of the four corners of the drilling pad to a depth of 30 ft for determination of water-quality parameters in the Biscayne aquifer based on weekly samples. The UIC construction permit and other local authorities also require approval of disposal sites for drilling fluids, cuttings, or waste generated in constructing or testing the wells. The review team determined that following these regulations would protect groundwater quality during installation and testing of the UIC wells and associated monitoring wells.

One of the UIC wells could be used to dispose of construction-related and sanitary wastewater (FPL 2014-TN4058). Because the volume and injection flow rate of this waste are expected to be less than the rates experienced during operation of proposed Units 6 and 7, the review team determined that the potential impact would be less than the impact of operational use discussed

in Section 5.2. Injection volume restrictions and monitoring requirements of the UIC permit (Fla. Admin. Code 62-528-TN556) would also apply.

The plant excavation and building activities create a potential for stormwater infiltration to transport pollutants from spills (e.g., gasoline) to the surficial aquifer. FPL has committed to cleanup any such spills to prevent them from affecting groundwater (FPL 2014-TN4058). Impacts on groundwater quality would be monitored and controlled using the Florida BMPs for stormwater management (FDEP 2012-TN1539). Cleanup of spills or other contaminants that could affect groundwater would also be required by the final Conditions of Certification issued by the State of Florida (2014-TN3637).

The review team determined that alterations in groundwater quality during the building of the proposed plant would not interfere with either the AO (FDEP 2014-TN4144) or the CA (Miami Dade County v. Florida Power & Light 2015-TN4505) activities associated with controlling the IWF salinity and mitigating the hypersaline plume that has extended beyond the site. Site preparation and building activities would only result in very shallow and localized changes in the quality of the Biscayne aquifer.

Based on information provided by FPL and the review team's independent evaluation, the review team concludes that the impacts of building activities on groundwater quality at the site would be temporary and SMALL, and no further mitigation, other than the BMPs discussed, would be warranted. Based on the preceding analysis and because NRC-authorized construction activities represent only a portion of the analyzed activities, the review team concludes that the impacts of NRC-authorized construction activities on groundwater quality would be temporary and SMALL, and no mitigation would be warranted.

4.2.4 Water Monitoring

Both surface-water and groundwater monitoring would be performed during building activities at the proposed Turkey Point site.

4.2.4.1 Surface-Water Monitoring

Prior to initiating building activities, FPL would be required to develop an SWPPP by FDEP (FPL 2014-TN4058). During building activities for proposed Turkey Point Units 6 and 7, the SWPPP would be in effect and may include a monitoring program (FPL 2014-TN4058). As required by FDEP, FPL states that monitoring would occur at the following locations (FPL 2014-TN4058):

- cooling canals
- barge-turning basin
- Biscayne Bay.

As required by FDEP, Turbidity is listed as a constituent to be monitored for each of these locations; water level is listed for the cooling canals (FPL 2014-TN4058). Other locations may be monitored as required by FDEP (FPL 2014-TN4058).

Chemical monitoring during construction is discussed in the ER (FPL 2014-TN4058). FPL states that surface-water quality monitoring of the industrial discharge to the cooling canals would continue as required by the IWF permit (FDEP 2014-TN3676). In addition, water-quality monitoring would be established at construction monitoring points, including the barge-turning basin and Biscayne Bay.

Because the review team anticipates only minor impacts on surface waters from building of proposed Turkey Point Units 6 and 7, no additional monitoring would be warranted.

4.2.4.2 Groundwater Monitoring

Most pre-application monitoring wells completed in the Biscayne aquifer are located within the disturbance footprint and would need to be decommissioned in accordance with FDEP or SFWMD regulatory guidelines. Section 6.6.2 of the ER (FPL 2014-TN4058) describes that new monitoring wells would be installed and sampled to monitor dewatering and construction impacts on the Biscayne aquifer at the two nuclear island excavations. Monitoring and reporting of groundwater quality in the vicinity of the UIC well installation activities would be required by FDEP to ensure that shallow groundwater in the Biscayne aquifer is not affected by fluids generated during installation and testing of the deep wells by FPL (FDEP 2010-TN1578; FPL 2012-TN1577). The report describes the shallow monitoring wells and sampling results associated with installation and testing of these deep wells. FPL could inject construction-related and sanitary wastewater into the Boulder Zone using one of the deep-injection wells after the injection permit is obtained from FDEP (FPL 2014-TN4058). Monitoring of the Upper Floridan aquifer and the underlying confining zone would be required in accordance with the FDEP UIC permit. Because the review team anticipates only minor impacts on groundwater from building of proposed Turkey Point Units 6 and 7, no additional monitoring would be warranted.

4.3 Ecological Impacts

This section describes the potential impacts on ecological resources resulting from development of proposed Turkey Point Units 6 and 7 and associated offsite facilities, including transmission lines required to tie into the Florida electrical grid system and pipelines to deliver potable water and reclaimed water for the cooling system. These facilities and their associated construction and preconstruction activities are described in Section 3.2 and Section 3.3, respectively. Impacts on terrestrial resources and wetlands are presented in Section 4.3.1, and impacts on aquatic resources are addressed in Section 4.3.2.

4.3.1 Terrestrial and Wetland Impacts

This section evaluates impacts on terrestrial and wetland resources from site-preparation activities and build-out for the proposed Turkey Point Units 6 and 7 and associated offsite facilities.

4.3.1.1 Terrestrial Resources – Site and Vicinity

The review team assumes that all terrestrial habitats within the proposed approximately 585 ac within the Units 6 and 7 project area would be permanently disturbed (Table 4-6). Building activities affecting terrestrial habitats on the site and in the vicinity include the following: land clearing and site preparation; building the power blocks and associated buildings; building the

cooling system, RCWs, and cooling towers; storage of spoils; plant access road building and modification; and underground injection controlled well installation.

Table 4-6. Extent of Proposed Impacts on Cover Types at the Turkey Point Site

Cover Type (Habitat)	FLUCFCS Code[a]	Availability in 6 mi Vicinity (ac)	Permanent Turkey Point Site Impacts (ac)	Total Impact Relative to Availability in 6 mi Vicinity (%)
Fill Areas	744	517	232	45
Non-Vegetated	650	394	182	46
Dwarf Mangroves	612-B	113	37	33
Mangrove Swamps	612	3,344	28[a]	1
Streams and Waterways	510	302	12	4
Mangrove Heads	612-A	12	12	100
Reservoirs >500 ac	531	13	12	93
Sawgrass Marsh	6411	14	12	85
Disturbed Land	740	121	10	9
Wetland Spoils	743-WET	9	9	99
Ditches	511	19	9	45
Australian Pine	437	16	8	49
Electrical Power Facilities	831	5,725	7	0.1
Spoil Areas	743	62	6	10
Roads and Highways	814	103	6	5
Mangrove Swamp/Willow and Elderberry	612/618	2	2	100
Exotic Wetland Hardwoods	619	45	1	1
Australian Pine	619-AP	1	>1	28
Total		10,812	585	5.4

(a) Although FPL regards impact to 3.98 ac of mangrove swamp from radial collector well delivery pipeline installation as temporary, the review team regarded impact to mangrove swamp from pipeline installation as permanent. Woody vegetation is not usually allowed to reestablish within pipeline corridors. However, the review team acknowledges FPL proposes to allow in situ regeneration of natural herbaceous wetland vegetation. There would still be a permanent loss of wetland function resulting from the loss of forest cover.

The largest impact on terrestrial habitats on the Turkey Point site would result from land clearing and site preparation for building the power blocks and associated facilities within the proposed 218 ac Units 6 and 7 plant area (Table 4-7). Placement of new spoils within three spoils areas outside of the plant area (Spoils Areas A, B, and C) would affect approximately 211 ac of additional land on previously filled lands within the IWF (generally on elevated berms separating cooling canals). Several other smaller areas to the north and west of the plant area would also be disturbed to accommodate support facilities (Figure 3-1). Other than the exception noted in the next paragraph, the review team's impact determination is based on an expectation that all impacts on habitat would result in permanent loss (at least for the duration of Units 6 and 7 operations).

The one exception involves non-forested wetlands within pipeline corridors. FPL proposes to remove, store, and replace topsoil following pipeline installation and restore the pipeline corridor to its original grade. Revegetation of the pipeline corridors was also proposed either by natural recruitment or supplemental planting if necessary. However, the review team determined the impacts on forested wetlands within pipeline corridors, including areas of mangrove cover, would be permanent (permanently converted from forested to emergent wetlands). Because woody growth is typically restricted from reestablishment within pipeline corridors, forested wetlands within pipeline corridors would be permanently converted to herbaceous wetland.

Table 4-7. Permanent Habitat Loss on the FPL Turkey Point Property Attributed to Building Units 6 and 7 Facilities

Area	Total Acres	Wetland Acres[a,b]
Proposed Units 6 and 7 Plant Area	218.27	211.92
Equipment Barge-Unloading Area	0.75	0
FPL Reclaimed Water-Treatment Facility (alternate location)	43.92	35.87
Heavy-Haul Road	5.17	0.15
Nuclear Administration Building	22.73	18.68
Radial Collector Well Laydown Area	2.72	0
Radial Collector Well Area	3.28	0
Radial Collector Well Delivery Pipelines	13.34	4.13
Spoils Area A	77.41	1.06
Spoils Area B	17.88	0
Spoils Area C	116.03	4.39
Training Parking	9.12	7.46
Transmission Laydown Area	2.88	0.33
Western Laydown Areas	51.88	32.17
Total	**585.4**	**316.2**

(a) Acreage calculated from FLUCFCS codes and not verified by the USACE as jurisdictional wetlands.
(b) All 500 and 600 series FLUCFCS codes and 743W are considered in this analysis to be wetlands.

Source: Adapted from Table 4.3-1 of Revision 6 (FPL 2014-TN4058).

Land-Cover Classes (Habitats)

Land-clearing, grubbing, grading, excavation, and the placement of fill would disturb a diverse set of land-cover types (each reflective of a different terrestrial habitat type) within the Turkey Point site. Development of Turkey Point site facilities would require removal of existing vegetation from approximately 585 ac of land (FPL 2014-TN4058). Excluding cover classes already occupied by existing development (electrical power facilities, roads and highways), approximately 573 ac of terrestrial habitat would be lost (Table 4-6). However, about 247 ac of the affected terrestrial habitat area consists of areas that had been substantially altered by deposition of fill during previous land-development activities. Of the remaining 325 ac, another 182 ac, consisting of much of the mud island that is the proposed Units 6 and 7 plant area, are classified as non-vegetated. This area is predominantly a mudflat, which is a special aquatic site according to 404(b)(1) Guidelines. Special aquatic sites have special ecological characteristics that significantly influence or positively contribute to the general overall environmental health or vitality of the entire ecosystem of a region. See 40 CFR Parts 230.3(q-1), 230.10(a)(3), and 230.42 (TN427). The USACE will consider this designation during the review of the DA permit application. Approximately 32 ac are classified as open waters. Australian pine has invaded an additional 9 ac. This leaves about 103 ac of relatively natural terrestrial land cover, including approximately 74 ac of various mangrove types, 12 ac of sawgrass marsh, 2 ac of mangrove/willow and elderberry, and an acre of mixed wetland hardwood. Approximately 4 ac of mangrove swamp within the RCW pipeline corridor would be converted to an herbaceous wetland cover type.

Trees

FPL tree surveys indicate 1,358 individual tree stems of 41 different species could be removed during the building of proposed Units 6 and 7 and the associated facilities and structures on uplands within the project area. As noted in Section 2.4 of the EIS, FPL tree surveys did not identify or address mangroves and other wetland tree species as trees. Most of the trees that would be removed are of six species: the paurotis palm (*Acoelorraphe wrightii*) (307 stems), American mahogany (*Swietenia mahagoni*) (215 stems), green buttonwood (*Conocarpus erectus*) (161 stems), cabbage palm (*Sabal palmetto*) (134 stems), sea grape (*Coccoloba uvifera*) (120 stems), and gumbo limbo (*Bursera simaruba*) (95 stems) (FPL 2011-TN1471; FPL 2011-TN1312). A Miami-Dade County tree-removal permit would be required prior to removal of any trees known to occur in the proposed project area except for poisonwood (*Metopium toxiferum*) (Miami-Dade County 2011-TN601).

Wetlands

Wetlands dominate the landscape of South Florida and the Turkey Point site. Approximately 316 ac of wetlands on the Turkey Point site would be permanently altered by filling and grading, clearing of vegetation, dewatering, erosion, sedimentation, and other alterations to existing hydrology such as road building and culvert installation (Table 4-7). Affected wetland cover classes include various mangrove-dominated wetlands (mangrove swamps, dwarf mangroves, and mangrove heads), reservoirs, streams and waterways, wetland spoils, ditches, willow and elderberry, and mixed wetland hardwoods (see paragraph below). Also included as wetlands are non-vegetated areas, including the tidal flat that occupies most of the 218 ac plant area. Most of 218 ac plant area is classified as non-vegetated because of frequent inundation and high salt content. Also within the plant area are numerous small, scattered mangrove heads (Figure 2-25). Two remnant ditches bisect the area, and the spoils from the ditches are classified as wetland spoils. The area is bordered on the east and west side by active canals that are part of the industrial wastewater cooling system for the existing units. A stand of dwarf mangroves and a reservoir are located on the western border.

Loss of mangrove stands (FLUCFCS Code 612) (including swamps, dwarf mangroves, and mangrove heads) constitutes a 2.2 percent loss of existing mapped mangrove cover within the 6 mi vicinity. This extent of permanent mangrove cover loss in the project vicinity; in a coastal area where mangroves, including dwarf mangroves, play a key role in stabilizing shorelines and providing specialized shoreline habitat; is a noticeable impact. Loss of approximately 30 ac of mangrove swamp related to the installation of the radial collector well system, nuclear administration building, and training parking locations would result in the loss of Aquatic Resources of National Importance (ARNI). The EPA is concerned about impacts on ARNI (EPA Jul 17, 2015 Comment Response Letter). ARNI wetlands are described as being economically important, rare or unique, and important for the protection, maintenance, and enhancement of the nation's waters (EPA 2015-TN4626). Although dwarf mangrove forests and mangrove head habitats do not exhibit typical characteristics of tidal mangrove stands, their extensive root systems still serve to stabilize sediments and associated nutrients. Stunting and decreased plant densities in dwarf mangrove forests may be the result of various environmental factors.

The FLUCFCS codes provided by FPL have not been field verified by the USACE with respect to Federal wetland jurisdictional status. FPL has submitted a wetland mitigation proposal based on the State of Florida requirements. The USACE will review the proposed discharges of fill material into jurisdictional wetlands pursuant to CWA Section (404)(b)(1) Guidelines, which requires a sequential process of avoidance, minimization, and compensatory mitigation. The USACE will conclude its CWA Section 404(b)(1) Guidelines and public interest analyses in its ROD.

Table 4-8. Wetland Types that Would Be Permanently Lost During Building of Proposed Units 6 and 7 and the Associated Facilities on the Turkey Point Site

FLUCFCS Code[a]	Description	Permanent Loss (ac)[b]
650	Non-Vegetated	182.1
612-B	Dwarf Mangrove	37.0
612	Mangrove Swamp	28.3[c]
510	Streams and Waterways	12.4
612-A	Mangrove Head	12.1
531	Reservoirs >500 ac	12.0
6411	Sawgrass Marsh	11.9
743-Wet	Wetland Spoils	9.1
511	Ditches	8.7
612/618	Mangrove Swamp/Willow and Elderberry	1.9
619	Exotic Wetland Hardwoods	0.6
619ap	Exotic Wetland Hardwoods-Australian Pine	0.2
	Total	**316.2[c]**

(a) Acreage calculated from FLUCFCS codes and not verified by the USACE as jurisdictional wetlands.
(b) All 500 and 600 series FLUCFCS codes and 743W are considered in this analysis to be wetlands.
(c) Includes approximately 4 ac of mangrove swamp permanently converted to herbaceous wetland cover.

Source: Adapted from Table 4.3-1 of Revision 6 (FPL 2014-TN4058).

Table 4-8 presents the wetland acreage on the Turkey Point property subject to permanent impacts. Most of the wetland impacts would occur in mudflats, which are a special aquatic site, within the proposed Units 6 and 7 plant area. These wetlands would be permanently altered to build the proposed Units 6 and 7, the cooling towers, makeup-water reservoir, substation, concrete batch plant, UIC wells, and a portion of the heavy-haul road. These facilities would also be built on existing mangrove heads and remnant canals. A considerable amount of mangrove wetlands that still persist around the margins of the proposed Units 6 and 7 plant area would also be lost. Approximately 4 ac of mangrove swamp would be converted to a herbaceous wetland cover type. A stand of mangrove swamp and mangrove swamp/willow and elderberry north of the proposed plant area would be converted into the training facilities and nuclear administration buildings and associated parking. The western laydown area that would contain treated reclaimed water-supply pipelines would be built upon dwarf mangrove stands and part of the existing IWF/cooling-canal system. The RWTF would be built on lands that contain mostly dwarf mangrove, sawgrass marsh, Australian pine, and exotic wetland hardwoods. Spoils would be deposited mostly on previously filled areas but would also fill in additional canal acreage classed as streams and waterways.

4.3.1.2 Terrestrial Resources – Associated Offsite Facilities

Potable Water Pipeline Corridor

The potable water pipeline would be installed within existing roadway medians and below temporary construction access roadway improvements (FPL 2015-TN4442). The review team expects that no wetlands or other natural habitat would be lost. Nearby wetlands, including some Miami-Dade County Environmentally Endangered Lands, could be affected by siltation resulting from excavation to install the pipeline. Noise from installation activities could result in the temporary displacement or loss of local wildlife. Erosion and siltation would be reduced through the use of environmental BMPs, and native plants would be allowed to naturally revegetate disturbed areas (FPL 2014-TN4058).

Reclaimed Water Pipeline Corridor

Approximately 134 ac of land within the corridor would be affected to build the pipeline, including 45 ac of undeveloped land that consists almost entirely of wetlands (FPL 2015-TN4442). Approximately 2 ac of uplands and 9 ac of wetlands would be temporarily affected, and 35 ac of forested wetlands would be permanently converted to herbaceous wetlands (FPL 2015-TN4442). Affected habitats include mangrove swamp, mixed wetland hardwoods, freshwater marsh, mangrove swamp/exotic wetland hardwoods, dwarf mangroves, and minor amounts of herbaceous prairie, shrub and brushland, and Brazilian pepper. Vegetation would be cleared prior to digging the pipeline trench. Nearby wetlands could also be affected by siltation resulting from ground-clearing and digging activities. Noise from installation activities could result in the displacement or minor loss of local wildlife. Non-native plant species could also become established as a result of this disturbance. FPL proposed to use environmental BMPs to minimize impacts on sensitive habitats, including regrading of disturbed portions to the original elevation. Revegetation would occur either naturally or from plantings if needed (FPL 2014-TN4058).

Transmission Line Corridors

FPL's proposed transmission line corridors are described in Section 2.2.2, summarized in Table 2-4, and shown in Figure 2-5. FPL would build new transmission lines for proposed Units 6 and 7 in existing transmission line corridors where possible but would still have to install some new transmission lines within new corridors. Within the East corridor, lines would be installed in existing corridors along all 19 mi of the Clear Sky-Davis corridor, and lines within the Davis-Miami corridor would be in a newly developed corridor (ESRI 2012-TN1469). In both West corridors, lines would be installed within approximately 30 mi of existing corridor. If the West Preferred corridor were used, lines would be installed within about 13 mi of new corridor. If the West Consensus corridor were developed, about 18 mi of new corridor would have to be developed. Table 4-9 provides a summary of the upland and wetland terrestrial habitat within the transmission line corridors (Note that other lands reflected in Table 4-4 are not accounted for in Table 4-9). The proposed West Consensus corridor is considerably wider than the right-of-way to actually be selected and used to build the transmission lines, and expected impacts would be less than suggested by Table 4-9.

Table 4-9. Summary of Undeveloped Uplands and Wetlands Found within Transmission Line Corridors

Transmission Line Segment		Uplands[a] (ac)	Wetlands[b] (ac)
East Corridor			
Clear Sky to Davis		78.9	89.4
Davis to Miami		21.3	16.7
	Total	100.2	106.0
West Preferred Corridor[c]			
Clear Sky to Levee		226.5	1,747.9
Levee to Pennsuco		19.4	171.2
	Total	**245.9**	**1,919.1**
West Consensus Corridor[c]			
Clear Sky to Levee		144.8	2,715.1
Levee to Pennsuco		19.4	171.2
	Total	**164.2**	**2,886.3**

(a) Uplands comprise areas mapped as 300-, 400-, and 700-series FLUCFCS codes.
(b) Wetlands comprise areas mapped using 500- and 600-series FLUCFCS codes. Acreage calculated from FLUCFCS codes and not verified by USACE as jurisdictional wetlands.
(c) Corridor widths are highly variable and figures do not represent expected impacts.

Source: Adapted from Table 2.2-3 of FPL 2014-TN4058.

East Corridor

Clear Sky to Davis. The first 1.8 mi of the existing Clear Sky to Davis corridor is within the Turkey Point site and the next 6 mi of this corridor are alongside and within the western boundary of Biscayne National Park. This corridor is approximately 330 ft wide, and, although it occupies approximately 635 ac, only about 168 ac are terrestrial or wetland habitats because the rest has already been developed or converted into agriculture (FPL 2014-TN4058). Most of the undeveloped acres within this corridor are either dry herbaceous prairie or mangrove swamp and over half of the undeveloped lands are wetlands. FPL estimated the maximum amount of wetland that would be affected by building the proposed transmission line structures within this corridor is approximately 0.06 ac (FPL 2011-TN1012, Table 2-5). The USACE has not yet independently reviewed and verified FPL's proposed compensatory mitigation plan for unavoidable impacts to jurisdictional wetlands because avoidance and minimization have not been demonstrated pursuant to CWA 404(b)(1) Guidelines. Additionally, no approved jurisdictional determination has been conducted for the project; however, a preliminary jurisdictional determination was signed by FPL on July 10, 2012. The USACE will proceed with the processing of the application under this preliminary jurisdictional determination. The USACE's CWA Section 404(b)(1) Guidelines analysis, including determination of the sufficiency of compensatory mitigation pursuant to 33 CFR Part 332, will be concluded in the USACE's ROD.

FPL proposes to add a single 230 kV transmission line to this corridor. New concrete poles would be embedded into the ground to support the wires and may or may not require guy wires (FPL 2010-TN272). Much of this corridor follows an existing transmission line right-of-way, and no new access roads would have to be built. Installation of the new transmission line would require clearing of all vegetation where structures would be installed. Non-forested upland

areas would be mowed; trees would be sawed down before clearing. All vegetation exceeding 14 ft in height within the corridor would also be cleared (FPL 2014-TN4058). Not all habitats within the proposed corridor would be eliminated. Ground disturbance could lead to the establishment of non-native plant species. Wildlife may also be temporarily displaced during installation activities because of the related noise and the presence of humans.

Davis to Miami. FPL plans to build a single 230 kV transmission line within a new corridor. The proposed corridor would occupy about 1,000 ac (FPL 2014-TN4058). Most of this entire corridor has been previously converted to managed lands. Only about 38 ac of upland and wetland terrestrial habitat in this corridor have not been previously developed (Table 4-9). Habitat types include dry prairie, shrub and brushland, upland hardwood forest, streams and waterways, and reservoirs (FPL 2014-TN4058). This corridor also passes adjacent to but does not encroach into habitat mapped as pine rockland, including the Tamiami Pineland Complex (State of Florida 2014-TN3637). Pine rockland habitats support high biodiversity and are known to support many Federal or State-listed species.

Concrete poles not supported by guy wires would be directly embedded into the ground. Some portions of this line may be collocated with another line and double-circuit concrete poles would be used. Where this line crosses the Miami River, an underground cable would be installed. No new access roads would be built to serve this corridor. FPL has not quantified these small areas of habitat loss from the installation of poles and wires, but it has indicated that there would be no wetland impacts (FPL 2011-TN1012). The statement of "no wetland impacts" would be verified by the USACE during the review of the DA permit application. This analysis will be concluded in the USACE's ROD. Most of this corridor lies within an urbanized environment and areas of remaining natural vegetation are somewhat limited in extent. Establishment of non-native species during ground disturbance could also result in permanent habitat alteration and loss. Previous development has likely resulted in establishment of non-native species and the result of increased disturbance from transmission line installation would not be significant. However, the introduction of non-native species into lands adjacent to the few small remaining pine rocklands adjacent to the proposed corridor could increase the risk of the eventual introduction of these non-native species to the rocklands. Acreages of both permanent and temporary habitat loss would be negligible considering past development within this corridor, with the exception of possible impacts on the few remaining pine rocklands adjacent to the proposed corridor.

West Preferred Corridor

Total acreage within the Clear Sky to Levee portion of the West Preferred corridor is about 3,031 ac. Approximately 1,748 ac consist of various wetland types including mixed wetland hardwoods, freshwater marsh, streams and waterways, exotic wetland hardwoods, mixed wetland hardwoods, wet prairies, dwarf mangroves, and lesser amounts of other various wetland cover classes (FPL 2014-TN4058). Lands classified as wet prairie may represent marl prairie habitat, which supports a very high diversity of native species. About one-third of the corridor has been previously developed. Upland classes constitute approximately 227 ac, consisting mostly of Brazilian pepper, spoil areas, shrub and brushland, and herbaceous prairie. FPL estimated that building within this corridor would result in the loss of approximately 298 ac of wetlands (FPL 2011-TN1012). The USACE has not yet independently reviewed and verified

FPL's proposed compensatory mitigation plan for unavoidable impacts to jurisdictional wetlands because avoidance and minimization have not been demonstrated pursuant to CWA 404(b)(1) Guidelines. Additionally, no approved jurisdictional determination has been conducted for the project; however, a preliminary jurisdictional determination was signed by FPL on July 10, 2012. The USACE will proceed with the processing of the application under this preliminary jurisdictional determination. The USACE's CWA Section 404(b)(1) Guidelines analysis, including determination of the sufficiency of compensatory mitigation pursuant to 33 CFR Part 332 (TN1472), will be concluded in the USACE's ROD.

FPL would build two new 500 kV transmission lines and a single 230 kV line in this corridor to connect the Clear Sky substation to the Levee substation. Poles supported by guy wires would be embedded into the ground. Some portions of this line may also contain steel poles (not supported by guy wires) installed on concrete caisson foundations. Installation of new transmission lines would require clearing of all vegetation across the entire right-of-way width where structures would be installed. Non-forested areas would be mowed and any trees present would be sawed down before clearing. All vegetation exceeding 14 ft in height within the corridor would also be cleared (FPL 2014-TN4058). This corridor contains a substantial portion of the 24 ac King's Highway Pineland NFC within the corridor that would be subject to clearing. The King's Highway Pineland NFC is a pine rockland, and pine rocklands support a very high diversity of native flora and fauna—many that are listed as either Federally or State-threatened or endangered (FNAI 2010-TN3515). Loss of any remaining pine rocklands would be a noticeable impact considering how little remains.

Miami-Dade County placed a number of requirements to minimize the acreage of permanent infrastructure to less than 10 percent of the total King's Highway Pineland NFC acreage (FDEP 2014-TN4371). New access roads would be built outside the NFC boundary. Surface disturbance including clearing and grubbing would be minimized, and BMPs such as the use of mats and rubber-tired vehicles would be used to maintain the substrate and understory. Equipment, materials, and debris would not be staged within the NFC. Cutting, pruning, and topping of native trees would be minimized, and all vegetative debris would be removed from the NFC. Barriers would be used during building to limit disturbance, encroachment of fill, sediment, and debris. Installation of fill would be restricted to backfilling of pole locations. Finally, low-impact methods would be used for stringing conductors over the King's Highway Pineland NFC. FPL has committed to avoiding or minimizing the impact on pine rocklands to the extent practicable, especially within the King's Highway Pineland NFC. To accomplish this, FPL incorporated many of these restrictions into design limits that would include using previously disturbed areas and affecting only 0.84 ac of the NFC (FPL 2015-TN4442). Restrictive clearing techniques including chain saws, low ground pressure shear or rotary type machines, or by removal by hand would be used to limit soil compaction and disturbance of native vegetation.

Habitat would be permanently lost during the installation of poles. Individual animals may also be temporarily displaced during vegetation clearing and access road development. Forest habitat could be changed to lower growing herbaceous habitat. Ground-disturbing activities could result in the establishment of non-native species, thereby reducing habitat quality. Acreages of both permanent and temporary habitat loss are unclear but would be substantial considering the relative lack of previous development within this corridor and the predominance

of wetland habitats. Two additional access roads would be required within this corridor (see below for related impacts).

West Consensus Corridor. The Clear Sky to Levee portion of the Consensus corridor contains approximately 3,695 ac. Like the West Preferred corridor, it is also mostly wetlands that total about 2,715 ac. Freshwater marsh is the predominant wetland class, followed by wet Melaleuca, mixed wetland hardwoods/freshwater marsh, sawgrass, mixed wetland shrubs, and lesser amounts of other wetlands classes (FPL 2015-TN4442). Naturally vegetated uplands make up only 145 ac and include spoil areas, herbaceous prairie, shrub and brushland, and minor amounts of other classes. Approximately 835 ac of this portion of the corridor have already been developed into agriculture. This corridor would be built to specifications similar to the preferred option, but this corridor deviates from the path of the preferred option and final design would depend upon the exact route selection within the corridor (FPL 2015-TN4442). The 3,695 ac within this portion represents a corridor that varies in width between 1,000 and 5,000 ft to allow flexibility in the final siting of transmission lines (FPL 2013-TN2941). FPL's conceptual modeling indicates tower pads and access roads would be expected to permanently alter approximately 193 ac of land classified as a wetland cover type, 8 ac of uplands, and 142 ac in agriculture (FPL 2015-TN4442). Adjacent wetlands could also be affected by siltation and runoff. The total amount of habitat permanently lost within this corridor is currently unknown and would be calculated during final design. FPL has not provided similar conceptual modeling information to quantify acreage impacts from tower pads and access roads within the West Preferred corridor. The West Consensus corridor crosses the King's Highway Pineland NFC following the same route as the West Preferred Corridor, and impacts to the NFC would therefore be similar.

Levee to Pennsuco Corridor. The portion of the West corridor between the Levee and Pennsuco substations is the same for both the Preferred and Consensus corridor options and is approximately 8 mi long and 330 ft wide. A new 230 kV transmission line would be installed within this corridor to support proposed Units 6 and 7. As in the other corridors poles would be embedded into the ground. Most land cover within this corridor is either wetlands or disturbed lands. Vegetation would be mowed across the width of the corridor where poles would be installed, and trees and other vegetation exceeding 14 ft in height would be cut. The corridor contains approximately 6 ac of wet prairie that may support many native and/or listed species known to occur in marl prairie habitats. FPL estimated building the proposed transmission line within this corridor would affect 1.3 ac of wetlands (FPL 2011-TN1012).

Other Transmission Activities

Two new access roads would be required to access the transmission line corridors. Five substations would also be built or modified in support of proposed Units 6 and 7.

Transmission Line Corridor Access Roads

Combined, the two new access roads for the West Preferred corridor would affect approximately 365 ac (Table 4-5). The Krome Avenue access road would result in habitat loss or alteration of 143 ac of freshwater marsh and almost 57 ac of exotic wetland hardwoods. However, FPL estimates only 0.2 ac of wetlands would be lost (FPL 2011-TN1012). The Tamiami Trail access

road would affect an additional 3.1 ac of freshwater marsh (Table 4-5).The four access roads necessary for the West Consensus corridor would affect a combined 110 ac. Most of the land-cover classes within proposed access road corridors represent previously disturbed habitats. A variety of wetlands would be lost, including 32 ac of canals, dikes, and levees; 22 ac of exotic wetland hardwoods; and 9 ac of freshwater marsh.

Substations

Davis Substation. Modifications of the Davis substation would permanently convert 1.12 ac of agricultural land (tree nursery) to developed land. Some terrestrial wildlife tolerant of agricultural settings would lose a small area of habitat. No substantial ecological impacts are expected at this location.

Clear Sky Substation. The Clear Sky substation would be installed immediately north of the proposed Units 6 and 7, within the plant area (FPL 2014-TN4058). Impacts on terrestrial resources are accounted for in the assessment of the site and vicinity in Section 4.3.1.1.

Levee Substation. The existing Levee substation would be expanded by 2.3 ac to accommodate new transmission lines. The expansion would require clearing, filling, and grading a 130 ft × 850 ft area (FPL 2014-TN4058). Approximately 1.81 ac of the expansion area is classified as exotic wetland hardwoods, and the remaining 0.52 ac is existing electric power facilities (FPL 2014-TN4058). Loss or modification of these habitats is not expected to substantially affect terrestrial wildlife or other ecological resources. A new stormwater-retention system would also be built to support the expansion. FPL estimated the planned expansion and stormwater-retention system would eliminate 7.5 ac of wetlands (FPL 2011-TN1012).

Pennsuco Substation. This substation would be expanded by 2.42 ac. Approximately 0.65 ac would be converted into a new stormwater-retention system and the remaining area would be transmission infrastructure (FPL 2014-TN4058). The expansion would occur entirely on lands classified as rock quarry. Potential effects on terrestrial wildlife and other ecological resources are therefore expected to be minimal.

Miami Substation. Modifications to the Miami substation would not require expansion and should not affect terrestrial resources (FPL 2014-TN4058).

4.3.1.3 Impacts on Important Terrestrial Species and Habitats

This section describes potential impacts on important terrestrial species including Federally listed or proposed threatened and endangered species, State-listed species, and other ecologically important species and habitats, as defined by the NRC in NUREG–1555 (NRC 2000-TN614) (see Section 2.4.1.3), resulting from all activities related to proposed Units 6 and 7. Impacts on species on the Turkey Point site are discussed first, with Federally listed species preceding State-listed species. Impacts on species associated with offsite facilities including transmission lines follow in the same manner. To meet responsibilities under Section 7 of the Endangered Species Act (ESA) (16 U.S.C. § 1531 et seq.) (TN1010), the staff prepared a biological assessment that documents potential project impacts on Federally listed threatened or endangered terrestrial species. The biological assessment is in the NRC Agencywide

Documents Access and Management System (ADAMS) at Accession Number ML15028A372, as indicated in Appendix F-2. Following the publication of the Draft EIS, the review team provided supplemented biological assessment data to the FWS addressing the Miami tiger beetle, which has been proposed for listing as endangered under the ESA (NRC 2016-TN4801).

Onsite Impacts on Listed Terrestrial Species

Federally Listed Terrestrial Species

Federally listed terrestrial plant and animal species that may occur on or in the vicinity of the Turkey Point site and associated offsite facilities are listed in Table 2-13. None of the Federally listed (or proposed) endangered, threatened, or candidate plant species known to occur in the vicinity of the Turkey Point site have been found on the site during biological surveys conducted by FPL during 2009−2011, and no designated or proposed critical habitat for Federally listed terrestrial species occurs within areas proposed for preconstruction or construction activities. However, this does not preclude them from occurring within the proposed project area and does not preclude impacts on Federally listed species and their habitats from proposed project activities. The potential impacts of development activities on individual Federally listed species are described below.

Plants

Crenulate Lead-Plant (*Amorpha herbacea var. crenulata*) – Endangered. The crenulate lead-plant occurs in marl prairie and wet pine rocklands. Neither of these habitats is found on the Turkey Point site, and the species is not known to occur within 6 mi of the Turkey Point site (Gann et al. 2012-TN137). No impacts on this species are therefore expected on the site.

Blodgett's Silverbush (*Argythamnia blodgettii*) – Proposed Threatened. Blodgett's silverbush is found in pine rockland, rockland hammock, and coastal berm habitats. Neither pine rockland nor rockland hammock habitats occur on the Turkey Point site, and this plant is not known to occur on the site (Gann et al. 2012-TN137). However, it has been recorded in both Biscayne and Everglades National Parks, and its occurrence in coastal berm habitats suggests that suitable habitat may exist along the Biscayne Bay shoreline adjacent to the Turkey Point site. The presence and distribution of Blodgett's silverbush on the coastal berm between Biscayne Bay and the Turkey Point site is unknown. The State of Florida requires surveys for sensitive species (Federally Endangered, Federally Threatened, State-Threatened, State Species of Special Concern) within all affected areas prior to the commencement of work (FDEP 2014-TN4371). Individual plants could be affected if they occur in areas affected by the proposed action, but it is reasonable to expect impacts would be minimized to the extent practicable if State surveys indicated this plant occurred within the proposed project footprint. FPL would likely work around or transplant individual plants in the footprint of ground disturbance.

Florida Brickell-Bush (*Brickellia eupatorioides [mosieri] var. floridana*) –Endangered. The Florida brickell-bush is endemic on the Miami Rock Ridge and is not known to occur on or within 6 mi of the Turkey Point site (FNAI 2000-TN139). No impacts on this species are therefore expected on the site.

Deltoid Spurge (*Chamaesyce deltoidea ssp. deltoidea*) – Endangered. The deltoid spurge occurs on exposed limestone and in sand under an open shrub canopy. It has not been recorded on the Turkey Point site and is not known to occur within 6 mi of the site (Gann et al. 2012-TN1322). No impacts on this species are therefore expected on the site.

Pineland Sandmat (*Chamaesyce deltoidea ssp. pinetorum*) – Candidate. This plant occurs in pine rocklands and exposed limestone. It has not been recorded on the Turkey Point site and is not known to occur within 6 mi of the site (FNAI 2000-TN139). No impacts on this species are therefore expected on the site.

Garber's Spurge (*Chamaesyce garberi*) – Threatened. Garber's spurge is only known to occur at two pine rocklands in Miami-Dade County and has been found on beach dune, coastal rock barren, hammock edges, and pine rockland (FWS 2007-TN3529). It has not been recorded on the Turkey Point site but is present within the Everglades National Park (Gann et al. 2012-TN137). No impacts on this species are therefore expected on the site.

Cape Sable Thoroughwort (*Chromolaena frustrata*) – Endangered. The Cape Sable thoroughwort is not found in disturbed habitats and has not been recorded on the Turkey Point site and is not known to occur near the site (FWS 2010-TN1323). No impacts on this species are therefore expected on the site.

Florida Semaphore Cactus (*Consolea corallicola*) – Endangered. This cactus species occurred historically on coastal berms and has been observed with buttonwood between rockland hammocks and coastal swamps. It has not been observed on or within the vicinity of the Turkey Point site, but it does occur within Biscayne National Park (Gann et al. 2012-TN137). Potentially suitable habitat may exist on the Turkey Point site along the Biscayne Bay shoreline. The presence and distribution of the Florida semaphore cactus along the Biscayne Bay shoreline adjacent to the Turkey Point site is unknown. Individual plants could be affected if they occur in areas affected by the proposed action. The State of Florida would require surveys for sensitive species within all affected areas prior to the commencement of work (FDEP 2014-TN4371). It is reasonable to expect that FPL would minimize impacts to the extent practicable if these surveys indicated this plant occurred within the proposed project footprint. FPL would likely work around or transplant individual plants in the footprint of ground disturbance.

Florida Prairie Clover (*Dalea carthagenensis floridana*) – Candidate. This shrub occurs in a variety of upland habitats, none of which is present on the Turkey Point site. Florida prairie clover plants have not been recorded on the Turkey Point site and only five known populations exist, all of which are more than 6 mi from the site (Gann et al. 2012-TN137). No impacts on this species are therefore expected on the site.

Florida Pineland Crabgrass (*Digitaria pauciflora*) – Candidate. Florida pineland crabgrass occurs in marl prairie and pine rockland habitats. Neither of these habitats occurs on the Turkey Point site and this plant has never been recorded on the site (Gann et al. 2012-TN137). No impacts on this species are therefore expected on the site.

Small's Milkpea (*Galactia smallii*) – Endangered. Small's milkpea grows in pine rocklands. Pine rockland habitat does not occur on the Turkey Point site, and this species is not known to occur

within 6 mi of the site (Gann et al. 2012-TN137). No impacts on this species are therefore expected on the site.

Beach Jacquemontia (*Jacquemontia reclinata*) – Endangered. This plant is adapted to grow on stabilized coastal dunes in hammocks and coastal scrub. It is known to occur on nine sites, all of which are more than 6 mi from the Turkey Point site (FNAI 2000-TN139). No impacts on this species are therefore expected on the site.

Sand Flax (*Linum arenicola*) – Proposed Endangered. Sand flax is found in pine rockland and marl prairie, and it also occurs adjacent to disturbed areas. Pine rockland and marl prairie habitats do not occur on the Turkey Point site and this plant species has not been recorded on the Turkey Point site. However, it has been found within Homestead Bayfront Park less than 1 mi north of the site (FNAI 2000-TN139). The presence of sand flax within 1 mi of the site indicates it may be present in suitable habitat within the proposed project area. Individual sand flax plants could be affected if they occur in areas affected by the proposed action. The State of Florida would require surveys for sensitive species within all affected areas prior to the commencement of work (FDEP 2014-TN4371). It is reasonable to expect that FPL would minimize impacts to the extent practicable if these surveys indicated that this plant occurred within the proposed project footprint. FPL would likely work around or transplant individual plants in the footprint of ground disturbance.

Carter's Small-Flowered Flax (*Linum carteri carteri*) – Endangered. Carter's small-flowered flax is another plant species endemic to pine rocklands. It has not been recorded on the Turkey Point site and is known to occur in locations more than 6 mi from the site (Gann et al. 2012-TN137). No impacts on this species are therefore expected on the site.

Tiny Polygala (*Polygala smallii*) – Endangered. The tiny polygala is adapted to a coastal environment, thriving in sandy substrates under a slash pine overstory in Miami-Dade County. There are no habitats on the Turkey Point site that resemble the habitat requirements of this plant species and it has not been recorded on the site (FWS 1999-TN136). No impacts on this species are therefore expected on the site.

Everglades Bully (*Sideroxylon reclinatum ssp. austrofloridense*) – Candidate. This shrub is also endemic to marl prairies and pine rocklands habitats, neither of which occurs on the Turkey Point site. It has not been reported on the Turkey Point site and is known to occur at sites west of the site (Gann et al. 2012-TN137). No impacts on this species are therefore expected on the site.

Florida Bristle Fern (*Trichomanes punctatum ssp. floridanum*) – Endangered. The Florida bristle fern occurs in rockland hammocks and sinkholes as well as on tree trunks in deep shade. It has not been recorded on the Turkey Point site, suitable habitat is not present within the site, and known locations are found more than 6 mi from the site (Gann et al. 2012-TN137). No impacts on this species are therefore expected on the site.

Wildlife

The Florida Fish and Wildlife Conservation Commission (FFWCC) has indicated that many of the species on the Federal Threatened and Endangered Species List that are known to occur in Miami-Dade County do not occur on or near enough to the Turkey Point site to be affected by proposed Units 6 and 7 preconstruction or construction activities (FDEP 2014-TN4371).

Florida Leafwing Butterfly (*Anaea troglodyte floridalis*) – Endangered. The distribution of the Florida leafwing butterfly is closely tied to the pineland croton (*Croton linearis*), its host plant. The pineland croton grows in pine rocklands that are not found on the Turkey Point site (FWS 2012-TN148). This butterfly would not be expected to occur there. No impacts on this species are expected to result from proposed building activities occurring within the Turkey Point site.

Miami Blue Butterfly (*Cyclargus thomasi bethunebakeri*) – Endangered. The Miami blue butterfly is only found within Bahia Honda State Park almost 80 mi from the Turkey Point site and would not be expected to occur on the site or in the vicinity (Daniels 2005-TN141). No impacts on this species are therefore expected on the Turkey Point site.

Schaus Swallowtail Butterfly (*Heraclides [Papilio] aristodemus ponceanus*) – Endangered. This butterfly occurs in hardwood hammocks (FWS 1999-TN136). No hardwood hammock habitats are present on the Turkey Point site, so this species would be unaffected by the proposed action. No impacts on this species are expected to result from proposed preconstruction or construction activities occurring within the Turkey Point site.

Bartram's Scrub-Hairstreak Butterfly (*Strymon acis bartrami*) – Endangered. Bartram's scrub-hairstreak is a butterfly that relies on the narrow-leafed croton (*Croton linearis*) as a host plant. This plant and butterfly are found in pine rockland habitat that does not occur on the Turkey Point site. Suitable habitat does not exist on the Turkey Point site and Bartram's scrub-hairstreak would not be expected to occur on the site. No impacts on this species are expected to result from proposed preconstruction or construction activities occurring within the Turkey Point site.

Stock Island Tree Snail (*Orthalicus reses reses*) – Threatened. The Stock Island tree snail occurs in hardwood hammocks, and because this habitat is not present on the Turkey Point site this species would also be unaffected. No impacts on this species are expected to result from proposed preconstruction or construction activities occurring within the Turkey Point site.

Miami Tiger Beetle (*Cicendelidia floridana*) – Proposed Endangered. There are only two known occurrences of the Miami tiger beetle, both of which occur in pine rocklands. No pine rockland habitat would be affected or otherwise altered by proposed activities occurring within the Turkey Point site, so this species would not be affected by preconstruction and construction activities occurring there.

Eastern Indigo Snake (*Drymarchon corais couperi*) – Threatened. Eastern indigo snakes occur in a wide variety of habitats and thrive in a mosaic of different habitat types, including mangroves. Although not known to occur within the boundaries of the Turkey Point site, this

species has been observed nearby and suitable habitat is present on the site (FPL 2014-TN4058; FWS 1999-TN136; FPL 2012-TN1468). FPL has proposed to install fencing along construction access roads, control traffic, and educate all construction personnel about the identification of protected species including the eastern indigo snake. Personnel would be instructed to stop work and notify FPL environmental managers if an indigo snake is observed within a work area. Informational signage in compliance with the U.S. Fish and Wildlife Service (FWS) Standard Protection measures would also be posted along access roads (FPL 2011-TN1012). The adequacy of the fencing to exclude the snakes from work areas is unknown, but the other measures such as the personnel education and stop work measures noted above would help to minimize risk to this species.

Cape Sable Seaside Sparrow (*Ammodramus maritimus mirabilis*) – Endangered. The preferred habitat, mixed marl prairie, is not present on the Turkey Point site and this species would not be affected by the proposed action. No impacts on this species are expected to result from proposed preconstruction or construction activities occurring within the Turkey Point site.

Florida Grasshopper Sparrow (*Ammodramus savannarum floridanus*) – Endangered. Florida grasshopper sparrows are not known to occur on the Turkey Point site or in the vicinity (FWS 1999-TN136). No impacts on this species are expected to result from proposed preconstruction or construction activities occurring within the Turkey Point site.

Florida Scrub Jay (*Aphelocoma coerulescens*) – Threatened. Florida scrub jays are not known to occur on the Turkey Point site or in the vicinity (FWS 2012-TN285). No impacts on this species are expected to result from proposed preconstruction or construction activities occurring within the Turkey Point site.

Red Knot (*Calidris canutus rufa*) – Threatened. The red knot is a shorebird species that winters but does not breed in Florida. It forages along sandy beaches and tidal mudflats. Red knots also use vegetated habitats such as salt marshes and mangroves (FWS 2012-TN146). A red knot was observed during late-winter surveys of the Turkey Point site and suitable habitat for this species on the site would be affected by the proposed action (FPL 2014-TN4058). Loss of the non-vegetated mudflat habitat on the mud island comprising the proposed plant area and loss of mangrove habitat elsewhere would constitute a loss of potentially suitable winter foraging habitat. But the mud island does not contain the beach habitat that is favored by the red knot, and the extensive mangrove habitat remaining along the fringes of Biscayne Bay would continue to provide suitable foraging habitat in the local landscape. Because non-mobile or weakly mobile nesting young are not expected in South Florida, foraging red knots would likely flee habitats subject to disturbance rather than endure direct mortality. The review team therefore expects that impacts would be minimal.

Ivory-Billed Woodpecker (*Campephilus principalis*) – Endangered. Ivory-billed woodpeckers are not known to occur on the Turkey Point site or in the vicinity (FWS 2012-TN286). No impacts on this species are expected to result from proposed preconstruction or construction activities occurring within the Turkey Point site.

Piping Plover (*Charadrius melodus*) – Threatened. Like the red knot, the piping plover is a migratory shorebird species that winters in Florida. Individuals from three different piping plover

populations winter in South Florida. Critical habitat has been designated in Florida, but none exists within Miami-Dade County. Piping plovers forage on mudflats and other sparsely vegetated wetlands. The non-vegetated mudflat habitat of the proposed Units 6 and 7 plant area could attract and hold wintering piping plovers. Land-clearing activities, removal of muck, dewatering, construction of the units, and building of other related facilities could result in permanent loss of winter habitat. Build-out activities, such as alteration of the barge-turning basin and installation of the RCW system, could temporarily displace individual birds that may be present on Biscayne Bay beaches if these activities occurred during the piping plover wintering season. The lack of designated critical habitat in Miami-Dade County indicates nearby habitats are not extensively used by this species and any impact would likely be minimal.

Kirtland's Warbler (*Dendroica kirtlandii*) – Endangered. The Kirtland's warbler is known as a neo-tropical migrant songbird species. It only occurs in Florida during migration between nesting range to the north and winter range to the south. Kirtland's warblers prefer dense and low woody vegetation. No Kirtland's warblers were previously observed on the Turkey Point site. Very little of the affected area on the Turkey Point site would be suitable for this species, because only mangroves would appear to be marginally suitable based on vegetation structure and the density of mangroves within most project areas is sparse. Therefore, the impact on this species would be minimal.

Wood Stork (*Mycteria americana*) – Threatened. The wood stork is a large wading bird that uses wetlands for most of its life history. Wood storks frequent shallow waters to forage where prey items become concentrated. Even though none of the Turkey Point site occurs within the 18.6 mi (29.9 km) core foraging area for any wood stork colony, wood storks have been observed foraging on the Turkey Point site. They have been observed using industrial wastewater canals and wetland habitats immediately west of the proposed Units 6 and 7 plant area that would be converted into a laydown area (FPL 2014-TN4058). Wetlands suitable for wood stork habitat that would be affected by the proposed action also occur elsewhere within the Turkey Point site boundary.

Wetland habitat suitable for wood stork foraging could be dewatered during preconstruction and then permanently lost when converted into the proposed Units 6 and 7 plant area and associated structures. Because none of this habitat intersects with designated wood stork core foraging areas, impacts on foraging habitat would be minimal and mitigation would not be warranted.

Red-Cockaded Woodpecker (*Picoudes borealis*) – Endangered. Red-cockaded woodpeckers are not known to occur on the Turkey Point site or in the vicinity. No suitable habitat is present and no impacts on species are expected to result from proposed preconstruction or construction activities occurring within the Turkey Point site.

Audubon's Crested Caracara (*Polyborus plancus audubonii*) – Threatened. The Audubon's crested caracara uses wet and dry prairie habitat that contains scattered cabbage palms (*Sabal palmetto*) or lightly wooded areas. None of the Turkey Point site resembles this habitat and no crested caracaras were observed during surveys. No impacts on this species are expected to result from proposed preconstruction or construction activities occurring within the Turkey Point site.

Everglade Snail Kite (*Rostrhamus sociabilis plumbeus*) – Endangered. The Everglade snail kite is not known to occur on the Turkey Point site. Habitat suitable for the Everglade snail kite is not present within the proposed Units 6 and 7 plant area. Land-cover information does not indicate freshwater marsh habitat suitable for snail kites exists on either the Units 6 and 7 plant area or the Turkey Point site. Although observed within the Everglades Mitigation Bank (EMB) adjacent to the Turkey Point site, its occurrence within adjacent marsh habitats would not be affected by the proposed actions.

Bachman's Warbler (*Vermivora bachmanii*) – Endangered. Little is known about the life history and habitat requirements of Bachman's warbler. However, this species has not been observed in Florida since 1977 and has not been observed within the United States since 1988 (FWS 1999-TN136). No impacts on this species are expected to result from proposed preconstruction or construction activities occurring within the Turkey Point site.

Florida Bonneted Bat (*Eumops floridanus*) – Endangered. The Florida bonneted bat requires specific conditions to roost and has been observed roosting in palms, hollow trees, and within tile building roofs (FNAI 2000-TN139). The nearest location this species is known to occur is near Homestead, Florida (FWS 2011-TN147). These bats forage while flying. It is not known whether Florida bonneted bats occur on the Turkey Point site, but suitable roosting habitat is not known to be present. If present, Florida bonneted bats could be displaced by excessive noise during nighttime foraging by activities related to the building of proposed Units 6 and 7. The Units 6 and 7 plant area does not appear to provide suitable Florida bonneted bat habitat, but suitable habitat may be present along proposed access roads. The FWS would require that surveys be conducted wherever suitable habitat may be present within Florida bonneted bat consultation areas. If found, it is reasonable to expect the FWS to coordinate impact minimization measures if needed, so impacts on this species would be minimal.

Florida Panther (*Puma [= Felis] concolor coryi*) – Endangered. The Florida panther thrives in large, contiguous tracts of undeveloped land and prefers upland forested habitats interspersed with other habitats including wetlands, and to some extent developed lands (FWS 1999-TN136; FWS 2008-TN1580). Upland forested habitats are extremely limited on the Turkey Point site. Critical habitat has not been designated for the Florida panther although the FWS has designated much of Miami-Dade County as a Florida Panther Focus Area (FWS 2008-TN1580). The Turkey Point site is excluded from focus area designation. Panthers are not known to occur often on the Turkey Point site and lands within the site boundary are marginally suitable or unsuitable as habitat for the panther.

The FFWCC is requiring FPL to institute measures that would lower the likelihood of preconstruction or construction impacts on the panther. FPL would install an underpass that provides a wildlife underpass within the temporary construction access road along SW 359th Street between 117th and 137th Avenues. To reduce construction access road collision mortality risk, speed limits would also be limited to 45 mph and fencing, lighted signs, speed bumps, and slow speed zones at dusk and dawn would be used (State of Florida 2014-TN3637). Roads widened for construction of proposed Units 6 and 7 would be returned to their previous widths. Therefore, the impact on the Florida panther, although adverse, would be minimal.

State-Listed Terrestrial Species

Plants

Seventeen State-listed plant species were found within the proposed transmission line corridors (FPL 2009-TN1449), but the full extent of State-listed plant species occurrence within the proposed project areas is undetermined. Individual plants and small populations found within proposed areas of ground disturbance may be eliminated during site preparation and/or deposition of fill. Populations growing adjacent to disturbance areas could also be indirectly degraded by the introduction of invasive plant species. Changes in overland water flow could also make habitats inhospitable to some of these plants.

FPL would be required to conduct surveys for State-listed plant species in all of the proposed work areas using qualified personnel, report findings, and implement practicable protection measures to avoid, minimize, or mitigate impacts before any proposed activities (State of Florida 2014-TN3637). Although these requirements would reduce impacts on State-listed plant species, they likely would not entirely preclude impacts.

Wildlife

An additional 23 State-listed animal species can also be found on or near the Turkey Point site. The list includes 1 amphibian, 3 reptiles, 16 birds, and 3 mammals. Survey information indicates that many of these species have been observed using habitats within the proposed project area, and life history as well as habitat preferences indicate that many of them would be expected to occur there. The FFWCC determined that only the limpkin (*Aramus guarauna*), Florida burrowing owl (*Athene cunicularia floridana*), little blue heron (*Egretta caerulea*), reddish egret (*Egretta rufescens*), snowy egret (*Egretta thula*), tricolored heron (*Egretta tricolor*), white ibis (*Eudocimus albus*), American oystercatcher (*Haematopus palliatus*), white-crowned pigeon (*Patagioenas leucocephala*), brown pelican (*Pelecanus occidentalis*), roseate spoonbill (*Platalea ajaja*), black skimmer (*Rynchops niger*), least tern (*Sterna antillarum*), and Everglades mink (*Neovison vison evergladensis*) have the potential to be affected by the proposed project activities because only these species are known or suspected to occur in the vicinity of the Turkey Point site (FDEP 2014-TN4371).

Alteration and permanent loss of habitat would affect many of these species that may rely on habitat within the proposed project area for all or part of their life histories. Noise during preconstruction and construction could displace individuals in adjacent habitats into habitats of marginal quality, thereby temporarily increasing mortality rates or decreasing productivity. Increased traffic during preconstruction and construction could also result in direct mortality of individuals. Permits for either a relocation or incidental take may be required from the State of Florida. The presence of individuals of State-listed species must be reported to the FFWCC, and FPL must contact the FFWCC if impacts on these species cannot be avoided before taking actions that could result in an impact (State of Florida 2014-TN3637).

Limpkin. Mangrove habitat would be permanently lost, although most of the affected areas are not high-quality mangrove habitat.

Florida Burrowing Owl. The Florida burrowing owl is found in open habitats and a single bird had been observed once within the IWF. Its habit of nesting underground indicates it requires upland habitats for nesting. The only "upland" habitats on the Turkey Point site are those that have been artificially filled, such as the roads.

Little Blue Heron, Reddish Egret, Snowy Egret, Tricolored Heron, White Ibis, and Roseate Spoonbill. These six species are all primarily piscivorous wading birds resident in South Florida that use shallow wetlands to forage and colonize trees for nesting. The permanent loss of wetlands would affect all of these species by reducing available foraging habitat.

American Oystercatcher. The permanent loss of mudflat habitat would reduce the amount of American oystercatcher foraging habitat. However, shellfish are the primary prey of this species and the distribution and abundance of shellfish within the project area is unknown so the amount of this loss is unknown.

White-Crowned Pigeon. White-crowned pigeons have been observed within the project area, but suitable habitat within the area is limited. Fruit of the poisonwood tree (*Metopium toxiferum*) is a known food source (FNAI 2000-TN139). Fifty-eight poisonwood trees were observed growing within the proposed western laydown yard, ten within the proposed access road, and three within the RCWs footprint (FPL 2011-TN1312). These trees would likely be removed during site preparation. Removal of these trees could slightly reduce the availability of food to white-crowned pigeons, but poisonwood is not a rare species in the region. Poisonwood is not protected under the Miami-Dade tree permitting process. No tree-removal permit would be required (Miami-Dade County 2011-TN601).

Brown Pelican. The brown pelican was observed within the project area. Preconstruction and construction activities could displace individuals that use local roosts or loafing sites within and near the proposed project area (FNAI 2000-TN139).

Black Skimmer. This species has nested on dredge spoil islands and along roads in open habitats. Deposition of dredge spoils within the IWF could displace individuals nesting on dredge spoil islands or other nearby areas. However, most black skimmers nest farther north in Florida, so effects are expected to be limited.

Least Tern. Least terns nest on gravel substrates with little vegetation such as dredge spoil islands and construction sites, and least terns have been observed on or near the proposed Units 6 and 7 plant area. If the deposition of dredge spoils within the IWF takes place from March through October, productivity could be reduced or eliminated due to disturbance if any least terns nest on the dredge spoils. FPL has proposed to conduct activities outside of the April through September nesting season to reduce potential impacts on nesting terns. FPL also proposed to maintain elevated gravel berms within the cooling-canal system to provide suitable tern nesting habitat (FPL 2011-TN1283).

Everglades Mink. The Everglades mink is the only State-listed terrestrial mammal believed to be present within the Turkey Point site. Little is known about this mink subspecies, but mink are known to occur in mostly riparian and aquatic habitats although they will forage in uplands. Loss of wetlands could reduce available habitat. The IWF likely provides the best mink habitat

on the Turkey Point site. Deposition of dredge spoils within the facility may temporarily affect a small amount of the total habitat present. It may also increase the direct mortality risk to mink from vehicle collisions. The FFWCC would require FPL to conduct surveys of suitable mink habitat within the proposed facility locations during the breeding season (FDEP 2014-TN4371). Further management actions including mitigation may be required by the FFWCC and other agencies.

FPL would be required to coordinate with FFWCC when conducting surveys for all listed species that may occur within the proposed Units 6 and 7 plant area, associated non-linear facilities, and associated linear non-transmission rights-of-way before preconstruction activities start (FDEP 2014-TN4371). Specific information that would be recorded and provided to FFWCC includes listed species observations; suitable habitats for listed species; breeding sites, nests, and burrows of listed species; wading bird colony locations; and habitat descriptions including acreage estimates. The FFWCC has required shorebird nesting surveys in all potential habitats before preconstruction and construction and daily during such activities, and disturbance would be restricted within 300 ft of any active shorebird nest (FDEP 2014-TN4371). A species management plan would be required if State-listed species may be affected by the proposed actions. FPL has also committed to enhancement and preservation of an approximately 170 ac mudflat, known as Mitigation Bank Assessment Area 10, immediately adjacent to the IWF, in order to mitigate mudflat habitat lost to shorebirds from the construction of Units 6 and 7 (FPL 2015-TN4630). In exchange for this activity, FPL would receive 5 mitigation credits that can only be used to offset shorebird habitat loss. Further mitigation may be required by other agencies.

Offsite Impacts on Listed Terrestrial Species

Federally Listed Terrestrial Species

Federally listed terrestrial plant and animal species that may occur on or in the vicinity of the offsite facilities associated with the proposed Units 6 and 7 are listed in Table 2-13. Associated offsite facilities include the proposed transmission lines, associated access roads and substations, reclaimed water pipeline, and potable water pipeline.

Plants

FPL had surveys conducted at selected sites to determine the presence, distribution, and abundance of listed plants within the transmission line corridors (FPL 2009-TN657). Similar surveys were not conducted within the reclaimed water pipeline corridors. None of the plants listed as Federally endangered or threatened has been observed within the proposed or existing transmission line corridors that would support proposed Units 6 and 7. However, a single proposed Federally endangered and 3 Federal candidate species along with 33 State-listed plant species were observed during surveys at selected locations within existing and proposed transmission line corridors (FPL 2014-TN4058). The botanical survey of the proposed transmission line corridors does not represent an exhaustive search for listed plants throughout all of the corridor areas (FPL 2009-TN657). Many of the Federal and State-listed plant species grow in pine rockland and/or marl prairie habitats. These two habitats are strongly associated with pine flatwoods and wet prairies, respectively, within the FLUCFCS land classification

system. The occurrence of pine flatwood or wet prairie land cover within transmission line corridors may indicate the presence of associated plants. Also, the FLUCFCS land-cover classification was conducted with satellite (LANDSAT) imagery. The use of remotely sensed information does not always allow detection of fine-scale habitat fragments so on-the-ground information was also used to determine potential impacts when and where available. The following discussion describes potential impacts on Federally listed species known to occur in Miami-Dade County

Crenulate Lead-Plant – Endangered. Crenulate lead-plants have not been observed within transmission line corridors that would provide service to proposed Units 6 and 7. However, the crenulate lead-plant occurs in wet pine rocklands and marl prairies. A small amount (0.03 ac) of pine flatwoods, the land-cover classification that represents pine rocklands, occurs within the Clear Sky to Davis segment of the East corridor. Botanical survey information also confirms pine rockland habitat still exists within the Clear Sky to Davis segment of the East corridor as well as within the Clear Sky to Levee segment of the West corridors. Botanical surveys were conducted within selected pine rocklands within the proposed transmission line corridors, and it is not known whether the crenulate lead-plant may exist within the transmission line corridors in rockland habitats that have not been surveyed. Potentially suitable habitat could be affected by the building of transmission lines or other offsite facilities.

Blodgett's Silverbush – Candidate. Blodgett's silverbush has not been found within any of the transmission line corridors, but it is associated with pine rocklands and rockland hammocks. Pine rockland habitat exists within the Clear Sky to Davis segment of the East corridor and within the Clear Sky to Levee portion of the West corridors, and it is unknown whether Blodgett's silverbush exists within the transmission line corridor or other offsite facilities. Potentially suitable habitat could be affected by the building of transmission lines or other offsite facilities.

Florida Brickell-Bush – Proposed Endangered. The Florida brickell-bush was observed in good quality pine rockland habitat within the West corridors (FPL 2009-TN657). Seventeen individual plants were also recorded in the King's Highway Pineland. The estimated total population within this pine rockland was between 100 and 1,000 individuals. Individual plants could be destroyed during ground-clearing, road-building, and pole-installation activities. FPL has committed to conducting pre-clearing surveys during access road and structure pad location activities. FPL has also proposed to relocate individual plants unavoidable during building of the transmission line corridor, if feasible (FPL 2012-TN1618). The King's Highway Pineland has been proposed as critical habitat for the Florida brickell-bush (78 FR 61293) (TN2912), and habitat would likely be permanently altered during clearing and transmission line installation if the line passed through this pineland as proposed. The likelihood of exotic plants introduction and subsequent degradation of critical habitat would also increase due to vehicle traffic on the maintenance road. However, FPL would eradicate or remove exotic, prohibited, controlled, and incompatible plant species within the transmission right-of-way and discourage hardwood hammock to the extent practicable (FPL 2015-TN4442). Impact on this species would likely result, but would be minimized to the extent practicable.

Deltoid Spurge – Endangered. The deltoid spurge is found on exposed limestone and in sand under an open shrub canopy. It has not been recorded within the proposed Units 6 and 7

transmission line corridors (FPL 2009-TN657). It is not known whether the unique habitat requirements of this species are found within the Units 6 and 7 transmission line corridors or whether it occurs within un-surveyed portions of the corridors.

Pineland Sandmat – Candidate. Pineland sandmat occurs in pine rocklands and exposed limestone. A total of 316 individual pineland sandmat plants were observed in pine rockland habitat within the Clear Sky to Levee portion of the West corridors and the total population of sandmat at this location was estimated at 1,000 to 10,000 individual plants. Individual pineland sandmat plants could be destroyed during land clearing and powerline installation. Habitat could also be permanently altered. FPL has committed to conducting pre-clearing surveys during access road and structure pad location activities. FPL has also proposed to relocate individual plants unavoidable during building of the transmission line corridor, if feasible (FPL 2012-TN1618).

Garber's Spurge – Threatened. Garber's spurge has not been observed within the proposed Units 6 and 7 transmission line corridors. It grows on beach dune, coastal rock barren, disturbed upland, and pine rockland habitats. Both disturbed upland and pine rockland habitats exist within the transmission line corridors; it is unknown whether Garber's spurge exists in un-surveyed locations within the transmission line corridors.

Cape Sable Thoroughwort – Candidate. The Cape Sable thoroughwort has not been found growing within any of the proposed Units 6 and 7 transmission line corridors. It typically grows in rockland hammocks, coastal rock barrens, and between buttonwood and coastal hardwood hammocks. The first section of the Clear Sky to Davis portion of the East transmission line corridor lies along the coast, but it is unclear whether any of these habitats are located within the corridor.

Florida Semaphore Cactus – Candidate. The Florida semaphore cactus has not been observed growing within the proposed Units 6 and 7 transmission line corridors. It occurred historically on coastal berms and has been observed with buttonwood between rockland hammocks and coastal swamps within the Biscayne National Park. It is not known whether potentially suitable habitat exists within the transmission line corridors.

Florida Prairie Clover – Candidate. This shrub occurs in a variety of upland habitats including pine rocklands, rockland hammock edges, marl prairie, and coastal uplands. Only five known populations exist, all of which are located within conservation areas. None of the proposed or existing transmission line corridors is known to affect any of the conservation areas that host this plant species, so no impacts are expected.

Florida Pineland Crabgrass – Candidate. Florida pineland crabgrass is found in marl prairie and pine rockland habitats and is only known to occur within the Big Cypress National Preserve and Everglades National Park. This species would not be affected by the proposed actions.

Small's Milkpea – Endangered. Small's milkpea has not been observed within existing or proposed Units 6 and 7 transmission line corridors. It grows in pine rocklands. Pine rockland habitat and its FLUCFCS surrogate pine flatwoods are found within the Clear Sky to Davis transmission line corridor. Other plants that occur in pine rocklands have been observed within

the proposed West transmission line corridors and Small's milkpea may also be present because suitable habitat is present.

Beach Jacquemontia – Endangered. Beach jacquemontia has not been observed within the proposed Units 6 and 7 transmission line corridors. This plant is adapted to grow on stabilized coastal dunes in hammocks and coastal scrub. Neither existing nor proposed transmission line corridors contain these types of habitats. No impacts on this plant species are expected to result from building or expanding electrical transmission to support proposed Units 6 and 7.

Sand Flax – Endangered. Pine rockland and marl prairie habitats suitable for sand flax would be affected within the Clear Sky to Levee segment of the West transmission line corridors and the Clear Sky to Davis portion of the East corridor, resulting in loss of actual or potential habitat for the sand flax. Building new transmission line corridors, expanding existing corridors, and installing new lines would create disturbed areas that may eventually be colonized by and benefit this plant species. However, recolonization of newly disturbed areas such as access roads may be temporary because subsequent use of roads or vegetation control efforts may eliminate plants that become established. FPL has committed to conducting pre-clearing surveys during access road and structure pad location activities and has also proposed to relocate individual plants unavoidable during building of the transmission line corridor, if feasible (FPL 2012-TN1618).

Carter's Small-Flowered Flax – Endangered. Carter's small-flowered flax is another plant species endemic to pine rocklands. It has not been recorded within transmission line corridors that would support proposed Units 6 and 7. However, as previously stated, pine rocklands would be affected by the building and expansion of transmission line corridors, which could affect the quality and quantity of available habitat for this plant species. The King's Highway Pineland has been proposed as critical habitat for Carter's small-flowered flax (78 FR 61293) (TN2912). The Clear Sky to Levee portion of the West corridors is proposed to pass through this pineland. If the corridor is developed as proposed, individual plants could be destroyed during ground-clearing activities. Approximately 11.2 ac of proposed critical habitat would also be permanently altered (79 FR 41211) (TN3725) and the likelihood of non-native plant introduction would increase.

Tiny Polygala – Endangered. The tiny polygala is adapted to a coastal environment, thriving in sandy substrates under a slash pine overstory typical of pine rockland habitat in Miami-Dade County. Although pine rockland habitat exists within the proposed Units 6 and 7 transmission line corridors, this plant has not been observed within the existing or proposed corridors. Impacts on pine rockland habitat could affect undetected populations of this plant.

Everglades Bully – Candidate. Everglades bully shrubs are endemic to marl prairie and pine rocklands habitats and are known to occur within pine rockland remnants in Miami-Dade County (FWS 2010-TN833). It has not been reported within the proposed Units 6 and 7 transmission line corridors, but habitat is present within the corridors. Mature Everglades bully plants are large and relatively conspicuous so it is doubtful that individuals of this species exist within surveyed habitats. However, degradation of pine rockland habitat could result in potential habitat loss for this species.

Florida Bristle Fern – Candidate. The Florida bristle fern occurs in rockland hammocks and sinkholes, grows on bare limestone and sometimes on tree trunks, and is always associated with deep shade (FWS 2010-TN834). It has not been recorded within the proposed Units 6 and 7 transmission line corridors and is only known to occur at five locations, three of which are in Miami-Dade County. The West Preferred corridor is located approximately 1.8 mi west of the closest known occurrence of the Florida bristle fern, so no impacts on known Florida bristle fern populations are expected to result from the proposed Units 6 and 7 transmission system.

Wildlife

Known distribution and habitat preferences indicate eight terrestrial species listed by the FWS as threatened, endangered, or candidates for such listing could be affected by the building of offsite facilities associated with proposed Units 6 and 7 (FFWCC 2011-TN554). This list includes the Cape Sable seaside sparrow, Miami tiger beetle, eastern indigo snake, Florida panther, piping plover, Everglade snail kite, wood stork, Bartram's scrub-hairstreak butterfly, and the Florida leafwing butterfly. The following paragraphs describe potential impacts on these species.

Cape Sable Seaside Sparrow – Endangered. Although the preferred habitat of the Cape Sable seaside sparrow is mixed marl prairie, this sparrow is not believed to occur within marl prairie habitat along the proposed Units 6 and 7 transmission line corridors or within any other proposed offsite locations. No Cape Sable seaside sparrows have been observed within the transmission line corridors because the entire population is limited to six subpopulations that are located south and west of the West corridor (FWS 2010-TN256). Impacts on this species are not expected to result from building the proposed transmission system or any other proposed offsite facility or structure.

Miami Tiger Beetle (*Cicendelidia floridana*) – Proposed Endangered. There are only two known occurrences of the Miami tiger beetle. One occurrence is within the Richmond Pine Rockland complex adjacent to the proposed East transmission corridor. FPL has proposed to install a single 230 kV transmission line from a new Clear Sky substation at the Turkey Point site to the existing Davis Substation within the East transmission corridor to support Turkey Point Units 6 and 7. The new transmission line would require concrete monopoles within an existing 330 ft wide corridor with multiple operating 230 kV transmission lines. The Richmond Pine Rocklands complex lies adjacent to a 0.46 mi portion of this proposed corridor. However, no pine rockland habitat would be altered because the existing corridor has space to accommodate the new transmission line. No portion of this pine rockland complex or other habitat suitable for the Miami tiger beetle would be altered or affected.

Eastern Indigo Snake – Threatened. Eastern indigo snakes occur in a wide variety of habitats and thrive in a mosaic of different habitat types. This species has been observed at two locations within the East corridor and suitable habitat is present at many locations within both the eastern and western transmission line corridors. Eastern indigo snakes use burrows and other underground refugia and are vulnerable to mortality while underground during ground-clearing and infrastructure installation activities that require off-road use of vehicles. Critical habitat has not been designated for the eastern indigo snake, but the FWS has required FPL to adhere to standardized protection measures for the eastern indigo snake. These measures include a snake protection plan that would include education of construction personnel to limit

impacts and provide a reporting protocol for indigo snake observations and takes (FWS 2004-TN779).

Florida Panther – Endangered. The Florida panther thrives in undeveloped lands and prefers upland forest habitats but will use wetlands, disturbed areas, and agriculture lands. It will also use developed lands to some extent. Florida panthers have been observed historically within the proposed West transmission corridors (FPL 2014-TN4058). More recently, during October 2013 an adult panther and kitten were sighted along the proposed West transmission line corridor in the Model Lands Basin approximately 2 mi west of the Turkey Point boundary (SFWMD 2013-TN2917).

The FWS has designated much of Miami-Dade County as a Florida Panther Focus Area (PFA), and the Clear Sky to Levee corridor would border or pass through portions of the PFA primary and secondary management zones. The building of new corridors, including removal of vegetation to modify existing corridors, and the building of access roads would alter Florida panther habitat within panther management zones.

Florida panthers are believed to use primitive roads and transmission line corridors during travel (FPL 2011-TN1283). FPL states that building roads through lowland habitat into transmission line access roads is converting habitat rather than reducing value or eliminating it altogether, and may actually enhance habitat by the creation of more upland habitats through the addition of fill materials. The review team does not agree with this finding. Fragmentation of wilderness contributed to the current state of peril for the Florida panther (FFWCC 2011-TN1579). Florida panthers require large contiguous blocks of habitat to thrive. Habitat fragmentation is considered one of the greatest threats to this species, and panther mortality from vehicle collisions is an ongoing management issue in South Florida (FWS 2008-TN1580). Although panthers may use linear features as travel corridors, the building of roads would not be considered as a management action to enhance panther habitat. Instead it would only serve to fragment panther habitat if built within areas suitable for panthers and could lead to increased mortality from vehicle collisions. Fragmentation and degradation of habitat as well as increased vehicle collision risk would likely result in reduced Florida panther populations in the affected areas. Human activity related to the proposed actions could temporarily displace panthers from adjacent habitats causing temporary indirect habitat loss. Because panthers have very large home ranges, the close proximity of the West transmission corridors to Everglades National Park would also mean panthers within the park could be affected, thereby reducing the visitor experience within these portions of the park. Increased traffic on offsite roads during construction could increase the likelihood of vehicle collision mortality.

Approximately 5.75 mi of proposed road improvements would occur within the PFA. These road improvements would reduce and fragmented panther habitat resulting in a potential loss of 69 ac of panther habitat worth a habitat value of 412 panther habitat units (PHUs) within the PFA using the FWS standardized methodology for determining habitat value (FPL 2011-TN1283).

After applying the FWS mitigation ratio of 2.5:1 for impacts on panther habitat within the PFA, mitigation required by the FWS could equal 1,030 PHUs for access road improvements. Additional compensatory mitigation of 3,980 PHUs for development of the West transmission

corridor may also be required by the FWS. However, the total impact on Florida panther habitat from development of the West transmission route cannot be determined until the corridor and exact route have been finalized. Total compensatory mitigation for habitat impact would be determined through continued consultation between FPL and the FWS.

Piping Plover – Threatened. The piping plover is a migratory shorebird species that occurs in Florida during winter. Individuals from three different piping plover populations winter in South Florida. Piping plovers forage on mudflats and other sparsely vegetated wetlands. Critical habitat has been designated for wintering piping plovers, but none was designated in Miami-Dade County.

Red Knot (*Calidris canutus rufa*) – Threatened. The red knot is a shorebird species that winters but does not breed in Florida. It forages along sandy beaches and tidal mudflats. Red knots also use vegetated habitats such as salt marshes and mangroves (FWS 2012-TN146). Suitable habitat exists on some segments of the proposed offsite transmission line corridors and other corridors. Loss of these areas of habitat would constitute a loss of potentially suitable winter foraging habitat. But none of the affected areas contain the beach habitat that is favored by the red knot, and the extensive mangrove habitat remaining elsewhere in the local landscape would continue to provide suitable foraging habitat. Because non-mobile or weakly mobile nesting young are not expected in South Florida, foraging red knots would likely flee habitats subject to disturbance rather than endure direct mortality. The review team therefore expects that impacts would be minimal.

Everglade Snail Kite – Endangered. The Everglade snail kite would be affected by the building of transmission lines within either West corridor regardless of which corridor is developed. Snail kites have been observed nesting where transmission lines would be installed in the West Preferred corridor. Nesting is also suspected in suitable habitat immediately west of the L-31 levee that borders a portion of both West corridors (FFWCC 2013-TN2339). This area is recognized as an important breeding area for the Everglade snail kite (PNNL 2013-TN2466; Reichert et al. 2011-TN2467). In addition, freshwater marsh habitat is present within much of the West Preferred and West Consensus corridors. Although suitability of habitats for snail kites is unknown except in those areas mentioned above, much of both West transmission line corridors lies within the FWS-designated Everglade snail kite consultation area (FWS 2003-TN227). Temporary disturbance during pole and wire installation could displace snail kites from the L-31 levee and surrounding habitats if this work occurred during the nesting season. If indeed there are nests nearby, productivity of this population could be temporarily affected if nesting pairs are displaced during pole and wire installation activities.

Habitat would be permanently altered during the installation of transmission lines and poles. Snail kites need relatively open marsh habitat that contains apple snails. Freshwater marsh habitat currently being used for nesting and foraging by snail kites would be converted into access roads and upland spoil for pole installation. Siltation and runoff would also degrade wetlands, although BMPs would be used to limit siltation to the extent practicable (FPL 2014-TN4058). Access roads could increase the introduction of non-native plants. This coupled with the alteration of surface-water flow could result in overhead cover becoming more prevalent, thereby decreasing the availability of prey and the suitability of habitat to snail kites. Snail kites are relatively small raptors and are preyed upon by larger hawks and eagles. Transmission

poles could also serve as perches for larger hawks and eagles that prey on snail kites, increasing predation and decreasing both habitat suitability and snail kite productivity (PNNL 2013-TN2466).

Much of the western third of Miami-Dade County has been designated as critical habitat for the snail kite, but no critical habitat would be affected by developing either of the West corridors. If the West Preferred corridor is developed, impacts on valuable snail kite habitat would be limited to the 7 mi section that borders suitable habitat near and within Everglades National Park. A reduction in snail kites at this location would also result in a reduction of snail kites in this portion of the park and a degradation of the visitor experience in the vicinity. Approximately 5.4 mi of the West Consensus corridor borders the L-31E Canal, so impacts on snail kites and their habitat would likely be less if this corridor were developed. The West Consensus corridor lies east of the West Preferred corridor and passes through a landscape that has a greater amount of previous disturbance than the West Preferred corridor.

Wood Stork – Threatened. Four wood stork colonies are located near the West Preferred corridor (FPL 2014-TN4058). Installation of transmission lines in this corridor would occur within 1 mi of two active wood stork colonies and within 3 mi of two other colonies. A portion of the West Consensus corridor also occurs within 1 mi of one of these wood stork colonies and within 3 mi of the other three. The three southernmost colonies are located within the Everglades National Park. Although there is no designated critical habitat for the wood stork, the FWS Southeast Florida Ecological Services Office recognizes a 0.47 mi nest colony buffer. The FWS also recommends the establishment of a primary zone around stork nesting colonies. This zone must extend at least 500 ft in every direction and up to 1,500 ft in open cover. No vegetation should be removed from within the primary zone. Wetland vegetation under and surrounding the colony shall be maintained. Power transmission lines, roadways, and other infrastructure should not be built within the primary zone. Also, humans should not get within 300 ft of the colony and human activity patterns should not be changed when storks are present at the colony. FWS also recommends the establishment of a secondary zone that extends 1,000 to 2,000 ft beyond the primary zone. Alteration of hydrology that could affect the primary zone and loss or degradation of wetlands should be minimized within the secondary zone. The proposed transmission line corridors are a sufficient distance from known wood stork colonies to comply with all of these FWS guidelines and impacts on wood storks nesting in nearby colonies during transmission line building activities would not be expected. However, the FWS also recommends that transmission lines not be built within 1 mi of stork nest colonies to lower the probability of low-flying stork strikes. As previously stated, the West Preferred transmission line corridor is proposed approximately 0.5 mi from two wood stork colonies. Wood storks have been injured or killed as a result of collisions with FPL electric utility structures (FPL 2011-TN1283) and could collide with transmission structures while they are being erected. Loss of wood storks from either of these Everglades National Park wood stork colonies would reduce the overall visitor experience of the park in this vicinity.

Wood storks frequent shallow waters to forage where prey items become concentrated and they have been observed foraging on the Turkey Point site. Guidelines drafted to address management of the wood stork foraging habitat recommend an 18.6 mi core foraging area management zone around all known wood stork colonies that have had active nests within the last 10 years in South Florida. Human activity should be restricted within 300 ft of forage sites

when storks are present and no closer than 750 ft if there is no vegetation to screen human activities from feeding storks (FWS 2010-TN226). Activities should also not alter water levels of stork forage sites from normal. Chemicals should not be introduced within wetlands that contain stork forage sites. Building of transmission lines within 1 mi of major feeding sites should also be avoided. Specific foraging locations for wood storks within the vicinity of the proposed Units 6 and 7 transmission line corridors are unknown. The majority of all proposed transmission corridors overlap with core foraging areas of at least one wood stork colony, and road-building and pole-installation activities would occur within wetland habitats that could be suitable as wood stork foraging habitat.

FPL is required to conduct preconstruction and post-construction flight surveys of the two known wood stork nesting colonies to determine flight corridors of fledging wood storks. FPL would also have to conduct pre-clearing aerial survey of transmission line corridors if nesting by wading birds is confirmed to occur within one-half mile of proposed transmission line corridors. Ground surveys of active colonies would also be required. FPL would also have to conduct post-construction monitoring during the breeding season after transmission line installation near wood stork colonies. Monitoring would include carcass searches and flight behavior observation. Impacts on suitable habitats, including foraging habitat, within 18.6 mi of a wood stork colony would require mitigation (FWS 2010-TN226). Using the FWS South Florida Wood Stork Effect Determination Key, FPL estimated the loss of wood stork forage within the nine designated wood stork core foraging areas from unavoidable wetland fill and alteration within the West Preferred corridor, including the Levee substation and both access corridors at 643.47 kg (FPL 2012-TN1618). FPL also proposed to compensate for this level of forage loss within wood stork core foraging areas through purchase of credits totaling 308 ac within the Hole-in-the-Donut Mitigation Bank, which would provide an additional 649 kg/yr of forage biomass (FPL 2012-TN1618). Final calculation of wood stork forage loss would depend on final corridor design details, structure locations and heights, and access road locations. Final mitigation requirements would be determined through ongoing discussions between FPL and the FWS, and additional monitoring and mitigation may be required, and could include the installation of flight diverters and perch discouragers on transmission infrastructure.

Bartram's Scrub-Hairstreak – Endangered. Bartram's scrub-hairstreak is not known to currently occur at any of the proposed project areas but has sporadically occurred in suitable habitats near the proposed West transmission line corridors (78 FR 49878) (TN2844). Both the West Preferred and West Consensus transmission line corridors are proposed to pass through the King's Highway Pineland that is designated as critical habitat for this butterfly (78 FR 49832) (TN2845). Designated critical habitat also exists immediately adjacent the proposed East transmission line corridor. Land clearing, road building, and pole installation could destroy individual pineland croton plants that the Bartram's scrub-hairstreak relies on for their continued survival. Transmission line maintenance would increase the likelihood of non-native plant introduction, degrading critical habitat.

Florida Leafwing – Endangered. The Florida leafwing does not occur in any of the proposed project areas (78 FR 49878) (TN2844). However, expansion of an existing transmission line corridor to accommodate the proposed East transmission line would occur immediately adjacent to a remnant pine rockland fragment that is designated critical habitat for this butterfly (78 FR 49832) (TN2845). Land clearing, road building, and pole installation into this critical habitat

could destroy individual pineland croton plants that serve and the sole host plant for Florida leafwing larvae. Transmission line maintenance would increase the likelihood of non-native plant introduction, further degrading proposed critical habitat.

State-Listed Terrestrial Species

Impacts on wetlands resulting from the installation of the proposed Units 6 and 7 transmission system would also affect many State-listed species. Loss and degradation of wetlands would affect many State-listed species because most of them rely on wetlands for all or part of their life histories. Impacts on upland habitats, including pine rocklands and marl prairies, could also affect many State-listed plant and animal species that rely on these habitats. Disturbance created during vegetation clearing, road building, and pole installation could allow the establishment or spread of non-native plant and animal species. FPL is required to conduct surveys for Federal- and State-listed species and their habitats prior to preconstruction. Recorded information would include occurrences of all listed species, breeding sites, nests, burrows, wading bird colony locations, and estimates of acreage and vegetation cover. Guidelines for surveys would be provided by the FWS and the FFWCC. Species management plans would be required for all State-listed species that could not be avoided (FFWCC 2011-TN554).

Other Associated Offsite Impacts

Potable Water Pipeline. The potable water pipeline would be installed within existing roadway medians and below temporary construction access roadway improvements (FPL 2015-TN4442). No wildlife habitat is expected to be lost. Nearby wetlands could be affected by siltation resulting from excavation to install the pipeline. Noise during site clearing and pipe installation activities could result in the displacement of wood storks and State-listed wildlife including the limpkin, little blue heron, reddish egret, snowy egret, tricolored heron, white ibis, roseate spoonbill, and the Everglades mink. Erosion and siltation would however be reduced through the use of environmental BMPs and native plants would be allowed to naturally revegetate disturbed areas (FPL 2014-TN4058).

Reclaimed Water Pipeline. Approximately 1,886 ac of upland, forested, and wetland habitats as well as previously developed or disturbed lands occur within the proposed reclaimed water pipeline corridor. Approximately 134 ac of land within the corridor would be affected for the final pipeline, including 45 ac of undeveloped land that consists almost entirely of wetlands (FPL 2015-TN4442). Approximately 2 ac of uplands and 9 ac of wetlands would be temporarily affected, and 35 ac of forested wetlands would be permanently converted to herbaceous wetlands. Affected habitats include mangrove swamp, mixed wetland hardwoods, freshwater marsh, mangrove swamp/exotic wetland hardwoods, dwarf mangroves, and minor amounts of herbaceous prairie, shrub and brushland, and Brazilian pepper. Vegetation would be cleared prior to digging the pipeline trench. Nearby wetlands could also be affected by siltation resulting from ground-clearing and digging activities. Noise from installation activities could result in the displacement or minor loss of local wildlife. Non-native plant species could also become established as a result of this disturbance and alter habitats. Environmental BMPs would be used to minimize impacts on sensitive habitats, including regrading of disturbed portions to the original elevation. Revegetation would occur either naturally or from plantings if needed

(FPL 2014-TN4058). Impacts from the installation of this pipeline would be temporary in nature, but could displace foraging wood storks and other State-listed wildlife species that use wetland habitats. It is not known whether any of these bird species, including wood storks, use the habitats that would be affected.

No listed plant species are known to occur within this corridor, but some upland marl prairie would also be affected. Marl prairie within this corridor could serve as habitat for and harbor the crenulate lead-plant, Florida prairie clover, Florida pineland crabgrass, sand flax, and Everglades bully. This pipeline would be in the vicinity of Homestead Bayfront Park where sand flax has been found, and habitat for this plant could be affected although it has not been found growing within or near the proposed corridor. No other listed species are expected to be affected by the installation of the reclaimed water pipeline.

Access Roads. Construction access roads would be developed on and along approximately 0.9 mi of SW 117th Avenue, 0.9 mi along SW 137th Avenue, and 3.68 mi along SW 359th Street (Lucille Drive). Lands designated as Environmentally Endangered by Miami-Dade County border portions of these proposed construction access roads west of SW 117th Avenue, north of SW 359th Street. Extensive Environmentally Endangered Lands (EELs) also exist approximated 260 ft (80 m) south of SW 359th Street. EELs were identified and purchased primarily for conservation. Although there are existing unpaved roads present where the proposed construction access roads would be built, clearing, grading, and filling to widen the roadway and paving would increase disturbance, further limit surface sheet water flow, and could disrupt wildlife access among EEL parcels and adjacent lands.

4.3.1.4 Impacts from Fill Acquisition

Another potential impact on terrestrial resources that was considered in the evaluation was mining of fill material needed to build proposed Units 6 and 7. FPL proposes to obtain about 8.9 million cubic yards of fill from commercial sources. Terrestrial resource impacts would take place within land areas already designated for commercial mining operations.

4.3.1.5 Terrestrial Monitoring

To date, FPL has not monitored populations of terrestrial plants or wildlife on the Turkey Point site. Population monitoring of the predominantly aquatic American crocodile (*Crocodylus acutus*) is discussed in the aquatic ecology sections of this EIS. However, before land-clearing activities for proposed Units 6 and 7 can be conducted, FPL would coordinate with the FFWCC and the FWS to conduct targeted surveys for listed species. Specifically, surveys would be conducted for the eastern indigo snake, wood stork, least tern, snail kite, Everglades mink, Florida panther, white-crowned pigeon, little blue heron, reddish egret, white ibis, snowy egret, roseate spoonbill, and the tricolored heron (FFWCC 2011-TN554). Pre-clearing surveys would also be conducted for listed plant species (FFWCC 2011-TN554).

4.3.1.6 Potential Mitigation Measures for Terrestrial Impacts

FPL proposes three broad categories of mitigation for impacts to terrestrial resources: wetland mitigation, an avian protection plan, and a series of mitigation measures addressing impacts to Federally-listed threatened and endangered species.

Wetland Mitigation Plan

FPL proposes wetland mitigation to offset unavoidable wetland losses caused by the project (FPL 2012-TN4629). The USACE has not yet independently reviewed and verified FPL's proposed plan. No approved jurisdictional wetland determination has been conducted for the project; however, FPL signed a preliminary jurisdictional determination on July 10, 2012. The USACE will proceed with processing the application under this preliminary jurisdictional determination. The USACE's CWA Section 404(b)(1) Guidelines analysis, including determination of the sufficiency of compensatory mitigation pursuant to 33 CFR Part 332 (TN1472), will be concluded in the USACE's ROD. The USACE would review the project pursuant to the CWA Section 404(b)(1) Guidelines, which require a sequential process of avoidance, minimization, and compensatory mitigation. Any unavoidable impacts to jurisdictional areas would require compensatory mitigation pursuant to 33 CFR Part 332 (TN1472), which may differ from State of Florida requirements. The USACE would conclude its CWA Section 404(b)(1) Guidelines and public interest analyses in its ROD. The mitigation would have to comply with the USACE's compensatory mitigation rule (33 CFR Part 332) (TN1472), which includes provisions to ensure the long-term success and preservation of completed mitigation activities.

FPL instituted measures early during project planning to avoid and minimize impacts on wetlands to the greatest extent practicable (FPL 2012-TN4629). Avoidance and minimization measures include maximizing the use of previously disturbed areas while minimizing use of areas with high-quality intact wetlands. Corridor selection for the reclaimed water pipeline, potable water pipeline, and transmission facilities maximized collocation with other existing or proposed infrastructure to limit additional disturbance. FPL estimates that situating new reactors and many of the ancillary facilities within the existing footprint of disturbance that previously resulted from building the older units on the Turkey Point site avoids impacts to over 200 ac of intact coastal mangrove swamps and freshwater wetlands on the property. FPL also estimates that movement of proposed parking and laydown areas early in the planning process would avoid impacts to approximately 159 ac of wetlands, including large areas of sawgrass wetlands (FPL 2012-TN4629).

FPL based its proposed compensatory wetland mitigation on compensating for the loss of wetland functions as quantitatively estimated using UMAM. Florida's State regulations (62-345.100 F.A.C) establish UMAM as a standardized process for developing compensatory mitigation for projects requiring state approval. According to those regulations, UMAM "provides a standardized procedure for assessing the functions provided by wetlands and other surface waters, the amount that those functions are reduced by a proposed impact, and the amount of mitigation necessary to offset that loss." The UMAM approach does not merely consider the number of acres of land proposed to offset the impacts to wetlands from the proposed action, but includes consideration of relative location within the landscape, quantity and quality of water available within a wetland, and vegetation community structure to calculate functional value. The procedure can be used to calculate the acres of permittee-responsible wetland mitigation or the number of credits that must be purchased from a wetland mitigation bank or in-lieu fee project to adequately compensate for the loss of hydrological, ecological, and social functions resulting from impacts to wetlands and other surface waters. The calculations used to determine the area or credits of mitigation necessary to offset impacts account for the time lag

needed for newly established wetland soils or vegetation to attain full function as well as for the risk that such areas may not become successfully established within the contemplated timeframe.

To meet the wetland mitigation requirements calculated for Units 6 and 7 using UMAM, FPL proposes a combination of wetland mitigation bank credits and permittee-responsible wetland restoration and enhancement in undeveloped portions of its Turkey Point property (FPL 2012-TN4629). FPL estimates that the wetland functions and values gained through the proposed compensatory mitigation, expressed as UMAM units, would offset the functions and values lost (Table 4-10).

Table 4-10. Proposed Mitigation Efforts to Offset Loss of Wetland Function Related to the Preconstruction and Construction of Proposed Units 6 and 7 and the Building and Installation of Related Structures

Site	Affected Area (ac)	UMAM Wetland Functional Change (Mitigation Units)	W.A.T.E.R. Wetland Functional Change (Mitigation Units)
Proposed Units 6 and 7 Site	250.2	-128.3	-148.4
Associated Non-linear Facilities	68.7	-46.1[(a)]	-51.5
Access Roads	81.6	-80.8	
Reclaimed Water Pipelines	43.6	-3.4[(a)]	
Transmission Line Corridors	308.2	-240.9	
Subtotal	**752.3**	**-499.5**	**-199.9**
Everglades Mitigation Bank		+175.8	+201
Hole-in-the-Donut Mitigation Bank		+308.0	
Reclaimed Water Pipeline Restoration	43.6	+3.4	
Northwest Mitigation Site	237.8	+37.6	
SW 320th Street Site	574.0	+60.4	
Sea Dade Canal Crocodile Sanctuary	6.2		+1.5
Subtotal	**864.6**	**+585.3**	**+202.5**
Total (Net Gain)		**+85.8**	**+2.7**

(a) FPL regards pipeline installation impact on wetlands as temporary and functional change accounts for the time lag of in situ remediation.
UMAM = Uniform Mitigation Assessment Method.
W.A.T.E.R. = Wetland Assessment Technique for Environmental Review.

Source: Turkey Point Units 6 & 7 Mitigation Plan – USACE Supplement (FPL 2012-TN4629).

FPL (2012-TN4629) proposes to purchase credits from the EMB to offset unavoidable impacts from development of the proposed Units 6 and 7 plant area, RWTF, nuclear administration building, training and parking area, and the East Preferred transmission line corridor. The EMB has an approved mitigation banking instrument authorized by USACE. The EMB consists of more than 13,000 ac situated directly west of the Turkey Point site that encompasses many of the same habitats occurring on the site in a similar landscape position. To determine the amount of mitigation necessary to compensate for these impacts, FPL had to use the Wetland Assessment Technique for Environmental Review (W.A.T.E.R.), which is an older methodology somewhat similar to UMAM that FPL developed specifically for calculating mitigation credits

using EMB (https://www.fpl.com/environment/pdf/wetland-assessment-review-manual.pdf). Like UMAM, W.A.T.E.R. involves quantifying impacts to and compensatory credits toward wetland functions considering specific hydrological, ecological, and social factors. The W.A.T.E.R. approach, like UMAM, does not merely consider the number of acres of land proposed to offset the impacts to wetlands from the proposed action, but includes consideration of relative location within the landscape, quantity and quality of water available within a wetland, and vegetation community structure to calculate functional value. At the time FPL established the EMB, UMAM had not yet been developed. Despite the need to use W.A.T.E.R. to calculate credits needed for purchase from the EMB, Table 4-10 converts mitigation credits calculated using W.A.T.E.R. into credits calculated using UMAM to demonstrate that FPL's overall wetland mitigation adequately compensates for the overall impact following the UMAM process. The EMB has been and would be protected with a conservation easement and a long-term funding mechanism pursuant to its mitigation banking instrument in accordance with 33 CFR Part 332 (TN1472).

FPL (2012-TN4629) also proposes purchasing mitigation credits within the NPS Hole-in-the-Donut Mitigation Bank to offset some of the freshwater wetland acreage and function lost from project activities such as development of the West Preferred transmission line corridor. The Hole-in-the-Donut Mitigation Bank consists of approximately 6,300 ac of previously farmed land within Everglades National Park identified for restoration to natural Everglades' vegetation through a multi-agency effort. FPL used the UMAM methodology to assess wetland impacts that would be mitigated by means other than EMB.

FPL's proposed permittee-responsible wetland mitigation involves two projects, both involving restoration and enhancement of existing but partially degraded freshwater wetlands (FPL 2012-TN4629). The first project, the Northwest Restoration Project, is located approximately 2 mi from where the new reactors would be built. It comprises several contiguous FPL-owned parcels totaling approximately 238 ac within the proposed Biscayne-Everglades Greenway and at the entrance to Biscayne National Park. FPL proposes to remove or control exotic vegetation, backfill ditches, grade the land to resemble a natural state, and plant native wetland vegetation as necessary. FPL also proposes to maintain and monitor vegetation for 3 years after mitigation activities and to preserve the lands under a conservation easement.

The second project, the SW 320th Street Restoration Project, encompasses approximately 574 ac roughly 4 mi northwest of where the new reactors would be built (FPL 2012-TN4629). As for the Northwest Restoration Site, FPL proposes to remove and control exotic plants on these lands with mechanical means and herbicide treatment where appropriate. FPL proposes to grade and backfill to restore natural contours, and plant herbaceous wetlands plants to encourage rapid colonization, and transfer these lands to a public trust to be managed by a qualified government entity after the conclusion of mitigation actions. FPL determined the functional lift provided by the various mitigation activities would exceed the wetland function lost (Table 4-10). The quantitative accounting of losses of wetland functions and values and functional life (credit) provided by the proposed wetland mitigation conservatively accounts for time lags in the establishment of planted vegetation and time needed for that vegetation to mature enough to provide ecological services (FPL 2012-TN4629). The final locations for facilities such as the transmission lines and pads and the RWTF have not been finalized and the final impacts on wetlands are not known. However, FPL applied conservative assumptions with

its approach to estimating wetland impacts and provided mitigation to address the maximum impact expected. Further mitigation for impacts on wetlands and listed species may be required by other Federal or State agencies.

FPL also proposes *in-situ* restoration of approximately 46 ac of wetlands that would be disturbed only temporarily to install pipelines to serve the new reactors. Additionally, FPL proposes to perform ecological enhancements to the Sea Dade Canal Crocodile Sanctuary. These mitigation activities are considered by FPL to be voluntary additional mitigation and are not counted for functional life needed to meet wetland mitigation requirements (FPL 2012-TN4629).

The NRC staff carefully examined FPL's entire wetland mitigation strategy and determined that, if fully and successfully implemented, it would likely compensate for the loss of ecological, hydrological, and social functions resulting from unavoidable wetland impacts associated with building Units 6 and 7 (including offsite appurtenances). The NRC staff recognizes that FPL's strategy relies on compensatory wetland mitigation practices calling for restoration and enhancement of wetlands, and that the ultimate success of such efforts to manipulate natural wetlands is less than fully certain, no matter how well designed. FPL has designed its proposed wetland mitigation using practices commonly used in South Florida, designed by qualified experts using state-of-the art methodologies, and approved by applicable state and Federal agencies who would oversee implementation and long-term monitoring. FPL has situated its compensatory mitigation practices in close proximity to the impacts in landscape positions that closely resemble those of the impacts. FPL calls for preserving, restoring, and enhancing wetlands with similar properties and functions as those subject to impacts. The NRC staff determined that FPL correctly reflected the above considerations in FPL's application of the UMAM and W.A.T.E.R methodologies. Accordingly, the NRC staff concludes that the FPL proposal for the use of mitigation bank credits, in-lieu fees projects, and permittee-responsible mitigation, as calculated using UMAM and W.A.T.E.R., is a reasonable estimate of the mitigation these measures can be expected to achieve.

As stated in the opening to this section, the USACE has not yet independently reviewed and verified FPL's proposed compensatory mitigation plan for unavoidable impacts to jurisdictional wetlands because avoidance and minimization have not been demonstrated pursuant to CWA 404(b)(1) Guidelines. Additionally, no approved jurisdictional determination has been conducted for the project; however, a preliminary jurisdictional determination was signed by FPL on July 10, 2012. The USACE will proceed with the processing of the application under this preliminary jurisdictional determination. The USACE's CWA Section 404(b)(1) Guidelines analysis, including determination of the sufficiency of compensatory mitigation pursuant to 33 CFR Part 332 (TN1472), will be concluded in the USACE's ROD.

Avian Protection Plan

FPL provides protection to migratory birds through a corporate avian protection plan (FPL 2011-TN1283). This plan adheres to the Avian Power Line Interaction Committee and FWS guidelines regarding birds and electrical energy production. The avian protection plan provides guidance for reporting bird mortalities, dealing with bird injuries, nest-management procedures,

permitting issues, construction design standards to minimize collision and electrocution, staff training, and mortality risk assessment.

Mitigation Specifically Developed for FWS

FPL has proposed a sequence of mitigation actions to the FWS as part of its consultation activities under Section 7 of the ESA (FPL 2016-TN4713). The NRC staff expects that FWS will enforce these mitigation actions under the ESA and thus considers them to be reasonably foreseeable. Some of the mitigation actions are the wetland and avian mitigation actions described above and are not discussed further here. Other mitigation actions involving terrestrial species include the following:

- FPL proposes to conduct updated pre-clearing surveys and assessments of Federally-listed species in potentially affected habitats prior to initiating ground disturbance.
- FPL proposes to conduct updated avian surveys of affected shorebird habitat prior to and during building activities and in wetland mitigation areas designed to provide shorebird habitat.
- FPL proposes to install physical wildlife protection features such as fences and culverted wildlife underpasses on several roads and access roads.
- To compensate for the loss of shorebird habitat, FPL proposes to establish approximately 219 ac of shorebird habitat within the coastal wetland mitigation areas (specifically within the EMB wetland mitigation areas and the Northwest Restoration Site and 320th Street Restoration Site).
- To address the wood stork, FPL proposes to incorporate avian protective measures into the design of associated transmission lines to protect wood storks, and FPL proposes to ensure that its proposed wetland mitigation provides equal or better wood stork habitat near wood stork core foraging areas.
- To address the Florida panther, FPL proposes to purchase 743 panther habitat units from an approved Florida panther mitigation bank to offset the estimated loss of 243 panther habitat units.
- To address possible impacts to Federally-listed plant species where the West Transmission Corridor crosses approximately 0.84 ac of the King's Highway Pine Rockland, FPL proposes pre-clearing surveys and relocation of affected plants to other suitable areas.

FPL also proposes to perform various compensatory mitigation measures addressing aquatic ecological resources such as American crocodiles and seagrasses; those are discussed in Section 4.3.2.

4.3.1.7 Summary of Impacts on Terrestrial Resources

The review team evaluated the potential impacts on terrestrial ecological resources from construction of the proposed Turkey Point Units 6 and 7 and the associated offsite facilities.

Development of the proposed Units 6 and 7 would proceed according to Federal and State regulations, permit conditions, existing procedures, and established BMPs. Construction and

preconstruction activities related to the proposed Turkey Point Units 6 and 7 would result in the permanent loss of approximately 585 ac of habitat on the Turkey Point site. Three land-cover classifications—previously filled areas, non-vegetated mudflat, and mangroves—compose more than 80 percent of the affected lands on the site (Table 4-6). Although wetlands would be avoided to the extent possible, approximately 320 ac of wetlands would be permanently lost within the Turkey Point site (Table 4-8).

Pipelines that would be built extending off of the Turkey Point site, including a 10 mi long potable water pipeline and a 9 mi long reclaimed water pipeline, would affect an additional area of approximately 2,211 ac, including approximately 719 ac of wetlands. Much of the land crossed by the proposed pipeline corridors has been previously developed or disturbed.

Transmission line corridors would be built or upgraded to support proposed Units 6 and 7. Depending on whether the West Preferred or the West Consensus corridor would be developed, these transmission lines would alter as much as 760 ac. All vegetation exceeding 14 ft in height would be removed, and vegetation would be cleared for pad installation and vehicle access. Relatively undisturbed terrestrial cover types that would be altered during these activities include mangrove swamp, freshwater marsh, mixed wetland hardwoods, shrub and brushland, and herbaceous prairie. Pine rocklands serve as a reservoir of endemic species and often contain many Federal and State-listed species. Pine rocklands and pine rockland habitat lies adjacent to the East (Davis to Miami) and within both West (Clear Sky to Levee) corridors. The FFWCC has required surveys to determine the distribution and abundance of listed plants and animals within all transmission line corridors as part of the State of Florida Site Certification permitting process. FPL estimated approximately 308 ac of wetlands would also be affected during transmission line development. Ground disturbance and alteration of surface-water flow could result in the establishment of non-native species.

Compensatory mitigation for unavoidable wetland impacts is required under both the Federal CWA Section 404 (33 U.S.C. § 1344) (TN1019) and the Florida Environmental Resource Permitting processes. FPL has proposed a compensatory mitigation plan that addresses wetland impacts (Table 4-10). The USACE will conclude its CWA Section 404(b)(1) Guidelines and public interest analyses in its ROD. As noted in Section 4.3.1.6, the NRC staff has reviewed the proposed wetland mitigation plan, independently of other reviews necessary for state or Federal permitting, and determined that if fully and successfully implemented, the plan would offset the losses of wetland functions resulting from project impacts. The NRC staff acknowledges that despite FPL's use of state-of-the art assessment and design procedures and qualified mitigation designers, and despite the fact that multiple regulatory agencies can be expected to enforce implementation of the mitigation, the long-term success of mitigation actions such as wetland restoration and enhancement is inherently uncertain. Nonetheless, the use of the UMAM and W.A.T.E.R. methodologies, as described above, results in a reasonable prediction of the likely effectiveness of these mitigation measures.

Site preparation and development for the proposed project area would affect wildlife and important species as defined by the NRC. The review team has determined that habitat loss, hazards posed by site preparation, noise, collisions with elevated structures, and increased traffic may negatively affect wildlife. However, the impacts on wildlife populations are expected to be localized and offset through onsite habitat enhancement and conservation measures.

Federally and State-listed threatened and endangered species, at times, may occur on or in the vicinity the Turkey Point site and the associated offsite facilities. Numerous plants listed as Federally endangered, threatened, or as candidates for listing as threatened or endangered are known to occur in Miami-Dade County. None of these plants has been observed on the Turkey Point site, and habitat does not exist within the Turkey Point site boundary for any of these plants. However, the sand flax (endangered), Florida brickell-bush (proposed endangered), and the pineland sandmat (candidate) have been observed growing within proposed transmission line corridors that would support proposed Units 6 and 7. One of the plant species listed by the FWS as endangered—sand flax—has been observed within the Clear Sky to Levee corridor. Two candidate species, the Florida brickell-bush and pineland sandmat, were also recorded to be growing within the Clear Sky to Levee corridor. This portion of the corridor is part of both the West Preferred and West Consensus corridors. The botanical survey of the proposed transmission line corridors does not represent an exhaustive search for listed plants throughout all of the corridor areas and further investigations may reveal additional listed species (FPL 2009-TN657). Most of the listed plant species occur in pine rockland habitats. Pine rockland habitat has been highly fragmented in Miami-Dade County and is now found in small, widely scattered remnants. Pine rocklands were historically maintained by periodic disturbance in the form of wildfire and are dependent upon such disturbance for continued existence (FWS 1999-TN136). The presence of pine rockland plant species within existing transmission line corridors may indicate periodic vegetation-management practices that have been used within the corridors may simulate the natural fire disturbance regime and serve to maintain pine rockland habitat (FPL 2009-TN657). Additional patches of pine rockland and marl prairie habitat, within which most of the other Federally listed plants are associated, have not yet been surveyed for plants.

Numerous terrestrial animal species that are Federally listed or proposed as either endangered, threatened, or as candidates for such listing are known to occur in Miami-Dade County. Suitable habitat does not exist at or near locations proposed to be affected by proposed Units 6 and 7 and all of their associated facilities. Those that could be affected are the eastern indigo snake (threatened), Florida panther (endangered), piping plover (threatened), Everglade snail kite (endangered), and the wood stork (threatened). No designated critical habitat for any of these species would be affected by the proposed actions. Measures to protect and minimize impacts on indigo snakes have been required by the FWS. Florida panther are not known to occur on the Turkey Point site but have historically occurred within habitats that would be affected by proposed Clear Sky to Levee (West) transmission line development. The FWS has established panther management zones within the State of Florida. The PFA includes much of Miami-Dade County west of the Turkey Point site but excludes the site itself. Proposed activities would result in loss of panther habitat. FPL has proposed mitigation for lost panther habitat as well as management controls to limit impacts of preconstruction and construction on panthers. Piping plovers would be minimally affected by both preconstruction and construction activities. Everglade snail kites are known to occur within the EMB adjacent to the Turkey Point site and a single kite was observed along the West Preferred corridor. Activities on the Turkey Point site are not expected to affect snail kites, but development of sections of the West Preferred or West Consensus corridors that lie adjacent to Everglades National Park could affect habitat and snail kites foraging nearby including within the park boundary. Development of the Clear West Consensus corridor could have relatively less impact on the snail kite

because this corridor is located further east than the West Preferred corridor and would pass through habitats that have been previously degraded and provide less ecological value to snail kites (FPL 2013-TN2941). Wood storks have been observed foraging on the Turkey Point site and two active nest colonies exist near the Clear Sky to Levee segment of the West Preferred corridor. The nearest colony is slightly less than 1 mi of the corridor and the other is within 3 mi. The FWS established management buffers around wood stork nest colonies and forage sites. FWS recommends building overhead transmission lines more than 1 mi from nesting colonies. The FFWCC requires FPL to conduct extensive pre- and post-installation monitoring, and further mitigation may be required, such as use of flight diverters and perch discouragers on transmission wires and poles.

Plant species listed by the State of Florida as threatened or endangered are numerous and occur in a variety of habitats; most species are associated with either pine rocklands or marl prairie. Some are also associated with disturbance. Individual plants and populations have been observed within proposed project areas, and other areas have not yet been surveyed, so distribution and abundance of State-listed plants within all proposed project area are unknown. In addition, numerous animal species listed by the State of Florida as threatened or endangered may occur at or in the vicinity of proposed facility locations. Miami-Dade County and the FFWCC have required FPL to conduct pre-clearing surveys for all State-listed species in coordination with the FFWCC. FPL would follow FFWCC-approved survey protocols, conduct regular reporting of results, and implement management actions for specific species or resources as required. Provided that adequate surveys are conducted prior to commencement of development, consultation with the FWS and FFWCC is initiated as needed, and other identified mitigation is implemented, impacts on threatened and endangered species from the proposed Turkey Point project likely would be reduced to the extent practicable. However, without proper surveys, consultation, and appropriate mitigation, the impact could be greater.

Based on the review team's independent evaluation of the Turkey Point project described above, including the ER, the SCA, FPL's responses to NRC's RAIs, the identified mitigation measures and BMPs, and consultation with other Federal, State, and County regulatory agencies, the review team concludes that the impacts of preconstruction and construction activities on terrestrial ecological resources (including wetlands and threatened and endangered species) would be MODERATE. This conclusion reflects the impacts on wetlands, wildlife, and Federally and State-listed plant and animal species at the Turkey Point site, in the vicinity of the site, and at or in the vicinity of all associated offsite facilities. It also reflects the proximity of many of these impacts to Biscayne and Everglades National Parks. The review team does not consider the terrestrial impacts from building the proposed facilities to be potentially destabilizing, considering the abundance of similar habitat in the vicinity and region; the history of prior disturbance of the proposed Units 6 and 7 plant area and adjoining areas; the extent that offsite pipeline and transmission line corridors have been collocated within or along existing corridors or routed to cross mostly disturbed lands; and the extent of the proposed wetland mitigation, which would be required under Federal and State regulations. However, the review team considers the impacts to be noticeable despite the proposed mitigation, considering the complexity and extent of the impacts, potential time lag and uncertainties associated with the mitigation, and the unavoidable presence of workers and equipment in sensitive terrestrial habitats, including pine rocklands, even if only temporary.

The USACE is concurrently reviewing the project but will not have enough information to support this impact level determination until after the public notice has been published, comments have been received from the public, and LEDPA has been identified.

The LWA rule (72 FR 57416) (TN260) specifically states that transmission lines, pipelines, heavy-haul roads, and other offsite actions that support building the proposed Units 6 and 7 are not included in the definition of construction. NRC-authorized construction activities would be limited to activities necessary to develop safety-related structures on the Turkey Point site, a subset of the total development activities on the site analyzed above for impacts on terrestrial resources. The NRC-authorized construction activities with the potential to affect terrestrial species and habitats include the use of cranes and the erection of safety-related structures; movement of construction vehicles and heavy equipment around the site; the noise associated with construction, machinery, and testing of diesel and combustion turbine generators; and minor changes in surface-water drainage. These NRC-authorized construction activities are not expected to increase mortality rates enough to destabilize affected wildlife populations, and detectable changes in abundance would not be expected at a regional population level. Based on these analyses, the NRC staff concludes that impacts on terrestrial ecological resources from NRC-authorized construction activities would be SMALL, and no mitigation beyond the actions stated would be warranted.

4.3.2 Aquatic Impacts

Based on the independent review of FPL's ER, SCA submission, other relevant information, and Federal and State regulatory agency comments, building-related effects on onsite and offsite aquatic resources could include the following:

- temporary or permanent loss of onsite surface water and other habitat from clearing and grading operations, and building of roads, permanent structures, laydown areas, pipelines, transmission lines and substations, and stormwater-drainage structures needed to support these activities
- effects of building site runoff and dewatering releases on aquatic species inhabiting the IWF
- deep-well injection installation
- RCW installation
- effects of stormwater or dewatering constituents and of excavated "muck" disposal on aquatic species inhabiting the IWF
- effects of light, sound, and vibration related to building activities on American crocodiles (*Crocodylus acutus*) occurring on the Turkey Point site
- increased vehicular traffic that could result in fatal or non-fatal collisions with American crocodiles present on the site
- habitat loss or alteration related to the building of the RCW system, or effects related to noise and building activity on nearshore aquatic resources

- habitat loss or alteration associated with the expansion of the existing equipment barge-unloading area and excavation and dredging in the vicinity of the existing barge-turning basin
- barge and tug traffic that could result in fatal or non-fatal collisions with the Florida manatee (*Trichechus manatus latirostris*), sea turtles, Smalltooth Sawfish (*Pristis pectinata*), or other species present near the barge-unloading area and turning basin during construction equipment deliveries.

Specific information about anticipated property disturbance by FLUCFCS land-use category is provided in Table 4-1. In general, activities resulting in the largest disturbance or loss of aquatic habitat (streams, waterways, ditches, reservoirs) are associated with building proposed Units 6 and 7 and the western equipment laydown areas and creation of designated spoils areas along some of the IWF berms to permanently store the muck excavated from the proposed Units 6 and 7 plant area.

In the following sections, the expected building-related effects likely to occur at onsite and offsite locations are described, including, when possible, the extent and duration of the expected effect. The narrative first focuses on likely effects within the site boundaries, and provides an overview of potential effects on aquatic habitats adjacent to FPL (e.g., Biscayne Bay, Everglades National Park, EMB, Florida Keys National Marine Sanctuary). The remainder of this section evaluates the potential building-related effects on the aquatic resources described in Section 2.4.2, including species considered to be ecologically, commercially, or recreationally important; those listed as threatened, endangered, proposed threatened, proposed endangered, or candidates for listing by State and Federal resource agencies; Federal or State Species of Concern, and species with designated or proposed critical habitat or designated essential fish habitat within or adjacent to the Turkey Point site. The aquatic monitoring studies proposed by FPL during building activities are summarized as are those requested by Federal or State resources agencies in their comment responses to FPL's ER or SCA submissions. A final determination of likely onsite and offsite impacts on aquatic resources is provided at the end of this section along with a summary of potential mitigation options, if any, that could lessen or eliminate the identified impacts on aquatic resources.

4.3.2.1 Aquatic Resources − Site and Vicinity

Onsite Surface-Water Habitats

This section provides a general summary of the likely impacts of building-related activities on aquatic resources at or near the Turkey Point site. A detailed assessment of building impacts is provided in Section 4.3.2.2 for transmission line and pipeline installation and Section 4.3.2.3 for building impacts on aquatic species and habitats at or near the site.

As described in Section 2.4.2, onsite aquatic habitats that could be affected by building activities include hypersaline mud flats, mangrove heads associated with historical tidal channels, remnant canals, and the cooling canals of the IWF. Potential impacts on onsite surface waters associated with the building of proposed Units 6 and 7 include the following:

- temporary or permanent loss of onsite surface-water and other habitat from clearing and grading operations, and building of roads, permanent structures, laydown areas, pipelines, transmission lines and substations, and stormwater-drainage structures needed to support building activities
- effects of building site runoff and dewatering releases on aquatic species inhabiting the IWF
- deep-well injection installation
- RCW installation
- effects of stormwater or dewatering constituents and of excavated "muck" disposal on aquatic species inhabiting the IWF.

For each of the above activities, temporary or permanent loss of aquatic habitats is expected to occur. Building activities also create the potential for the degradation of water quality caused by site runoff, leading to siltation or sedimentation, water turbidity, or release of chemicals or other constituents related to building activities into surface waters.

Proposed Units 6 and 7 Plant Area

The power blocks, makeup-water reservoir, switchyard, and related infrastructure associated with proposed Units 6 and 7 would occupy approximately 218 ac at the northeastern edge of the existing IWF (FPL 2014-TN4058). FPL characterizes this area as a sparsely vegetated hypersaline mudflat that is partially buffered from tidal influence by the IWF.

As described in ER Revision 6 (FPL 2014-TN4058), wetland and aquatic habitats within the proposed Units 6 and 7 plant area and adjacent laydown areas include the following:

- 187.5 ac of mudflats
- 25 ac of remnant and active canals
- 17 ac of dwarf mangroves
- 16 ac of open-water habitat
- 12 ac of mangrove heads
- 10 ac of wetland spoil areas.

In June 2009 as part of pre-application monitoring, Tetra Tech NUS (FPL 2009-TN201) conducted a survey of fish species in areas that would be affected by building the new units. All fish collected during the survey represented hardy species common to South Florida. No rare, unusual, sensitive, or protected species were observed. Building-related impacts on aquatic resources at this location would include the permanent loss of aquatic habitat and potential disturbance of American crocodiles nesting in the northeastern corner of the IWF. Heavy equipment operation in this area could also result in fatal or non-fatal collisions with crocodiles. Additional impacts related to the building of the power block and related structures include releases of stormwater or dewatering constituents into the IWF and relocation of the "muck" excavated from the Units 6 and 7 power block area to dredge spoil sites located within the IWF.

Pipelines and Reclaimed Wastewater-Treatment Facility

As described in ER Revision 6, (FPL 2014-TN4058), a 72 in. diameter water pipeline would be buried to bring reclaimed water from Miami-Dade County to the Turkey Point site. This pipeline would extend approximately 9 mi north from the site generally following existing roadways or corridors including the existing Clear Sky to Davis transmission line right-of-way for 6.5 mi. A second pipeline would be constructed to bring potable water to the site from MDWASD. This pipeline would be 10 mi long, and approximately 2.5 mi of the pipeline corridor would require new land disturbance (FPL 2014-TN4058). The review team assumes the reclaimed water pipeline and the entire potable water pipeline rights-of-way would likely affect aquatic resources in ways similar to those ascribed to the transmission line corridors. The pipelines would be installed in trenches within or alongside existing corridors, or alongside roadways in conjunction with planned roadway enhancements. Areas disturbed during construction would be graded and landscaped after pipeline installation. Standard industry practices would include the use of silt fences, mulching, slope texturing, and other techniques that are protective of both terrestrial and aquatic resources occurring along the pipeline route. The reclaimed water pipeline supplies water to the onsite RWTF. The RWTF would be built on approximately 44 ac of land immediately north and west of the IWF near SW 360th Streets (Figure 3-1). This land currently contains sawgrass marsh, dwarf mangroves, upland Australian pine (*Casuarina* spp.), an excavated canal system (the Moat), and exotic wetland hardwoods (FPL 2014-TN4058).

Roads, Bridges, Parking Areas, and Laydown Space

As described in the ER (FPL 2014-TN4058), approximately 52 ac of space west of the proposed Units 6 and 7 plant area would be used for building laydown, including fill areas for roads and highways. This area contains streams, waterways, land adjacent to the existing IWF, and wetland and dwarf mangroves. To support building activities, existing roads on the Turkey Point site would be improved to provide heavy-haul capabilities to transport large components and equipment from the equipment barge-unloading area. This building is expected to result in the permanent loss of 5.17 ac of water courses, and non-vegetated, disturbed land, including fill areas and land with existing highways and power facilities. In addition, to accommodate heavy loads, two new bridges would be installed over existing canals (FPL 2014-TN4058). As described in Section 2.4.2, the predominant fish species found in onsite surface-water habitats are the Sheepshead Minnow (*Cyprinodon variegatus*), followed by the Sailfin Molly (*Poecilia latipinna*) and the Goldspotted Killifish (*Floridichthys carpio*). All of the species collected represent hardy species common to South Florida; no rare, unusual, or protected species were observed during the collections (FPL 2009-TN201). Additional information about road and bridge building is available in the Conceptual Design Report by HDR Engineering, Inc. (HDR) (HDR 2009-TN1040). Because these road improvements would occur in areas adjacent to established crocodile populations, there is a potential for increased fatal or non-fatal collisions with building equipment. Additional discussion of this potential building impact and proposed mitigation measures follows.

Building-Related Erosion, Runoff, and Spills

In its ER (FPL 2014-TN4058), FPL describes the general building-related impacts related to sedimentation, changes to water turbidity, spills, and habitat disturbance that are likely to affect

aquatic species on or near the Turkey Point site. Building-related activities such as excavation, road building, grading, storage of soil piles, and use of heavy machinery can result in soil erosion that can lead to sedimentation and changes in water clarity or quality in onsite waterbodies or those near the building site. Building activities can also increase the likelihood of chemical spills into aquatic environments. To reduce erosion and turbidity effects, FPL has indicated environmental BMPs would be used during building; these techniques would include the use of stormwater-retention basins, silt screens, mulching, slope texturing, buffer strips, and soil reseeding to minimize erosion and runoff. In addition, a Spill-Prevention, Control, and Countermeasure (SPCC) plan would be implemented in accordance with EPA regulations described in 40 CFR Part 112 (TN1041). This plan would require immediate cleanup of spills occurring on the building site (FPL 2014-TN4058). Activities used to minimize erosion, runoff, and spills at the proposed Units 6 and 7 plant area would likely also apply to other areas within or adjacent to the Turkey Point site.

Industrial Wastewater Facility

The IWF encompasses 5,900 ac on the existing Turkey Point site (Figure 2-4). The IWF is used as a closed-loop system to provide reactor cooling for Turkey Point Units 1 through 4, and receives blowdown water from Unit 5. As described in Section 2.4.2, the IWF is hypersaline, consists of an extensive system of unlined canals and berms, and supports a variety of aquatic species that are tolerant of subtropical, hypersaline environments. Gamefish species observed in the IWF include Tarpon (*Megalops atlanticus*) and Common Snook (*Centropomus undecimalis*), and a variety of forage fish species are present, including Sheepshead Minnow, killifish, Mosquitofish (*Gambusia holbrooki*), Sailfin Molly, and Needlefish (*Strongylur*a sp.) (FPL 2014-TN4058). A robust American crocodile population lives within this system, and nests have been observed in the northeast portion of the canal system adjacent to the site of proposed Units 6 and 7. Potential activities that could affect species within the IWF from building of proposed Units 6 and 7 include the following:

- excavation and disposal of “muck” excavated from the proposed Units 6 and 7 plant area at three spoils sites on IWF berms, resulting in dewatering constituents entering the IWF
- discharge of construction-related effluents and stormwater from the Units 6 and 7 site into the IWF, as described in Section 3.3.1.1
- other building-related impacts, including increased risk of fatal or non-fatal encounters between aquatic species and building equipment, and the effects of noise and vibration on sensitive aquatic resources within or adjacent to the IWF, including crocodiles.

Muck Excavation and Disposal

As described in the ER (FPL 2014-TN4058), approximately 5 ft of muck would be excavated and removed from the proposed Units 6 and 7 plant area and disposed of in the IWF at three locations designated as Spoils Areas A, B, and C (Figure 4-3). Engineered fill material would then be used to raise the grade to the appropriate level for building. The total volume of muck to be removed is estimated to be 1.8 million cubic yards (FPL 2010-TN272). Potential effects on aquatic communities residing in the IWF include disturbance from heavy equipment and truck traffic and related noise and vibration, increased risk of collision of American crocodile with

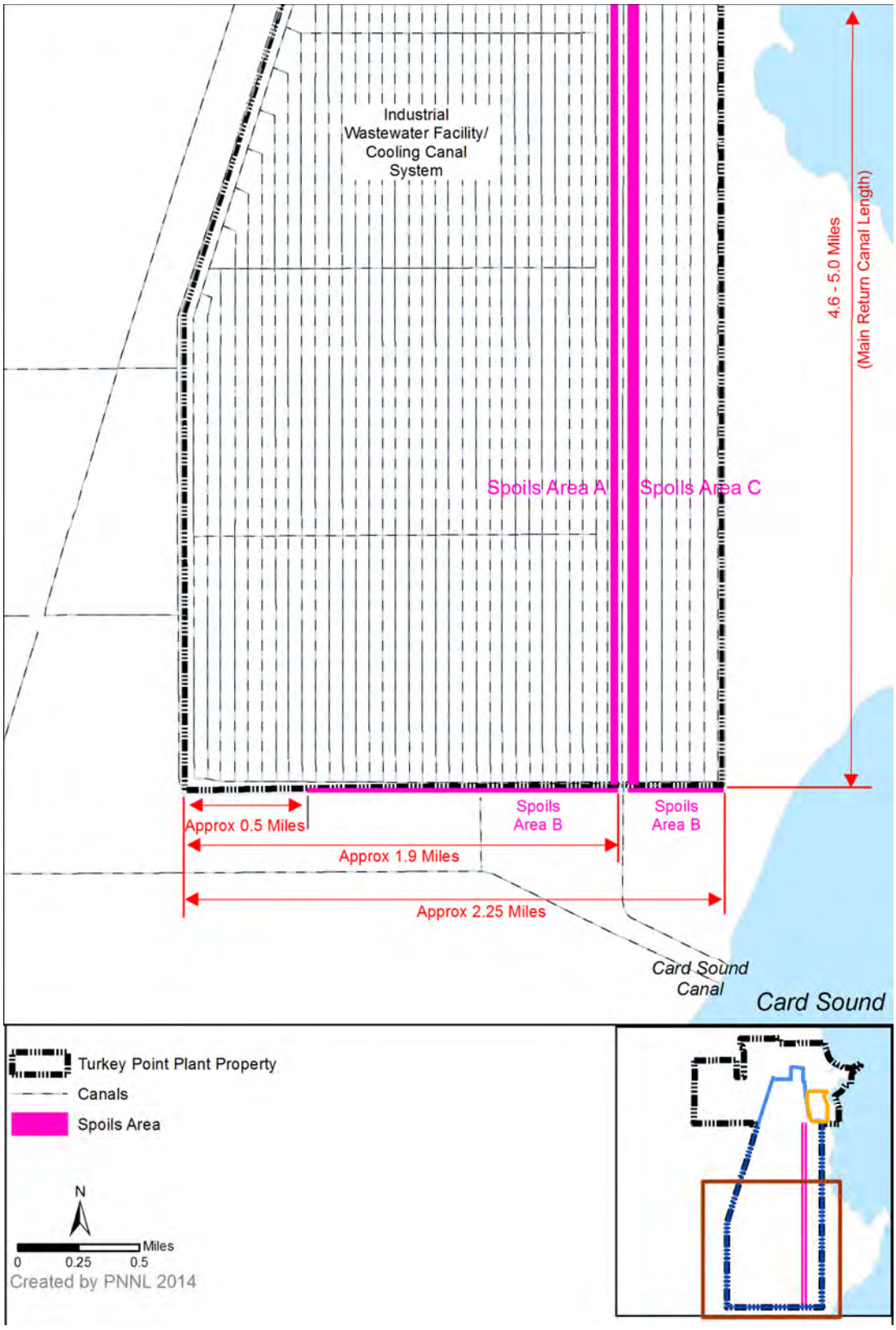


Figure 4-3. Location of Muck Spoils Area within the IWF (Source FPL 2014-TN4058)

vehicles, alterations to IWF water quality from dewatering constituents or fine particles associated with muck, and habitat loss in areas of designated spoils disposal. FPL has addressed many of these concerns in its Threatened and Endangered Species Evaluation and Management Plan (FPL 2010-TN170) and has also stated that BMPs would be used to lessen building-related impacts on the IWF. These practices would include controlling runoff through structural or operational measures such as berms, riprap, and sedimentation filters to intercept water before it flows into the IWF, and to provide runoff control. To further evaluate the potential for leachate from muck to affect IWF water quality, the review team used a mass-balance model to calculate the concentrations of nitrogen and phosphorus that would be discharged into the IWF as pore water. A detailed description of the mass-balance modeling used to assess potential changes in water quality is provided in Section 4.2.1.4. Specific impacts associated with muck disposal on species residing within the IWF are described below for species known to occur in the IWF.

Building-Related Effluent Discharge

As discussed in Section 3.3.1.1, stormwater runoff from the plant area and the laydown area during building activities would be directed to the cooling canals of the IWF. Table 2-10, in the Local Site Drainage subsection of Section 2.3.1.1, provides annual discharge volumes from the building areas within the site as computed by the review team. As discussed in FPL's Stormwater Management Plan (FPL 2011-TN303), except for equipment area runoff all stormwater runoff from the RWTF area would be routed to stormwater-management basins before being released to its surrounding wetland area. The review team determined that building within the plant area and laydown area would not detectably alter the amount of runoff entering the cooling canals (which the review team currently estimates to have an average annual runoff of 1,163 ac-ft [Table 2-10]), because the area to be disturbed for the proposed units already drains into the cooling canals.

Potential impacts on aquatic biota from discharges into the IWF are primarily related to increased exposure to contaminants or constituents in the water, the potential for turbidity, and sedimentation near the effluent release. It is also possible that construction-related activities occurring near the IWF could affect adjacent nearshore areas of Biscayne Bay, though the hydrological connection between these two waterbodies is not well understood it is unlikely that there would be detectable changes in the water quality of the bay attributed to construction-related activities. Potential impacts on species within the IWF are discussed below, with an emphasis on the American crocodile and its prey species.

Other Building-Related Impacts

As described above, during the building of proposed Units 6 and 7 and related facilities, there would be increased vehicle and heavy equipment traffic throughout the site. Of particular concern is the potential for vehicle collisions with the endangered American crocodile, especially during excavation and subsequent placement of fill to bring the Units 6 and 7 site up to planned grade as well as transport of the muck to the spoils areas within the IWF.

The effects of building noise and vibration are also a concern for crocodiles residing in or near the IWF. In its ER (FPL 2014-TN4058), FPL acknowledges that the impact of building noise and risk of collision would be moderate for crocodiles, and that mitigation would be required. To

mitigate the hazards associated with the increased traffic between the northern end of the IWF and the test cooling canals, FPL is proposing to install a system of wildlife underpasses to allow crocodiles to move safely under the primary access road to the plant when traveling between the IWF, the test cooling canals, and associated freshwater ponds on the berms to the north. Additional details about potential mitigation actions proposed to FFWCC and FWS are provided below, and by FPL (2012-TN1618). Potential effects related to noise and vibration from construction and building activities are discussed below for crocodiles and other species that could be affected. A detailed discussion of noise and vibration effects on listed species is provided in Appendix F-2 and F-3.

Turkey Point Nearshore Waters

The Turkey Point peninsula is located at the northeastern portion of the FPL property adjacent to Biscayne Bay, the Biscayne Bay Aquatic Preserve, and Biscayne National Park. On the Turkey Point peninsula, FPL would install four RCWs to provide one source of cooling water for proposed Units 6 and 7. The other source would be reclaimed wastewater from Miami-Dade County. For the RCW water source, associated delivery pipelines would require excavation on the Turkey Point peninsula and the existing berm east of the plant area. Potential building-related impacts on aquatic resources on or adjacent to the Turkey Point peninsula result from the following activities:

- building of RCWs
- installation of water delivery lines.

Building of the Radial Collector Wells and Water-Supply Line

As described in the ER (FPL 2014-TN4058) and SCA Chapter 5 (FPL 2010-TN272), the RCWs would be constructed on previously disturbed land at the northern edge of the Turkey Point site. Approximately 3 ac of land would be required for the RCWs and associated facilities; an additional 3 ac of industrial/fill habitat would be needed for a building area; and approximately 13 ac of land would be disturbed during the building of the water-supply pipelines to the new units (FPL 2014-TN4058). Each radial well would consist of a central reinforced caisson extending below ground level and lateral pipes extending approximately 900 ft from the caisson into and underneath Biscayne Bay at a maximum depth of approximately 25 to 40 ft. During installation and lateral drilling (see Section 4.2.1.2), BMPs would be used to reduce the potential for surface-water or sediment disturbance. No in-water work is needed for the installation of the RCWs. The SFWMD Conditions of Certification outline RCW installation conditions for the applicant to follow, including submission of a drilling plan and techniques for approval, and development of contingency plans in the event of a natural or man-made uncontrolled release of excavated material (State of Florida 2014-TN3637). Pre-installation baseline monitoring and characterization of aquatic resources in Biscayne Bay near the RCW area is required by FDEP, FFWCC, and SFWMD for a period of at least two (2) years prior to the start of installation activities (State of Florida 2014-TN3637). This baseline monitoring would be included in an RCW monitoring plan that FPL is required to submit to FDEP two (2) years prior to RCW installation for approval. Other conditions of the RCW monitoring plan are discussed further in Section 4.3.2.4.

During operation, water from the well laterals (horizontal collector lines) would flow to collection caissons and be pumped via pipelines to proposed Units 6 and 7. These water-supply lines would require excavation on the Turkey Point peninsula and the existing berm east of the plant, and would cross streams, waterways, mangrove swamps, and fill areas (FPL 2014-TN4058). FPL's general concern related to building activities on the Turkey Point peninsula is the potential for disturbance or loss of mangrove habitat that supports important aquatic species. Table 4-2 lists the potential impact of RCW pipeline installation as affecting 4 ac of mangrove swamp and 0.15 ac of streams and waterways. The FWS National Wetlands Inventory maps code the mangrove swamps in this area as intertidal and irregularly flooded (tidal waters flood the land surface less often than daily), and not as subtidal or open water (FWS 2016-TN4583). FPL has stated that RCW caissons would be installed primarily on areas of existing upland fill and roadways to minimize effects on adjacent mangrove wetlands (FPL 2014-TN4058). Specific impacts on aquatic resources during the building of the RCWs and associated infrastructure are discussed below.

Biscayne Bay, Biscayne National Park, Biscayne Bay Aquatic Preserve

Potential building-related impacts on Biscayne Bay, Biscayne National Park, and Biscayne Bay Aquatic Preserve include the following:

- noise, vibration, and turbidity related to dredging and building-related activities to support enlargement of the barge slip
- increased collision risk for sea turtles and manatees related to barge and vessel traffic to support building activities
- noise, vibration, and potential water-quality effects related to RCW building activities
- potential changes in the water quality of nearshore areas of Biscayne Bay related to the discharge of dewatering effluent and stormwater to the IWF.

Dredging and Building Activities Related to the Equipment Barge-Unloading Area

To support building activities, the equipment barge-unloading area located at the northeastern portion of the Turkey Point site would need to be expanded. As described in the ER (FPL 2014-TN4058), this area would be expanded to a total area of approximately 0.75 ac, which would require the dredging of approximately 780 yd^3 in a 0.1 ac area in the turning basin and the installation of sheet piling to support building activities. As reported in the ER (FPL 2014-TN4058), a survey of the area showed sparse growth of seagrasses and algae within the turning basin. FPL has committed to surveying the turning basin again for benthic resources, including seagrass, prior to dredging and barge area expansion (FPL 2015-TN4417), which is required by the SFWMD as described in the Conditions of Certification (State of Florida 2014-TN3637). FPL expects dredging to result in temporary impacts on water quality because of increased turbidity, and would use sheet-pile walls, turbidity curtains, silt screens, or similar technology to minimize impacts (FPL 2010-TN272). Material dredged from the turning basin would be placed in designated spoils areas located on existing berms within the IWF. FPL would submit an application to USACE for a permit to dredge pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403) (TN4768), as described in the ER (FPL 2014-TN4058). FPL did not indicate in ER Revision 6 (FPL 2014-TN4058) that dredging of the

entrance channel or intercoastal waterway would be required to support the proposed building activities. If dredging in these areas is required, the review team assumes a dredging permit would be obtained from USACE.

Barge and Vessel Traffic

In ER Revision 6 (FPL 2014-TN4058, Section 4.3.2.2.1) FPL indicates there were historically five to seven barge deliveries of fuel oil per week, or 269 to 364 deliveries per year for Turkey Point Units 1 and 2. These deliveries have decreased since Unit 2 was converted to synchronous condenser mode in January 2013, and that further reductions in deliveries would occur when Unit 1 is converted to a similar purpose in October 2016 (FPL 2013-TN2630).

During the 6-year building period, approximately 80 deliveries of building equipment and modules would occur for each unit (FPL 2014-TN4058). This represents an average annual number of deliveries for both units of fewer than 30. Potential effects on aquatic resources from barge and tug traffic include short-term changes in water turbidity vessel movements, lethal or non-lethal encounters between tug/barge tandems and manatees and sea turtles, and potential for vessel groundings along the entrance channel leading to Turkey Point that result in damage to benthic habitat, corals, and seagrass resources as well as the release of petroleum or other products into the bay.

Given the 7 ft depth of the entrance channel, water turbidity during tug/barge transit would likely increase during shipments, but the effects are expected to be short-term, and similar to existing turbidity levels that occur during wind-induced wave events in shallow-water areas of Biscayne Bay. To reduce the potential for fatal or non-fatal encounters between tug/barge operations and manatees and sea turtles, FPL developed a Barge Delivery Plan (FPL 2009-TN169). This plan provides detailed procedures for the delivery of major equipment to the Turkey Point site during the building of the proposed Units 6 and 7 that would be protective of listed species in particular and marine resources in general.

In response to a Freedom of Information Act request from NRC staff, the U.S. Coast Guard (USCG) provided documentation of vessel-grounding incidents near the Turkey Point site for the past 20 years, during which barge deliveries ranged from 269 to 364 per year (USCG 2012-TN1063). The USCG records reveal three incidences of vessel groundings, as follows:

- On October 4, 1996, the fishing vessel *St. Lazaro* was intentionally run aground in Biscayne Bay to avoid sinking, resulting in the release of approximately 50 gal of diesel fuel. USCG records indicate approximately 30 gal of fuel was recovered.
- On February 28, 2001, the tugboat *Coastal St. Marks* towing the barge *T/B Coastal 202* grounded in the right (north) side of the entrance channel to the Turkey Point site. The tug and barge system was refloated approximately 5 hours later and completed its passage to the Turkey Point site.
- On November 17, 2007, the tug *Coastal St. Marks* towing the barge 501 ran aground on the “east shoal of the cut” (USCG 2012-TN1063) during a low-tide event. The tug/barge was refloated approximately 5 hours later and completed its transit to the Turkey Point site.

Given the historical number of weekly barge/tug deliveries that occur at Turkey Point site, groundings are exceedingly rare, but the accident investigations conducted by USCG have relevance with respect to the increased barge/tug traffic expected to occur during the building phase of the proposed Turkey Point Units 6 and 7. USCG findings for the February 28, 2001 event indicate the grounding was apparently caused by a missing channel buoy that had been removed for maintenance by FPL but not replaced with an equivalent marker. Because a replacement buoy was not installed, the Master of the *Coastal St. Marks* was uncertain of the channel location, resulting in the grounding event. Weather and tide conditions during the grounding included a northwest wind of 15 kt, and an ebb tide followed by a slack water event. According to the USCG report, the influence of the wind on the barge resulted in a "crabbing" motion that placed the bow of the barge near the northern edge of the channel, effectively increasing the width of the barge/tug system from 54 ft to approximately 100 ft (USCG 2012-TN1063). In the closeout documentation for the February 28, 2001 grounding, the USCG indicated the FPL Turkey Point Facilities Maintenance Supervision had stated the FPL "…currently has a stock pile of four additional buoys" and that "…this incident was isolated and should not happen again" (USCG 2012-TN1063). The USCG documentation also noted FPL had changed its operation to replace each buoy one-at-a-time and would not have a missing buoy while the original is under repair.

The USCG investigation of the November 17, 2007 grounding event concluded "…one of the contributing factors was the discrepant/missing private aids to navigation in the Turkey Point Channel." The report specifically mentioned that one aid was missing, aids were faded or covered in bird guano, and reflective tape was missing or damaged. The USCG investigation summary also noted that because the entrance channel to the Turkey Point site is marked by private navigational aids maintained by FPL, it is FPL's responsibility to ensure the aids are in proper operating condition at all times. USCG considers a discrepancy to exist whenever an aid is not displaying the characteristic as set forth in the approved application. As a result of the November 17, 2007 accident investigation, FPL was required to correct discrepant aids within 30 days or face a fine or revocation of its private aid application (USCG 2012-TN1063).

The two tug/barge-grounding incidents described above illustrate the importance of maintaining navigational aids, and the potential for groundings that can occur during transits of the entrance channel during low-tide events or windy conditions. The groundings also suggest that maneuverability generally decreases with increased barge length, and wind-induced "crabbing" can increase the effective width of the barge under tow to dimensions exceeding channel width. The NRC staff notes that in both tug/barge-grounding incidents, the lengths of the barges (295 ft for *Tug/Barge Coastal 202* and 297.5 ft for *Barge 501*) were significantly greater than the 230 ft maximum length of barges currently being used for fuel deliveries, as reported by FPL in its Barge Delivery Plan (FPL 2009-TN169).

During the building of proposed Turkey Point Units 6 and 7, the review team assumes FPL would maintain navigational aids in the private entrance channel in compliance with USCG regulations and follow the terms and conditions set forth in the Barge Delivery Plan (FPL 2009-TN169). Because the plan specifies that the maximum barge length for building equipment delivery would be 210 ft (FPL 2011-TN43), it is expected that tug/barge maneuverability would increase, and the potential for "crabbing" would not result in the kind of vessel grounding that occurred on February 28, 2001 when a 295 ft long barge was used for fuel oil delivery. As

noted in the USCG investigations of recent groundings, Coastal Tug and Barge has a written policy governing when its vessels may or may not enter the Turkey Point entrance channel; for instance, wind conditions must be less than 20 kt in general and less than 15 kt when wind is blowing out of the east. The investigation also notes that vessel masters are granted wide latitude in using their own discretion upon entry into the channel, and may delay entry if they are not comfortable with the existing conditions or associated marine traffic. Based on the information supplied by the USCG, tug/barge groundings in the vicinity of Turkey Point are rare. If the conditions in the Barge Delivery Plan are met, compliance with USCG regulations continue, and adherence to existing policies and procedures occur, the impacts of additional barge deliveries on aquatic resources in Biscayne Bay during building of proposed Turkey Point Units 6 and 7 are expected to be minimal. The National Marine Fisheries Service (NMFS 2009-TN1475) reached a similar conclusion with respect to the risk of increased vessel collisions resulting from new dock and marina building in Florida waters. Using conservative (e.g., environmentally protective) assumptions, NMFS estimated that a new marina project designed to accommodate 500 vessels would likely result in a single sea turtle strike (defined as a "take" by ESA) every 2.9 to 8.8 years (NMFS 2009-TN1475).

Offshore Impacts of Radial Well Building

Because much of the building of the RCWs would occur on land adjacent to Biscayne Bay and involve lateral drilling, impacts on water quality at offshore locations would be unlikely. However, drilling noise and vibration could affect sensitive species, as discussed in Section 4.3.2.

Other Protected Areas

Building of the proposed Units 6 and 7 is not expected to adversely affect aquatic resources west, south, and southeast of the site (Everglades National Park, EMB, Model Lands Basin, Card Sound, Card Sound Canal, Florida Keys National Marine Sanctuary) because no building-related activities are planned within those areas. Construction of the Clear Sky to Levee transmission line will occur east of the Everglades National Park boundary, and is not expected to adversely affect nearby aquatic resources. A complete description of the proposed corridor routes and associated land-use classifications is provided in Section 2.2.

4.3.2.2 Aquatic Resources – Transmission Line and Pipeline Corridors

As described in Section 2.2.2 and Chapter 3, proposed Turkey Point Units 6 and 7 would require new transmission facilities to integrate the new power sources into the FPL transmission system. New pipelines would also be required to supply reclaimed water from MDWASD for reactor cooling and potable water for plant use. What follows is a description of the aquatic species likely to be present in existing or planned transmission line and pipeline corridors and the potential for building activities to result in adverse impacts.

Transmission Line and Pipeline Corridors

As described in Section 2.4.2, fish known to occur in the wetland and open-water habitats along the transmission line and pipeline corridors include native fish (e.g., Mosquitofish, Sailfin Molly, killifish, sunfish [*Lepomis* spp.], gar [*Lepisosteus* spp.]), and non-indigenous species (Peacock Bass [*Cichla ocellaris*], tilapia, Mayan Cichlid [*Cichlasoma urophthalmus*], Jaguar Guapote

[*Cichlasoma managuense*], and Oscar [*Astronotus ocellatus*]). All of these species are common to South Florida. With the exception of the Mangrove Rivulus (*Rivulus marmoratus*), no rare or protected fish or aquatic species are expected to occur within the proposed transmission line and pipeline corridors (FPL 2014-TN4058), although American alligators may occasionally be present. FPL also indicates encounters with manatees and American crocodiles are unlikely because manatees are generally found in coastal areas away from the routes, and crocodile populations are centered in the IWF. FFWCC (2011-TN554) describes the requirements for monitoring of listed species prior to clearing and building following standard methodologies and the appropriate mitigation strategies if unavoidable impacts are likely. FPL would also be required to follow standard manatee protection procedures for in-water work (FPL 2012-TN2768). As described in the SCA (FPL 2010-TN272), the applicant would avoid major lakes, rivers, and streams. While transmission line and pipeline installation may require installation of culverts or placement of fill resulting in temporary localized increases in turbidity and siltation, these impacts are expected to be temporary. FPL also states that no withdrawals or discharges to surface waters (not including the IWF) are planned during the building of new transmission and pipeline facilities or modifications to existing facilities, and BMPs would be used to reduce effects on aquatic biota (FPL 2014-TN4058). Based on the above information, the review team believes the building-related impacts on aquatic resources within the corridors would likely be minimal. Aquatic resource monitoring of the corridors is described in Section 4.3.2.4.

4.3.2.3 Aquatic Species and Habitats

This section evaluates the potential effects of building-related activities on important aquatic species described in Section 2.4.2, including ecologically, commercially, or recreationally important species; Federally or State-listed species; those with designated critical habitat; and species with designated essential fish habitat.

Ecologically, Commercially, or Recreationally Important Species

Marine Mammals

Although a variety of marine mammals has been reported in Biscayne Bay, many are transitory and are unlikely to be affected by constructed activities. Those commonly present in Biscayne Bay include the common bottlenose dolphin (*Tursiops truncatus*) and the Florida manatee. Potential effects on manatee are discussed in the Federally or State-Listed Species section below. Common bottlenose dolphins are generally found throughout Biscayne Bay and may transit close to shore. Potential impacts on this species and others located near Turkey Point from building activities are expected to be related to noise associated with construction activities at the Units 6 and 7 plant site, and the noise and vibrations associated with the lateral drilling beneath Biscayne Bay during installation of RCWs on the Turkey Point peninsula.

Noise related to construction activities could also adversely affect marine mammals near the area. As described by FPL (FPL 2014-TN4058), the highest levels of construction noise on land would be from impact wrenches, cranes, backhoes, front-end loaders, trucks, bulldozers, and the concrete batch plant. FPL estimates aerial noise levels to be 85 dBA 3 ft from the source, 75 dBA 200 ft from the source, and 65 dBA 400 ft from the source, which is within the range of current ambient noise levels measured by FPL (2014-TN4058). Thus, marine mammals transiting near the Turkey Point peninsula would likely receive minimal exposure to aerial building noise.

The potential for noise and vibrations from in-water or nearshore construction activities to affect marine mammals is discussed in FPL (2014-TN3717). Noise or vibration-producing activities evaluated in the report included (1) pulsed sound associated with sheet-pile installation in the equipment barge-unloading area, (2) continuous sound and vibrations related to construction of the RCW laterals using microtunneling technology, (3) pulsed sound associated with sheet-pile installation in the Units 6 and 7 plant area, and (4) site preparation and construction of plant infrastructure and RCW caissons. Numerical models and other sources of information were then used to calculate impact radii corresponding to the threshold for auditory injury (180 dB RMS) and behavioral response changes (160 dB RMS). Given predicted noise levels at the sheet-pile installation location of 220 dB peak pressure and 194 dB cumulative sound exposure, auditory injury to marine mammals is possible at a distance of 130 ft from the sheet-pile installation site and behavioral responses could occur up to about 600 ft from the site (FPL 2014-TN3717).

While FPL acknowledges these exposure levels could result in adverse impacts on marine mammals (likely bottlenose dolphin and manatee) the assumption is risk is low because both species would likely avoid areas of injurious noise levels and are rarely seen in the equipment barge-unloading area and entrance channel, and sheet-pile installation would occur for only 2 weeks. Although dredging activities would not cause harmful levels of noise, temporary and localized increases in suspended sediment and turbidity are likely but would not adversely affect either species. As described in FPL (2014-TN3717), construction activities would occur during daylight hours and the current manatee protection plan discussed in Appendix F-2 would be used to ensure protection during construction. As noted in FPL (2014-TN3717), site-preparation activities associated with RCW installation on the Turkey Point peninsula would generate aerial noise, but are not expected to produce sounds in water that would adversely affect marine mammals.

Based on an analysis conducted by FPL contractors and presented in FPL (2014-TN3717), installation of RCW laterals using microtunneling technology would generate a maximum of 120 dB re 1μPa at 1 m from the drill head, and drilling would occur 25 to 40 ft below the bottom of Biscayne Bay. Sound and vibration would dissipate as it moved upward through the limestone and bottom sediments to the sediment-water interface at the bottom of Biscayne Bay. These sound emissions are below thresholds expected to cause auditory injury or behavioral responses in marine mammals (FPL 2014-TN3717).

While FPL notes that sound and vibrations associated with sheet-pile installation at the Units 6 and 7 plant site and site preparation and construction on the Turkey Point peninsula would create aerial noise, these emissions are not expected to affect marine mammals in nearshore locations (FPL 2014-TN3717). A complete discussion of the potential construction-related effects on listed marine mammals is provided in Appendix F-2 (FWS Biological Assessment) and Appendix F-3 (NMFS Biological Assessment).

Game Fish

As described in Section 2.4.2, a variety of game fish are present in waterbodies on or near the Turkey Point site. Representative game fish species occurring in Biscayne Bay include Common Snook, Tarpon, Spotted Seatrout (*Cynoscion nebulosus*), Red Drum (*Sciaenops*

ocellatus), and Red Grouper (*Epinephelus morio*). Most of these species are found in a variety of water depths and salinity regimes and are widely dispersed within Biscayne Bay. For example, the NPS used the Spotted Seatrout as an indicator species during the development of salinity targets for Biscayne Bay. This species prefers brackish to marine waters and is found in shallow coastal and estuarine waters, on sandy bottoms, or in eelgrass to depths of 33 ft. During warm summer months, Spotted Seatrout are found in seagrass beds; they move to deeper waters in estuaries during the cooler months. Spawning occurs in late spring and summer, and juveniles move to seagrass beds, muddy bottoms, and shell reefs as they grow into adults (FMNH 2012-TN167). Adverse impacts on Spotted Seatrout and similar species related to building activities would be unlikely at or near the Turkey Point site. Thus, building-related impacts are expected to be minor for game fish near the Turkey Point site.

As described above, Common Snook and Tarpon have been observed in the IWF but are not managed by FPL or harvested by members of the public. These species have adapted to the harsh conditions of the IWF and may also be tolerant of building-related impacts. The review team believes building-related impacts on these species would be minor.

Forage Fish

Forage fish represent an important component of freshwater, estuarine, and marine food webs, providing food for larger fish, reptiles, birds, and mammals. Over a dozen species were identified in Section 2.4.2 as ecologically, commercially, or recreationally important. This list includes Mosquitofish, Sheepshead Minnow, snappers, grunts, Pinfish (*Lagodon rhomboides*), and various species of perch. Many of these species are found in aquatic habitats within Turkey Point site boundaries, in the IWF, or in aquatic habitats associated with the proposed transmission line and pipeline corridors, as described in Section 2.4.2. For instance, the Mosquitofish has been reported in surface-water habitats on the Turkey Point site, in the IWF, and in aquatic habitats associated with transmission line and pipeline corridors. The Sheepshead Minnow has been found onsite and in the IWF. In general, these species are hardy forage fish that are tolerant to changes in water quality and temperature and would likely not be adversely affected by building runoff or dewatering effluent introduced into the IWF, surface-water sites within or near the Turkey Point site, or during transmission line and pipeline building.

Bluestriped and White grunts (*Halemulon sciurus*, *H. plumierii*), Fringed Pipefish (*Anarchopterus criniger*), and Pinfish were numerically abundant during the 2008-2009 sampling by Ecological Associates, Inc. in Card Sound; Pinfish were the most abundant (EAI 2009-TN154). These species are generally found along shorelines and in mangroves to depths exceeding 100 ft; juveniles occur in shallow-water seagrass beds (FMNH 2012-TN167). Silver Perch (*Bairdiella chrysoura*) are found in seagrass beds, tidal creeks, rivers, and marshes, and are similar in appearance to Sand Seatrout (*Cynoscion arenarius*) (FFWCC 2011-TN159), and the NPS included them as an indicator species (NPS 2006-TN183) for establishing ecological targets for western Biscayne National Park. Given their proximity to the Turkey Point peninsula, these kinds of forage fish could be susceptible to building-related effects, but the impacts would likely be minimal because the affected area is small and suitable habitat is available elsewhere in Biscayne Bay.

Crustaceans and Mollusks

As described in Section 2.4.2, Biscayne Bay contains a diverse assemblage of fish and invertebrate species and a complex, dynamic food web. Crustacean and mollusk species identified in Section 2.4.2 that have ecological, recreational, or commercial importance include the pink shrimp (*Farfantepenaeus duorarum*), the spiny lobster (*Panulirus argus*), and the blue crab (*Callinectes sapidus*). Nelson et al. (1991-TN174) indicated pink shrimp larvae and juveniles are highly abundant in Biscayne Bay, and the NPS included this species as an indicator with regard to establishing salinity targets for the bay (NPS 2006-TN183). Spiny lobsters are also common in Biscayne Bay, and juveniles are found in nursery areas that include seagrass meadows and algal beds. Blue crabs are common to the south-central portion of Biscayne Bay, and optimum hatching takes place in salinities ranging from 23 to 28 ppt (Browder et al. 2005-TN151). Because these species could occur in areas adjacent to the Turkey Point site, there is a potential for building-related effects associated with installation of RCWs and dredging activities in the area of the barge slip. Because lateral drilling would be used when building radial wells, effects are expected to be small for crustaceans and mollusks. Dredging operations may cause short-term changes in water quality, but these effects are expected to be confined to a small area of Biscayne Bay, and suitable refuge areas are available for mobile species. Although dredging may result in mortality to non-mobile species, the impacts are not expected to be detectable at the population level. Thus, building-related effects on crustaceans and mollusks are expected to be minor. Impacts on crustaceans and mollusks present in the IWF that may occur during muck-disposal operations are expected to be localized and temporary.

Corals

As noted in Section 2.4.2, on August 27, 2014, the National Oceanographic and Atmospheric Administration (NOAA) listed 20 new coral species as threatened (NOAA Fisheries 2014-TN4022; 79 FR 53851 [TN4097]). Of these, the following are known to occur in the Florida Atlantic region:

- *Acropora cervicornis* (Staghorn coral)
- *Acropora palmata* (Elkhorn coral)
- *Mycetophyllia ferox* (Cactus coral)
- *Dendrogyra cylindrus* (Pillar coral)
- *Montastraea (Orbicella) annularis* (Boulder star coral)
- *Montastraea (Orbicella) faveolata* (Mountainous star coral)
- *Montastraea (Orbicella) franksi* (Star coral).

Hard-bottom areas near Turkey Point are generally considered marginal habitat for coral because of large temperature and salinity fluctuations, and species richness and abundance generally increase west-to-east in response to the increasing influence from the Atlantic Ocean (Lirman et al. 2003-TN1519). Although some corals present near Turkey Point may be affected by dredging and associated in-water activities, effects would be localized. Species present in

central or eastern portions of Biscayne Bay or offshore locations would also likely be unaffected by building-related activities. Therefore, effects on offshore corals are not likely to be detectable.

Submerged Aquatic Vegetation

Potential effects on submerged aquatic vegetation (SAV) during building include those from the installation of the RCW system and dredging and excavation activities at the equipment barge-unloading area at the northeast end of the Turkey Point site. Because the installation activities associated with the RCW system occur on land, they are unlikely to affect SAV. Dredging and excavation activities at the equipment barge-unloading area may have minor effects on SAV. Such effects would likely consist of short-term, localized water-quality changes related to increased turbidity and deposition of suspended sediments. As described in the ER (FPL 2014-TN4058), expansion of the barge-unloading area would require dredging and removal of sediment in an area encompassing approximately 0.1 ac. FPL would use BMPs, including the use of curtain wall technology, to minimize effects of dredging. As required under the Conditions of Certification (State of Florida 2014-TN3637), a new baseline survey for seagrass and SAV is required prior to dredging and expansion of the barge area. Increased barge traffic may also create temporary increases in suspended sediment, thereby reducing water clarity, but the increases are expected to be minor. SAV effects in the IWF related to muck disposal would likely be localized and temporary.

Non-Indigenous Species

Based on the above discussion, building activities are not expected to affect the abundance or distribution of non-indigenous species in the vicinity of the Turkey Point site. As reported by Ogden et al. (2005-TN197), South Florida has one of the largest non-indigenous faunal communities in the world; more than 25 percent of the resident mammal, bird, reptile, amphibian, and fish species are classified as non-native. Because the expected building-related activities are not likely to substantially affect water quality, temperature, or salinity in Biscayne Bay, or result in additional vectors for non-indigenous species, building-related impacts are expected to be minimal.

Federally or State-Listed Species and Designated Critical Habitat

As described in Section 2.4.2, Federally or State-listed species known or expected to occur on or near the Turkey Point site include one marine mammal (Florida manatee), five species of sea turtle (Hawksbill, Leatherback, Green, Loggerhead, Kemp's ridley), American alligators and crocodiles, the Smalltooth Sawfish (*Pristis pectinata*), and Johnson's seagrass (*Halophila johnsonii*) (Table 2-28). Designated critical habitat for the American crocodile is present on and near the site, designated critical habitat for the Florida manatee is near the southern end of the site, and other designated critical habitats are outside the affected area. A summary of likely building-related effects on these species and habitats is also provided below, and the biological assessments for these species are presented in Appendix F-2 and F-3, and additional consultation information is referenced in correspondence listed in Appendix F (NRC 2016-TN4801; NRC 2016-TN4802).

Marine Mammals

Although a variety of large whales listed as threatened or endangered by NOAA has been observed in Biscayne Bay, most are considered infrequent visitors and are not expected to occur near the Turkey Point site and therefore are not considered further in this assessment of building-related impacts. Florida manatees are common in Biscayne Bay near the Turkey Point site and are the most likely Federally listed marine mammal to potentially be affected by building activities in the vicinity of the equipment barge-unloading area. Changes in water quality and turbidity during dredging, noise and vibration associated with sheet-pile installation and dredging, and general building noise and activity could affect marine mammals in the vicinity of the equipment barge-unloading area. Risk of collision between marine mammals and tugs and barges may also increase during building. During the proposed 6-year building period, FPL estimates 80 barge trips would be required per unit to support building activities, resulting in a risk of manatee collision with barge and tug operations. To reduce collision risk for this species, FPL has developed a Barge Delivery Plan (FPL 2009-TN169) that describes how operations would be monitored to ensure the risks of collisions are reduced. Specific activities to be used include the following:

- coordination of building equipment delivery with potential ongoing fuel oil deliveries to minimize the need for simultaneous barge movements within the turning basin and barge entrance channel
- maintenance of a ship's log documenting manatee sightings, collisions, or injuries during the project
- movement of work barges and associated vessels and in-water work only during daylight hours
- presence of a dedicated observer during in-water work, including dredging or barge movement, to identify the presence of manatees
- operation of vessels in the building area at no-wake or idle speeds
- restriction or cessation of work if a manatee is detected within 100 ft or 50 ft, respectively, of building or barge activities.

As described above, noise associated with installation of sheet-pile at the equipment barge-unloading area has the potential to adversely affect marine mammals, but these effects would be localized and temporary. Sheet-pile installation and dredging at the equipment barge-unloading area would occur over a 2-week period and effects would likely be confined to the nearshore areas and entrance channel. RCW lateral installation would occur over a 2–4 year period, but laterals would be drilled sequentially and noise and vibration effects would be attenuated, given the proposed location of the RCW laterals is 25 to 40 ft below the bottom of Biscayne Bay (FPL 2014-TN3717). Manatees may temporarily leave an area where building noise, vibration, and vessel traffic are present. The FFWCC (2011-TN554) has also provided specific guidance for protection of manatees during in-water work that is consistent with the SCA (FPL 2009-TN169). Given the above precautions, building-related activities are not expected to result in adverse impacts on the manatee. No adverse modifications of manatee critical habitat are expected because no detectable changes in water quality in Card Sound are anticipated.

Sea Turtles

Potential impacts on sea turtles from building activities at the Turkey Point site include the effects of noise, vibration, and area lighting associated with the building of the RCW system; short-term impacts on water quality, turbidity, noise, and vibration from dredging and excavation; percussive noise associated with sheet-pile installation; aerial noise from building activities; and an increased risk of collision or disturbance related to barge or vessel traffic in the equipment barge-unloading area or adjacent entrance channel. Of the five sea turtles identified as threatened or endangered by Federal and State resource agencies, the green sea turtle (*Chelonia mydas*) is the most common to Biscayne Bay and Card Sound based on stranding data. Green sea turtles visit these areas at various times of the year to feed (FPL 2014-TN4058). With regard to noise generated from sheet-pile installation at the equipment barge-unloading area and installation of RCW laterals under Biscayne Bay, contour lines corresponding to levels of sound that could elicit physical or auditory injury or behavioral changes were produced using computer models as described in FPL (2014-TN3717). These analyses suggest below ambient noise levels for RCW lateral installation and that given the predicted noise levels at the sheet-pile installation location of 220 dB peak pressure and 194 dB cumulative sound exposure, physical/auditory injury to sea turtles is possible within 30 ft of the sheet-pile installation location, behavioral response changes are possible within about 600 ft of the site, and auditory injury is possible within 2,815 ft of the site. Auditory injury estimates are based on installation of 10 piles per day and a conservative (protective) assumption related to how noise would propagate along the walls of the entrance channel (FPL 2014-TN3717).

Although these analyses suggest a potential for harm to sea turtles during sheet-pile installation, FPL considers the risk to be minimal, because sea turtles are not commonly found in the entrance channel or equipment barge-unloading area, and construction duration is expected to be only 2 weeks. It is likely, however, that sea turtles in the vicinity would avoid this area during active sheet-pile installation and dredging because of noise and increased turbidity. Impacts on sea turtles are expected to be further reduced if the conditions for in-water building required by NMFS are followed (NMFS 2006-TN3451). NMFS requirements for in-water work includes working only during daylight hours, worker training on safe practices and implications of harming a sea turtle, the use of siltation barriers that will not entangle turtles, “no-wake/idle” speeds in construction areas, and cessation of operations if sea turtles are observed within 50 yards of active construction/dredging operations or vessel movement. NMFS also requires immediate reporting of a collision with a sea turtle.

As discussed above for marine mammals, noise and vibration associated with microtunnel drilling during RCW installation, sheet-pile installation at the Units 6 and 7 site, and building and construction activities on the Turkey Point peninsula to support RCW installation and operation are not expected to generate noise or vibration levels that would adversely affect sea turtles.

Alligators and Crocodiles

The American crocodile is currently listed as Federally and State-threatened; the American alligator is listed as Federally threatened due to its similarity in appearance to the crocodile and is a Species of Concern in the State of Florida. As described in Section 2.4.2, there is a robust population of American crocodiles in the IWF on the Turkey Point site, and American alligators

are common in aquatic environments bordering the site. Designated critical habitat for the American crocodile that would be lost through adverse modification due to the building of Units 6 and 7 include the power block area and areas designated for muck disposal. Building-related impacts include additional risk of collision with construction vehicles and equipment, disturbance of crocodile nesting activity at the northeastern end of the IWF during the excavation of the power block for proposed Units 6 and 7, discharge of dewatering effluent and stormwater into the IWF during building activities, and the placement of approximately 1.8 million cubic yards of muck excavated from the site along spoils areas within the IWF, which could result in the migration of fine-grained sediment, nutrients, contaminants, and other constituents to IWF waters.

In Section 4.3.1.1.2 of ER Revision 6 (FPL 2014-TN4058), FPL acknowledges that increased vehicle traffic could pose a risk to crocodiles, especially along 359th Street, an area scheduled for roadway improvements to support building activities. In November 2011, FPL reported the death of a young crocodile in the vicinity of exploratory UIC work (NRC 2011-TN4121). As described in its 2009 Threatened and Endangered Species Evaluation and Management Plan, FPL has proposed to install three wildlife underpasses on the road between the northern end of the IWF and test canals to the west of the IWF to mitigate collision hazards (FPL 2010-TN170).

Building of the power block for proposed Units 6 and 7 would require excavation and building in areas adjacent to the northeastern portion of the IWF. As discussed in Section 2.4.2 and shown in Figures 2-30 and 2-31, nests have been documented close to the Units 6 and 7 plant area and along the IWF Grand Canal where muck disposal would occur. FPL has concluded (FPL 2014-TN4058) that impacts on the local population of American crocodiles as a result of increased traffic and building noise, vibration, and disturbance would be moderate and would require mitigation. The review team agrees with this assessment. Additional information about potential effects of construction noise on crocodiles is provided in (FPL 2014-TN3717) and in Appendix F-2.

As described in Section 4.2.1, dewatering of the site during building would result in a maximum discharge flow to the cooling canals of 1,200 gpm (1.7 Mgd) for 1 year. Based on a recirculating flow rate of 2,747 Mgd, this discharge would represent an increase of less than 0.1 percent. Stormwater runoff from the plant and laydown areas would not increase compared to the runoff levels that currently drain to the cooling canals from same area. Consequently, building-related discharge would have an undetectable effect on IWF water quality, and adverse impacts from stormwater runoff on the American crocodile or its prey would be unlikely. Stormwater runoff from the Units 6 and 7 site would be to the IWF, as described in Section 4.2.2. The volume of the discharge of stormwater runoff would be approximately the same, but there might be a slight change in water quality.

Excavation at the Units 6 and 7 site would result in removal of approximately 1.8 million cubic yards of muck, and FPL proposes to store the material in designated spoils areas encompassing approximately 211 ac within the IWF, an area identified as critical habitat for American crocodile (Figure 4-3). As described in the *Turkey Point Units 6 & 7 Project – Conceptual Earthwork and Materials Disposal Plan* (FPL 2011-TN1042), spoils would be put in an existing trench with a berm to prevent sediment runoff into the IWF. This is expected to reduce or eliminate the sediment loading from the spoils mound into the IWF. Increases in

nutrient levels (nitrogen and phosphorus) in the waters of the IWF were estimated by the review team to be 8.6 µg/L and 0.29 µg/L, respectively, as noted in Section 4.2. A complete discussion of the potential for water-quality impacts on the IWF or nearshore waters of Biscayne Bay, including recent changes in IWF water quality, can be found in Section 4.2.

With regard to direct impacts on crocodiles from muck disposal, the spoils areas were specifically selected due to their lack of suitable nesting substrate for American crocodile (FPL 2012-TN1618). As shown in Figures 2-31 and 2-32, surveys conducted by FPL from 1978 to 2013 have shown that only a few nests have been observed in areas where muck disposal would occur. Because crocodiles have been observed in these areas, FPL considers the locations to be potential habitats and would continue habitat enhancement activities to improve crocodile habitat onsite and offsite by creating juvenile freshwater refugia and enhancing substrates on berms that have not traditionally supported high numbers of crocodile nests due to poor substrate (FPL 2012-TN1618). In addition to relocating hatchlings to low-salinity environments located in depressions on top of the IWF berms, FPL has indicated it would create a new sanctuary area (Sea Dade Crocodile Sanctuary) located south and west of the IWF (FPL 2012-TN1618) to provide additional habitat for crocodiles away from the main construction area.

Based on the above discussion, and the results of the biological assessment, the review team concluded that minor building-related impacts on the American crocodile would occur from unit construction, noise, light, muck disposal, dewatering effluent, and stormwater discharge into the IWF, which may adversely affect designated critical habitat. Major building-related effects on this species would likely occur with respect to disturbance of individuals that have nested near the Units 6 and 7 plant area and from increased risk of collision with construction traffic. Reduction of impacts would be dependent on the success of the worker training programs and the effectiveness of proposed wildlife overpasses and barriers designed to decrease collision risk. Therefore, some adverse effects on crocodiles and critical habitat may occur during construction. Additional information about potential impacts on crocodiles from building activities is found in the FWS biological assessment (Appendix F-2). The FWS provided comments and asked for clarification concerning muck disposal and containment on the IWF berms, which is included above and referenced in Appendix F. After further review of the biological assessment and commitments by FPL to minimize vehicular mortalities and the potential for mortalities from construction and building activities, the FWS and NRC staff concurred with a may affect, not likely to adversely affect determination for the American crocodile (FWS 2016-TN4728; NRC 2016-TN4801).

Smalltooth Sawfish (*Pristis pectinata*)

The Smalltooth Sawfish is a tropical species that has been observed in Biscayne Bay and Card Sound. This species is currently listed as Federally endangered but does not have designated critical habitat near Turkey Point (NOAA 2010-TN179). As described in ER Revision 6 (FPL 2014-TN4058), given one of the primary threats to this species is loss of protective mangrove habitat for juvenile fish, nearshore building activities that disturb or eliminate nearshore habitat could contribute to population declines. FPL has indicated that the building of RCWs would be designed to preserve nearshore mangrove resources, would not occur in water, and BMPs would be used to protect Biscayne Bay from the impacts of stormwater, effluent, or accidental spills (FPL 2014-TN4058). A recent assessment of likely effects on

Smalltooth Sawfish from noise related to sheet-pile installation at the equipment barge-unloading area and construction and building activities on the Turkey Point peninsula concludes that there is a potential for physical and auditory injury and behavioral changes to sawfish from these activities. FPL does not expect adverse effects to occur, given the short duration of the construction activities and the likelihood that sawfish would avoid the area during active construction. Based on an analysis conducted by FPL contractors and presented in FPL (2014-TN3717), installation of RCW laterals using microtunneling technology would generate a maximum of 120 dB re 1μPa at 1 m from the drill head which would be located 25 to 40 ft below the bottom of Biscayne Bay, and the emitted sound would dissipate as it moved upward through the limestone and bottom sediments. These sound emissions are below thresholds expected to cause auditory injury or behavioral responses in fish. Thus, the review team concludes impacts on Smalltooth Sawfish would likely be minor because building-related disturbance would be temporary and localized and because individuals can avoid the area. The review team also assumes in-water building guidance for the sawfish developed by NMFS (2006-TN3451) would be followed. Additional information regarding the potential construction-related effects on this species are provided in Appendix F-3 (NMFS Biological Assessment).

Johnson's Seagrass (*Halophila johnsonii*)

Johnson's seagrass is a Federally threatened species that may occur in Card Sound and Biscayne Bay (FPL 2014-TN4058). Critical habitat for this species includes the central portion of Biscayne Bay extending from Virginia Key 23 mi north-northeast of the site to Miami (65 FR 17786 [TN273]; NOAA 2010-TN180). This species was not reported in the survey conducted around the Turkey Point peninsula by Ecological Associates, Inc. in 2009 (EAI 2009-TN153). Because the documented occurrence of this species is well north of the Turkey Point site, it is unlikely to be affected by in-water building activities or installation of the RCW system on the Turkey Point site.

Federal or State Species of Concern

Federal or State-listed Species of Concern that could occur on or near the Turkey Point site include the Mangrove Rivulus, Dusky Shark (*Carcharhinus obscurus*), Nassau Grouper (*Epinephelus striatus*), Opossum Pipefish (*Microphis brachyurus lineatus*), Sand Tiger Shark (*Carcharias taurus*), and Speckled Hind (*Epinephelus drummondhayi*). Of these, only the Mangrove Rivulus and the Nassau Grouper could potentially be affected by building activities at the Turkey Point site because they are known to occur in the vicinity where suitable habitat exists, including the C-1 Canal (FPL 2014-TN4058). The potential effects of noise and vibration from construction activities on this species are similar to those described above for Smalltooth Sawfish. Given the Mangrove Rivulus habitat preferences, this fish species could also be affected by the building of pipelines, transmission lines, and the RCWs. The FFWCC requires surveys for the Mangrove Rivulus to be done in the affected areas of the pipelines, transmission lines, and RCWs. If the presence of Mangrove Rivulus is determined in any of these areas, FPL and FFWCC would prepare a mitigation plan to address specific effects and mitigation measures, and monitoring to document the effectiveness of mitigation (State of Florida 2014-TN3637). Adult Nassau Grouper are often found near coral reef systems and rocky bottoms in depths to 100 m; juveniles are found in shallower water depths in and around coral, macroalgae, and in seagrass beds (Sadovy and Eklund 1999-TN200). FPL intends to follow

existing corridors and rights-of-way, and use BMPs to reduce impacts on these species during the building of the reclaimed wastewater pipeline (FPL 2014-TN4058). FPL has also indicated that building activities for the RCWs would be controlled to minimize impacts on red mangroves. No presently undisturbed mangrove habitat is expected to be affected by building activities (FPL 2014-TN4058). With regard to the remaining Federal or State Species of Concern, most are found throughout Biscayne Bay, and would be less likely to be affected by in-water dredging and building or installation of the RCW system because suitable habitat is available elsewhere.

Species with Designated Essential Fish Habitat

As described in Section 2.4.2, designated essential fish habitat exists near the Turkey Point site for the snapper-grouper complex, spiny lobster, pink shrimp, and coral. In addition, habitat areas of particular concern (HAPCs) identified by NOAA (2010-TN835) near the Turkey Point site include mangrove and seagrass habitats described above for the snapper-grouper complex, and Biscayne Bay for spiny lobster. Biscayne Bay and Biscayne National Park are also HAPCs for coral, coral reefs, and hard-bottom communities. In general, building-related impacts on these species and habitat areas are expected to be minor and localized and would consist primarily of in-water dredging and building at the barge-unloading area and potential short-term changes in nearshore water quality at the RCW installation site at the Turkey Point site. A complete analysis of building-related effects on essential fish habitat and HAPCs is provided in the essential fish habitat assessment and NRC's response to NMFS conservation recommendations (NRC 2016-TN4802) are referenced in Appendix F-4.

4.3.2.4 Aquatic Monitoring

Section 2.4.2 provides a summary of past monitoring studies conducted by FPL to assess existing baseline conditions at and near the Turkey Point site. FPL has developed a Threatened and Endangered Species Evaluation and Management Plan (FPL 2010-TN170) and a detailed Barge Delivery Plan describing monitoring and assessment practices that would be used during in-water work to protect manatees from harm (FPL 2009-TN169). The review team assumes FPL would follow the protocol to protect Smalltooth Sawfish developed by the NMFS (2006-TN3451). In addition, FPL would continue its ongoing monitoring program to assess and protect American crocodiles inhabiting the IWF (FPL 2014-TN4058). The State of Florida Conditions of Certification describe biological monitoring and surveys that are required during installation and post-installation activities (State of Florida 2014-TN3637). Monitoring required during installation activities is described for the RCW installation and pipeline installation activities. For the RCW installation, FPL's RCW system monitoring plan should include construction monitoring during all construction activities. The monitoring should include seagrass cover and benthic fauna within the area surrounding the peninsula and the extent of the RCW laterals, as well as two control sites with seagrass beds within 5 mi of the peninsula.

Measures and Controls to Limit Adverse Impacts during Building

In Table 4.6-1 of the ER (FPL 2014-TN4058), FPL describes a series of measures and controls to limit adverse impacts during building. Those pertaining to aquatic resources include the following:

- Use restrictive land-clearing processes and BMPs to limit spills, turbidity, runoff, or other discharges to aquatic systems from the building of nuclear power plant buildings, related structures, transmission lines, and pipelines.
- Use technologies that physically isolate building activities from nearby water sources (e.g., use of sheet piles to protect nearshore resources during building of the RCWs and expansion of the barge-unloading area).
- Limit, when possible, building activities to locations that have already been disturbed. For example, this action would be used to limit adverse impacts on red mangroves when building RCWs, and thus reduce potential impacts on Mangrove Rivulus and Nassau Grouper.
- Follow project-specific management plans to protect listed species during building, including a Threatened and Endangered Species Evaluation and Management Plan to limit disturbance or risk of vehicle collision for the American crocodiles (FPL 2010-TN170), a Barge Delivery Plan to reduce risk of collision or injury of manatees from tug and barge operations or dredging (FPL 2010-TN272), and Sea Turtle and Smalltooth Sawfish Construction Conditions document that describes established procedures to protect sea turtles and Smalltooth Sawfish during nearshore construction activities (NMFS 2006-TN3077).

4.3.2.5 Summary of Impacts on Aquatic Resources

Based on a review of FPL's ER (FPL 2014-TN4058), the SCA (FPL 2010-TN272), agency comments, and the review team's independent evaluation, the review team concludes that the impacts of preconstruction and construction activities on aquatic resources would be MODERATE for American crocodiles and SMALL for other species. Based on the expectation that NRC-authorized construction activities would also affect American crocodiles due to proximity and activity, the NRC staff concludes that the impacts on aquatic resources due to NRC-authorized construction activities would be MODERATE for American crocodiles and SMALL for other species. Because American crocodiles are known to occur and nest in the IWF near the building site for proposed Units 6 and 7, they may be disturbed by NRC-authorized construction and other building activities, including the disposal of muck from the power block site. Nests have also been documented along the IWF Grand Canal where muck disposal is planned. Further, this species is susceptible to injury or death from collisions with vehicle or building equipment, and fatal encounters have been documented on the site. As described in the ER (FPL 2014-TN4058), disturbances of crocodile populations in the IWF related to building activities or muck disposal would be mitigated through creation of additional freshwater refugia areas for juveniles and ongoing vegetation restoration efforts to improve existing nesting habitat. Building activity restrictions would also be used during the nesting season. To mitigate hazards related to vehicle collision, FPL will continue its worker awareness program and implement its proposed series of wildlife underpasses on the road between the northern end of the IWF and test canals to the west of the IWF (FPL 2014-TN4058; FPL 2010-TN170). As noted in the FWS Biological Assessment (Appendix F-2), construction of the proposed units would result in the adverse modification of approximately 218 ac of designated American crocodile critical habitat at the plant area, as well as approximately 211 ac of critical habitat along IWF berm walls to support muck disposal. Collectively, these actions would affect

less than 1 percent of the designated critical habitat in South Florida. Additional discussion is provided in Appendix F-2.

With regard to noise and vibration related to building and construction activities adjacent to nearshore areas, the review team concludes that sheet-pile installation at the equipment barge-unloading facility has the potential to harm marine mammals, sea turtles, and fish, but adverse effects are unlikely because these species are not commonly found near the sheet-pile installation site and adjacent entrance channel, and the duration of the installation is expected to be only 2 weeks (FPL 2014-TN3717). Species sensitive to in-water sound would likely leave the area during construction activities. Noise and vibration related to building and construction on the Turkey Point peninsula and microtunneling activities for RCW lateral installation are unlikely to affect aquatic resources because sound levels are below thresholds of concern established by Federal resources agencies.

4.4 Socioeconomic Impacts

Building activities can affect individual communities, the surrounding region, and minority and low-income populations. This evaluation assesses the impacts of building activities and of the construction workforce on the region.

Although the review team considered the entire region within a 50 mi radius of the Turkey Point site when assessing socioeconomic impacts, the primary area for physical impacts is the area closer to the plant. As described in Section 2.5, with regard to social and economic impacts, the entire 50 mi radius is considered, but the focus is primarily on the economic impact area of Miami-Dade County. Based on commuter patterns, populations, and the distribution of residential communities in the area, the review team expects minimal impacts on other counties within the 50 mi radius in Florida.

The following sections describe the physical impacts on the site (Section 4.4.1), demographic impacts (Section 4.4.2), economic impacts on the community (Section 4.4.3), and the impacts on infrastructure and community services (Section 4.4.4). The impacts on minority and low-income populations are covered in Section 4.5.

4.4.1 Physical Impacts

Building activities can cause temporary and localized physical impacts such as noise, odors, vehicle exhaust, dust, and visual aesthetic disturbances. Vibration and shock impacts are not expected because of the strict control of blasting and other shock-producing activities. This section addresses potential building impacts that may affect people, buildings, and roads.

4.4.1.1 Noise Impacts on Workers and the Local Public

Building activities would generate noise. FPL assessed the potential noise from building Turkey Point Units 6 and 7 based on noise levels from equipment similar to that expected to be used for the building of Turkey Point Units 6 and 7 (FPL 2014-TN4058). The highest levels of onsite noise would be generated by impact wrenches, cranes, backhoes, front-end loaders, trucks, bulldozers, and operation of the concrete batch plant. Noise levels could reach as high as 102 dBA during short periods.

To limit onsite noise impacts, workers would use noise protection as required by the Occupational Safety and Health Administration (OSHA) when engaging in work subject to noise hazards. Offsite, the nearest residence is located 3.9 mi away from the proposed units and peak noise conditions at that residence would be below 65 dBA (FPL 2014-TN4058), a level at which noise impacts would be of small significance.

Vehicular traffic from construction workforce commuting and heavy material and equipment deliveries is another source of noise. Traffic noise levels are not expected to be high because of the varying nature of traffic noise, the dispersion of traffic as it moves away from the construction site, and the distance of residential areas from the vicinity of the site. Traffic-related noise can be reduced by lowering the speed limit, shuttling workers, staggering shifts, and using the railroad spur for large deliveries.

All project activities would also be subject to regulations from the Noise Control Act of 1972, Federal regulations for noise from construction equipment (40 CFR Part 204) (TN653), OSHA regulations (29 CFR 1910.95) (TN654), and State regulations. The review team expects that noise impacts on the general public would be minimal with the use of the mitigation actions included in the above regulations (as applicable) and because noise attenuates rapidly with distance, intervening vegetation, and variations in topography. Consequently, the review team concludes that noise impacts on surrounding communities would be minimal and mitigation would not be warranted.

4.4.1.2 Air-Quality Impacts on Workers and the Local Public

The review team discusses impacts on local air quality in Section 4.7. Construction and preconstruction activities, such as land clearing and filling and exhaust emissions from vehicles used to transport workers and construction materials, could emit particulate matter, carbon monoxide, oxides of nitrogen, sulfur dioxide, and volatile organic compounds. Based on FPL's commitment to developing and implementing a dust-control plan, strategies to minimize daily emissions, the roadway improvement plan, and generally favorable meteorological conditions for dispersal of air pollutants, in Section 4.7 the review team concluded that impacts on local air quality would be minimal and would not warrant mitigation measures beyond those already proposed by FPL. Therefore, the review team determined the air-quality impacts on workers and the local public would also be minimal.

4.4.1.3 Buildings

Construction and preconstruction activities would not affect any onsite buildings. Onsite safety-related buildings have been constructed to safely withstand any possible impact, including shock and vibration, from activities associated with building new reactors at the Turkey Point site (10 CFR Part 50, Appendix A) (TN249).

The transmission line construction and expansion within the West corridor (whether West Preferred or West Consensus corridor) would be primarily on wetlands, agricultural, or undeveloped land. The transmission line construction and expansion within the East corridor would be primarily on urban land. Where practicable, new transmission lines would be routed in existing corridors owned by FPL and routed adjacent to existing transmission lines or other existing linear facilities (e.g., access roads, transportation routes) to minimize impacts

(FPL 2014-TN4058). New construction, upgrades, and/or expansions of the Turkey Point, Clear Sky, Levee, Pennsuco, Davis, and Miami substations would be needed. Because none of these is expected to affect existing buildings, the review team expects impacts to be negligible.

4.4.1.4 Roads

FPL proposes a number of road improvements in the vicinity of the proposed site to accommodate the increased traffic expected during construction and operations. These road improvements would noticeably alter roads in the area because they would expand existing thoroughfares and/or convert dirt roads into improved surfaces. Socioeconomic impacts of building activities on traffic are analyzed in Section 4.4.4.1. The physical impacts from road improvements are described below (FPL 2014-TN4058).

Figure 4-4 shows FPL's assessment of which intersections would need improvements to facilitate building-related traffic. A new access road would be constructed along SW 359th Street, which would be connected to SW 344th Street/Palm Drive by improving SW 137th Avenue/Tallahassee Road and SW 117th Avenue. In addition, existing road segments of SW 328th Street/North Canal Drive, SW 117th Avenue, and SW 344th Street/Palm Drive would be widened. Specific improvements would be made as follows:

- SW 137th Avenue/Tallahassee Road (SW 344th Street/Palm Drive to SW 359th Street: improved to three lanes (two southbound and one northbound).
- SW 359th Street (SW 137th Avenue/Tallahassee Road to SW 117th Avenue): improved to three lanes (two eastbound and one westbound).
- SW 137th Avenue/Tallahassee Road at SW 359th Street: new curve linking SW 137th Avenue/Tallahassee Road with SW 359th Street. This curve would be designed so that it integrates appropriately with the existing FPL transmission lines.
- SW 117th Avenue (SW 344th Street/Palm Drive to SW 359th Street): improved to four lanes (two northbound and two southbound).
- SW 359th Street (SW 117th Avenue to the Turkey Point site): improved to four lanes (two eastbound and two westbound).
- SW 359th Street and SW 117th Avenue: new intersections with signalization or police control; two eastbound approach lanes (prohibit eastbound left turns); one westbound through lane; one westbound right-turn lane; two southbound approach lanes (one striped as an exclusive left-turn lane and the other as a shared left-turn/right-turn lane).
- SW 328th Street/North Canal Drive (SW 137th Avenue/Tallahassee Road to SW 117th Avenue): widened from two to four lanes.
- SW 328th Street/North Canal Drive and SW 137th Avenue/Tallahassee Road: signalization or police control; one additional southbound left-turn lane; one additional westbound through lane; two westbound right-turn lanes.
- SW 328th Street/North Canal Drive and SW 117th Avenue: signalization or police control; two northbound left-turn lanes; one eastbound right-turn lane; restripe the eastbound through lane to a shared through/right-turn lane.

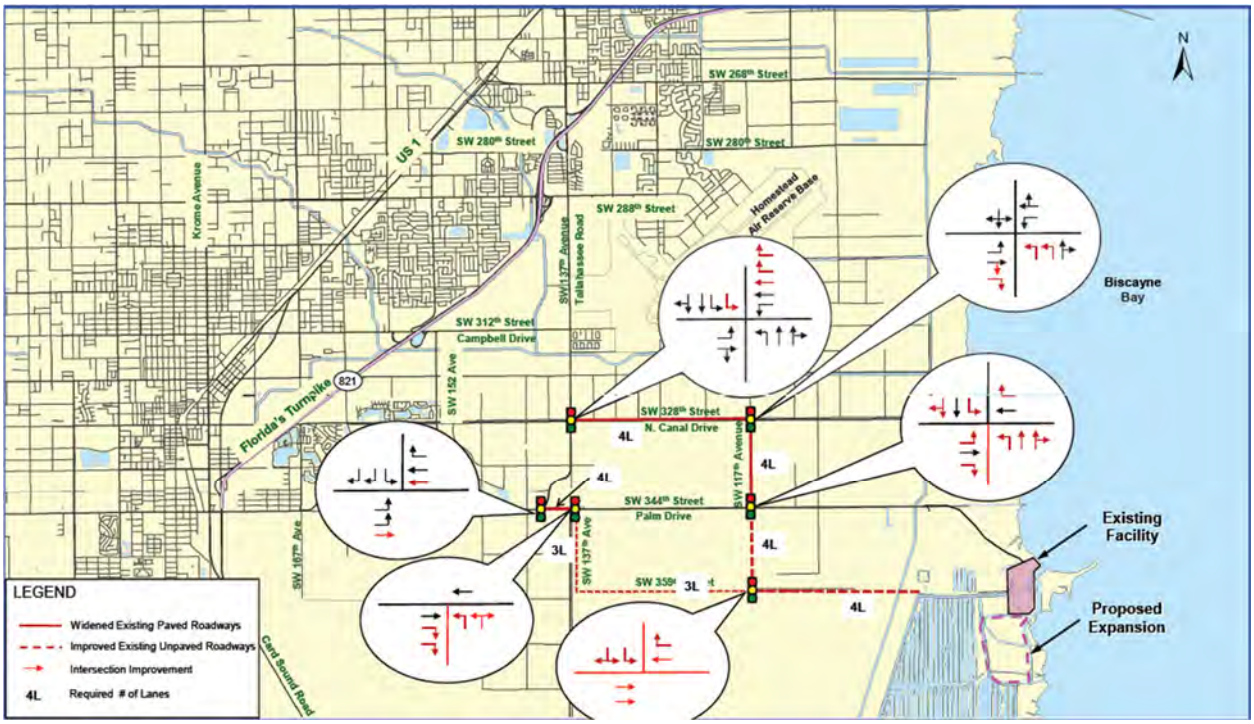


Figure 4-4. Road Improvements to Maintain an Acceptable Level of Service (Traf Tech 2009-TN1266)

- SW 117th Avenue (SW 328th Street/North Canal Drive to SW 344th Street/Palm Drive): widened from two to four lanes.
- SW 344th Street/Palm Drive (SW 137th Avenue/Tallahassee Road West to SW 137th Avenue/Tallahassee Road [East]): widened from two to four lanes.
- SW 344th Street/Palm Drive and SW 137th Avenue/Tallahassee Road (West): signalization or police control (p.m. peak hours only); one separate eastbound through lane; one additional westbound left-turn lane.
- SW 344th Street/Palm Drive and SW 137th Avenue/Tallahassee Road (East): new Intersection; signalization or police control (p.m. peak hours only); two eastbound right-turn lanes; two northbound approach lanes (one striped as an exclusive left-turn lane and the other as a shared left-turn/right-turn lane).
- SW 344th Street/Palm Drive and SW 117th Avenue: signalization or police control; one eastbound left-turn lane; one eastbound right-turn lane; one westbound right-turn lane; one northbound left-turn lane; two northbound through lanes (outside lane would function as a shared through/right-turn lane); one southbound left-turn lane; one southbound through lane (outside lane would function as a shared through/right-turn lane).

In its ER (FPL 2014-TN4058), FPL stated that "…after completion of construction, FPL would remove a portion of the roadway improvements on SW 359th Street and return to a transmission patrol road." All other updates to the transportation system would be used and maintained throughout construction and operation. Operational impacts on the roads are discussed in Section 5.5.1.

From a socioeconomic perspective, the review team considers the road improvements derived from increasing lanes, signalization, and police control to represent noticeable and beneficial changes. However, such changes have the potential to impose impacts on land use and terrestrial ecology. For an analysis of these impacts see Sections 4.4.1, 4.4.3, and Chapter 7.

4.4.1.5 Waterways

Large components and modules for Units 6 and 7 would arrive by barge. Approximately 80 barge trips for large components and modules are estimated for each unit. Materials arriving by barge would be trucked over an onsite heavy-haul road to the Units 6 and 7 plant area. The review team expects only minor impacts on waterways from these activities.

4.4.1.6 Aesthetics

The building impacts of proposed Units 6 and 7 would involve the use of 460 ft-high cranes, which would be slightly higher than the tallest structures currently at the Turkey Point site (the 400-ft-high emission stacks). Commercial and recreational boating traffic on the eastern side of the property would have a broad view of the entire Units 6 and 7 plant area, and would have an open view of Units 6 and 7 building activities. This viewscape would be temporarily affected by the presence of construction equipment and the new reactor modules being installed.

Light pollution and light trespass would be addressed during construction of Units 6 and 7 when working in low-light hours. Guidelines specifically addressing potential lighting issues, from the Illuminating Engineering Society of North America (IES 2012-TN1044), would be incorporated into the outdoor lighting design to the extent practicable while meeting NRC and OSHA (29 CFR Part 1910) (TN654) requirements for security and worker and plant safety (FPL 2014-TN4058). Typical features to be incorporated would include minimizing upward light from luminaries, minimizing upward light in general so that light reaches its intended target, turning off lighting not needed for safety and security between 11:00 p.m. and sunrise, containing light within its intended target area by suitable choice of luminaries for light distribution, carefully selecting mounting height and physical location, and minimizing glare in the horizontal or vertical directions (FPL 2014-TN4058). Because light from current Turkey Point units is visible from several locations surrounding the site, sky glow from these units is visible from urban areas as far away as Miami (Section 2.5.2.4), and because of the mitigating factors listed above, the review team concluded that the visual impact of the building of proposed Units 6 and 7 would be noticeable but temporary.

The building of transmission lines in established transmission line corridors would have a temporary visual impact that would have little contrast with the existing use of these areas. The line from Clear Sky to Turkey Point lies within Turkey Point site and when completed would not alter the view of the existing lines between the McGregor switchyard and the Turkey Point switchyard (FPL 2014-TN4058). Because the Davis to Miami transmission line would be collocated with the MetroRail and a major transportation highway in an urbanized area, visual impacts would also not contrast with the existing environment. The segments of the western transmission line corridor between Everglades National Park and the Levee substation would be adjacent to the Everglades National Park (both the Western Consensus corridor and the Western Preferred corridor) until its northern-most leg, just south and north of US 41, when it

would turn east to connect to the Levee substation. Building activities would be visible to recreational users of the park up to a distance of 20 mi (FPL 2014-TN4058). Construction of the transmission line along the borders of the Everglades National Park would follow SW 187th Avenue and the presence of the road would attenuate any visual contrast with the natural environment. Based on the information provided by FPL and the review team's independent assessment, the review team determined the physical impacts of construction and preconstruction from site-related viewscape intrusion, light pollution, and transmission line visibility would be minimal and would not warrant mitigation.

4.4.1.7 Summary of Physical Impacts

Based on the information provided by FPL (FPL 2014-TN4058) and the review team's independent analysis, the review team concludes that the overall physical impacts of construction and preconstruction on workers and the local public, buildings, and aesthetics near the Turkey Point site would be SMALL and adverse, although there would be MODERATE and beneficial socioeconomic impacts on roads near the existing Turkey Point site.

4.4.2 Demography

The following assessment of population impacts is based on FPL's estimated peak project workforce analysis (FPL 2014-TN4058). The proposed project schedule assumes 10 years—39 months for preconstruction activities and 84 months for NRC-authorized construction—to build both units. The greatest number of onsite NRC-authorized construction and operation workers for the project would occur during month 81 of the building schedule (month 42 of the construction schedule) and would include the following:

- 3,950 construction workers
- 33 operations workers for Unit 6.

The review team believes that the above assumptions are plausible. The workforce estimates and the assumption of the family size of in-migrating workers are based on existing studies (FPL 2014-TN4058). FPL determined the best estimate for the in-migrating workforce for building proposed Units 6 and 7 was 50 percent of the construction and operation workers present during peak employment, or 1,992 workers (1,975 construction workers and 17 operations workers). Also, FPL assumed that approximately 70 percent of in-migrating construction workers (1,383) would bring family members, as would 100 percent of in-migrating operations workers (17). Using an average family size for the workforce of 3.25 people (Malhotra and Manninen 1981-TN1430), this would bring the total in-migrating project-related population to 5,142 (5,087 construction workers and their families and 55 operations workers and their families). Upon construction completion, FPL estimates that 50 percent of the in-migrating construction workforce would leave the 50 mi region (2,543 workers and family members). This would outweigh the increase in in-migrating operations workers for fully staffing Units 6 and 7 (773 workers and family members after the month of peak employment). Therefore, the project-related in-migrating population (building and operations) would reach, at its peak, 5,142 workers and family members.

The review team believes that the assumption that 50 percent of the workforce would migrate into the 50 mi region may be an upper-bound estimate based on the number of construction

workers and the local unemployment rate in Miami-Dade County. Furthermore, the review team believes the assumption that the average family size of the in-migrating workforce would be 3.25 people is also an upper-bound estimate because the average family size in Florida in 2012 was 3.19 people (USCB 2012-TN4080). Projections for overall population growth in Miami-Dade County were presented in Section 2.5, but no forecasts are available for the unemployment rate. At peak employment, 3,983 workers would represent about 7 percent of the currently available construction workforce in Miami-Dade County, and 50 percent (the locally supplied workers) would represent about 3.5 percent of the currently available construction workforce in Miami-Dade County (57,345, Section 2.5). Therefore, the review team believes it is not unreasonable to expect that at least 50 percent of the construction workforce would be available locally and that the following analysis is an upper-bound estimate of the impacts that may occur.

The review team assumes based on the FPL analysis that the in-migrating population will follow the same geographic distribution as the existing workforce. Therefore, at peak construction employment, 42.8 percent (2,201 people) of the in-migrating population would live in Homestead and Florida City, and 83.3 percent (4,283) in Miami-Dade County. Based upon these assumptions, there would be a net population increase of less than two-tenths of 1 percent in the projected population of Miami-Dade County and approximately a 3.1 percent increase in population in the Homestead and Florida City area, based on 2012 population estimates.(1) If the in-migration rate for construction workers were larger than assumed or if more workers brought families, then it is possible that impacts could be greater than shown in the remainder of this section. However, given the propensity of construction workers to either commute long distances or relocate temporarily to a job site without families, and given the number of communities, in addition to Homestead and Florida City, in the Miami urbanized area and within the 50 mi region, the review team believes that the impact of in-migration would not be larger than that assumed.

For each direct local job created by building Turkey Point Units 6 and 7, additional local jobs and earnings would be created in two ways. To the extent that the increased demand for materials and services is satisfied by local suppliers, this increased demand would result in indirect jobs and earnings in those sectors supplying the building of Units 6 and 7. In addition, in-migrating workers would generate additional local jobs and earnings through their local purchases. Because a portion of the dollars spent in the area is re-spent in the area by those earning the dollars, a multiplier effect is generated, resulting in the creation of jobs and earnings beyond those of the workers directly employed in the building of Units 6 and 7. The U.S. Department of Commerce's Bureau of Economic Analysis (BEA) provides estimates for regional multipliers for industry jobs and earnings. For each new job created in the construction industry in Miami-Dade County, an estimated 0.9535 indirect jobs in all industries would be created in Miami-Dade County, and for each new job created in the power-generation and supply industry in Miami-Dade County an estimated 2.1696 indirect jobs would be created in Miami-Dade County (FPL 2011-TN56).(2) The in-migration of workers also will stimulate new employment in Homestead and Florida City (see Section 4.4.3.1 for a detailed discussion), but

(1) 59,866 population estimate for Homestead and 11,313 population estimate for Florida City.
(2) RIMS II (Regional Input-Output Modeling System) direct effect employment multipliers for Miami-Dade County are 1.9535 for the construction industry and 3.1696 for the power generation and supply industry.

the review team expects these indirect jobs would be filled by current residents and not by new in-migrating people.

Figure 4-5 characterizes the size of the workforce for the entire project. FPL estimates NRC-regulated construction activities to be 84 months long, peaking in year four. Also shown is the 39 months of preconstruction activities. The figure shows the construction workforce and the operations workforce for proposed Turkey Point Units 6 and 7 (FPL 2014-TN4058). A corresponding table showing total estimated numerical values by month for the Turkey Point workforce is in the supporting documentation in Appendix G.

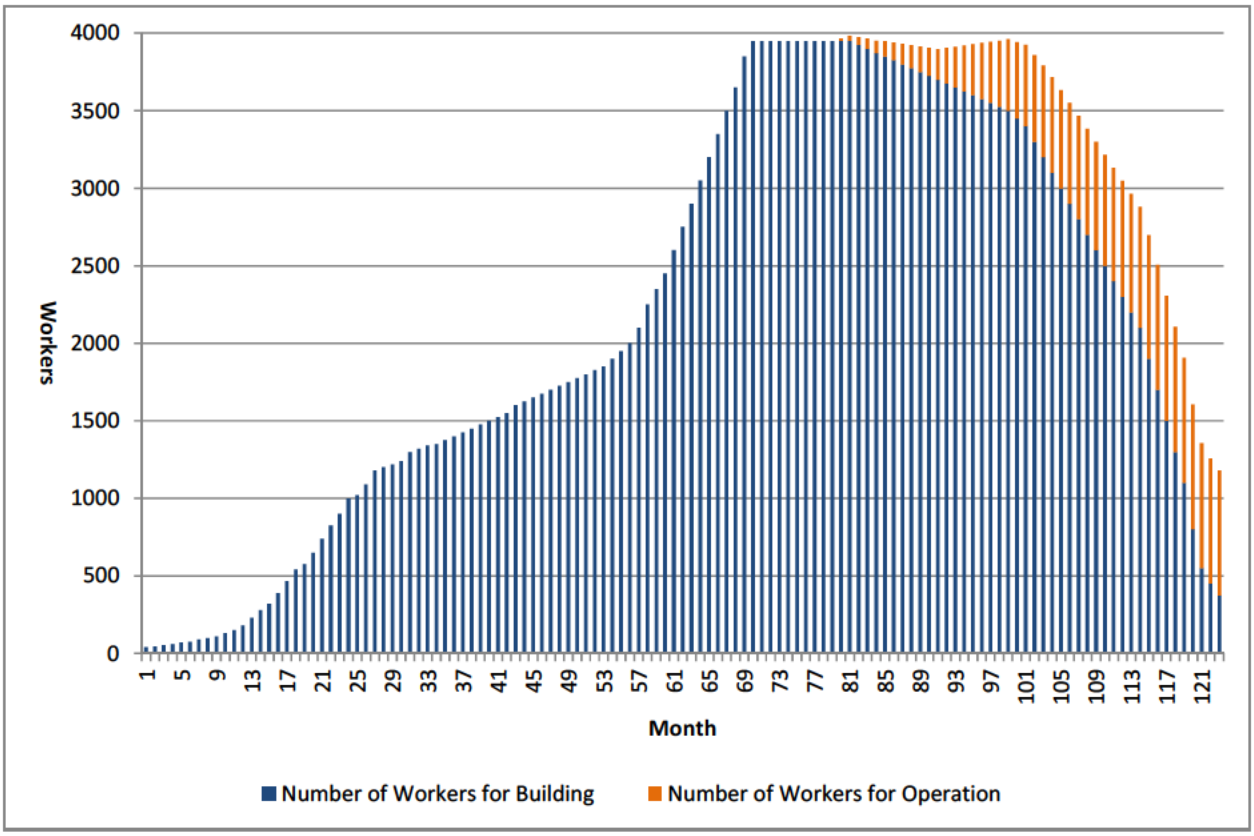


Figure 4-5. Total Workforce at Turkey Point Plant Units 6 and 7

Based on its independent analysis, the review team concludes that the demographic impacts of building in Miami-Dade County would be SMALL. Although the impacts may be larger in the Homestead and Florida City area than in the county as a whole, the review team determined the impacts would still not noticeably alter the demographics of the Homestead and Florida City area. Therefore, the demographic impacts on Homestead and Florida City would also be SMALL.

4.4.3 Economic Impacts on the Community

This section evaluates the social and economic impacts on the area within 50 mi of the Turkey Point site as a result of building proposed Units 6 and 7. The evaluation assesses the impacts of building Units 6 and 7 and the demands placed by the larger workforce on the surrounding

region. Because the review team expects the economic impact area will receive the majority of the impacts associated with building Turkey Point Units 6 and 7, the review team determined the economic impacts outside the economic impact area but within the 50 mi region would be minimal but beneficial. The remainder of this discussion focuses on the economic impacts within the economic impact area.

4.4.3.1 Economy

The impacts of building the proposed units on the local and regional economy depend on the region's current and projected economy and population. For this analysis, FPL assumed site-preparation activities would begin in 2016 and commercial operation dates would be 2025[3] for Unit 6 and 2026 for Unit 7.

The generation of 3,950 new construction jobs would create new indirect jobs in the area through a process called the "multiplier effect" (described in Section 4.4.2). Assuming the construction workforce residential patterns would be similar to those of the current Turkey Point workforce, and assuming one worker per job,[4] 83.3 percent (3,290) of the new construction job workers would reside in Miami-Dade County. Although the impacts calculated below are for Miami-Dade County, the impact would be larger if the impacts on surrounding counties were included.

For every new construction job, the BEA multiplier estimates an additional 0.9535 jobs would be created in Miami-Dade County (FPL 2011-TN56). Therefore, the 3,290 construction workers residing in Miami-Dade County would support 3,137 indirect jobs. Because most indirect jobs would be service or retail related and not highly specialized and because this represents approximately 2.9 percent of the number of unemployed in the county in 2013 (Table 2-40), the review team assumed these jobs would be filled by local residents and would result in no additional in-migration.

The review team used BEA multipliers for Miami-Dade County. Because these multipliers capture indirect impacts in the area where workers spend their incomes, and because workers typically spend most of their incomes close to their areas of residence, the review team used only the portion of workers expected to reside in Miami-Dade County (83.3 percent) to estimate indirect employment generation. In addition, the review team considered that all workers that would be employed in the building and operation of Turkey Point Units 6 and 7 would constitute "new employment," and applied the multiplier to all direct employment residing in Miami-Dade County, not just in-migrating employment. The reason for doing so is that workers already residing and working in Miami-Dade County who left their jobs to work at Turkey Point Units 6 and 7 would leave a vacant position that would need to be filled by others.[5]

(3) From the time of this analysis, commercial operation dates have been moved to 2027 and 2028, respectively (FPL 2015-TN4502). The review team does not expect this change to affect the results of the current analysis.
(4) Throughout this section, the review team assumed one worker per job.
(5) The review team assumes these replacement workers would be recruited from the local unemployed workforce. For more information about BEA RIMS II regional economic multipliers see BEA 2012 (TN1569). RIMS II is an essential tool for regional developers and planners.

Using the BEA multipliers, the review team estimated that the 3,950 new construction jobs created during peak project workforce use would generate 3,137 (3,950 × 0.9535 × 0.833) indirect jobs in Miami-Dade County and the 33 new operation jobs created during peak project workforce use would generate 60 (33 × 2.1696 × 0.833) indirect jobs in Miami-Dade County. Because most indirect jobs would be service or retail related and not highly specialized, and because the total of 3,197 indirect jobs represents approximately 3.0 percent of the number of currently unemployed in the county (3,197 ÷ 108,230, see Table 2-40), the review team considers that these jobs would likely be filled by local residents and any additional in-migration would be negligible.

The employment of a large construction workforce over an approximately 10-year building period would have positive economic impacts in the region. BEA estimates that for each dollar paid in the construction industry in Miami-Dade County, an additional 80.22 cents of earnings are generated in the region (FPL 2011-TN56). If each construction worker earned $56,145[(6)] a year, $1,015,663,050 ($56,145 × 10 years × 1,809 average annual construction employees residing in Miami-Dade County during building period) in salaries would be generated during the building phase of the project (see Appendix G for the number of workers employed per month). These earnings would generate an additional $814,764,899 in earnings during the building phase, or an average indirect earnings to the region of about $81 million per year, over the 10-year period

In the peak construction employment months, $15,393,088 (3,290 construction employees residing in Miami-Dade County × $4679) in direct earnings would generate an additional $12.3 million per month ($15,393,088 × 0.8022) of indirect earnings for a total of $27.7 million in total earnings in the region.

After reaching peak project employment, the construction workforce would start to decline and produce a decline in related payrolls. There would be a corresponding decline in economic impacts. The loss of project-related jobs would mean a decrease in indirect jobs through the "multiplier effect." However, this decline would lag the loss in project-related jobs and would be partially offset by the economic impact of the arriving operations workforce.

The review team concludes that beneficial economic impacts could be experienced throughout the 50 mi region surrounding the site as a result of building activities at the Turkey Point site. Because peak construction earnings would be less than eight-tenths of 1 percent of total wage earnings in Miami-Dade County,[(7)] these beneficial impacts would not noticeably alter local earnings. Peak workforce construction jobs and the jobs indirectly created by the in-migrating workforce would total 3,290 + 3,137 = 6,427 new jobs in Miami-Dade County. Because these new jobs would be less than 1 percent of employment in the Miami-Dade County (see Table 2-40), these beneficial impacts would likely not noticeably alter local employment. The review team concluded that the impacts would be minor and beneficial.

(6) Source: BLS 2012-TN4084. Average Annual Pay in Heavy and Civil Engineering, Miami-Dade County, 2012.
(7) Source: BLS 2012-TN4084. $46,667 million annual estimate in 2012, divided by 12 months, equals an average of $3,889 million.

4.4.3.2 Taxes

Several tax revenue categories would be affected by building proposed Units 6 and 7. These include corporate income taxes, sales and use tax and other taxes on sales and services, and property taxes.

Personal and Corporate Income Taxes

As stated in Section 2.5.2.2, the State of Florida does not levy a personal income tax on individuals. Florida does levy a corporate income tax but FPL would pay none on Units 6 and 7 until they become operational. Local construction expenditures would increase revenues from local businesses resulting in an increase in the corporate income taxes they pay. Similarly, purchases by the construction workforce would also increase revenues of local businesses and the corporate income taxes they pay.

FPL estimates it would spend between $12.8 billion and $18.7 billion over a 12-year period from initiation of licensing activities to completion of Unit 7 (FPL 2014-TN4058). This corresponds to average annual expenses between $1.07 billion and $1.56 billion. The review team's experience is that applicants purchase approximately 10 percent of their construction materials locally. Assuming the same percentage for Turkey Point Units 6 and 7, the average annual local expenses would be between $107 million and $156 million. If all corporate revenues were corporate profits (costs = 0), corporate profits taxes paid by local business would increase by no more than $8.58 million per year during the construction period, due to Turkey Point Units 6 and 7 construction expenditures ($156 million x 5.5 percent). Because corporate income is actually only a fraction of corporate revenues (costs >0), the actual corporate income taxes in the month of peak employment would be much lower.

The corporate income tax generated by direct local expenditures would total no more than $8.58 million per year. The State of Florida received $1.87 billion (6.3 percent of its total tax revenue of $29.7 billion) from corporate income and excise taxes in fiscal year (FY) 2010-2011 (Table 2-42). The impact would be minor and not noticeably alter corporate income tax revenues in the State.

Sales and Use Taxes

The region would experience an increase in the sales and use taxes collected from building purchases made for the project. The area around the proposed site would also experience an increase in sales and use taxes generated by retail expenditures (e.g., restaurants, hotels, merchant sales, food) by the construction workforce.

FPL estimates it would spend between $12.8 billion and $18.7 billion over a 12-year period from initiation of licensing activities to completion of Unit 7 (FPL 2014-TN4058). This corresponds to average annual expenses between $1.07 billion and $1.56 billion. Because Florida provides 100 percent tax exemption for equipment and materials associated with the building of power plant equipment and for pollution-control equipment, the only taxable expenses are purchases of services. Based on FPL's Petition to Determine Need for Turkey Point Nuclear Units 6 and 7 Electrical Power Plant (FPL 2007-TN445), the review team estimates that services would make up less than 20 percent of construction costs. Purchases made out of state receive a tax credit for sales taxes paid in those states. FPL estimates that 67 percent of labor and services

expenses would be purchased from Miami-Dade County providers with the remaining being purchased out of state (FPL 2014-TN4058). With a Florida State 6 percent sales tax, the estimated sales tax paid to the State would be up to $12.5 million a year ($1.56 billion × 0.20 × 0.67 × 0.06). An additional 1 percent surtax imposed by Miami-Dade County would generate another $2.1 million a year for the County. As noted in Section 2.5.2.2, the State of Florida received $1,935 billion from sales and use taxes in FY 2011. State sales tax revenues from the building of the proposed project would therefore correspond to less than approximately seven-hundredths of 1 percent of the annual sales tax revenues from the State. Because of the large tax base of the State, the impact would be minor and beneficial. Miami-Dade County adopted budget shows $282.7 million in sales and use taxes in FY 2011-2012 (Table 2-41). The 1 percent surtax imposed by Miami-Dade County on construction expenses of Units 6 and 7 would correspond to approximately seven-tenths of 1 percent of sales and use tax revenues.

The area around the Turkey Point site would also experience an increase in sales and use taxes generated by retail expenditures by the construction workforce. The total earnings generated by Units 6 and 7 during the month of peak employment was estimated in Section 4.4.3.1 to be $29 million. If all these earnings were spent in taxable expenses, sales and use taxes for both the State and the County would add up to about $2 million during the month of peak employment. The impact on State and County revenues would be minor and beneficial.

Property Taxes

According to Florida Statute Title XIV, Chapter 192, “improved or portions not substantially completed of real property” are not attributed value for the purposes of property taxation. Substantially completed means that the “the improvement or some self-sufficient unit within it can be used for the purpose for which it was constructed” (Fla. Stat. Title 14 2012-TN1585). Because Turkey Point Units 6 and 7 cannot be used for the purpose for which they were constructed until start of operations, the review team concludes there should be no new property taxes paid due to Turkey Point Units 6 and 7 during the construction period.

One possible source of revenue from property taxes during the construction period would be housing purchased by some construction workers. In-migrating workers could purchase houses. Because there is such a large housing stock available in Miami-Dade County, the review team does not expect upward pressure on housing prices (see Section 4.4.4.3). If incoming worker families were to reside in Miami-Dade County, they would represent an increase of less than two-tenths of 1 percent over Miami-Dade County’s projected population in 2020 population. If 43 percent of in-migrants would choose to reside in the Homestead and Florida City area, in accordance with the residence patterns of current Turkey Point workers, incoming workers and families would represent a 3.1 percent increase in population in the Homestead and Florida City area (based on 2012 population estimates) (see Section 2.5.1.1). These in-migrating worker families would contribute property taxes to the counties and special districts in which they reside. It is unlikely that the property tax revenues in Homestead or Florida City would increase with the construction of Units 6 and 7. Therefore, the property tax impacts from new residents would cause a minor and beneficial change in property tax revenues.

Summary of Tax Impacts

The review team expects tax revenue increases in the form of sales, corporate, and property taxes because of the building of the proposed Units 6 and 7 and the influx of construction workforce into the region. Because of the large tax bases of Florida State and Miami-Dade County, the impact on their tax revenues would likely be minimal and beneficial. The impact on Homestead and Florida City would also be minimal and beneficial for property tax revenues.

4.4.3.3 Summary of Economic Impacts on the Community

Based on its independent analysis, the review team concludes that all of the economic impacts of building activities would be SMALL and beneficial in the 50 mi region, Miami-Dade County, Homestead, and Florida City.

4.4.4 Infrastructure and Community Service Impacts

Infrastructure and community services include transportation, recreation, housing, public services, and education.

4.4.4.1 Traffic

FPL proposes a number of road improvements in the vicinity of the proposed site to accommodate the increased traffic expected during construction and operations. Among them, the new access road along SW 359th Street would open traffic to an area with limited accessibility to the public. Because this new access road would lead mostly, if not exclusively, to the Turkey Point power plant, the review team expects traffic along this new access road to be mostly used by plant-related traffic.

Building impacts on traffic would be greatest during the period of peak building workforce use—month 81 of the building schedule and month 45 of the construction schedule. By then, a new entrance on SW 359th Street and access road would provide access to the Turkey Point site and all construction traffic would be routed to the new construction entrance.

As explained in Section 4.4.2, the peak workforce would consist of an estimated 3,983 construction and operation workers. In addition to this workforce, existing traffic and vehicles transporting construction and fill material also would be using roads in the vicinity of the site. To assess the impact of the proposed Turkey Point Units 6 and 7, a traffic study was conducted in 2009. Because project-related traffic during peak workforce would exceed the capacity of local roads, the study identified improvements that would need to be made at key intersections so that all affected intersections would maintain a “level of service” of at least D. The Transportation Research Board “level of service” (LOS) designations define the flow of traffic on a designated highway. LOS designations can range from traffic freely flowing (LOS A) to a point where traffic flow exceeds the design capacity of the highway resulting in severe congestion (LOS F). Miami-Dade County adopts LOS D (flow at 90 percent capacity) (Miami-Dade County 2012-TN1495) as a standard for planning and operational analysis (Traf Tech 2009-TN1266).

The traffic study assumed the project-related workforce would commute to the Turkey Point site by the same routes used by current Turkey Point plant employees. The workforce would be divided into two shifts; 70 percent would be assigned to shift 1 (6:00 a.m. to 4:30 p.m.) and 30 percent to shift 2 (5:00 p.m. to 3:00 a.m.). The time of the day of peak commute would be between 4:30 p.m. and 5:00 p.m. The traffic study assumed that a maximum of 36 trucks per hour would enter and leave the site for a total of 72 trips per hour. Half of the trucks were assumed to come from a quarry north of the site using SW 117th Avenue and the other half were assumed to come via US-1 and SW 344th Street to SW 137th Street. Figure 4-4 shows the improvements that would need to be made to roads and intersections to maintain an acceptable LOS. These improvements are listed in Section 4.4.1.3. The resulting LOS designations for the key intersections are shown in Table 4-11.

The 2009 traffic study assumed a peak workforce of 3,650, considerably less than the current peak workforce estimate of 3,983. However, additional sensitivity analyses were conducted and the conclusions remained valid, even with this increment in the peak workforce (FPL 2012-TN1463).

Table 4-11. Level-of-Service Designations for Key Intersections during Peak Workforce after Road and Intersection Improvements

Intersection	A.M. Peak Hour	P.M. Peak Hour
SW 328th St & SW 137th Ave	C	D
SW 328th St & SW 117th Ave	C	D
SW 344th St & SW 137th Ave (W)	C	B
SW 344th St & SW 137th Ave (E)	B	B
SW 344th St & SW 117th Ave	C	C
SW 359th St & SW 117th Ave	C	D

Source: Traf Tech 2009-TN1266

Traffic in the vicinity of the site would likely exceed the levels discussed above for short periods. Events at the Homestead Miami Speedway on SW 344th Street/Palm Drive would bring additional traffic to the area two to four times a year. In addition, refueling outages for the existing units would occur during construction, bringing in an additional 600 to 1000 workers. FPL stated that mitigation measures could include staggering the outage shifts to not coincide with construction shifts, encouraging workers to carpool, providing van services to remote parking facilities, and adjusting the construction schedule to ensure that the construction workforce is not commuting when the most traffic would be arriving at the speedway. The review team concludes that given the mitigation strategies proposed by FPL, the increase in traffic from building activities for Units 6 and 7 would be noticeable, but not destabilizing. The impacts would also be temporary and intermittent. However, if the mitigation strategies were not put in place, the review team expects that impacts from traffic would be significant and destabilizing.

FPL estimates truck traffic could reach 36 trucks an hour over a period of 5 years (FPL 2013-TN3546). Some of this traffic may occur before the proposed road improvements. Because there is currently considerable available peak hour capacity at traffic count stations in the vicinity of the proposed site (see Section 2.5.2.3), and because field visits confirmed the current low

level of road use in the vicinity of the site, the review team considers that this increased truck traffic would be noticeable but would not destabilize traffic in the vicinity of the site.

To assess potential impacts of truck traffic on roads beyond the vicinity of the site, the review team estimated the current LOS at Florida Department of Transportation (FDOT) traffic-monitoring sites along potential truck routes. This was done based on the peak hour directional traffic and FDOT LOS thresholds. Peak hour directional traffic information was obtained from FDOT Florida Traffic Online (FDOT 2013-TN3558) and consists of the Annual Average Daily Traffic (AADT) at each traffic-monitoring site, a Standard Peak Hour Factor (K) and a Directional Distribution Factor (D). The multiplication of these three elements (AADT x K x D) provides an estimate of the current peak hour directional traffic volume. The LOS was determined comparing this peak hour directional traffic volume with the maximum thresholds for each LOS in Table 7 (urban areas) of FDOT's Generalized Service Volume Tables (FDOT 2013-TN3297). The review team used FDOT's 2013 Quality/Level of Service Handbook (FDOT 2013-TN3297) to determine how to classify roads (e.g., highway, freeway, or arterial). The review team assumed trucks would be coming from one of two potential places, typically carrying fill material:

- Rail lines west of Homestead. After transloading cargo from trains to trucks, the trucks would head west on West Mowry Drive, south on SW 187th Avenue and east on SW 8th Street/ SW 328th Street. For a traffic-monitoring site on SW 8th Street, west of US-1 the review team estimated a peak hour directional traffic of 413 vehicles corresponding to a LOS of D. An increase of 36 trucks an hour would keep the estimated LOS unchanged (Table 4-12).
- The Cemex FEC Quarry next to the Florida Turnpike/SR-821, south of North Okeechobee Road. Trucks would head south on SR-821 to SW 328th Street. The review team estimated a LOS at three different traffic-monitoring sites along SR-821. An increase of 36 trucks an hour would not alter these levels of service (Table 4-12).

A third potential source of fill material would be the Atlantic Civil rock mine located about 10 mi west of the FPL site, but the use of this site would only require the use of roads in the vicinity of the FPL site.

Table 4-12. Peak Workforce Traffic LOS Analysis for Truck Traffic beyond the Vicinity of the Site

Traffic-Monitoring Site	Baseline Peak Hour Directional Traffic	Baseline LOS	Added Peak Hour Directional Traffic	Peak Hour Directional Traffic with Project	LOS with Project
SW 8th west of US-1	413	D	36	449	D
SR-821 north of 8 St.	7,242	E	36	7,278	E
SR-821 north of US-1	5,745	E	36	5,781	E
SR-821 north of SW 137th St.	3,476	C	36	3,512	C

Source: Review team calculations based on FDOT 2013-TN3558 and FDOT 2013-TN3297.

In addition to congestion impacts, construction-related traffic would also result in traffic accidents, injuries, and fatalities. The costs associated with these incidents include workers' compensation premiums, lost productivity, environmental remediation, property damage, fines and penalties, insurance premiums, and medical costs. Section 4.8.3 presents an estimate of construction-related vehicular impacts on accidents, injuries, and fatalities. Because the review team expects the impacts on accidents, injuries and fatalities to be low, the associated socioeconomic impacts would be minor.

Based on the information provided by FPL (2014-TN4058) and the review team's independent analysis, the review team concludes that the construction impacts on traffic would be noticeable. Traffic on the roads surrounding the proposed site would noticeably increase during construction but, with the proposed mitigation measures described above, would not destabilize traffic in the affected area.

4.4.4.2 Recreation

Several recreational facilities exist in the vicinity of the proposed site: Biscayne National Park, Homestead Bayfront Park, Homestead Miami Speedway, and Mangrove Preserve. In addition, the segments of the western transmission line corridor between the Everglades National Park and the Levee substation would be adjacent to the Everglades National Park. To the extent that traffic, noise, air emissions, and the visual landscape are affected by the building of Units 6 and 7, recreational activities in these facilities also could be affected. Traffic impacts of building activities are analyzed in Section 4.4.4.1. Traffic impacts would be unevenly distributed during the day and would be greatest during peak commuting hours (4:30 p.m. to 5:00 p.m.). Visitors to recreational facilities in the vicinity of the park would face increased traffic on some of the local roads. Noise and air emissions impacts of building activities are analyzed in Section 4.4.1.1. Visual impacts of building activities are analyzed in Section 4.4.1.4. Building activities at the proposed site would be fully visible to recreational users of Biscayne National Park.

The influx of building-related population to Miami-Dade County, and to the Homestead and Florida City areas in particular, would increase the number of local users of recreational facilities. Because the in-migrating population would be less than two-tenths of 1 percent of the projected population of Miami-Dade County in 2020 and approximately 3.1 percent of the population in the Homestead and Florida City area, the review team expects the impact on current recreational infrastructure to be negligible.

4.4.4.3 Housing

Section 4.4.2 of this chapter presents the assumptions behind the review team's estimate of the number of in-migrating workers. The review team assumed that 1,660 ((1,975 in-migrating construction workers + 17 in-migrating operations workers) × 0.833 relocating to Miami-Dade County) workers would migrate to Miami-Dade County. Approximately 1,166 (1,400 × 0.833) of these workers would bring families and 494 (592 × 0.833) workers would relocate without families. All 1,660 in-migrating workers would need housing. Some of the workers would need permanent housing, generally owner-occupied, and others would elect to rent housing. Still others would elect to reside in transitional housing such as residential hotels, motels, rooms in private homes, or to bring their own housing in the form of campers and mobile homes.

As shown in Section 2.5.2.5, the U.S. Census Bureau estimated Miami-Dade County to have 163,185 vacant housing units in 2012, 35,884 of which were for rent. Because the demand from in-migrating workers would be 1.0 percent of the available housing, the review team expects the housing market in the county would be able to absorb the influx of workers, and rental rates and housing prices would not suffer a perceptible increase because of this influx.

In Homestead and Florida City there were 26,215 housing units in the area in 2012, 4,928 of which were vacant. If the distribution of the residences of Units 6 and 7 workers were the same as that of present Turkey Point plant employees, 853 workers (42.8 percent) would reside in the area. The demand from in-migrating workers would be for 17.3 percent of the available housing.

Because houses vary in characteristics, there may or may not be enough to absorb the estimated influx of workers to the Homestead and Florida City area. During a field visit, the review team verified that commuting from south Miami-Dade County to the Miami urban area is common and that commuting from north Miami-Dade County to the Homestead and Florida City area would be acceptable to workers migrating into the area and would occur against the direction of most traffic during rush hours. The review team concluded that if vacant housing in the Homestead and Florida City area were insufficient to accommodate 853 workers during peak building employment, these workers would be able to find housing in other areas of Miami-Dade County within a convenient driving distance to the Turkey Point site. The review team confirmed this in discussions with local community leaders (NRC 2010-TN1457). Impacts on rental rates and housing prices in the Homestead and Florida City area could occur but would be minor and temporary.

Because of the temporary nature of construction, workers often choose not to live in permanent housing. There are eight recreational vehicle parks or campgrounds in Miami-Dade County with 1,277 spaces with full hookups (water, sewer, and electricity) for private recreational vehicles. Approximately 62 percent (792) of these spaces are in the Homestead and Florida City area (FPL 2014-TN4058). In the South Dade region, which includes the Homestead and Florida City area, 25 hotels/motels with approximately 1,683 rooms were available in 2007 and the average occupancy percentage for the area was 63.9 percent (FPL 2014-TN4058). Due to the numerous housing opportunities available, the review team expects impacts on recreation vehicle (RV) parks, campgrounds, and hotels/motels would be minor.

Construction of Units 6 and 7 and their associated transmission lines could affect property values, if proximity to nuclear reactors or to transmission lines affects the attractiveness of properties to prospective buyers or renters. Various studies have reviewed the recent evidence and found the body of studies to be inconclusive. For example, Bezdek and Wendling (2006-TN2748) found that various studies report no statistical effect of proximity to nuclear plants, while other studies have found positive or negative effects. The authors' own analysis of impacts around seven nuclear facilities finds a potential positive impact that they explain by the jobs and tax contributions of the plants. They caution, though, that results may vary from case to case, depending on the various factors that influence housing market prices and suggest further research is needed. In the case of proposed Units 6 and 7, other nuclear reactors are already at the site, suggesting that results from the literature examining new power plants in locations with no power plant may be less informative about the potential impacts at Turkey

Point. In the case of transmission lines, studies have often also reached different conclusions. For example, Chalmers and Voorvaart (2009-TN4395), noting that the literature on the effects of transmission lines on property values is extensive but of uneven quality, argue that of what they consider to be the 16 studies that "form the core of the professional literature and are widely quoted and cross-referenced on to the other," half find a negative effect and half find none. When effects were found they tended to be small, decay with distance, and dissipate over time. Because the current evidence is inconclusive, it is not possible to state whether construction of Units 6 and 7 and their associated transmission lines would or would not affect property values.

Based on its independent analysis, the review team concludes that the impacts on housing in Miami-Dade County of building the proposed Turkey Point Units 6 and 7 would be minor. The impacts may be larger in the Homestead and Florida City area than in the county as a whole. However, the impacts would not likely alter the housing market of the Homestead and Florida City area other than for short periods of time. Therefore, the impacts on housing in Homestead and Florida City would also be minor.

4.4.4.4 Public Services

This section describes the public services available and discusses the impacts of building at the Turkey Point site on water supply and waste treatment; police, fire, and medical services; education; and social services in the region.

Water Supply and Wastewater-Treatment Facilities

A detailed description of building-related water requirements and their impacts is presented in Section 4.2 of this EIS.

FPL estimates the maximum potable onsite water use to be 0.8 Mgd during the peak construction period. This would include personal uses (potable) and uses related to concrete batch plant operation, concrete curing, cleanup activities, dust suppression, placement of engineered backfill, and piping hydrotests and flushing operations. Miami-Dade County would provide the necessary water for potable onsite use during construction (FPL 2014-TN4058). A consumption of 0.8 Mgd would represent less than two-tenths of 1 percent of the current Miami-Dade County water and sewer capacity (Table 2-47).

The in-migrating population would also increase offsite demand for potable water. The review team estimated the in-migrating population (including families) at peak employment for the 50 mi region to be 5,142, 83.3 percent (4,283) of whom would be expected to move into Miami-Dade County. According to the EPA, U.S. residents use about 100 gpd of water (EPA 2012-TN1267). If each in-migrating person used approximately 100 gpd, demand would increase by approximately 0.43 Mgd. A total of less than a 1.3 Mgd increase in water demands could be reached during the building of proposed Units 6 and 7 before the MDWASD system reached capacity. This would represent a three-tenths of 1 percent increase beyond current demands on the MDWASD supply capacity of 483.61 Mgd and would be less than 1 percent of current available capacity (Section 2.5.2.6). The MDWASD is currently operating at 71.92 percent of its capacity. If 42.8 percent of workers establish themselves in the Homestead and Florida City area, the 2,201 additional people would generate an increase in potable water demands of 0.22 Mgd, increasing current use from 70.8 percent to 71.9 percent of available capacity.

Onsite sanitary/wastewater treatment during the initial phases of Units 6 and 7 construction would be provided via portable facilities and/or a separate, packaged wastewater-treatment facility. All wastewater treatment in the economic impact area is handled by MDWASD except for Homestead. Assuming all new project-related water consumption results in wastewater, then the increase in water demand of 0.43 Mgd would increase wastewater treatment from 87.6 percent to 88.0 percent. Assuming 2,201 people migrate into Homestead (and none to Florida City, which is a part of the MDWASD), the increase in wastewater for Homestead of 0.22 Mgd would increase treatment from 102.2 percent of current capacity to 105.8 percent of current capacity.

As explained in Section 2.5.2.6, Homestead's proposed 10-Year Water Supply Facilities Work Plan identifies and details the construction of a 3.45 Mgd high-level disinfectant wastewater-treatment plant upgrade, which would accommodate this increase in demand. In addition, Homestead uses the MDWASD system as a backup.

Based on the information provided by FPL (2014-TN4058) and the review team's independent analysis, the review team concludes that the overall impacts of building the proposed Turkey Point Units 6 and 7 on the water-supply and wastewater-treatment facilities would be minor, with implementation of Homestead's 10-Year Water Supply Facilities Work Plan or current use of MDWASD's system as a backup for Homestead.

Police, Fire Protection, and Medical Facilities

The temporary increase in population from the workforce for building the proposed Turkey Point Units 6 and 7 can increase the burdens on local fire and police departments. The transitory nature of this increase can require management of both the increased burden when construction workers migrate to the area, and the decreased demand (and possible excess capacity) when construction workers leave the area, if personnel or assets were previously obtained to meet the influx of construction workers.

For onsite security, FPL would use its own security force. The offsite, residents-to-law enforcement officer ratios for Miami-Dade County are presented in Table 4-13. The ratio of residents-to-law enforcement officers in Miami-Dade County was 575.8 to 1. If 4,283 (0.833 × 5,142) workers and their families migrate into the county during peak construction periods, the population in-migration would increase that ratio to 576.8, a two-tenths of 1 percent increase. In the Homestead and Florida City area, the increase in residents-to-law enforcement ratio would be 3.1 percent. These increases would be minor to the police protection services in Miami-Dade County or Homestead and Florida City.

To the extent that these areas want to maintain their current residents-to-law enforcement ratios, an additional five law enforcement officers would be needed in Miami-Dade County and an additional five in the area of Homestead and Florida City.

Residents-to-firefighter ratios for Miami-Dade County are presented in Table 4-14. In 2012, the ratio of residents to firefighters in Miami-Dade County was 717.8 to 1. If 4,283 (0.833 × 5,142) workers and their families migrate into the county during peak construction periods, the population in-migration would increase that ratio to 719.0, a two-tenths of 1 percent increase. In

the Homestead and Florida City area, the increase in residents-to-firefighter ratio would be 3.1 percent. These increases would be minor to the fire protection in Miami-Dade County or the Homestead and Florida City.

Table 4-13. Construction Impact on Police Protection in Miami-Dade County and the Homestead and Florida City Area

	Miami-Dade County	Homestead and Florida City
Population (2012)[a]	2,512,219	71,179
Sworn law enforcement officers (2010)[b]	4363	135
Ratio of residents per law enforcement officer	575.8	527.3
Population with building-related in-migration	2,516,502	73,380
Ratio of residents per law enforcement officer with building-related in-migration	576.8	543.6
Percent increase in residents-to-law enforcement ratio	0.2%	3.1%
Additional sworn law enforcement officers needed	9	5

(a) USCB 2012-TN4098.
(b) FPL 2014-TN4058.

Source: Review team calculations.

Table 4-14. Construction Impact on Fire Protection in Miami-Dade County and the Homestead and Florida City Area

	Miami-Dade County	Homestead and Florida City
Population (2012)[a]	2,512,219	71,179
Active firefighters (2010)[b]	3500	69
Ratio of residents per active firefighter	717.8	1,031.6
Population with building-related in-migration	2,516,502	73,380
Ratio of residents per active firefighter with building-related in-migration	719.0	1,063.5
Percent increase in residents-to-firefighter ratio	0.2%	3.1%
Additional active firefighters needed*	7	3

(a) USCB 2012-TN4098.
(b) FPL 2014-TN4058.

Source: Review team calculations.

To the extent that these areas want to maintain their current residents-to-firefighter ratios, an additional seven firefighters would be needed in Miami-Dade County and an additional three in the area of Homestead and Florida City.

The population increase in Miami-Dade County from building-related in-migration would be approximately two-tenths of 1 percent of the population. A two-tenths of 1 percent increase in the average daily census in Miami-Dade hospitals would be negligible if compared to the current occupancy rate of 77.5 percent (for those hospitals for which a census is available). In addition, the review team determined the two-tenths of 1 percent increase in the annual admissions and the annual outpatient visits would not be noticeable relative to the existing medical service capacity.

The review team concludes that the impacts of building the proposed Turkey Point Units 6 and 7 on police, fire services, and medical facilities would be minor and temporary.

4.4.4.5 Education

Based on a 1981 study of the migration of workers at nuclear power plant construction sites (Malhotra and Manninen 1981-TN1430), the review team assumed that each in-migrating worker with a family would have eight-tenths of one school-age child, so the in-migrating peak building workforce with families of 1,166 (1,400 × 0.833) people would bring approximately 933 (1,166 × 0.8) school-aged children. If all of these children attended public schools, the additional 933 students would represent three-tenths of 1 percent of the 2011-2012 enrollment in Miami-Dade County Public School District. Because three-tenths of 1 percent is considerably less than the 1 percent average annual variation in public school enrollment in Miami-Dade County in the past years and because Miami-Dade County public schools generally meet current mandated class sizes (see Section 2.5), the review team expects the education system in the county to be able to accommodate students that would accompany the construction workers.

As discussed in Section 4.4.2, the peak building-related workforce with families of 499 (1,400 × 0.833 × 0.428) people would bring approximately 399 (499 × 0.8) school-aged children into the Homestead and Florida City area. These students would represent an increase of 1.6 percent relative to the 23,923 students enrolled in either a traditional public school or a charter school in 2011-2012 in the Homestead and Florida City area. Although this is 60 percent more than the typical annual variation in school enrollment in Miami-Dade County, the increase in student enrollment due to building-related in-migrating families would be short term. The workforce would steadily increase over about 6 years, and only remain near the peak level for about three years, then rapidly decline as building activities cease. For this reason, and because Homestead and Florida City area public schools generally meet current mandated class sizes (see Section 2.5), the review team expects the education system in the Homestead and Florida City area to be able to accommodate students that would accompany the construction workers.

Approximately 15 percent of students in Miami-Dade County currently attend private schools (FPL 2014-TN4058). If the same share of in-migrating school-aged children were enrolled in private schools, this would further reduce the use of the expected public school capacity. Fifteen percent of in-migrating students would correspond to approximately 143 students, or two-tenths of 1 percent of the students enrolled in private pre-K through 12th grade schools in Miami-Dade County as of 2007-2008 (Section 2.5). The review team expects the private school system in the county to be able to accommodate this increase in demand.

Based on FPL's ER, the review team's independent assessment, and meetings with local officials, the review team determined that the building-related impacts on schools would be minor. However, if Miami-Dade School District decided to maintain the status quo with respect to student-teacher ratios and class size during the building phase of the proposed project, the new students moving into Homestead and Florida City would impose additional costs from hiring temporary teachers, expanding the fleet of trailers used for classrooms, and additional

administrative costs. However, even with such new costs, the review team expects the overall impact of building-related impacts on education would remain minor.

4.4.4.6 Summary of Infrastructure and Community Service Impacts

Based on the information provided by FPL, interviews with local planners and officials, and the review team's independent review, the review team concludes that building-related impacts on the regional infrastructure and community services would be SMALL for the 50 mi region and the economic impact area, with the exception of impacts on traffic, which would be MODERATE for Homestead and Florida City, and SMALL elsewhere in the economic impact area and the 50 mi region.

4.4.5 Summary of Socioeconomic Impacts

The review team has assessed the activities related to building proposed Units 6 and 7 and their potential socioeconomic impacts in the vicinity and region. Physical impacts on workers and the general public include impacts on existing buildings, transportation, aesthetics, noise levels, and air quality. Based on information provided by FPL and the review team's independent evaluation, the review team concludes that the physical impacts of building activities would be SMALL for the 50 mi region and the economic impact area, with the exception of MODERATE and beneficial impacts on roads near the plant.

Social impacts span issues of demographics, economy, taxes, infrastructure, and community services. Based on the information provided by FPL and review team interviews with city and county planners, social service providers, and school district officials, the review team concludes that the overall impacts of building activities on the economy in the socioeconomic impact area would be SMALL for the 50 mi region and the economic impact area, with the exception of a MODERATE, adverse impact on traffic in the Homestead and Florida City area, based upon FPL's identified mitigation strategies. The review team determined there would be a LARGE, adverse impact on traffic if the identified mitigation strategies were not implemented.

4.5 Environmental Justice Impacts

The review team evaluated whether the health or welfare of environmental justice (EJ) populations of interest (as defined in Section 2.6.1) in the communities identified in Section 2.6 of this EIS could experience disproportionately high and adverse impacts from building Turkey Point Units 6 and 7 at the proposed site. The review team (1) identified all potentially significant pathways for human health and welfare effects, (2) determined the impact of each pathway for individuals, and (3) determined whether the characteristics of the pathway or special circumstances of the EJ populations of interest would result in a disproportionately high and adverse impact. To perform this assessment, in the context of building-related activities at the Turkey Point site, the review team studied populations of interest identified through census data and examined potential pathways that could lead to a disproportionately high and adverse impact on EJ populations of interest.

The review team determined that, for physical impacts, the high proportion of minority and low-income people living in the vicinity of the Turkey Point site creates a potential for a

disproportionate impact. Furthermore, through phone and field consultations with local organizations and review of FPL's ER, the review team concluded that subsistence activities such as subsistence fishing are typically not conducted by any identified minority or low-income groups. However, the review team identified migrant agricultural workers as a mostly minority (Hispanic) and low-income group with potentially unique pathways for exposure to environmental effects. Migrant agricultural workers spend most of the day outdoors, making them potentially more exposed to air and noise pollution. EJ impacts are described in the following sections, including the impacts on health and environment (Section 4.5.1), socioeconomics (Section 4.5.2), subsistence and special conditions (Section 4.5.2), and high-density communities (Section 4.5.4). EJ impacts are summarized in Section 4.5.5.

4.5.1 Physical and Socioeconomics Impacts

4.5.1.1 Physical Impacts

Except for the final phases of building activities, when fuel is loaded into the reactor, construction of a nuclear power plant is very similar in its environmental effects to the construction of any other large-scale industrial project. The three primary physical pathways in the environment for impacts to occur are via soil, water, and air. The potential impacts on each of these pathways, along with noise are discussed below.

Soil-Related Impacts

Building activities for the proposed Units 6 and 7 would involve moving large quantities of soil. This would occur mainly at the proposed site, but also along the proposed transmission line and pipeline corridors. FPL would follow standard industry practice to minimize dust, erosion, and sedimentation. Methods would include limiting the time disturbed soil is exposed to weather, covering disturbed areas, and appropriate design of grading and drainage (FPL 2014-TN4058). Because standard industry practice would minimize dust, erosion, and sedimentation, the review team expects no soil-related high and adverse environmental and human health effects from building activities. No soil-related high and adverse environmental and human health effects would, therefore, disproportionately affect any EJ populations of interest.

Water-Related Impacts

As discussed in Section 4.2, the review team determined the impacts of building activities on surface-water use and quality and groundwater use and quality would be minor and not require mitigation beyond Florida regulations and BMPs. Because impacts on surface water and groundwater would be minor and because no special pathways for water-related impacts on EJ populations of interest were identified, the review team determined no disproportionately high and adverse impacts on any EJ populations of interest would exist.

Air-Quality Impacts

Section 4.7 discusses impacts of building activities on air quality and concludes that impacts would be minimal and not warrant mitigation beyond FPL's commitments. The review team identified migrant agricultural workers as being particularly vulnerable to air-quality impacts because of their outdoor presence. However, the closest agricultural areas to the site would be

approximately 3 mi away, and most agricultural areas within the 50 mi region are more than 10 mi away, to the west of US-1. Because of the distance from the site and the minimal impacts on air quality, the review team determined no air-quality–related disproportionately high and adverse impacts on any EJ populations of interest would exist.

Noise Impacts

Noise levels from building activities may exceed 100 dB within the site, but would be lessened by distance and obstacles such as buildings, vegetation, and topography (Section 4.8). Noise from traffic along the access routes to the sites may intermittently exceed levels acceptable for residential areas. However, these impacts would be highly concentrated in the area immediately proximate to the site or the site-access roads where few individuals live. Sensitive noise receptors closest to the site are likely to experience intermittent, but temporary, noise pollution during building activities. The review team identified migrant agricultural workers as being particularly vulnerable to noise impacts because of their outdoor presence. However, as discussed above, their distance from the site and the fact that noise impacts are lessened by distance mean they would not be particularly affected by noise during building activities. The review team determined there would be no noise-related disproportionately high and adverse impacts on any EJ populations of interest.

4.5.1.2 Socioeconomics

Socioeconomic impacts are discussed in Section 4.4. The review team concluded that all socioeconomic impacts identified were small with the exception of moderate impacts on traffic near the plant. The review team did not identify any special pathways through which socioeconomic impacts would affect EJ populations of interest. Therefore, the review team concluded there would be no disproportionately high and adverse impacts on any EJ populations of interest.

4.5.2 Health Impacts

Section 4.9 assesses the potential radiological health impacts of building activities. Section 4.9 concludes that radiation exposure of construction workers during building of Units 6 and 7 would be within the NRC annual exposure limits and that impacts would be small and not warrant further mitigation. Section 4.8 evaluates potential nonradiological health impacts from building Turkey Point Units 6 and 7. The section discusses potential impacts on public and occupational health, the potential impacts from noise, and transportation of workers and construction materials. Section 4.8 concludes that, given the mitigation measures identified by FPL, and State and local permits and authorizations, the impacts would be minimal and not require further mitigation. The review team did not identify special pathways through which EJ populations of interest would be more exposed to these minimal impacts. Therefore, there would be no disproportionately high and adverse human health and environmental impacts on any EJ populations of interest.

4.5.3 Subsistence and Special Conditions

The NRC's EJ methodology includes an assessment of affected populations of particular interest or with unusual circumstances, such as minority communities that are exceptionally

dependent on subsistence resources or identifiable in compact locations (e.g., American Indian settlements) and those that have a high density of minority or low-income groups.

4.5.3.1 Subsistence and Unique Pathways of Exposure to Environmental Effects

As discussed in Section 2.6.2, the review team concluded that subsistence activities such as subsistence fishing are typically not conducted by any identified minority or low-income group in the vicinity of the Turkey Point site. This conclusion was based on phone and field consultations with local organizations and review of FPL's ER. Therefore, the review concludes that there will be no disproportionately high and adverse impacts on any EJ populations of interest.

4.5.3.2 High-Density Communities

Based on the analysis in Section 2.6, most of the census block groups in the 50 mi radius around the proposed site are populations of interest under the NRC's identification criteria. Because of its proximity to the proposed site, the area surrounding the Homestead airbase, a low-income and African-American population is of particular interest. The review team does not believe any pathways exist to disproportionately affect this population. Another area of particular importance is the Miccosukee area on the corner of Krome Avenue and Tamiami Trail, which is bordered by FPL's potential location for the western transmission line corridor (Western Preferred corridor). Areas crossed by the eastern transmission line corridor in the proximity of Miami area are also often inhabited by low-income and African-American groups. Because there are no identified pathways through which health, physical, or socioeconomic impacts would disproportionately affect high-density communities, the review team concluded there would be no disproportionately high and adverse impacts on any EJ populations of interest in high-density communities.

4.5.4 Summary of Environmental Justice Impacts

The review team evaluated the extent to which potential environmental and socioeconomic impacts would disproportionately affect EJ populations of interest. After reviewing the evidence presented in the various sections of this chapter, and after considering any special pathways through which EJ populations of interest could be more affected than other population groups, the review team did not identify any high and adverse human health or environmental impacts and concluded that no disproportionately high and adverse impacts on any EJ populations of interest would exist.

4.6 Historic and Cultural Resources Impacts

The National Environmental Policy Act of 1969, as amended (NEPA) (42 U.S.C. § 4321 et seq.) (TN661) requires Federal agencies to take into account the potential effects of their undertakings on the cultural environment, which includes archaeological sites, historic buildings, and culturally traditional places. The National Historic Preservation Act of 1966 (NHPA) (54 U.S.C. § 300101 et seq.) (TN4157) also requires Federal agencies to consider the impacts on those resources if they are eligible, or considered potentially eligible for listing in the National Register of Historic Places (NRHP or National Register (54 U.S.C. § 300101 et seq.) (TN4157) (such resources are referred to as "Historic Properties" in the NHPA). The USACE is the lead

Federal agency for compliance with Section 106 of the NHPA. The USACE's NHPA Section 106 consultation for this project has been completed with the exception of the transmission line consultation with the SHPO and the THPOs for STOF and the Miccosukee Tribe which is ongoing.

Construction and preconstruction of new nuclear power plants may affect either known or undiscovered cultural resources. In accordance with the USACE Regulatory Program's Procedures for Protection of Historic Properties at 33 CFR Part 325, Appendix C, the USACE is required to make a reasonable and good faith effort to identify historic properties in the Area of Potential Effect (APE) and, if such properties are present, determine whether significant impacts are likely to occur. Identification of historic properties by the USACE is to occur in consultation with the State Historic Preservation Office (SHPO), Federally recognized Native American tribes, and other interested parties. If significant adverse impacts on historic properties eligible for the NRHP are possible, efforts shall be made to mitigate them. If it is determined that potential eligible or eligible historic properties are present, the USACE is required to assess and resolve any adverse effects of the undertaking.

For a description of the historic and cultural resources at the Turkey Point site, see Section 2.7. In 2009, FPL conducted an archaeological and architectural resources survey of the direct- and indirect-effects APEs on the Units 6 and 7 project site (FPL 2011-TN95). FPL concluded that there are no NRHP-eligible archaeological sites, above-ground resources, or traditional cultural properties located within the direct-effects APE and the indirect-effects APE. As a result of cultural resources studies conducted for the Turkey Point Units 6 and 7 project area, FPL concluded that no known cultural resources exist within the direct or indirect APEs. The Florida SHPO concurred with FPL's informal determination of "no historic properties affected" (Appendix 2.5A in FPL 2014-TN4058). During the site visit in June 2010 (NRC 2010-TN1457), the NRC staff reviewed the documentation used by FPL to prepare the cultural resources section of the ER. The NRC staff did not identify any important onsite cultural resources that would be affected directly or indirectly by construction and preconstruction of proposed Turkey Point Units 6 and 7.

For transmission lines and other offsite facilities, FPL has completed desktop cultural resources investigations, including a search of the Florida Master Site file (Janus Research 2009) (FPL 2011-TN95). The archaeological sites and historic structures within the direct and indirect-effects APEs for the transmission line corridors are listed in Section 2.7. The desktop investigation concluded that no known resources were found in the APE for the non-transmission lines offsite facilities, including water pipelines from the MDWASD SDWWTP and various access roads and bridges. However, resources do occur within or near the corridors for the transmission lines, including at least one sacred area as identified by the Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida. There is the potential for archaeological sites and sites that likely contain human remains to occur within or near the corridors as well.

In a work plan prepared for the offsite facilities (FPL 2009-TN1515), FPL has committed to conducting comprehensive archaeological and above-ground historical resource surveys of these offsite facilities prior to construction, as well as preparing an unanticipated finds discovery plan. FPL reiterated this commitment, as well as their commitment to Florida State Conditions of Certification regarding cultural and historic resources, in a letter to the USACE dated March

31, 2016 (FPL 2016-TN4581). These surveys would be conducted pursuant to Section 106 of the NHPA and in coordination with the USACE, Florida SHPO, and Federally recognized tribes. If avoidance of any resources determined eligible for the NRHP were not feasible, appropriate minimization or mitigation measures shall be developed in coordination with the USACE and SHPO. In addition, the USACE, the Florida SHPO (FPL 2014-TN4058, Appendix 2.5A), and the Miami-Dade County Office of Historic and Archaeological Resources (NRC 2010-TN1458) have required FPL to conduct surveys and other studies of offsite areas and, if practicable, avoid National Register-eligible sites or mitigate effects in an acceptable manner, as determined through consultation with these agencies. They also require FPL to develop an unanticipated finds plan outlining the procedures to be followed if significant archaeological materials or human remains are encountered during construction. FPL has also committed to developing procedures for informing construction managers and workers to stop work if cultural materials or human remains are inadvertently discovered during construction and to notify the SHPO and USACE, who in turn shall inform the Federally recognized tribes (FPL 2014-TN4058). The special conditions that the USACE typically uses for permitting actions dictate that all work and ground-disturbing activities shall halt within a 100 m radius of any unanticipated discovery of cultural materials or human remains. All work would be halted until the discovery is resolved, per the permit's Special Conditions. Any land-disturbing activity that affects a cultural resource would require a cultural resource assessment.

For the purposes of the review team's onsite NEPA analysis, based on the information provided by FPL, consultation with the Florida SHPO, and the review team's independent evaluation, the review team concludes that the impacts from the construction and preconstruction activities of Units 6 and 7 project site APEs would be SMALL. This finding was based on (1) no known historic properties within the Units 6 and 7 onsite APEs, (2) FPL's commitment to develop procedures to follow in the event that ground-disturbing activities discover historic or cultural resources, and (3) consultation with the Florida SHPO that concluded with a finding of no historic properties affected for the Turkey Point Units 6 and 7 onsite APE (FDHR 2010-TN1455; Appendix 2.5A in FPL 2014-TN4058) and ongoing consultation efforts for transmission lines and offsite locations.

For the purposes of the review team's offsite NEPA analysis, based on the information provided by FPL, the USACE's ongoing NHPA Section 106 review for the project, consultation with Native American tribes, and the review team's independent evaluation, the review team concludes that the impacts from the construction and preconstruction activities for the proposed transmission lines and other offsite activities would be MODERATE with the potential for greater impacts. This finding was based on (1) the large number of known NRHP-eligible or potentially eligible resources that are located in the offsite areas and (2) USACE's ongoing NHPA Section 106 consultation with the Florida SHPO and Federally recognized tribes. Archaeological resources within the offsite direct-effects APE could be affected directly as could above-ground resources such as buildings and historic districts within the indirect-effects APE for the transmission lines, and they could be subject to visual impacts. The review team concludes that impacts on historic resources may be difficult to avoid and mitigation would be required by the USACE if adverse effects on these resources or unanticipated discoveries cannot be avoided. These mitigation measures would be determined by the USACE in consultation with the Florida SHPO, the Miami-Dade County Office of Historic and Archaeological Resources, and Federally

recognized tribes. FPL has committed to working with the USACE, Federally recognized tribes, and the Florida SHPO to conduct comprehensive Phase I surveys prior to construction activities (FPL 2014-TN4058).

According to 10 CFR 50.10(a)(2)(vii) (TN249), transmission lines are not included in the definition of construction and are not an NRC-authorized activity. Because of this, the NRC staff concludes that the potential impacts on historic and cultural resources from NRC-authorized construction activities would be SMALL.

4.7 Meteorological and Air-Quality Impacts

Sections 2.9.1 and 2.9.2 describe the meteorological characteristics and air quality of the Turkey Point site. The primary impacts of building two new units on local meteorology and air quality would be from dust from land clearing and filling of the site, grading and compacting, open burning, exhaust emissions from equipment and machinery (including the temporary emissions from two ultra-low sulfur-fired boilers used to clean steam piping and tubing), concrete batch plant operations, and exhaust emissions from vehicles used to transport workers and materials to and from the site.

Section 3.9 and Section 4.4.1 of the Turkey Point ER (FPL 2014-TN4058) describe the preconstruction and construction activities that would be conducted at the Turkey Point site that would affect air quality. Section 3.9.1 of the ER specifically addresses the amount of land clearing, fill, and earth movement activity. Section 4.4.1.2 of the ER summarizes the air emissions from site-preparation and construction activities and the air emissions from the exhaust of construction equipment used during site preparation and construction. Section 3.10 describes the transportation activity associated with the transportation of construction workers to and from the site. The SCA Section 5.5 (FPL 2010-TN272) presented air emissions from earth movement during site preparation, as well as exhaust emissions from earth movement for site preparation, land filling, and facility construction activities. Air-quality impacts directly associated with these activities are described below in Section 4.7.1; air-quality impacts associated with transportation of construction workers are addressed in Section 4.7.2.

4.7.1 Construction and Preconstruction Activities

Development activities at the Turkey Point site would result in temporary impacts on local air quality. Major activities include earthmoving, placement of land fill, concrete batch plant operation, facility construction, operation of temporary boilers, and emission of vehicular exhaust. Emissions from these activities would include particulate matter, carbon monoxide, oxides of nitrogen, sulfur dioxide, and volatile organic compounds.

As discussed in Section 2.9.2, Miami-Dade County is an attainment area for all criteria pollutants for which National Ambient Air Quality Standards have been established under 40 CFR 81.344 (TN255). As a result, a conformity analysis for direct and indirect emissions is not required (40 CFR 93.153) (TN2495).

Emissions from preconstruction activities would result in the generation of fugitive particulate matter emissions, as well as vehicle and equipment exhaust emissions. Fugitive particulate matter emissions would be primarily from the transport of muck and spoils and the delivery of fill

material over paved and unpaved roads at the site. Other site-preparation activities, such as grading, placement of fill, and wind erosion from depositing spoils upon existing berms within the Turkey Point site, also would generate particulate matter emissions. Other important emissions would be derived from the combustion of petroleum fuels related to construction equipment used in site preparation and construction, and from the temporary boilers.

Table 4-15 summarizes the expected annual emissions during site preparation and construction (FPL 2010-TN272; EPA 2011-TN1088; FERA 2014-TN4002; Simard et al. 2006-TN4001; Rybicki et al. 2000-TN4003). Mobile sources used in construction and site preparation were assumed to be Tier 3 equipment. Site preparation is assumed to occur over a period of 18 months. The clearing of the site of vegetation and burning of the vegetation was assumed to take place within 1 year. The analysis does not include the disposal of vegetation offsite, or vegetation left to decompose within the cleared lands. Offsite disposal would be done in accordance with approved local and State waste-disposal procedures and regulations. FPL would prepare a Post-Certification Waste Management Plan prior to removal of vegetation.

Table 4-15. Anticipated Annual Average Atmospheric Emissions (T/yr) Associated with Site Preparation and Construction of Proposed Units 6 and 7

Type	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOCs
Fugitive dust onsite	83.55	10.35				
Fugitive dust offsite (FPL-owned)	11.77	1.78				
Burning of vegetation	2.54	2.21			12.54	1.12
Boiler, batch plant, construction equipment onsite	15.48	12.31	133.44	0.67	111.91	12.67
Construction equipment offsite (FPL-owned)	2.67	2.67	48.15	0.09	46.36	5.35
Total Construction Emissions	**116.01**	**29.32**	**181.59**	**0.76**	**170.81**	**19.14**

CO = carbon monoxide; $PM_{2.5}$ = particulate matter with an aerodynamic diameter of 2.5 microns or less; PM_{10} = particulate matter with an aerodynamic diameter of 2.5 microns or less; NO_x = nitrogen oxides; SO_2 = sulfur dioxide; T/yr = tons per year; VOCs = volatile organic compounds.

As required by FDEP Rule 62-296.320(4)(c)3, F.A.C. (Fla. Admin. Code 62-296-TN555), reasonable precautions need to be implemented to prevent fugitive particulate emissions. FPL stated that prior to beginning construction activities it would develop a dust-control plan that identifies specific measures to implement to minimize fugitive dust emissions. This plan would describe the management controls and measures that FPL intends to implement to minimize the impacts of fugitive dust emissions on air quality. Current policies and procedures at the Turkey Point site address the requirements of regulations and permits. These policies and procedures may need to be supplemented to address specific measures to mitigate the air-quality impacts of the construction of proposed Units 6 and 7.

The dust-control plan would also identify specific mitigation measures to control fugitive dust and other emissions. Section 4.4.1.2 of the ER (FPL 2014-TN4058) lists mitigation measures specifically related to dust control that could be used. These measures include the following:

- stabilizing construction roads and unsuitable soils piles
- limiting speed on unpaved roads
- watering unpaved roads

- performing housekeeping (e.g., removing dirt spilled onto paved roads)
- covering haul trucks when loaded or unloaded
- minimizing material handling (e.g., drop heights, double handling)
- ceasing grading and excavation during high winds and air-pollution episodes
- re-vegetating road medians and slopes.

Finally, the plan would include control strategies to minimize daily emissions by phasing the project and performing construction vehicle maintenance.

Construction and preconstruction activities, such as operation of on-road construction vehicles, commuter vehicles, non-road construction equipment, and marine engines would also result in greenhouse gas (GHG) emissions, principally carbon dioxide (CO_2). The GHG footprint for two new nuclear units at the Turkey Point site is estimated to be 78,000 MT CO_2 equivalent (CO_2e) (an emission rate of about 11,100 MT CO_2e annually, averaged over the preconstruction/ construction period of 7 years). This is about 0.004 percent of the 290 million MT CO_2e total GHG emissions for the State of Florida in 2007 (FDEP 2010-TN2997). This also equates to about 0.0002 percent of the total U.S. annual emission rate of 6.5 billion MT CO_2e (EPA 2014-TN4008). Appendix J of this EIS provides the details of the review team's estimate for a reference 1,000 MW(e) nuclear power plant.

Based on its assessment of the relatively small construction equipment GHG footprint compared to total Florida and U.S. annual GHG emissions, the review team concludes that the atmospheric impacts of GHG from construction and preconstruction activities would not be noticeable and additional mitigation would not be warranted.

In general, emissions from construction and preconstruction activities (including GHG emissions) would vary based on the level and duration of a specific activity, but the overall impact would be expected to be temporary and limited in magnitude. Considering the information provided by FPL and its commitment to developing and implementing a dust-control plan that would reduce particulate emissions plus other pollutants, as well as strategies to minimize daily emissions by phasing the project and performing construction vehicle maintenance, the review team concludes that the impacts from construction and preconstruction activities on air quality would not be noticeable because appropriate mitigation measures would be adopted.

4.7.2 Transportation

In its ER (FPL 2014-TN4058), FPL estimates the maximum workforce for proposed preconstruction activities of about 1,200 workers; while a maximum workforce of 3,950 workers, working an average of 40 hours per week, would be needed for the construction of proposed Units 6 and 7. The workforce would be divided into two shifts with 70 percent assigned to the day shift and 30 percent to a swing shift. Each construction worker would be assumed to use a single vehicle to commute to and from work. The associated transportation trips would add the following emissions to Miami-Dade County: an additional 0.86 T/yr of PM_{10} (particulate matter with an aerodynamic diameter of 2.5 microns or less), 0.78 T/yr of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5 microns or less), 74.6 T/yr of NO_x (nitrogen oxides), 0.30 T/yr of SO_2 (sulfur dioxide), 689 T/yr of CO (carbon monoxide), and 70.9 T/yr of VOCs (volatile organic carbons).

The current primary access road to Turkey Point site is a two-lane undivided road that would likely experience a significant increase in traffic during shift changes that could lead to periods of congestion and decreased air quality. FPL intends to develop a second entrance to relieve this congestion. Although the second entrance would not be completed before construction is scheduled to begin, it would be available within a few months.

Workforce transportation would also result in GHG emissions, principally CO_2. Assuming a 7-year period for construction and preconstruction activities and a typical workforce, the review team estimates that the total workforce GHG emission footprint for building up to two nuclear power plants at the Turkey Point site to be on the order of 86,000 MT CO_2e (an emission rate of about 12,300 MT CO_2e annually, averaged over the period of construction/preconstruction). This is about 0.004 percent of the 290 million MT CO_2e total GHG emissions for the State of Florida in 2007 (FDEP 2010-TN2997). This also equates to about 0.0002 percent of the total U.S. annual emission rate of 6.5 billion MT CO_2e (EPA 2014-TN4008). Appendix J of this EIS provides the details of the review team's estimate for a reference 1,000 MW(e) nuclear power plant.

Based on the roadway improvement plan and the generally favorable meteorological conditions for dispersal of air pollutants, the review team concludes that the impact on local air quality from the increase in vehicular traffic related to construction and preconstruction activities would be temporary and would not be noticeable. Based on its assessment of the relatively small construction and preconstruction workforce GHG footprint compared to the Florida and U.S. annual CO_2 emissions, the review team concludes that the atmospheric impacts of GHG from workforce transportation would not be noticeable, and additional mitigation would not be warranted.

4.7.3 Summary of Meteorological and Air-Quality Impacts

The review team evaluated the potential impacts on air quality associated with criteria pollutants and GHG emissions during Turkey Point site-development activities. The review team determined that the impacts would be minimal. On this basis, the review team concludes that the impacts of Turkey Point site development on air quality from emissions of criteria pollutants and GHGs would be SMALL, and that no further mitigation would be warranted. Because the NRC-authorized construction activities represent only a portion of the analyzed activities, the NRC staff concludes that the air-quality impacts of NRC-authorized construction activities would also be SMALL; the NRC staff also concludes that no further mitigation, beyond FPL's commitments, would be warranted.

4.8 Nonradiological Health Impacts

Nonradiological health impacts on the public and workers from building the proposed Turkey Point Units 6 and 7 include exposure to dust and vehicle exhaust, occupational injuries, and noise, as well as the transport of materials and personnel to and from the site. The land around the Turkey Point site is almost exclusively undeveloped and characterized by wetlands and occasional wooded tracts (FPL 2014-TN4058). The closest incorporated communities are Florida City and Homestead. Florida City is 8 mi west of the site and the municipal limits of Homestead are 4.5 mi west of the site. The nearest residences are approximately 2.7 mi

(Biscayne National Park and Homestead Bayfront Park transient residences for staff and visitors) and 3.9 mi (permanent residence) from the proposed Units 6 and 7 plant area. Biscayne Bay is immediately adjacent to the Turkey Point site (Figures 2-1 and 2-2 in Section 2.1) and the proposed Units 6 and 7 plant area. The area to the south and southwest of the site consists primarily of marshland and glades and remains sparsely populated. Extrapolating from data in the ER (FPL 2014-TN4058) and the FSAR (FPL 2015-TN4502), in 2010 approximately 139,000 people lived within 10 mi of the site and approximately 50,000 others are estimated to have worked or visited within this radius (e.g., at Turkey Point, commercial locations, and recreational areas). People who are vulnerable to nonradiological health impacts from site-preparation and construction-related activities include construction workers and personnel working at Turkey Point; people working or living in the vicinity or adjacent to the site; and transient populations in the vicinity (i.e., temporary employees, recreational visitors, tourists).

4.8.1 Public and Occupational Health

This section discusses the impacts of building proposed Units 6 and 7 on the nonradiological health of the public and the impacts from site preparation and development on the nonradiological health of workers. Section 2.10 provides background information about the affected environment and nonradiological health at and within the vicinity of the Turkey Point site.

4.8.1.1 Public Health

The physical impacts on the public from development activities at the Turkey Point site could include noise, odors, exhausts, and thermal emissions. FPL states in its ER that these physical impacts would be temporary and managed in compliance with applicable Federal, State, and local environmental regulations and would not significantly affect the Turkey Point site and the vicinity (FPL 2014-TN4058). Fugitive dust and fine particulate matter emissions, including PM_{10}, would be generated during excavation, backfilling, grading and compacting, concrete batching, vehicular travel over paved and unpaved roads, and when using sources of fill material to raise the elevation of the Units 6 and 7 plant area.

Construction equipment and offsite vehicles used for hauling debris, soil, construction equipment, and supplies would also produce emissions. Wind erosion over exposed land area might also generate fugitive dust, smoke, and other fine particulate emissions. Open burning associated with site-preparation activities could be conducted as needed.

As discussed in Section 4.7, operational controls would be imposed, and will be fully described in the applicant's dust-control plan, to minimize fugitive dust and vehicular emission; these controls would include paving disturbed areas, using water suppression, covering truck loads and debris stockpiles, minimizing material handling, limiting vehicle speed, inspecting emission-control equipment, and maintaining fuel-burning equipment in good mechanical order and in accordance with local, State, and Federal emission standards (FPL 2014-TN4058). Given these measures, it is anticipated that no discernible impact on the local air quality in the vicinity of the Turkey Point site would be realized. Furthermore, there would be no general public access to the proposed plant area and, as discussed in Section 2.10 and as seen in Figure 2-41, the nearest residence (the transient residences in Homestead Bayfront Park) is approximately 2.7 mi from the proposed units at the Turkey Point site. Given the fugitive dust-

suppression and vehicle exhaust emission-control measures discussed above, the applicant's compliance with Federal, State, and local air emission regulations, and the general public's distance from the site, the review team expects that the nonradiological impacts on public health from site-preparation and construction air emissions would be negligible and that additional controls beyond the actions identified above would not be warranted.

4.8.1.2 Construction Worker Health

The U.S. Bureau of Labor Statistics (BLS) reports take into account occupational injuries and illnesses as total recordable cases, which includes those cases that result in death, loss of consciousness, days away from work, restricted work activity or job transfer, or medical treatment beyond first aid. As noted in Section 2.10, the total recordable cases rate published by the BLS for 2010 for heavy and civil engineering construction was 3.8 per 100 full-time workers in the United States overall and 3.4 per 100 full-time workers in Florida. These rates are substantially lower than rates from previous years and are a culmination of several years of decreasing rates.

FPL used 2008 rates to estimate the number of total recordable cases for the site preparation and construction of proposed Units 6 and 7 (FPL 2014-TN4058). The national and State total recordable case rates were multiplied by the number of workers. The annual average total recordable cases for the 120-month period encompassing site-preparation, LWA, and construction activities were estimated by FPL for both units as well as the peak annual (12 months) total recordable cases. The resulting estimates are an annual average of 86 (based on U.S. data) and 93 (based on Florida data) recordable cases and a peak 12-month amount (months 34 to 45) of 161 (U.S.) and 173 (Florida) recordable cases. Over the entire 120-month site-preparation and construction period, the total numbers of recordable cases are estimated to be 860 (U.S.) and 930 (Florida).

The ER did not provide estimates of fatal injuries during site preparation and construction. Using an approach similar to that used for non-fatal injuries and illnesses, and using the latest fatal injuries annual U.S. rate (for 2007) of 10.4 per 100,000 from Section 2.10, Table 2-60, the staff estimated annual average number of fatalities during site preparation and construction of proposed Units 6 and 7 is 0.2; the peak 12-month amount is 0.4. Over the entire 120-month site-preparation and construction period, the total number of fatal injuries is estimated to be 2.2.

When interpreting these results, it is especially important to note that they are gross (total) injury estimates. If the workers were not employed building proposed Units 6 and 7, they would be doing other work or would be unemployed. Furthermore, as noted in Section 2.10, the injury rate for employment in utility construction is low compared to most other construction activities. Thus, the estimates developed above are conservative worst-case estimates of the impact of Turkey Point site-preparation and construction activities on workplace injuries.

Also of note is that the occupational injury and fatality risks are reduced by strict adherence to NRC and OSHA (29 CFR 1910) (TN654) safety standards, practices, and procedures. Appropriate State and local statutes also must be considered when assessing the occupational hazards and health risks associated with site preparation and construction. FPL is expected to

fully adhere to NRC, OSHA, and State safety standards, practices, and procedures during any activities related to site preparation/excavation or building the proposed facility.

Other nonradiological impacts on workers who are clearing land or building the facility discussed in this section include noise, fugitive dust, and gaseous emissions resulting from site-preparation and development activities. Control measures discussed in this section for the public, such as operational controls and practices, would also help limit exposure to workers (FPL 2014-TN4058). Onsite impacts on workers also would be minimized through adherence to an industrial safety program instituted by FPL that meets all applicable Federal and State safety requirements, as well as training and use of personal protective equipment to minimize the risk of potentially harmful exposures (FPL 2014-TN4058). Emergency first-aid care and regular health and safety monitoring of personnel also could be undertaken.

4.8.1.3 Summary of Public and Construction Worker Health Impacts

Based on adherence to permits and authorizations required by State and local agencies, control measures identified by FPL in its ER, and the review team's independent evaluation, the review team concludes that the nonradiological health impacts on the public and on workers for site-preparation and construction activities would be minimal, and no further mitigation would be warranted.

4.8.2 Noise Impacts

Development of a nuclear power plant project is similar to development of other large industrial projects and involves many noise-generating activities. The impact of noise upon humans is difficult to determine because of the varying (subjective) responses of humans to the same or similar noise patterns. Regulations governing noise from activities are generally limited to worker health. Federal regulations governing construction noise are found in 29 CFR Part 1910 (TN654) and 40 CFR Part 204 (TN653). The regulations in 29 CFR Part 1910 address noise exposure in the construction environment and the regulations in 40 CFR Part 204 generally govern the noise levels of compressors.

The noise impacts of proposed Units 6 and 7 site-preparation and construction activities were evaluated by FPL (2010-TN272). The evaluation considered construction equipment associated with daytime and nighttime site preparation and construction of permanent features, such as foundations, buildings, cooling towers, and other components of each unit. Limited or no weekend construction is anticipated. The noise sources used for the evaluation were typical of conservative noise levels from similar equipment. The highest levels of construction noise from the proposed Units 6 and 7 plant area would be generated by impact wrenches, cranes, backhoes, front-end loaders, trucks, bulldozers, and operation of the concrete batch plant. The analysis predicts that the highest onsite construction noise level would be between 70 and 90 dBA (measured at a distance of 50 ft), although levels as high as 102 dBA are possible intermittently from sources such as bulldozers and pile drivers.

As illustrated in Table 2-60 in Section 2.10.2, noise strongly lessens with distance. Thus, peak noise levels of 95 dBA at a distance of 50 ft from the source would decrease to approximately 77 dBA at 400 ft. For context, and as described in Section 2.10, the sound intensity of a quiet

office is 50 dBA, normal conversation is 60 dBA, busy traffic is 70 dBA, and a noisy office with machines or an average factory is 80 dBA. In contrast, based on the Turkey Point noise study (FPL 2009-TN1246; FPL 2010-TN272), which used both background noise measurements and noise modeling, the closest residences, which are 2.7 mi away at Homestead Bayfront Park, would experience a maximum noise level during the site-preparation and construction phase for proposed Units 6 and 7 of about 64.4 dBA during the daytime and 54.2 dBA during the nighttime, which would be equal or close to the measured background noise levels of 64.4 dBA during the daytime and 54.1 dBA during the nighttime. The day-night average sound level (L_{dn}) (calculated using the approach described in Section 2.10.2, which adds 10 dBA to nighttime sound levels) for both situations is estimated at 64.3 dBA, indicating that site-preparation and construction would have no impact at this location. Similarly, the nearest residences at Homestead Bayfront Park (2.7 mi from the proposed units) would experience a maximum noise level during the site-preparation and construction phase of about 49.7 dBA during the daytime and 47.8 dBA during the nighttime, which would be close to the measured background noise levels of 49.4 dBA for the daytime and 47.2 dBA for the nighttime. The L_{dn} at this location during the site-preparation and construction phase for proposed Units 6 and 7 thus would be about 55.4 dBA, while the background L_{dn} would be about 54.9 dBA, which indicates that site-preparation and construction would have little or no impact at this location. The day-care facility (2 mi from the proposed units), would experience a maximum noise level during the site-preparation and construction phase of about 50.2 dBA during the daytime and 50.4 dBA during the nighttime, which would be close to the measured background noise levels of 44.1 dBA for the daytime and 47.9 dBA for the nighttime. The L_{dn} at this location during the site-preparation and construction phase thus would be about 58.4 dBA, while the background L_{dn} would be about 55.1 dBA, which indicates that site-preparation and construction would have minimal impact at this location. Furthermore, as described in Section 2.10.2, NUREG–1437 (NRC 2013-TN2654) notes that L_{dn} noise levels below 60 to 65 dBA, as at these locations, are considered to be of small significance.

More recently, the impacts of noise were considered in NUREG–0586, Supplement 1 (NRC 2002-TN665). The criterion for assessing the level of significance was not expressed in terms of sound levels, but was based on the effect of noise on human activities and on threatened and endangered species. The criterion in NUREG–0586, Supplement 1 (NRC 2002-TN665) is stated as follows:

> The noise impacts...are considered detectable if sound levels are sufficiently high to disrupt normal human activities on a regular basis. The noise impacts...are considered destabilizing if sound levels are sufficiently high that the affected area is essentially unsuitable for normal human activities, or if the behavior or breeding of a threatened and endangered species is affected.

Based on the temporary nature of building activities and the location and characteristics of the Turkey Point site, including its large size and exclusion area, as well as the distance to the nearest residences, the noise impacts from building proposed Units 6 and 7 would be minimal, and further control measures, beyond limiting activities to daytime hours would not be warranted.

As described in Section 4.4.1 of the ER (FPL 2014-TN4058), other noise generated by building proposed Units 6 and 7 would be the noise levels resulting from building new transmission systems and substation expansions. The noise generated from building the transmission lines and expansion of substations would include right-of-way clearing, access road and pad construction (where necessary), line construction, and right-of-way restoration. The noise-generating machinery required for these phases of building would include bulldozers, shearing machinery, chain saws, trucks, cranes, and possibly helicopters. The transmission line construction and expansion within the West corridor would be primarily on wetlands or agricultural or undeveloped land; therefore, any noise from the construction would be lessened prior to reaching receptors in the urban areas. The transmission line construction and expansion within the East corridor would be primarily on urban land. The noise would be attenuated by distance from the source. The transmission line construction activities would be taking place in both agricultural areas, where few people would be affected by the additional noise, and urban settings, where people already experience noise from construction, traffic, etc. Also, this phase of construction would be accelerated, short-term, and performed during daytime hours. Therefore, noise generated by the construction of the transmission systems and substations would result in small impacts and would not warrant mitigation.

As also described in the ER (FPL 2014-TN4058), noise related to building proposed Units 6 and 7 would be generated by building roadway expansions and improvements and an increase in traffic by the construction workforce on access roadways and onsite roads. The roadway construction noise would be associated with jack hammers, bulldozers, road pavers, road scrapers, earth movers, and trucks. The road expansions and the new access road would be constructed on agricultural or undeveloped land; therefore, any noise from the construction would be lessened prior to reaching receptors in the urban areas. Other road improvements would be made along existing roadways. The noise generated by these road construction activities would be of short duration and during daytime hours. Noise from the increase in traffic caused by the construction workforce would occur on existing roadways as well as the road extensions once they are completed and on the Turkey Point site. Because of the short duration of construction activities in a single location and settings in urban areas or in agricultural or undeveloped areas with few receptors, and limiting road construction to daylight hours, the impacts from noise from road construction and traffic would be minimal and mitigation beyond limiting activities to daytime hours would not be warranted.

4.8.3 Impacts of Transporting Construction Materials and Personnel to the Turkey Point Site

This EIS assesses the impact of transporting workers and construction materials to and from the Turkey Point site from the perspective of three areas of impact: the socioeconomic impacts, the air-quality impacts of dust and particulate matter emitted by vehicle traffic, and potential health impacts due to additional traffic-related accidents. Human health impacts are addressed in this section, while the socioeconomic impacts are addressed in Section 4.4, and air-quality impacts in Section 4.7.2. The impacts evaluated in this section for two new nuclear generating units at the Turkey Point site are appropriate for characterizing the alternative sites discussed in Section 9.3 of this EIS. Alternative sites evaluated in this EIS include the existing Turkey Point site (proposed) and alternative sites at Martin, Glades, Okeechobee 2, and St. Lucie. There is no meaningful differentiation among the proposed and the alternative sites regarding the

nonradiological environmental impacts from transporting construction materials and personnel to the Turkey Point site and alternative sites, so these issues are not discussed further in Chapter 9.

The general approach used to calculate nonradiological impacts of fuel and waste shipments is the same as that used for transportation of construction materials and construction personnel to and from the Turkey Point site. The assumptions made to provide reasonable estimates of the parameters needed to calculate nonradiological impacts are discussed below. In the ER (FPL 2014-TN4058), FPL estimated material quantities for building two new AP1000 reactors. The review team divided these values by two to obtain the per-unit material requirements and estimated the following: approximately 77,200 yd^3 of concrete; 16,400 T of structural steel and rebar; 810,000 linear ft of cable; 298,000 linear ft of piping, and 7,200,000 yd^3 of backfill material. For consistency with previous environmental reviews, the staff increased the quantity of cable to 6.5 million linear ft per unit. Additional information used to develop the nonradiological impact estimates is as follows:

- The review team assumed that shipment capacities are approximately 13 yd^3 of concrete, 11 T of structural steel, 3,300 linear ft of piping and cable, and 20 yd^3 of backfill per shipment. It was assumed that these materials would be transported to the site over an estimated 5-year delivery schedule for COL activities outlined in the ER (FPL 2014-TN4058).

  The peak monthly workforce during the building of the two units was used to calculate the nonradiological transportation impacts. The peak monthly workforce was obtained by dividing in half the peak monthly workforce for building two units. In its ER (FPL 2014-TN4058), FPL estimated that a maximum of 3,950 workers would travel to and from the site on a daily basis during the peak building period for two units. The review team assumed that one-half of the workers, or 1,975 persons, would be assigned to each unit. Assuming conservatively that the average vehicle occupancy is 1 person per vehicle, there would be about 1,975 vehicles per day per unit. Each person was assumed by the review team to travel to and from the Turkey Point site 250 days per year.

- The review team assumed the average shipping distance for construction materials to be 50 mi one way based on the region of influence. The review team assumed the backfill material would be transported approximately 15 mi one way to bound the nonradiological impacts of traffic accidents (note there is an existing structural fill source less than 5 mi (8 km) from the proposed site).

- The review team assumed the average commuting distance for construction workers to be 20 mi one way. This assumption is based on U.S. Department of Transportation (DOT) data, which estimated the typical commute to be approximately 16 mi one way (DOT 2003-TN297).

- Accident, injury, and fatality rates for transporting building materials were taken from Table 4 in the *State-level Accident Rates for Surface Freight Transportation: A Reexamination* (Saricks and Tompkins 1999-TN81). Rates for the State of Florida were used for construction material shipments, which are typically conducted in heavy-combination trucks. The data provided by Saricks and Tompkins (1999-TN81) are representative of heavy-truck accident rates and do not specifically address the impacts associated with commuter traffic (i.e., workers traveling to and from the site). However, a single source that provided all three

rates to estimate the impacts from worker transportation to and from the site was not available. To develop representative commuter traffic impacts, a source was located that provided a Florida-specific fatality rate for all traffic for the years 2004 through 2008 (DOT 2008-TN411). The average fatality rate for the 2004 through 2008 period in Florida was used as the basis for estimating Florida-specific injury and accident rates and adjustment factors were developed using national-level traffic accident statistics from *National Transportation Statistics 2010* (DOT 2010-TN408). The adjustment factors are the ratio of the national injury rate to the national fatality rate and the ratio of the national accident rate to the national fatality rate. These adjustment factors were multiplied by the Florida-specific fatality rate to approximate the injury and accident rates for commuters in the State of Florida.

- The DOT Federal Motor Carrier Safety Administration evaluated the data underlying the Saricks and Tompkins (1999-TN81) rates, which were taken from the Motor Carrier Management Information System, and determined that the rates were under-reported. Therefore, the accident, injury, and fatality rates from Saricks and Tompkins (1999-TN81) were adjusted using factors derived from data provided by the University of Michigan Transportation Research Institute (Blower and Matteson 2003-TN410). The University of Michigan Transportation Research Institute data indicate that accident rates for 1994 to 1996, the same data used by Saricks and Tompkins (1999-TN81), were under-reported by about 39 percent. Injury and fatality rates were under-reported by 16 percent and 36 percent, respectively. As a result, the accident, injury, and fatality rates were increased by factors of 1.64, 1.20, and 1.57, respectively, to account for the apparent under-reporting. These adjustments were applied to the construction materials, which are transported by heavy-truck shipments similar to those evaluated by Saricks and Tompkins (1999-TN81) but not to commuter traffic accidents.

The estimated nonradiological impacts of transporting construction and backfill materials to the proposed Turkey Point site and of transporting construction workers to and from the site are listed in Table 4-16. The estimates would be doubled for the building of two units at the Turkey Point site. Based on Table 4-16, the nonradiological impacts are dominated by the transport of construction workers and backfill materials to and from the Turkey Point site. The estimated total annual transportation-related fatalities related to building the facility represent about a 0.2 percent increase above the average 316 traffic fatalities per year that occurred in Miami-Dade County, Florida, from 2004 to 2008 (DOT 2008-TN412). Increases for alternative sites were about 1.9 percent for the Martin site in Martin County (DOT 2008-TN413), 8.1 percent for the Glades site in Glades County (DOT 2008-TN414), 4.7 percent for the Okeechobee 2 site in Okeechobee County (DOT 2008-TN415), and 1.4 percent for the St. Lucie site in St. Lucie County (DOT 2008-TN416). These increases are small relative to the current traffic fatality risks in the areas surrounding the proposed Turkey Point site and alternative sites.

Based on the information provided by FPL, the review team's independent evaluation, and consideration of the number of shipments of building materials and the number of workers that would be transported to the site, the review team concludes that the nonradiological health impacts from transporting building materials and personnel to the proposed FPL site and alternative sites would be small, and no mitigation would be warranted.

Table 4-16. Estimated Impacts of Transporting Workers and Materials to and from the Turkey Point Site for a Single Unit

	Accidents per Year Per Unit	Injuries per Year Per Unit	Fatalities per Year Per Unit
Workers	**$4.6 \times 10^{+1}$**	**$2.1 \times 10^{+1}$**	**3.2×10^{-1}**
Materials			
Concrete	2.8×10^{-2}	1.6×10^{-2}	3.2×10^{-3}
Rebar, Structural Steel	6.9×10^{-3}	4.1×10^{-3}	8.0×10^{-4}
Cable	9.3×10^{-3}	5.4×10^{-3}	1.1×10^{-3}
Piping	4.2×10^{-4}	2.5×10^{-4}	4.9×10^{-5}
Backfill	2.5×10^{0}	1.5×10^{0}	2.9×10^{-1}
Total – Construction	**$4.9 \times 10^{+1}$**	**$2.2 \times 10^{+1}$**	**6.1×10^{-1}**

4.8.4 Summary of Nonradiological Health Impacts

As part of its evaluation of nonradiological health impacts, the review team considered the mitigation measures identified by FPL in its ER (FPL 2014-TN4058) and relevant permits and authorizations required by State and local agencies for building proposed Units 6 and 7. The review team evaluated nonradiological impacts on public health and on construction workers from fugitive dust, occupational injuries, noise, and transport of materials and personnel to and from the proposed Turkey Point Units 6 and 7 plant area. No significant impacts related to the nonradiological health of the public or workers were identified during the course of the review. Based on information provided by FPL and the review team's independent evaluation, the review team concludes that the nonradiological health impacts of site-preparation and construction activities associated with the proposed Units 6 and 7 would be SMALL, and no further mitigation would be warranted. Based on the above analysis, and because NRC-authorized construction activities represent only a portion of the analyzed activities, the NRC staff also concludes that the nonradiological health impacts of NRC-authorized construction activities would be SMALL and that control measure, beyond those described above would be warranted.

4.9 Radiation Exposure to Construction Workers

The sources of radiation exposure for construction workers include direct radiation exposure, exposure from liquid radiological waste discharges, and exposure from gaseous radiological effluents from existing Turkey Point Units 3 and 4 during the construction phase. In addition, during the construction of proposed Unit 7, workers would be exposed to radiation from proposed Unit 6. For the purposes of this discussion, construction workers are assumed to be members of the public; therefore, the dose estimates for the construction workers are compared to the dose limits for the public, pursuant to 10 CFR Part 20, Subpart D (TN283). FPL noted that all major building activities are expected to occur outside of the Turkey Point Units 3 and 4 exclusion area boundary, but inside the Turkey Point site boundary (FPL 2014-TN4058).

4.9.1 Direct Radiation Exposures

In its ER (FPL 2014-TN4058), FPL identified two sources of direct radiation exposure from the Turkey Point site: (1) Turkey Point Units 3 and 4 equipment associated with spent fuel and radwaste storage and handling; and (2) the independent spent fuel storage installation. In addition, FPL identified Unit 6 as a source of direct radiation exposure to Unit 7 construction

workers. The NRC staff did not identify any additional sources of direct radiation during the June 2010 site visit or during document reviews.

FPL uses fence-line thermoluminescent dosimeters (TLDs) and environmental TLDs around the Turkey Point site. Although FPL's TLD measurements do not show any measurable increase in direct doses from Units 3 and 4 compared to the preoperational surveillance program, FPL conservatively assumed a direct radiation dose rate of 1 mrem/yr from each unit. FPL applied an occupancy time of 2,080 hr/yr resulting in a direct radiation dose from Units 3 and 4 of 0.47 mrem (FPL 2014-TN4058). In addition, for a fully loaded independent spent fuel storage installation (ISFSI), FPL calculated an annual dose to the construction worker of 0.013 mrem (FPL 2014-TN4058). Compared to the assumed dose contribution of 1 mrem per year from each of the existing units, the calculated dose rate of 0.013 mrem/yr from a fully loaded ISFSI is negligible.

According to Section 12.4.2.1 of the AP1000 Design Control Document (Westinghouse 2011-TN261), refueling water would be stored inside the containment instead of in an outside storage tank, as at other facilities, so it would not contribute significantly to external radiation levels at the proposed Turkey Point Unit 6 fence line. FPL stated that direct radiation exposure to construction workers beyond the proposed Turkey Point Unit 6 fence line from the containment building and other facility buildings would be negligible (FPL 2014-TN4058).

In addition, at certain times during construction, FPL would receive, possess, and use specific radioactive byproduct, source, and special nuclear materials in support of construction and preparations for operation. These sources of low-level radiation are required to be controlled by FPL's radiation protection program and have very specific uses under controlled conditions. Therefore, these sources are expected to result in a negligible contribution to construction worker doses.

4.9.2 Radiation Exposures from Gaseous Effluents

As presented in the ER (Section 4.5.3), FPL estimated the doses to construction workers at proposed Turkey Point Unit 7 from Turkey Point Unit 6 operation using expected annual airborne effluent releases (FPL 2014-TN4058). For the proposed Unit 6, the gaseous releases would come from the nuclear power station vent or the turbine building vent. The nuclear power station vent contains the following discharges: containment venting releases, auxiliary building ventilation releases, annex building releases, radwaste building releases, and the gaseous radioactive system releases. The turbine building vent contains the following discharges: condenser air removal system releases, gland seal condenser exhaust releases, and turbine building ventilation releases. For gaseous releases from Turkey Point Units 3 and 4, FPL determined the bounding releases based on the annual effluent reports from 2004 to 2008 (FPL 2014-TN4058). Using GASPAR II (Strenge et al. 1987-TN83), FPL estimated a total body dose from Unit 6 of approximately 5.2 mrem/yr based on a worker occupancy assumed to be 2,080 hours annually (FPL 2014-TN4058). The NRC staff performed confirmatory dose calculations using information contained in the FPL ER and 2 years of meteorological data as discussed in Appendix G.

4.9.3 Radiation Exposures from Liquid Effluents

In ER Section 4.5.2 (FPL 2014-TN4058), FPL discussed the radiation exposure from liquid effluents. FPL states that potable water for proposed Units 6 and 7 would be supplied from the MDWASD. Thus, a drinking water exposure pathway is not possible for the construction workers. Units 3 and 4 liquid effluents are released into the cooling-canal system (CCS), which is a possible exposure source for workers coming in contact with the CCS water or adjacent soils. FPL states that these pathways would be managed to ensure that doses are negligible (FPL 2014-TN4058).

As stated in Section 3.4.3, liquid effluents from proposed Units 6 and 7 would be discharged via deep-well injection. Therefore, during the construction of Unit 7, there would no Unit 6 liquid pathway dose due to normal plant operations.

4.9.4 Total Dose to Construction Workers

The maximum peak construction workforce for proposed Unit 7 during any month while proposed Unit 6 is operational would be no more than 2,800 people, assuming a site occupancy per construction worker of 2,080 hours annually. In addition, while this peak is assumed to last less than a year, for conservatism, FPL assumed that this peak workforce would be maintained over the course of an entire year (FPL 2014-TN4058). FPL estimated the annual dose to construction workers would be approximately 6.0 mrem based on the FPL workforce occupancy. This estimated total dose to construction workers is less than the 100-mrem annual dose limit to an individual member of the public found in 10 CFR 20.1301 (TN283).

The maximum estimated annual collective dose to construction workers, based on an annual individual worker dose of approximately 6.0 mrem and an estimated workforce of 2,800 workers, is approximately 17 person-rem (FPL 2014-TN4058; FPL 2015-TN4502). The maximum annual dose to a construction worker of 6.0 mrem/yr is much smaller than the approximately 311 mrem/yr that residents of the United States receive on average from background radiation (NCRP 2009-TN420).

4.9.5 Summary of Radiological Health Impacts

The NRC staff concludes that the estimate of doses to construction workers during the building of the proposed Units 6 and 7 is well within the NRC annual exposure limits (i.e., 100 mrem) designed to protect public health. Based on information provided by FPL and the NRC staff's independent evaluation, the NRC staff concludes that the radiological health impacts on construction workers engaged in building activities related to proposed Units 6 and 7 would be SMALL, and no further mitigation would be warranted. The NRC regulates radiation exposure from all NRC-licensed activities. Therefore, NRC staff concludes the radiological health impacts for NRC-authorized construction of proposed Turkey Point Units 6 and 7 would be SMALL, and no further mitigation would be warranted.

4.10 Nonradioactive Waste Impacts

This section describes the environmental impacts that could result from the generation, handling, and disposal of nonradioactive waste during building activities related to proposed

Turkey Point Units 6 and 7. The types of nonradioactive waste that would be generated, handled, and disposed of during building activities include cleared vegetation, building material debris, municipal waste, spoils, stormwater runoff, sanitary waste, dust, and other air emissions. The assessment of potential impacts resulting from these types of wastes is presented in the following sections.

4.10.1 Impacts on Land

Land disturbance would occur on about 600 ac of the Turkey Point site, exclusive of areas that have been previously disturbed. This includes the areas for proposed Units 6 and 7, laydown, parking, the nuclear administration and training buildings, the heavy-haul road, equipment barge-unloading area, spoils areas, RCWs and pipelines, and the FPL RWTF and pipelines (FPL 2014-TN4058). Most of the proposed Units 6 and 7 plant area requiring clearing and grubbing consists of sparsely vegetated mudflats along with smaller areas of open water, mangrove swamps, uplands, wetlands, fill areas, and roadways. Most of the land disturbance would occur during preconstruction activities.

Offsite lands that would be disturbed include about 128 ac for improved roads and about 7,000 ac for the corridors for the reclaimed wastewater and potable water pipelines, transmission line corridors, upgraded substation areas, and associated access roads (FPL 2014-TN4058). Within the transmission line corridors, trees would be replaced with low-growth vegetation (FPL 2014-TN4058).

Three spoils areas for the disposal of unsuitable[8] soils, muck, and other materials would be created along the two sides of the main return canal and at the southern end of the IWF. The three spoils areas would cover a total of approximately 200 ac and would have a capacity of approximately 2 million cubic yards when filled to the design elevation of 16 to 20 ft NAVD88 (FPL 2014-TN4058).

During site preparation, cleared vegetation would be burned (see Section 4.10.3), disposed of offsite, or left to decompose within the cleared lands. Offsite disposal would be in accordance with approved local and State waste-disposal procedures and regulations (FPL 2014-TN4058). Some vegetation could be mowed, cut, or chipped, and then spread to decompose in place. Some vegetation may be removed with unsuitable soils and muck and be placed in one of the spoil areas where it would decompose in place.

Dredging in the equipment barge-unloading area would generate dredge spoil, which would be spread on the IWF berms (FPL 2014-TN4058). No dredge spoil would be disposed in the marine environment.

Most of the plant equipment would be produced offsite and delivered in modular units, thereby reducing the generation of onsite waste (FPL 2014-TN4058). Building activities would generate small quantities of waste, such as scrap wood, wallboard, plastics, paper, and metal, which would be salvaged, recycled, or disposed of in a local landfill appropriate for handling building debris. Municipal trash generated by the workforce during building activities may include food waste, glass, metals, cloth, plastics, and paper. Trash would be collected in appropriate waste containers and disposed of in an approved offsite location. Building waste and trash would be

(8) "Unsuitable" is defined as not meeting FPL's requirements for onsite reuse as fill or topsoil.

handled, transported, and disposed of in accordance with all applicable Federal, State, and local regulations (FPL 2010-TN272).

The slurry trenches for the proposed diaphragm walls for the two nuclear islands would be excavated in vertical panels, as opposed to continuous trenching, thereby minimizing slurry requirements and allowing greater slurry reuse. Excess slurry from the building of the diaphragm walls would be dewatered and disposed of in the onsite spoils storage areas (FPL 2014-TN4058).

Waste asphalt from building roads or pipelines would be disposed of in accordance with all applicable Federal, State, and local requirements (FPL 2010-TN272).

Engineering projections of the soil cut-and-fill balance indicate that the proposed project would require more than 13 million cubic yards of additional clean fill to reach design grades in the plant area and along transmission line corridors and access roads (FPL 2014-TN4058). Therefore, no clean[9] excavation spoils are expected to require disposition offsite. Little or no organic soil is expected to require disposition offsite.

Based on the proposed practices for minimizing solid waste generation and the plans to manage solid wastes in compliance with all applicable Federal, State, and local requirements and standards, the review team expects that impacts on land from nonradioactive solid wastes generated during the building of proposed Turkey Point Units 6 and 7 would be minimal, and no further mitigation would be warranted.

4.10.2 Impacts on Water

Building activities would generate liquid wastes from the sanitary wastewater-treatment system and from stormwater runoff.

During building activities, sanitation needs would be met by using portable sanitary waste facilities until completion of the packaged permanent wastewater-treatment facility, and as needed thereafter during peak construction periods (FPL 2014-TN4058). The temporary facilities could include centralized restroom and hand-washing trailers, as well as individual portable toilets. The provision of portable restrooms for building sites is governed by Fla. Admin. Code 64E-6.0101 (TN642). A licensed sanitary waste-disposal contractor would periodically remove, transport, and dispose of the sanitation waste (FPL 2014-TN4058).

FPL could use one of the UIC wells for sanitary wastewater disposal in accordance with the UIC permit (FPL 2014-TN4058).

FPL would use the Generic Permit for Stormwater Discharge from Large and Small Construction Activities administered by the FDEP for stormwater discharges during building activities. The application process for coverage under for the generic permit requires that FPL prepare a SWPPP and submit a Notice of Intent to the FDEP NPDES Stormwater Notices Center (FPL 2014-TN4058). Section 4.2.3.1 discusses the management of stormwater and the SWPPP.

(9) “Clean” spoils are defined as suitable for onsite reuse as fill or topsoil.

Runoff and erosion from the three spoils storage areas would be controlled by grading to limit surface flow into the IWF. Sediment-control materials could be used to further reduce the physical and ecological impacts of drainage from the spoils areas (FPL 2014-TN4058).

Based on the proposed practices for managing liquid wastes in compliance with all applicable Federal, State, and local requirements and standards, the review team expects that impacts on water from nonradioactive liquid wastes generated during buildings activities would be minimal, and no further mitigation would be warranted.

4.10.3 Impacts on Air

Building activities would cause impacts on air quality via the generation of dust, the burning of cleared vegetation, and combustion of fuel in vehicles and equipment. Air-quality impacts from building activities are discussed in detail in Section 4.7.1.

Building activities at the Turkey Point site would generate dust from earthmoving activities and from the travel of vehicles and equipment on unpaved roads. Once cleared, exposed land areas may also generate fugitive dust as a result of wind erosion (FPL 2014-TN4058).

Open burning of vegetation from land clearing would generate additional particulate emissions. Burning would take place in accordance with Miami-Dade County Fire Rescue Department, Fire Prevention Division requirements if a permit was issued (Miami-Dade County 2012-TN1039). After permit issuance, burning would be contingent upon daily approval by the Miami-Dade County Fire Communication Office.

The large mass of concrete required for the building foundations and other structures would require the installation and operation of a temporary concrete batch plant. Activities at the batch plant associated with the movement of aggregates and cement would generate dust. Mitigation measures, such as the use of dust-suppression water sprays on aggregate stockpiles, would minimize this dust generation. Because the concrete batch plant would be located far from the site boundaries, no discernible impacts are expected at offsite locations (FPL 2014-TN4058).

The operation of diesel-powered heavy equipment would generate additional particulate emissions, primarily PM_{10} and smaller, as well as the gaseous combustion byproducts SO_2, NO_x, and CO. FPL has estimated the emissions from diesel engines and construction equipment of CO, NO_x, VOC, PM_{10}, and SO_2 to average 63.7, 65.9, 8.3, 3.7, and 0.14 T/yr, respectively (FPL 2014-TN4058). These emissions are expected to be consistent with emissions from other building projects of this size, and there should be no significant impacts on air quality at offsite locations during the building period. Traffic caused by workers commuting to and from the Turkey Point site would also produce vehicle emissions.

Along the transmission line corridors, vegetation with a mature height exceeding 14 ft would be cleared. Upland areas without heavy vegetation would be mowed, leaving the low ground cover largely intact. FPL may perform any open burning within the transmission line corridors (FPL 2010-TN272).

In general, emissions from building activities (including GHG emissions) would vary based on the level and duration of a specific activity, but the overall impact is expected to be temporary and limited in magnitude. During building, FPL would implement emission controls, mitigation

measures, and air-quality monitoring. The review team expects that impacts on air from nonradioactive airborne wastes generated during building activities would be minimal, and no further mitigation would be warranted.

4.10.4 Summary of Nonradioactive Waste Impacts

Solid, liquid, and gaseous wastes generated when building proposed Turkey Point Units 6 and 7 would be handled according to County, State, and Federal regulations. Solid waste would be recycled, disposed of in existing, permitted landfills, or, in the case of vegetative waste only, chipped and spread onsite or burned in accordance with applicable regulations.

Sanitary wastes would be removed to an existing licensed sanitary waste-treatment facility or discharged into a UIC well after being treated by the onsite sanitary waste-treatment plant to the levels stipulated in the NPDES permit. A SWPPP would specify the mitigation measures to be put in place to manage stormwater runoff.

To avoid any noticeable, offsite air-quality impacts, BMPs to control dust and minimize vehicle emissions would be expected.

Based on information provided by FPL and the review team's independent evaluation, the review team concludes that nonradioactive waste impacts on land, water, and air would be SMALL, and additional mitigation would not be warranted. Because NRC-authorized construction activities represent only a portion of the analyzed activities, the NRC staff concludes that the nonradioactive waste impacts of NRC-authorized construction activities also would be SMALL, and no further mitigation would be warranted.

4.11 Measures and Controls to Limit Adverse Impacts During Construction Activities

In its evaluation of environmental impacts during building activities for the proposed Turkey Point Units 6 and 7, the review team relied on FPL's compliance with the following measures and controls that would limit adverse environmental impacts:

- compliance with applicable Federal, State, and local laws, ordinances, and regulations intended to prevent or minimize adverse environmental impacts
- compliance with applicable requirements of Federal and State permits or licenses required for building the new units (e.g., USACE Section 404 permit and the NPDES permit)
- identification of environmental resources and potential impacts during the development of the ER and the COL process
- incorporation of environmental protection requirements into construction contracts.

Table 4-17, which is the review team's adaptation from FPL's Table 4.6-1 (FPL 2014-TN4058), summarizes the measures and controls proposed by FPL to limit adverse impacts during the building of proposed Units 6 and 7 at the Turkey Point site.

Table 4-17. Summary of Measures and Controls Proposed by FPL to Limit Adverse Impacts During Construction and Preconstruction of Proposed Units 6 and 7

Impact Category	Specific Measures and Controls
Land-Use Impacts	
Site and Vicinity	According to FPL (ER Section 4.1.1.2) (FPL 2014-TN4058), site-preparation and site-development activities for proposed Units 6 and 7 would be conducted in accordance with applicable Federal, State, and local regulations and would be consistent with applicable zoning and land-use plans. FPL would acquire the necessary permits and authorizations (see Appendix H) and would implement environmental controls such as stormwater-management systems, fugitive dust control, and spill-containment controls before initiating earth disturbance. FPL stated (ER Section 4.1.1.2) (FPL 2014-TN4058) that it would use standard dust-control measures, and stabilize, contour, and revegetate permanently disturbed lands.
Transmission Line Corridors and Offsite Areas	FPL would be required to comply with applicable laws, regulations, and permit requirements. Standard industry construction practices that FPL proposes to use include erosion-control devices, matting to reduce compaction caused by equipment, use of wide-track vehicles when crossing wetlands, and restoration activities after the transmission lines are built. FPL has indicated that it will use existing rights-of-way to the extent practicable (FPL 2014-TN4058) and that it routinely uses standard industry construction practices, environmental Best Management Practices (BMPs), and mitigation measures to ensure adverse environmental effects of construction are avoided, minimized, or mitigated (FPL 2014-TN4058). FPL also stated that it will use restrictive land-clearing processes in forested wetland areas (right-of-way clearing and preparation), turbidity screens and erosion-control devices in areas of wetlands and water resources (access road/structure pad construction), existing access roads for ingress and egress to rights-of-way where available (access road/structure pad construction), and standard industry construction practices for foundation and structure excavation and construction (line construction).
Water-Related Impacts	
Hydrologic Alterations	Grouting at the base of the approximately 35 ft deep plant excavations and use of bentonite slurry walls would limit extraction of groundwater from the Biscayne aquifer and hydraulically isolate the plant excavations from Biscayne Bay and Biscayne National Park.
Water-Use Impacts	Areas affected by construction dewatering activities would be isolated with sheet piling technology or the equivalent if needed to control extraction of groundwater. The presence of the industrial wastewater facility and the berm to the east of the return canal would restrict surface-water flows and limit impacts on down-stream bodies of surface water or resources including wetlands and Biscayne Bay.
Water-Quality Impacts	Building activities related to the transmission lines and pipelines would comply with Federal and State regulations. Environmental BMPs would be applied, including use of existing rights-of-way to the extent practicable, erosion-control devices, matting to reduce compaction and post-construction restoration activities. Work would be performed under existing permits/plans and a stormwater pollution prevention plan (SWPPP) developed for the building activities.

Table 4-17. (contd)

Impact Category	Specific Measures and Controls
	Berms would be installed to direct onsite runoff to the industrial wastewater facility. Offsite: A perimeter berm could be used to restrict the flow of surface water onto the property. The berm could also be used in association with detention basins and a truck-wash facility to reduce surface-water runoff from the site and prevent soils from being unintentionally spread to offsite areas. Drainage ditches could be used to direct surface-water flow away from the site and could be reconnected to any drainage features that once flowed through the property to maintain surface flow. Cutoff walls (sheet piles) would be installed to isolate the equipment barge-unloading area from the turning basin. This work would be performed under permit requirements issued by the U.S. Army Corp of Engineers. Activities related to installation of deep-injection wells and injection monitoring wells is regulated by FDEP's Underground Injection Control Program and local permits. These regulations specify approved construction techniques and testing and monitoring requirements to ensure that groundwater quality is not adversely affected by construction of the wells. Any surface-water runoff related to construction of the deep-injection wells, monitoring wells, and associated equipment would be directed to the cooling canals of the industrial wastewater facility. Existing roads would be used to the extent practicable. Ditches and the use of culverts would allow stormwater drainage to be maintained along the road route. During onsite construction, stormwater runoff would be directed to retention basins before being discharged to the industrial wastewater facility. If modification to the existing draining ditches or drainage features is required, the impacts would be temporary and the disturbed areas would be returned to preconstruction conditions. All work would be performed in accordance with site-obtained permits. During offsite construction, surface water would be routed to areas that could accept the additional surface flow that would then alter the flow in the vicinity of the road. Cutoff wall technology including the use of a slurry wall could be used to limit potential impacts during construction dewatering activities. The water from dewatering activities would be directed into the cooling canals of the industrial wastewater facility. The construction activities would be performed in accordance with the required local, State, and Federal guidelines and accepted industry practices. The necessary permits would be obtained before beginning construction activities. The delivery pipeline routes would be recontoured afterward. Excavated material would be stockpiled in designated spoils areas. Sedimentation barriers would be installed to limit potential impacts on surface-water bodies. Sedimentation basins would also be used to minimize the potential for surface-water runoff impacts on nearby water bodies in accordance with FDEP regulations. Once construction activities are complete, the drainage would be restored to preconstruction conditions.

Table 4-17. (contd)

Impact Category	Specific Measures and Controls
	Sheet piles could be used to limit potential impacts during construction dewatering activities. Water from dewatering activities would be directed to the industrial wastewater facility. The necessary construction activities would be performed under a new SWPPP or under a modification of an existing Turkey Point SWPPP and associated spill-prevention plan that could include oil and fuel containment. Any minor spills of diesel fuel, hydraulic fluid, lubricants, or other construction-related pollutants during construction of the project would be cleaned up quickly to prevent them from moving into the groundwater or flowing to nearby surface water.
Ecological Impacts	
Terrestrial Ecosystems	Impacts on wetlands, including but not limited to mangrove forests, would be minimized by installation of culverts under existing road beds and the use of silt fences. Unavoidable wetland impacts would be mitigated through a series of wetland restoration projects on FPL-owned land and purchase of credits in two nearby wetland mitigation banks, the Everglades Mitigation Bank and Hole-in-the-Donut Mitigation Bank. Measures to reduce noise and vibration levels during construction may include staggering work activities and use of noise dampeners and noise-control equipment on vehicles and equipment. To the extent practicable, unnecessary lights would be turned off at night, lights would be turned downward or hooded directing light downward, and lower-powered lights would be used during construction to minimize impacts on wildlife. Impacts on wetlands within the wood stork core foraging area would mitigated as prescribed by regulatory agencies. To mitigate the potential for collisions or electrocutions, avian-friendly design standards would be used as provided for in the avian protection plan. Measures to reduce impacts on the eastern indigo snake include educating site personnel about snake identification and FWS requirements for reporting eastern indigo snake occurrences in the project area. Measures to reduce the impact on Florida panthers include speed limits and road restoration.
Aquatic Ecosystems	A project-specific management plan for crocodiles and other listed species has been created for this building activity. Mitigation measures may include warning signs and education material (for construction personnel) about the presence and status of crocodiles and restrictions of nocturnal activities. Traffic access at the north end of the cooling canals of the industrial wastewater facility may pose a threat to crocodiles crossing this road that would be mitigated by installation of a wildlife corridor to provide pathways for crocodiles to travel between wetlands on either side of this road. Construction of transmission facilities within the cooling canals of the industrial wastewater facility may avoid known crocodile nests and be conducted between nesting seasons. During in-water and nearshore construction activities, a Barge Delivery Plan would be followed to reduce risk of collision or injury of manatees from tug and barge operations or dredging (FPL 2010-TN272). In addition, FPL may follow the guidance provided by the NMFS (2006-TN3077) to protect sea turtles and Smalltooth Sawfish during nearshore construction activities. Spill-prevention techniques would include locating storage areas for petroleum

Table 4-17. (contd)

Impact Category	Specific Measures and Controls
	products at a safe distance from surface waters. Any spills of diesel fuel, hydraulic fluid, or lubricants during building would be cleaned up to prevent spilled fuel or oil from affecting aquatic resources. A Spill-Prevention, Control, and Countermeasure (SPCC) Plan would be implemented in accordance with EPA regulations (40 CFR 112) (TN1041). Spills would be attended to and not allowed to flow to nearby surface water. Modification to the equipment barge-unloading area would be performed using cutoff wall technology (sheet piles) to isolate the equipment barge-unloading area from the turning basin. Dredging, if necessary, would conform with guidance provided by the U.S. Army Corps of Engineers and dredging permit conditions. Building activities would be controlled to minimize any impacts on red mangroves or Mangrove Rivulus.
Socioeconomic Impacts	
Physical Impacts	The impact of fugitive dust on the surrounding environment would be minimized through the implementation of a dust-control plan. Construction activities would be phased to minimize daily emissions of particulate matter, carbon monoxide, oxides of nitrogen, sulfur dioxide, and volatile organic compounds. Proper maintenance of construction vehicles would be performed to maximize efficiency and minimize emissions. To the extent possible, FPL would minimize aesthetic impacts on the natural and built environment through the selection process of transmission line corridors, engineering options, and construction techniques used.
Social and Economic Impacts	Project information would be disseminated to municipal and county government authorities, nongovernmental organizations, and local media to enable business and individuals to make informed decisions and economic choices, as project construction is phased out. Project information would be disseminated to local and regional governmental and nongovernmental organizations to enable organizations to plan accordingly for new residential and commercial development, additional demand for water and wastewater services, law enforcement and firefighting services, and increased enrollment in public schools. Fill deliveries would be scheduled to not coincide with peak commuting hours; delivery of construction material would be scheduled to not be concentrated during peak hours of travel FPL would build a new entrance and access road and widen existing roads and turning lanes.
Environmental Justice Impacts	No mitigating measures or controlled are considered to be required.
Historic and Cultural Resources	FPL has developed a work plan describing additional cultural resources studies required for the offsite facilities. Further, prior to construction FPL would develop an unanticipated discoveries plan for the treatment of cultural resources inadvertently discovered during construction.
Radiation Exposure to Construction Workers	During construction, the plant area would be monitored to ensure that construction worker doses are as low as is reasonably achievable (ALARA). As conditions warrant, if necessary, additional actions would be taken to continue to ensure that doses are ALARA.
Nonradiological Health Impacts	• Comply with Federal, State, and local regulations governing construction activities and construction vehicle emissions.

Table 4-17. (contd)

Impact Category	Specific Measures and Controls
	• Comply with Federal and local noise-control ordinances. • Comply with Federal and State occupational safety and health regulations. • Implement traffic-management plan. • Control fugitive dust.
Nonradioactive Wastes	Hazardous and nonhazardous solid wastes would be managed according to County, State, and Federal handling and transportation regulations. Implement recycling and BMPs to minimize waste generation.

Source: Adapted from FPL 2014-TN4058

4.12 Summary of Construction and Preconstruction Impacts

The impact levels determined by the review team in the previous sections are summarized in Table 4-18. The impact levels for NRC-authorized construction are denoted in the table as being SMALL, MODERATE, or LARGE as a measure of their expected adverse environmental impacts, if any. Impact levels for the combined preconstruction and construction activities are similarly noted. Socioeconomic categories for which the impacts are likely to be beneficial are noted as such in the Impact Level column.

Table 4-18. Summary of Impacts from Construction and Preconstruction of Proposed Turkey Point Units 6 and 7

Category	Comments	NRC-Authorized Construction Impact Level	Construction and Preconstruction Impact Level
Land-Use Impacts	Land-use impacts from placement of new transmission lines would noticeably affect existing land uses, but would not destabilize regional land-use patterns.	SMALL	MODERATE
Water-Related Impacts			
Water Use – Surface Water	Construction and preconstruction impacts on surface-water use would be negligible.	SMALL	SMALL
Water Use – Groundwater	Construction and preconstruction impacts on groundwater use would be negligible.	SMALL	SMALL
Water Quality – Surface Water	Construction and preconstruction impacts on surface-water and groundwater quality would be negligible.	SMALL	SMALL
Water Quality – Groundwater	Construction and preconstruction impacts on groundwater quality would be negligible.	SMALL	SMALL
Ecological Impacts			
Terrestrial Ecosystems	Construction and preconstruction activities would noticeably affect wetlands, wildlife, and Federally and State-listed plant and animal species at the Turkey Point site, in the vicinity of the site, and in areas traversed by associated offsite facilities such as transmission lines, pipelines, and access roads.	SMALL	MODERATE

Table 4-18. (contd)

Category	Comments	(NRC-Authorized Construction Impact Level	Construction and Preconstruction Impact Level
Aquatic Ecosystems	Construction and preconstruction activities would have minimal impact on aquatic ecological resources and habitat with the exception of the American crocodile. The American crocodile may be disturbed by construction activities and is susceptible to injury or death by collisions with vehicles.	SMALL to MODERATE	SMALL to MODERATE
Socioeconomic Impacts			
Physical Impacts	Physical impacts from noise, air-quality, buildings, waterways, and aesthetics would be minor. Impacts on road quality would be noticeable and beneficial.	SMALL	SMALL (adverse) to MODERATE (beneficial)
Demography	The population relocating to the region for the site-development activities likely would be SMALL relative to the existing population base.	SMALL	SMALL
Economic Impacts to Community	Construction and preconstruction economic and tax revenue impacts on the communities nearest to Turkey Point are expected to be SMALL and beneficial in Miami-Dade County, Homestead, and Florida City.	SMALL (beneficial)	SMALL (beneficial)
Infrastructure and Community Services	Construction and preconstruction traffic impacts would be noticeable but not destabilizing; other infrastructure and community services impacts are expected to be limited.	MODERATE for traffic impacts SMALL for other infrastructure and community service impacts	MODERATE for traffic impacts SMALL for other infrastructure and community service impacts
Environmental Justice	There would be no disproportionate and adverse impacts on minorities or low-income populations from any potential pathways or practices of these populations.	NONE[(a)]	NONE[(a)]
Historic and Cultural Resources	Given the potential for indirect visual impacts on built resources from the construction of transmission lines, the offsite impacts of the project on cultural resources is MODERATE. However, because NRC-regulated activities do not include construction of transmission lines, impacts of NRC-regulated activities would be SMALL. Further, FPL has committed to develop procedures for the treatment of unanticipated cultural resources.	SMALL	MODERATE
Meteorology and Air-Quality Impacts	Impacts from emissions of criteria pollutants and GHGs would be temporary and limited to construction workforce and would not be noticeable.	SMALL	SMALL

Table 4-18. (contd)

Category	Comments	(NRC-Authorized Construction Impact Level	Construction and Preconstruction Impact Level
Nonradiological Health Impacts	Emissions of dust and air pollutants would be limited by operational controls; noise impacts would comply with Federal, State, and County standards. Worker health and safety would be ensured by compliance with NRC, Occupational Safety and Health Administration, and State standards. Transportation impacts would be minimal.	SMALL	SMALL
Radiological Health Impacts	Doses to construction workers would be maintained below NRC public dose limits (10 CFR Part 20) (TN283).	SMALL	SMALL
Nonradioactive Waste	Impacts on water, land, and air from the generation of nonradioactive waste would be minimal.	SMALL	SMALL

(a) A determination of “NONE” for environmental justice analyses does not mean there are no adverse impacts on minority or low-income populations from the proposed project. Instead, an indication of “NONE” means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

5.0 OPERATIONAL IMPACTS AT THE TURKEY POINT SITE

This chapter examines environmental issues associated with the operation of proposed Units 6 and 7 at the Turkey Point Nuclear Power Plant (Turkey Point) site for an initial 40-year period as described by Florida Power & Light Company (FPL). As part of its application for combined construction permits and operating licenses (COLs), FPL submitted an Environmental Report (ER) that discussed the environmental impacts of plant operation (FPL 2014-TN4058). The U.S. Nuclear Regulatory Commission (NRC) staff, its contractor staff, and U.S. Army Corps of Engineers (USACE) staff (hereafter referred to as the "review team") independently evaluated information presented in FPL's ER (FPL 2014-TN4058) and supplemental documents, FPL responses to NRC Requests for Additional Information (RAIs), FPL's Site Certification Application (SCA) submitted to the Florida Department of Environmental Protection (FDEP) (FPL 2010-TN272), the FDEP review of the proposed project (State of Florida 2014-TN3637), USACE permitting documentation, as well as other government and independent sources.

This chapter is divided into 13 sections. Sections 5.1 through 5.11 discuss the potential operational impacts on land use, water, terrestrial and aquatic ecosystems, socioeconomics, environmental justice, historic and cultural resources, meteorology and air quality, nonradiological health, radiological health, nonradioactive waste, and postulated accidents. Section 5.12 discusses measures and controls that would limit the adverse impacts of station operation during the 40-year operating period. In accordance with Title 10 of the *Code of Federal Regulations* Part 51 (10 CFR Part 51) (TN250), impacts have been analyzed and a significance level of potential adverse impacts (i.e., SMALL, MODERATE, or LARGE) has been assigned by the review team to each impact category. In the area of socioeconomics related to taxes, the impacts may be considered beneficial and are stated as such, as appropriate. The review team's determination of significance levels is based on the assumption that the mitigation measures identified in the ER or activities planned by various State and County governments, such as infrastructure upgrades, as discussed throughout this chapter, are implemented. Failure to implement these upgrades might result in a change in significance level. Possible mitigation of adverse impacts is also presented, where appropriate. A summary of these impacts is presented in Section 5.13.

5.1 Land-Use Impacts

This section provides information about the land-use impacts associated with operation of proposed Units 6 and 7. Section 5.1.1 discusses land-use impacts at the site and in the vicinity. Section 5.1.2 discusses land-use impacts at offsite transmission line corridors and associated offsite facilities. Section 5.1.3 summarizes the land-use impacts.

5.1.1 The Site and Vicinity

The sections below address land-use impacts from operation of Units 6 and 7 facilities on the Turkey Point site and vicinity.

5.1.1.1 Onsite Land-Use Impacts

Permanent facilities in the 218 ac plant area would include the Units 6 and 7 power blocks, cooling towers and makeup-water reservoir, Clear Sky substation, and associated infrastructure (FPL 2014-TN4058). Outside of the plant area but still on the Turkey Point site, permanent facilities would include the FPL reclaimed water-treatment facility (RWTF), reclaimed water pipelines, radial collector wells (RCWs) and pipelines, nuclear administration and training buildings, parking areas, laydown areas, expanded equipment barge-unloading area, security buildings, heavy-haul road improvements, transmission infrastructure, sanitary-waste pipelines, potable-water supply pipelines, access road improvements, and the spoils areas. Table 4-1 lists each element of the proposed project and the land that would be dedicated to each. As noted in Section 4.1.1.1, the review team is assuming for purposes of analysis that all of the land dedicated to the project would be permanently dedicated.

Because the land dedicated to the project would remain occupied by plant-related facilities throughout the operational life of Units 6 and 7, the review team expects that the land dedicated to the project would not be available for unrelated land uses over that time. However, below-grade facilities such as pipelines may have only limited permanent land-use impacts, because they are underground and, in most places, the land at grade could be used for certain other unrelated uses (e.g., parking or storage). This is discussed in more detail below for specific facilities. FPL states that former construction laydown areas would be permanently dedicated to the project over its operational life and may be used during operations (FPL 2014-TN4058). The review team therefore assumes that these areas would not be available for non-project-related land uses throughout the operational life of Units 6 and 7.

Because the Units 6 and 7 facilities would be built mostly in previously undeveloped lands away from other concentrated areas of development, the review team expects that operation of the Units 6 and 7 and associated facilities would not affect or interfere with other land uses on the site or in the vicinity. Units 6 and 7 would be situated near other power-generation facilities (Units 1 through 5). Therefore, operation of the proposed new units would not represent a substantial change in land-use characteristics. While some land uses in the vicinity could be sensitive to the specific effects of the operation of a nuclear power plant, those effects are addressed in other sections of this environmental impact statement (EIS) related to aesthetics, recreation, and traffic (all in Section 5.4); salt deposition and fogging from cooling-tower operation (Section 5.7); and ecology (Section 5.3). These effects do not however suggest a potential for substantial land-use inconsistencies. As described in Section 2.2, land in the vicinity is predominantly wetlands and forestland (FPL 2014-TN4058) and includes several environmentally protected areas designated by the Miami-Dade County Comprehensive Development Master Plan (Miami-Dade County 2012-TN1150), as well as several areas of public land. The review team's evaluation of potential ecological impacts (Section 5.3) does not suggest any serious land-use conflicts with environmentally protected areas. Agricultural land composes approximately 4.5 percent (approximately 2,858 ac) of the land within the vicinity (Table 2-3). The review team expects because the proposed new facilities would be sufficiently isolated from these agricultural lands that would prevent substantial conflicts with nearby agricultural use.

Zoning and Consistency with Land-Use Plans

As addressed in Section 4.1, the Miami-Dade County Comprehensive Development Master Plan (Miami-Dade County 2012-TN1150) land-use designation for the location of proposed Units 6 and 7 is *Environmental Protection, Subarea F*. Electrical generation and transmission facilities are among the land uses described as being consistent with this designation.

The 218 ac plant area and most of the surrounding land on the Turkey Point site is zoned as GU (Interim District), with the exception of the land occupied by existing Turkey Point Units 1 through 5 and the area north of the plant area, which are zoned as IU-3 (Industrial, Unlimited Manufacturing District) areas. The GU zoning district allows for nuclear reactors, provided that approval by Miami-Dade County of an *Unusual Use* for the site is obtained. FPL applied for *Unusual Use* approval for Units 6 and 7 from Miami-Dade County, which was granted in Resolution No. Z-56-07 (Miami-Dade County 2007-TN1085) by the Miami-Dade Board of County Commissioners in December 2007. No additional changes to land use within the Turkey Point site are proposed or required for operation of Units 6 and 7.

Mineral Resources

As stated in Section 2.2, there are no known oil or gas wells or any sand or rock mining located within the Turkey Point site boundary. Thus, the review team finds that operation of the proposed project would cause no impacts on oil, gas, or mineral resources.

Prime and Unique Farmland

There is no prime or unique farmland, or farmland of State or local importance, as defined in the Farmland Protection Policy Act (7 U.S.C. § 4201 et seq.) (TN708) on the Turkey Point site (USDA 2012-TN1314). No impacts on special status farmland are therefore expected. Operational activities on the site are not expected to affect agricultural operations.

Coastal Zone Consistency

The Florida Coastal Management Act (Fla. Stat. 28-380-TN1147) authorizes the Coastal Zone Management Section of the FDEP to certify consistency with the Florida Coastal Management Program for all Federal licenses, permits, activities, and projects, when such activities affect land or water use. The Site Certification issued by the State of Florida on May 19, 2014 constitutes the State's concurrence that the licensed activity or use is consistent with the Federally approved program under the Florida Coastal Management Act.

Comprehensive Everglades Restoration Plan

Operating the Units 6 and 7 facilities after they are built is not expected to substantially interfere with the objectives or implementation of the CERP.

5.1.1.2 Pipelines

Land that would be used for the below-ground reclaimed water pipelines is identified in Figure 2-5 (FPL 2014-TN4058). Maintenance access by Miami-Dade County or FPL during

operations would be accomplished on public roads or through access agreements with adjacent landowners. Because the pipelines would be easily accessible from roadways, maintenance and repair activities are not likely to interfere with adjacent land uses. Once built, the RCW caissons and pumping station would require periodic maintenance. Because these facilities would be located below ground, land uses of the offsite land area or Biscayne Bay would not be substantially affected. Impacts on other resources are addressed in other chapters of this EIS.

5.1.1.3 Access Roadways

As described in Section 3.3, the proposed project includes road improvements for operational access. The proposed improvements include widening three existing roadways and upgrading existing unpaved roads to establish new paved roadways (FPL 2014-TN4058).

FPL has indicated that roadway improvements installed during development of proposed Units 6 and 7 may not be needed for operations and could be removed to accommodate future land-use demands, although this is not specifically proposed (FPL 2014-TN4058). If roadway improvements were to be removed by FPL, FPL states that it would remove previous building materials, maintain historical hydrology, and regrade to previous contours (FPL 2014-TN4058).

5.1.2 Transmission Line Corridors and Associated Offsite Areas

5.1.2.1 Transmission Line Corridors

The following subsection addresses operations within the transmission line corridors and at substations.

The land proposed for use as transmission line corridors for proposed Units 6 and 7 is described in Section 2.2.2.

FPL has indicated that it would acquire land or easements as necessary to establish the proposed transmission line rights-of-way and would restrict incompatible uses in the rights-of-way during operation of the transmission lines (FPL 2014-TN4058). FPL requires that land uses in rights-of-way be compatible with the safe and reliable transmission of electricity. In areas that are in active agricultural cultivation, FPL typically allows farmers to grow feed for livestock and tree crops within the transmission line rights-of-way, subject to height limitations for vegetation and operation (FPL 2014-TN4058). FPL's standard rights-of-way vegetation management and line-maintenance programs would be followed to maintain the rights-of-way and transmission lines (FPL 2014-TN4058). These programs include requirements for use of herbicide application according to Federal, State, and local regulations. In addition, FPL states that environmental Best Management Practices (BMPs) would be used to reduce soil erosion and sedimentation, and that vegetation management in forested wetlands would comply with Fla. Stat. 29-403.814-TN1259, General Permits.

Local communities have raised concerns about the visual impacts and potential indirect blight impacts as a result of FPL's proposed location of the transmission lines (State of Florida 2012-TN1248; State of Florida 2011-TN1260; State of Florida 2011-TN1261). In addition, the National Park Service (NPS) has expressed concerns about aesthetics and land-use effects of locating transmission lines near the Everglades National Park (NRC 2010-TN516).

During scoping for this EIS, local agencies expressed concerns about potential interference with local agency radio operations. While effects are largely dependent on tower height and signal frequency, because all radio frequencies in the FM range are higher than the frequency emitted by the lines and because the effect would diminish very quickly with distance, interference would be unlikely to occur (Exponent 2012-TN3710).

5.1.2.2 Substations

As described in Section 4.1, FPL has stated that building and/or expansion of several substations would meet applicable environmental regulatory requirements for their development and operation. Thus, the review team finds that operation of the proposed expanded substations (the Turkey Point, Levee, Davis, and Pennsuco substations) would be compatible with existing land uses near the substations (power generation, tree nurseries, and rock quarries).

5.1.3 Summary of Land-Use Impacts

The effects on land-use resulting from operation of proposed Turkey Point Units 6 and 7 would be minimal because the land to be used for operations is land that has been previously disturbed to build the new facilities. Operation and maintenance of permanent site-access roadways and pipelines would be compatible with the current land uses and would not affect any existing or planned land uses.

Operation and maintenance of transmission lines would also be generally compatible with the current land uses and would not affect any existing or planned land uses. However, Miami-Dade County and cities within the county have raised issues related to the aesthetic compatibility of parts of the proposed new transmission lines with some urban areas. In addition, NPS has raised compatibility questions regarding where parts of the proposed transmission lines would be situated close to or adjacent to Everglades National Park.

Based on information provided by FPL and the review team's independent review, the review team concludes that the land-use impacts associated with operation of Units 6 and 7 would be MODERATE. The MODERATE conclusion primarily reflects the compatibility of portions of the transmission lines with adjacent land uses.

5.2 Water-Related Impacts

This section discusses water-related impacts on the surrounding environment from operation of proposed Turkey Point Units 6 and 7. Details of the operational modes and cooling-water systems associated with operation of the proposed units are discussed in Section 3.2.2.2.

Managing water resources requires understanding and balancing the tradeoffs between various, often conflicting, designated uses. At the site of the proposed Turkey Point Units 6 and 7, FDEP designates Biscayne National Park as an Outstanding Florida Water, meaning there is to be no degradation of its water quality (FDEP 62-302.400(14) and FDEP 62-302.700(9)(a)1) (Fla. Admin. Code 62-302-TN776). The canals in the area (constructed before November 28, 1975) are evaluated based on the limited aquatic life support and habitat limits of these waters (FDEP 62-302.400(4) [TN776]). The designated uses include navigation, recreation, visual

aesthetics, fisheries, and consumptive water uses. The responsibility for any work in, over, or under navigable waters of the United States is delegated to the USACE. The FDEP is responsible for protecting and restoring the quality of Florida water, air, and land resources, and the Florida Department of Community Affairs is responsible for determining that projects are consistent with Florida's Coastal Management Program (FDEP 2012-TN1544).

Water-use and water-quality impacts involved with operation of a nuclear plant are similar to the impacts associated with the operation of any large thermoelectric power-generation facility. Accordingly, FPL must obtain the same water-related permits and certifications as any other large industrial facility. These include the following:

- Clean Water Act (CWA) (33 U.S.C. § 1251 et seq.) (TN662) - Section 401 is at 33 U.S.C. § 1341 (TN4764) Certification. This certification is issued by the FDEP as part of Florida's Power Plant Siting Act Certification (Fla. Stat. 29-403.501 2011-TN1068) and ensures that the project does not conflict with State water-quality standards. This certification is required before the NRC can issue a COL to FPL. Florida issued the final Order of Certification on May 19, 2014 (State of Florida 2014-TN3637). If a Department of the Army permit is issued, the 401 Water Quality Certification would be required in addition to a Coastal Zone Consistency Determination both of which are provided by the State of Florida.
- Department of the Army Permit. Authorization from the USACE would be required under CWA Section 404 (33 U.S.C. § 1344) (TN1019) for the discharge of dredge or fill material into waters of the United States associated with the site-preparation activities and construction of the nuclear power plant and its associated components. Authorization would also be required under Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403) (TN4768) for the construction of structures or work in, under, or over navigable waters of the United States associated with the construction of the nuclear power plant and its associated components. The USACE will conclude its Clean Water Act Section 404(b)(1) Guidelines and public interest analysis for this permit decision in its Record of Decision. Furthermore, Section 14 of the Rivers and Harbors Act (33 U.S.C. § 408) (TN4769) requires authorization for any components of the project that would in any way impair the usefulness of a USACE Civil Works Project; a separate 408 review will be conducted to ensure the will be no inconsistency with the intended use that was authorized by Congress.
- Clean Water Act (33 U.S.C. § 1251 et seq.) (TN662) - Section 402 is at 33 U.S.C. § 1342 (TN4765) National Pollutant Discharge Elimination System (NPDES) permit. This permit would regulate limits of pollutants in liquid discharges to surface water. The U.S. Environmental Protection Agency (EPA) has delegated the authority for administering the NPDES program in Florida to the FDEP. The NPDES permits are part of Power Plant Siting Act certification. A stormwater pollution prevention plan (SWPPP) for construction would also be required.
- Water-use permit. Consumptive use of surface water or groundwater would require a permit from the FDEP or the water-management district.
- Groundwater well drilling and operating permits. Construction of water wells would require a permit from the South Florida Water Management District (SFWMD).
- FDEP Class I Industrial Waste Underground Injection Control Permits (Fla. Admin. Code 62-528-TN556). Underground Injection Control (UIC) wells are required to be constructed,

maintained, and operated so that the injected fluid remains in the injection zone, and the unapproved interchange of water between aquifers is prohibited. Class I injection wells are monitored so that if migration of injection fluids were to occur it would be detected before reaching the underground source of drinking water (USDW).

5.2.1 Hydrological Alterations

The staff assessed the following potential hydrological alterations associated with the operation of Units 6 and 7 and the resulting effects on the environment:

- Operation of RCWs under Biscayne Bay for use as a backup supply of cooling water that would remove water from Biscayne Bay, the industrial wastewater facility (IWF), and the Biscayne aquifer.
- Use of potable and service water for the proposed units that would be obtained from the existing Miami-Dade Water and Sewer Department (MDWASD) water supply, which comes from the Biscayne aquifer in Miami-Dade County.
- Injection of station blowdown water and other liquid waste streams into the Boulder Zone—a cavernous, high-permeability South Florida geologic horizon located at depths of approximately 2,900 to 3,500 ft in the Lower Floridan aquifer.
- Deposition of drift from Units 6 and 7 cooling towers, including associated salt and chemical contaminants, onto nearby aquatic and terrestrial systems. With the use of reclaimed water as the cooling-tower water supply, chemical contaminants could be present in the cooling-tower water and drift. With the use of the Biscayne Bay as a backup supply of water (via the RCWs), salt deposition could occur on terrestrial and aquatic systems.
- Stormwater runoff from buildings, pavement, and RWTFs, and accompanying changes in the quality of runoff water from the spoils disposal area.

The following water resources are of primary interest for the review of hydrologic alterations:

- Biscayne Bay;
- Biscayne aquifer;
- Boulder Zone;
- IWF (cooling canals); and
- water resources on offsite/adjacent areas.

In the summer of 2014, the IWF experienced elevated temperatures, elevated salinities, elevated algae, and decreased water-surface elevations (see Section 2.3.1.1, Industrial Wastewater Facility). As discussed in Section 2.3.1.1, in response to these changes water was pumped into the canals from the Biscayne aquifer, Upper Floridan aquifer (also called the UFA), and the L-31E Canal. Continued actions are planned and the review team considered the consequence of the possible changes for the future affected environment.

The staff determined the only plausible change to the draft EIS impact assessment would be from the operation of the RCW. The review team identified no plausible significant changes in impacts from the operation of Units 6 and 7 under reclaimed water operation because the operation does not withdraw water from the Upper Floridan aquifer, the Biscayne aquifer, or

Biscayne Bay. As discussed Section 3.1, the AP1000 reactor design does not rely on either the reclaimed water supply or the RCWs to shut down safely.

Neither the conditions observed in the IWF in the summer of 2014 nor the subsequent response by FPL changed the review team's understanding of the current affected environment. However, future plans (see Section 2.3.1.1, Industrial Wastewater Facility) would change the affected environment in ways that were not explicitly discussed in the draft EIS. For instance, continued freshening of the cooling canals with water from wells in the Upper Floridan aquifer and the Biscayne aquifer, and withdrawals from the L-31E Canal may result in a sustained higher water-surface elevation and lower salinity in the IWF than observed during 2014 through 2015. In addition, efforts to retract the hypersaline plume to beneath FPL's property boundary would alter water pressures in the Biscayne aquifer and result in a general reduction of the salinity of groundwater in the Biscayne aquifer on the Turkey Point site.

Neither the exact design of systems for implementing either of the above actions nor their efficacy is fully known. Therefore, the review team considered a broad range of future conditions to determine if they might change the minimal incremental impact of the operation of the RCWs discussed in the EIS. The review team evaluated the hydrological alterations and their potential effects on the above-mentioned resources as discussed below.

5.2.1.1 Biscayne Bay

Hydrological alterations that may affect Biscayne Bay due to the operation of proposed Turkey Point Units 6 and 7 include (1) RCW operation, (2) drift deposition, and (3) stormwater runoff.

Effect of Radial Collector Well

To evaluate the effect of RCW pumping on salinity in Biscayne Bay, the U.S. Geological Survey (USGS), in conjunction with NRC conducted a numerical modeling study of the Biscayne Bay-Biscayne aquifer system (NRC 2014-TN3078; Appendix G). The model used for this study is a three-dimensional surface and groundwater model and was derived from a previously developed and calibrated model of the Biscayne aquifer and Biscayne Bay (Lohmann et al. 2012-TN1429). The NRC contracted with the USGS to modify the model to include the proposed RCWs, the IWF, and a dewatering well used during the building of proposed Units 6 and 7. The model incorporates tidal exchange with the Atlantic Ocean and freshwater inflows from canals and groundwater. The model was calibrated to groundwater heads, canal base flows, and the location of the saltwater-freshwater interface, salinity, and temperature in Biscayne Bay. The calibration period covered a 9-year simulation period from 1996 through 2004. The USGS prepared an administrative report (NRC 2014-TN3078) that documents the modeling analysis, which includes the effects of operating the RCW pumping on the surface and groundwater system. The review team summarized this administrative report, which is provided in Appendix G of this EIS.

The base case and all scenario model runs were made for a simulation period from 1996 through 2004 (the calibration period), during which time the effects of RCW pumping were examined via the differences in results for piezometric head and salinity. The base case was derived from the calibrated model with the addition of the cooling canals of the IWF and the

wells used for dewatering of the plant area during building. The two dewatering wells were set to pump for a 6-month period (June 2001 through December 2001 of the simulation period) with a maximum pumping rate of 98,320 m^3/d) (9,128 gpm). The scenarios were derived from the base case with the addition of the RCWs. The USGS analysis (NRC 2014-TN3078) examined several RCW pumping scenarios, but the review team used the continuous-pumping scenario for its examination because it provided the most conservative analysis of the effects of the RCW operations. Continuous pumping is the most conservative scenario because it allows no time for the groundwater system to recover from RCW pumping.

Much of the assessment of RCW pumping used by the review team was based on the salinity time-series analyses provided by the USGS analysis of model results (NRC 2014-TN3078). However, the review team conducted additional analyses of the model results, which included examination of salinity time series at locations in Biscayne Bay in addition to those examined by the USGS (NRC 2014-TN3078). These additional locations were close to and north of Turkey Point (Appendix G, Figure G-5). The review team was also interested in examining the spatial distribution of salinity and salinity differences in Biscayne Bay produced by RCW pumping. The review team selected two dates that had either a relatively large salinity increase or a relatively large salinity decrease between the continuous-pumping scenario and the base case. The relatively large salinity increase occurred on 10/3/2003, while the relatively large salinity decrease occurred on 10/25/2004. The plot of the time series of salinity differences shown in Figure G-9 in Appendix G indicates these dates.

The review team's examination of salinity time series indicated that the salinity difference between the continuous pumping scenario and the base case was mostly within ±1 psu, with only transient increases to near 2 psu (Appendix G, Figure G-9). The review team examined the spatial distribution results on the date of a large increase (10/3/2003) and found the largest increases were less than about +2.3 psu. Also, the salinity increases greater than +1 psu occurred in a relatively small area (14.4 km^2 [5.57 mi^2]) located north of Turkey Point (Appendix G, Figure G-8); the maximum salinity within this area was about 30.8 psu. The review team examined the spatial distribution results on a date of a large salinity decrease and found salinity decreases less than -1 psu occurred in an area that was 24.2 km^2 (9.33 mi^2) in size located north of Turkey Point (Appendix G, Figure G-10); the maximum salinity within this area was about 31.8 psu. Overall, these results show that the temporal and spatial variation of salinity with continuous RCW pumping was minimal. The review team notes that the actual duration of pumping will not be continuous. As required by the FDEP Conditions of Certification (COCs; State of Florida 2014-TN3637), operation of the radial wells is to be limited to 60 days or less per year. This short duration of pumping will allow time for the groundwater system to recover after any pumping from the RCW and will limit the entrainment of saltwater and reduce alterations of salinity patterns within Biscayne Bay. Therefore, the effect on Biscayne Bay salinity of any permitted pumping would be much reduced from the already minimal salinity change found by the review team in the USGS modeling analyses for a continuous-pumping scenario. The NRC staff is aware that on April 20, 2016, a Florida court, (State of Florida 2016-TN4781) remanded the Conditions of Certification to the Florida Siting Board insofar as the COCs relate to proposed transmission lines and associated mitigation measures in the East Everglades. The remand, however, did not require reconsideration of the COCs related to operation of the RCWs. Accordingly, the original COC limiting RCW operation to 60 days per

year remains undisturbed. Even if the COCs related to RCW operation are revisited, the review team considers it reasonable to expect that Conditions of Certification similar to or no less effective than those originally issued in regard to RCW operation will be in place before construction and operation of the proposed units begins.

Effect of Drift Deposition

While using treated reclaimed water as the source for makeup water, FPL would operate the cooling system to achieve four cycles of concentration (FPL 2014-TN4058). While using the RCWs (Biscayne Bay saltwater) as the source for makeup water, the system would operate at 1.5 cycles of concentration. Any residual contaminants in the treated reclaimed water and the chemical constituents of saltwater could be concentrated in the cooling-water system due to evaporative losses during cooling, although any individual contaminant could also have losses due to volatilization and environmental decay, thereby decreasing the concentration.

Small droplets of water (drift) and salt particles would be emitted from the cooling towers during operation. For the Turkey Point Units 6 and 7 combined drift rate from the circulating-water system and service-water system towers the expected maximum drift rate would be approximately 8 gpm (Table 3-6). As a result, salt along with any potential contaminants in the cooling water could be deposited on the area surrounding the cooling towers. When using treated reclaimed water for makeup water, priority pollutants and contaminants of emerging concern (CECs) could be contained in the drift. When using the RCWs, priority pollutants contained in seawater could occur in drift. Section 2.3.3.1 lists concentrations of contaminants that were detected in Biscayne Bay.

The review team has conducted analyses to estimate drift deposition of chemical contaminants on aquatic and terrestrial habitats. Four general categories of chemical constituents are included in the drift-deposition analysis: general water chemistry (e.g., total dissolved solids [TDS]), metals (e.g., copper), volatile organic compounds (VOCs; e.g., 1,4-dichlorobenzene), and CECs (e.g., 4-nonylphenol). The constituent TDS concentration increases in the cooling water by evaporation due to operation of the cooling towers. The high concentration of TDS in the cooling water results in drift with a high concentration of TDS. Evaporation of the water in the drift results in salt particles, which are deposited in the area surrounding the cooling towers. The other constituents (metals, VOCs, and CECs) are assumed to be carried with the drift particles in the same ratio as in the source water.

The EPA (2012-TN1018) identifies CECs as previously undetected chemicals in water or chemicals that are detected at concentrations different than expected, and for which human health and environmental risks are unknown or poorly known.

The estimated drift-deposition rates are used for determining aquatic and terrestrial ecological effects. The specific habitats examined include the cooling canals of the IWF, nearshore Biscayne Bay, and terrestrial areas west of the proposed Units 6 and 7 cooling towers. The potential concern for the cooling canals, while not a water body regulated for water quality, is related to the potential impact on the Federally protected crocodiles, which nest on the cooling-canal berms at several locations at the IWF. For Biscayne Bay, the concern relates to the designation by FDEP of Biscayne National Park as an Outstanding Florida Water (FDEP 2010-TN156).

The review team independently estimated drift deposition with the use of makeup water from reclaimed water and from Biscayne Bay water. Drift deposition is determined by the flow rate through the cooling towers and TDS concentration of the cooling water—higher TDS concentration produces higher deposition rates. The review team used the CALPUFF model to independently compute drift-deposition rates from the cooling towers. Using the total drift deposition of salt computed from CALPUFF for both reclaimed wastewater and Biscayne Bay marine water, the review team estimated the salt deposition and the associated drift deposition for representative chemical contaminants. The review team assumed that the ratio of contaminant concentration to TDS concentration was the same in the cooling-tower water as it was in the makeup water supplied by Miami-Dade County to FPL, including an adjustment for cycles of concentration. This conservative approach assumes no loss of contaminants via removal at FPL's RWTF, biodegradation, or volatilization. This conservative approach provides the worst case of loading via drift deposition from the cooling towers. It includes the assumption of increased concentration with increased cycles of concentration.

The TDS for makeup water derived from the reclaimed water source is expected to be 680 mg/L, which the review team calculated from Miami-Dade wastewater TDS concentrations and then assumed four cycles of concentration for estimating the drift concentrations. For saltwater, the makeup-water TDS concentration used was approximately 34,300 mg/L (FPL 2012-TN263) with a drift concentration assuming 1.5 cycles of concentration. The review team assumed there was no alteration of salinity from treatment.

To evaluate the potential effects of cooling-tower deposition on the aquatic resources of Biscayne Bay, the review team first performed a screening-level assessment to identify chemicals and constituents likely to occur at ecologically relevant concentrations in both reclaimed water and Biscayne Bay seawater obtained from the RCW system. As stated above, four general categories of chemical constituents were included in the initial screen: general water chemistry (e.g., TDS), metals (e.g., copper), organic compounds (e.g., 1,4-Dichlorobenzene, phenanthrene), and CECs) commonly found in pharmaceuticals, personal care products, and other consumer products. Likely concentrations in reclaimed water and Biscayne Bay seawater were obtained from technical data provided by FPL (2012-TN263), a study by Lietz and Meyer (2006-TN1005) on CECs from the Miami-Dade South District Wastewater Treatment Plant (SDWWTP), and information available in a 2011 study by the Biscayne Bay Coastal Wetlands Rehydration Pilot Project (Miami-Dade County 2011-TN1006). Detected concentrations of general water chemistry parameters (Section 2.3.3.1), organic compounds, and metals were compared to existing EPA freshwater and marine water-quality criteria, which are readily available for many compounds and believed to be protective of aquatic life. Compounds exceeding established water-quality criteria were retained in the screening-level assessment for fate and effects modeling. For chemicals lacking established water-quality criteria, such as many CECs, detected concentrations in reclaimed or Biscayne Bay water were compared to toxicological benchmarks available on EPA's ECOTOX (Ecotoxicology) Database (EPA 2012-TN1525). Chemicals present at >1/10 of a benchmark were retained in the screen and included in fate and effects modeling, as described in Section 5.3.2. Table 5-1 presents the review team's estimated drift-deposition rates for these compounds for three separate areas: the cooling canals of the IWF, adjacent areas west of the IWF, and Biscayne Bay. Compounds included for fate and effects analysis in the cooling canals

included nine CECs and one metal. Constituents identified in Biscayne Bay seawater at levels above EPA criteria included only chlorides and sulfides. Areas west of the IWF were examined only for deposition rate and are considered in terrestrial ecology sections (Section 5.3.1).

Table 5-1. Estimated Annual Average Deposition Rates from Cooling-Tower Drift

Constituent Concentrations			Review Team-Estimated Annual Average Drift-Deposition Rates		
Constituent	Category	Concentration (µg/L)	Cooling Canals (g/m^2-yr)	Western Areas/Model Lands (g/m^2-yr)	Biscayne Bay (g/m^2-yr)
Reclaimed Water					
TDS	Wastewater	680,000[a]	0.34	0.18	0.082
1,4-Dichlorobenzene	Insect repellant	1.3[a]	6.6×10^{-7}	3.4×10^{-7}	1.6×10^{-7}
3 Beta-coprostanol	Human digestion	2[b]	1.0×10^{-6}	5.2×10^{-7}	2.4×10^{-7}
4-Nonylphenol	Detergent metabolite	4[b]	2.0×10^{-6}	1.0×10^{-6}	4.8×10^{-7}
Acetyl-hexamethyl-tetrahydro-naphthalene (AHTN)	Polycyclic musk (e.g., tonalide)	4[b]	2.0×10^{-6}	1.0×10^{-6}	4.8×10^{-7}
Hexahydrohexa-methylcyclo-pentabenzopyran (HHCB)	Polycyclic musk (e.g., galaxoide)	0.5[b]	2.5×10^{-7}	1.3×10^{-7}	6.1×10^{-98}
Phenanthrene	Polycyclic aromatic hydrocarbon (PAH) compound	0.6[b]	3.0×10^{-7}	1.5×10^{-7}	7.3×10^{-98}
Warfarin	Pharmaceutical	0.12[b]	6.1×10^{-8}	3.1×10^{-8}	1.5×10^{-8}
17 Beta-estradiol (E2)	Hormone	0.035[b]	1.8×10^{-8}	9.0×10^{-9}	4.2×10^{-9}
Triclosan	Antimicrobial	120 [d]	8.1×10^{-5}	4.1×10^{-5}	1.9×10^{-5}
Copper	Metal	9.6[a]	4.9×10^{-6}	2.5×10^{-6}	1.2×10^{-6}
Phosphorus	Nutrient	183[e]	9.3×10^{-5}	4.8×10^{-5}	2.3×10^{-5}
Radial Collector Well Water					
TDS	Sea water	35,800,000[a]	6.1	3.1	1.6
Chloride	Sea water	20,700,000[a]	3.5	1.8	0.90
Sulfide	Sea water	8,000[a]	1.4×10^{-3}	7.0×10^{-4}	3.5×10^{-4}
Phosphorus	Nutrient	670[e]	3.4×10^{-4}	1.8×10^{-4}	8.3×10^{-5}

(a) FPL 2012-TN263.
(b) Lietz and Meyer 2006-TN1005.
(c) Contaminant with lowest environmental effect concentration.
(d) Miami-Dade County 2011-TN1006.
(e) FPL 2014-TN4058.

The salt-deposition rates over the nearshore of Biscayne Bay are lower with the use of reclaimed water (0.0069 g/m^2/mo) than with the use of marine waters for Biscayne Bay obtained from the RCWs (0.1292 g/m^2/mo). With the use of either the reclaimed water or RCWs, the deposition rates of potentially associated chemical contaminants are extremely low. Only TDS, chloride, and sulfide have deposition rates greater than 10^{-6} g/m^2/mo, and chloride and sulfide naturally occur in marine waters.

The review team considered the impact of contaminant drift deposition on Biscayne Bay by first examining the volumetric tidal exchange in the nearshore region of the Turkey Point site. The review team used the tidal elevation data from the Virginia Key station (NOAA 2012-TN1321) to compute the tidal range and volume change over the drift-deposition area in the CALPUFF model. (Because other National Oceanographic and Atmospheric Administration stations within Biscayne Bay had only limited historic data, they were not used.) The review team computed the average depth in this region to be 1.24 m and the median tidal range to be about 0.6 m. Using this tidal range and the computed volume in the nearshore region potentially affected by drift deposition, the review team calculated a median volumetric tidal exchange of 48 percent of the total nearshore volume. This means that almost half the volume is exchanged with each turn of the tide. Consequently, with the extremely low contaminant-deposition rates (Table 5-1) and high tidal exchange rate, contaminant concentrations from drift deposition in the water column would be too small to detect.

Effect of Stormwater Runoff

The site hydrology prior to construction is discussed in Section 2.3.1.1. Modifications to the land surface made during preconstruction and construction activities would alter the site hydrology, and these alterations would remain during plant operations. As discussed in Section 4.2.1.4, stormwater runoff from spoils areas, and nuclear administration and training buildings areas would be managed with environmental controls and directed to the IWF. Stormwater runoff from the RWTF area, except for the equipment area runoff, would be routed to stormwater management basins before being released to its surrounding wetland area. As discussed in Section 3.2.2.1, no direct stormwater discharges would be made to Biscayne Bay. Therefore, during operations, no noticeable effect of stormwater runoff in the hydrologic conditions of the Biscayne Bay is expected.

5.2.1.2 Biscayne Aquifer

Hydrological alterations affecting Biscayne aquifer that would be associated with the operation of Turkey Point Units 6 and 7 are the RCWs removing water from the aquifer beneath Biscayne Bay, and the additional demand for MDSWD-supplied potable water to meet the need for process and potable water. Removal of water by the RCWs is expected to (1) increase the velocity of water movement from the bay into the bed of the bay, (2) reduce aquifer hydraulic head within the aquifer under the bay, (3) influence aquifer hydraulic gradients in the vicinity of the hypersaline plume, and (4) change the water chemistry in sediments between the bay floor and the radial well laterals by increasing the flow of oxygenated water. These alterations to the groundwater flow system are described below.

Changes in the Velocity of Water Movement into the Bed of Biscayne Bay from Operation of the Radial Collector Wells

Water pumped by the RCWs will be drawn downward through the sediment and rock formations underlying Biscayne Bay and laterally through the more permeable zone where the well laterals are installed. The review team calculated that the vertical velocity of saltwater approaching the bay bottom would average 0.0003 ft/min (0.000152 cm/sec) or about 0.4 ft/d if all of the pumped water flowed homogeneously into the bay bottom within a polygon encircling the RCW laterals

at the expected maximum flow rate of 86,400 gpm (327 m^3/min) (FPL 2014-TN4058). This assumption is conservative in that a large portion of the water is expected to move into the aquifer through the bay floor outside of the polygon and then move laterally through the aquifer to the wells. The review team estimated that the average vertical permeability of the aquifer confining layer is about 0.7 ft/d compared to 10,000 ft/d for the highly permeable portion of the aquifer (see Section 2.3 of the EIS). However, the approach velocity will vary laterally across the bay floor because of variations in the vertical permeability of the sediment and limestone that lie between the bay bottom and the permeable layer of the aquifer where the radial collector laterals will be placed. The review team analyzed a possible worst-case scenario for approach velocity by assuming that an enhanced vertical permeability flow path exists near the RCW laterals with a permeability of 1,000 ft/d, which is 1,428 times higher than the average vertical permeability. This results in a calculated maximum approach velocity of 0.43 ft/min at the enhanced vertical permeability feature. In reality, water pumped by the RCWs would likely infiltrate the bay bottom over a much larger area resulting in lower velocities.

Changes in Aquifer Hydraulic Head from Operation of the Radial Collector Wells

The RCWs installed under Biscayne Bay would pump saline groundwater from the Biscayne aquifer at a depth between 25 and 40 ft beneath the bay floor (Section 3.2.2). The review team determined that this pumping would reduce hydraulic head in the Biscayne aquifer resulting in flow of water from the overlying bay and from relatively permeable sediment layers that compose the Biscayne aquifer. Impacts on the inland portion of Biscayne aquifer are determined by the volume of water captured by the RCWs that comes from the inland portion of the aquifer compared to the volume that comes from the bay. Removing relatively large volumes of water from the inland aquifer could lower the water table in the inland portion of the aquifer, affecting existing water-supply wells and increasing saltwater intrusion to the Biscayne aquifer.

In regard to the Biscayne aquifer, saltwater from the sea has already intruded into the groundwater in the Biscayne aquifer in the vicinity of the Turkey Point site, which has resulted in elevated salinity in that groundwater. This saltwater intrusion from the sea is unrelated to operations at Turkey Point. Because of its elevated salinity, groundwater from the Biscayne aquifer in the vicinity of the Turkey Point site cannot be used as a drinking water source without treatment. Seepage of saline water from the IWF cooling canals associated with the existing Turkey Point Units 3 and 4 has also resulted in locally higher groundwater salinity near the cooling canals. Analyses from the USGS groundwater-surface water model presented in the EIS show that in the absence of remediation of the IWF hypersaline plume, increases in groundwater salinity may occur inland from Turkey Point because of movement of the existing hypersaline plume regardless of whether or not the proposed units are built and operated. The model-predicted increase in groundwater salinity is not caused by RCW pumping or other activities related to the proposed units. The model-predicted increase in groundwater salinity also does not reach the location of drinking water wells.

The review team determined that RCW drawdown effects are unlikely in the inland areas west and south of the IWF because the IWF cooling canals, the interceptor ditch, and the L-31E canal create hydraulic barriers that isolate the inland Biscayne aquifer from the RCWs. Effects on saltwater intrusion and inland wells in the Biscayne aquifer would also be reduced by the

limitations on use of the RCWs, which is expected to be limited to 60 days per year, or less (FPL 2012-TN1262; State of Florida 2014-TN3637). The review team evaluated information about the reliability of the components of the reclaimed water system and determined that the RCW supply system would be called into use infrequently and for durations much shorter than 60 days. The NRC review team determined that there is a large volume of treated municipal wastewater that can be used for cooling the proposed plants without affecting the ability to meet demands for fresh water. Miami Dade Water and Sewer Department is required to direct 60 percent of the wastewater flows to reuse by 2025 and to cease using ocean outfalls by 2025 under the Florida State Ocean Outfall Legislation Compliance Plan (Miami Dade County 2013-TN4786). Therefore, the NRC staff concluded that the reclaimed water supply is reliable. The review team further determined that the primary reclaimed water source is reliable because of the reliability of the proposed reclaimed water-treatment facility and associated pipelines. Further, the review team also considered alternative sources of cooling water in EIS Section 9.4.2, none of which are environmentally preferable to the proposed sources of cooling water. In view of the high reliability of the reclaimed wastewater source and the availability of the RCW system as a backup, there is no need to consider additional backup sources of cooling water. If the RCWs are needed for a backup supply of water, the maximum pumping rate would be 86,400 gpm (327 m^3/min) (FPL 2014-TN4058). The minimum volume expected to be pumped per year for RCW maintenance and testing purposes would be a total of 40,000 gal (151.4 m^3).

The RCWs are designed so that nearly all the water comes from Biscayne Bay rather than from the inland aquifer because of the location of the RCW laterals a relatively short distance beneath the bay. However, the review team determined that the volume of water that would be removed from the inland aquifer is difficult to predict with certainty because it depends on several hydrogeologic features and parameters that are incompletely quantified. Water flowing to the RCWs from the bay must move through the bay floor or through permeable layers of the limestone bedrock exposed to seawater, either in the bay or at the continental shelf. As described in Section 2.3 the bottom of the bay consists of either sandy material, exposed rock, or a sandy muck. Areas of sand or sandy muck are usually signified by the presence of seagrass. However, the review team has observed that silty sediments are present in some areas of the Biscayne Bay floor near the proposed RCW location. These silty sediments could impede the downward flow of water from the bay to the laterals.

FPL used a local-scale groundwater flow model of the Biscayne aquifer to simulate the effects of construction dewatering and operational cooling-water withdrawals from proposed RCWs in sediments beneath Biscayne Bay. Results and details of the model configuration and calibration were provided in FPL's groundwater model report (FPL 2011-TN1440).

As described in Section 5.2.1.1, the USGS (2012-TN1441) also performed numerical modeling analysis of RCW operation to confirm the effect of RCW pumping on the Biscayne aquifer and Biscayne Bay. A detailed description of the USGS model is provided in Appendix G of this EIS. The review team used results from both of these models in its assessment of groundwater impacts at the Turkey Point site. However, neither of the models was the sole basis of the review team's assessment because such models are only an approximation of the real physical system.

According to FPL's groundwater modeling (FPL 2014-TN4069), the RCWs would draw produced water from Biscayne Bay (approximately 98 percent), the IWF cooling canals (approximately 2 percent), and the inland portions of the Biscayne aquifer (less than 0.3 percent) (FPL 2014-TN4058).

The USGS model also showed that nearly all of the water produced by the RCWs would come from Biscayne Bay with minor, seasonally variable, amounts of water coming from the inland portion of the Biscayne aquifer, from the IWF, and from nearby freshwater canals. The USGS model had a larger domain and included the effects of variable density fluid and changes in water levels at freshwater canals, which were ignored in the FPL model. However, the USGS model had a coarser discretization than the FPL model. Although the scale and discretization of the USGS model was not appropriate for providing accurate estimates of water volumes captured by the RCWs from different sources, it did provide information about potential RCW effects on salinity in the Biscayne aquifer and Biscayne Bay. For the continuous pumping scenario, the operation of the RCWs decreased aquifer salinity in an area centered northwest of Turkey Point. This was caused by the replacement of hypersaline water from the IWF with fresher water from the aquifer, adjacent canals, or Biscayne Bay. As described in Appendix G, the USGS model predicted increasing aquifer salinity in a ring around the IWF from continued migration of the IWF hypersaline plume. Predicted increases were near 40 psu in areas west of the IWF. The increase was predicted for scenarios both with and without RCW pumping and is not related to construction or operation of the proposed units.

If the RCWs are used as a backup supply of cooling water, the proportion of water flowing into the RCWs from the Biscayne aquifer is expected to be small, with over 95 percent of the water flowing into the RCWs coming from the overlying Biscayne Bay. This estimate is supported by separate groundwater modeling efforts performed by FPL and by the USGS, as described above. The modeling provided evidence that pumping of the RCWs as a backup water supply for 60 days per year or less would be unlikely to cause a significant increase in salinity within the bed of Biscayne Bay or within the bay itself compared to the variability that occurs under current conditions. The models also indicated that pumping the RCWs for 60 days per year or less is unlikely to cause a noticeable change in the existing extent of saltwater intrusion or to noticeably lower groundwater levels to such an extent that it would affect other users of the Biscayne aquifer. The review team recognizes that complete knowledge of the hydrologic system associated with the RCWs is not now available, and that uncertainties therefore remain in the impact analysis. Further, future operational and environmental conditions are not known with certainty. A vast number of future scenarios are plausible. The sources of uncertainty in the RCW analysis include: heterogeneity in subsurface parameters, lack of experience with RCW systems in carbonate strata, and uncertainty in the potential need for using the backup water supply. Uncertainties in the future site environment include: freshening of IWF cooling canals, remediation of the subsurface hypersaline plume, and the magnitude and rate of future sea level rise. In view of these uncertainties, the review team has taken care to avoid relying too heavily on numerical models, and has concludes that even the general conservatism adopted in the analysis does not ensure that the analysis is bounding of all future conditions. Accordingly, the review team does not rely solely on the output of any numerical model.

Numerical models are numerical representations of complex processes occurring in three dimensions over time. The appropriate role of a numerical model is to test assumptions of the

behavior of complex systems. While running a numerical model numerous times with different parameters cannot compensate for all uncertainties, the models employed here have been tested and benchmarked within the conditions that limit their application. In this assessment the review team used models to test possible consequences of changes in the affected environment and uncertainty in some subsurface parameters within the capability of the models employed. This information was combined with the geography of the RCW field (such as the relatively short distance from the laterals to the bottom of Biscayne Bay relative to the distance from the laterals to the Homestead well fields) and the COC requirement of a monitoring program with mitigation options. The review team determined that the proposed monitoring of RCW construction and operation that is included is sufficient to detect unexpected behavior in a timely manner. While all possible mitigation measures have not yet been spelled out, in accordance with the COCs, the review team considers the ultimate mitigation of ceasing operation of the RCWs as ensuring prevention of any impacts in a timely manner. "When harm occurs, or is imminent, SFWMD will require Licensee to modify withdrawal rates or mitigate the harm" (FDEP COCs Page 61).

All groundwater models are subject to uncertainty caused by model assumptions and limited characterization data. Therefore, results from both the USGS model and the FPL groundwater model were only used qualitatively by the review team to understand potential impacts. The model results combined with the available characterization data supporting the leaky character of the Biscayne aquifer, and give confidence that the fraction of fresh groundwater that would be captured by the RCWs is small compared to the fraction that would come from saltwater in the bay. The review team estimated that the worst-case volume of groundwater removed from the Biscayne aquifer could reasonably be as high as 4,500 gpm during RCW operation. This represents 5 percent of the water produced by the RCWs and is conservatively 166 times greater than the fraction estimated by the base-case FPL groundwater model.

The review team determined that the proposed monitoring of RCW construction and operation is sufficient to detect unexpected behavior in a timely manner. While all possible mitigations are not detailed in the Conditions of Certification, the review team considers the ultimate mitigation of ceasing operation of the RCWs as ensuring prevention of any impacts in a timely manner. "When harm occurs, or is imminent, SFWMD will require [the] Licensee to modify withdrawal rates or mitigate the harm" (FDEP COCs Page 61). If reclaimed water is not available and the 60-day limitation on RCW pumping is exhausted, the plant can be safely shut down. Cooling the main condenser is not a safety function in the AP1000 design. Accordingly, there is no NRC requirement for a contingency plan to supply for emergency backup cooling water to the main condenser if reclaimed water is not available and the 60-day limitation on RCW pumping is exhausted. The plant can be safely shut down if water is not available from either source. Safety-related cooling water is stored onsite, and can be replenished from multiple sources. In a situation where the RCWs water may be needed, the EIS analyzes the case in which the RCWs would not operate more than 60 days per year as a bounding case. The case of continuous pumping was also analyzed as a sensitivity case. The primary source of cooling water, reclaimed wastewater from the Miami-Dade Water and Sewer Department, should be highly reliable, and therefore the availability of backup cooling water supplies need not be evaluated. Further, the review team also considered alternative sources of cooling water in EIS Section 9.4.2, none of which are environmentally preferable to the proposed sources of cooling water. In view of the high reliability of the reclaimed wastewater source and the availability of

the RCW system as a backup, there is no need to consider additional backup sources of cooling water. Saline water from the RCWs beneath Biscayne Bay would only be used when reclaimed treated wastewater is not available in sufficient quantity or quality, and for a maximum of 60 days per year, as permitted under the Florida State Conditions of Certification. These limited periods of pumping of the RCWs will reduce the hydraulic head in the aquifer beneath Biscayne Bay near the wells and, therefore, will remove some water from the aquifer. However, the proportion of water flowing into the RCWs from the aquifer is expected to be small and over 95 percent of the water flowing into the RCWs is expected to be from the overlying Biscayne Bay. This estimate is supported by separate groundwater modeling efforts performed by FPL and by the USGS (Appendix G).

The models indicated that pumping the RCWs for 60 days per year or fewer is unlikely to cause a noticeable change in the existing extent of saltwater intrusion or to noticeably lower groundwater levels to such an extent that it would affect other users of the Biscayne aquifer. A vast number of future scenarios are plausible. The sources of uncertainty in the RCW analysis include heterogeneity in subsurface parameters, lack of experience with RCW systems in carbonate strata, and uncertainty in the potential need for using the backup water supply. Uncertainties in the future site environment include freshening of the IWF cooling canals, remediation of the subsurface hypersaline plume, and the magnitude and rate of future sea-level rise. In view of these uncertainties, the review team has taken care to avoid relying too heavily on numerical models, and concludes that even the general conservatism adopted in the analysis does not ensure that the analysis is bounding of all future conditions. Accordingly, the review team does not rely solely on the output of any numerical model.

Changes in the IWF Hypersaline Plume

If it becomes necessary to use the backup water supply, RCW pumping of saline groundwater from Biscayne aquifer beneath Biscayne Bay, could also affect movement of the hypersaline groundwater plume from the IWF cooling canals (described in Section 2.3.1.2). Under current conditions, most of the hypersaline water leaking from the cooling canals into the underlying groundwater system flows eastward beneath Biscayne Bay and likely mixes with bay water. The movement of this water in the subsurface is affected by tidal fluctuations that reverse the flow direction and by the complex mixing pattern of the ground waters with differing densities (Hughes et al. 2010-TN1545). Some hypersaline groundwater may move westward, although the interceptor ditch located on the west side of the IWF is operated to prevent inland movement of hypersaline groundwater (FPL 2014-TN4058). Pumping from the RCWs would increase the hydraulic gradient to the northwest. Both the FPL and USGS groundwater models (Appendix G) predict that some hypersaline water from the cooling canals would be drawn into the RCWs during extended periods of pumping. The increased gradient during RCW pumping would likely increase the flow velocity of hypersaline water eastward under Biscayne Bay and may change the area affected by the hypersaline plume.

After publication of the draft EIS, the review team performed additional groundwater modeling of the interaction between the planned RCWs, the existing hypersaline plume, and the cooling canals using a 2D cross-section model and a limited-extent 3D model. A more detailed description of this review team focused analysis is provided in Appendix G and in Oostrom and Vail (2016-TN4739). These models accounted for fluid density effects caused by salinity and

temperature. The simulations were performed to better understand how the existing hypersaline plume may be affected by RCW pumping combined with remediation actions stipulated in a recent Consent Agreement between FPL and Miami-Dade County (Miami Dade County v. Florida Power & Light 2015-TN4505).

The modeling was useful in showing salinity changes that occur in the aquifer near the RCWs when the wells are operated. The results showed that when the wells are not operating hypersaline water from the cooling canals is present in the high-permeability zone where the well laterals are installed. This saline water would be drawn into the wells during the first few days of RCW pumping, resulting in increasing, then decreasing, salinity at the well. The salinity of the water produced by the operating RCW eventually would drop to about the concentration of the bay water. Water flowing down through the bed of the bay and into the RCWs would be expected to have about the same salinity as bay water. When RCW pumping ceases, water in the high-permeability zone would again increase in salinity because of the migration of water from the hypersaline plume into the high-permeability zone. This migration of hypersaline water into the high-permeability zone would occur regardless of the presence of the RCWs.

Predicted future change in sea level and its effect on interactions between the RCWs and the hypersaline plume were also simulated. The additional modeling confirmed that pumping of the RCWs would move hypersaline water toward the RCWs and would remove some groundwater captured by the RCWs from the hypersaline plume region of the Biscayne aquifer. The model also indicated that RCW pumping is not likely to reduce the effectiveness of hypersaline plume remediation actions specified in the Consent Agreement.

Changes in Groundwater Chemistry Caused by Movement of Bay Water into the Aquifer

Operation of the radial wells will induce water from Biscayne Bay to enter the material bottom at the top of the bay floor in the vicinity of the RCWs. The natural variability of the substrate will result in some preferential flow paths. The water chemistry along these flow paths may be altered as the well-oxygenated water from the Bay displaces the existing pore water. The substrate water quality is unknown and the nature of preferential flow paths is also currently unknown. However, previously in this section the review team has estimated the extent of the area possibly influenced by the RCW operation. Any increase in the density of preferential flow paths would reduce the area of influence and thereby reduce the extent of the changes in substrate water quality.

Changes in Hydraulic Heads and Saltwater Intrusion from Increased Demand on the MDWASD Potable-Water Supply

As described in Chapter 3 of this EIS, potable and service water for operation of the proposed units would be obtained from the MDWASD potable water-supply pipeline. Potable water from the MDWASD is almost entirely from the Biscayne aquifer in Miami-Dade County. Average increased demand for MDWASD potable water was estimated to be 1.5 Mgd based on normal use of 936 gpm with an occasional maximum use of 2,553 gpm for operating the proposed units (FPL 2014-TN4069). This represents less than 0.5 percent of the 349.5 Mgd that MDWASD is permitted to pump each year from the Biscayne aquifer (SFWMD 2012-TN1318). Any additional groundwater withdrawals required to meet Miami-Dade County needs will be

managed under SFWMD policies to minimize impacts on the Biscayne aquifer. Therefore, the review team determined that the impact of this increased demand for potable water from MDWASD on Biscayne aquifer water levels and saltwater intrusion along the coast will be negligible.

5.2.1.3 Boulder Zone

Hydrologic alterations affecting the Boulder Zone of the Lower Floridan aquifer would result from the injection of up to 90 Mgd of blowdown water and other liquid waste streams from the proposed units. The injected water would include effluent from the sanitary waste-treatment plant, wastewater-retention basin, and liquid radwaste treatment system. The estimated injection rate is approximately 20 Mgd when only reclaimed water is used as a cooling-water source, as high as 90 Mgd when only saltwater from the RCWs is used, and between 20 Mgd and 90 Mgd if a combination of these water sources is used (FPL 2014-TN4058). However, the review team has determined that since reclaimed water will be the primary source injection rates higher than 20 Mgd will occur only on rare occasions and for short durations.

Composition of Injected Wastewater

Chemical constituents and concentrations in the injected water would vary depending on whether the source of cooling water is reclaimed water or saltwater from the RCWs. Chapter 3 provides details about the plant processes that affect the blowdown water composition and properties. Chemical constituents and concentrations expected to be present in water injected in the Boulder Zone are listed in Table 3-5 (Section 3.4.4.2) for both 100 percent reclaimed water as a cooling-water source and for 100 percent saltwater from the RCWs. FPL estimated these concentrations (FPL 2012-TN263) by adjusting the expected influent concentrations (reclaimed water or saltwater) based on the chemical changes expected to be caused by the RWTF, the circulating- and service-water systems, concentration in the cooling towers, and dilution to reduce radionuclide concentrations prior to discharge into the UIC wells. The concentrations for the reclaimed water case were estimated from analysis of composite effluent samples collected at the Miami-Dade SDWWTP from 2007 to 2011 and reported to the FDEP's UIC program. Concentrations for the saltwater case were based on analysis of samples collected from the production well during a pumping test conducted on Turkey Point from April 4 through May 5, 2009, from a monitoring well (MW-1 D2) on the Turkey Point site, and from a surface-water sampling location in Biscayne Bay (SP-1).

Upward migration of wastewater into an USDW, which has occurred at several Class I municipal disposal wells in Florida, was historically prohibited by Federal and State Underground Injection Control (UIC) regulations and the Safe Drinking Water Act (SDWA). Previously, facilities where migration into USDWs had occurred would have been forced to cease injecting and adopt an alternate wastewater disposal method. However, due to the severe local restrictions on wastewater disposal alternatives in Florida, the EPA revised the Federal UIC requirements for Florida to allow continued disposal well operations where migration had occurred, provided the injected wastewater is given "pretreatment, secondary treatment, and high-level disinfection prior to injection" in order to "provide an equivalent level of protection to USDWs as provided by the existing no-fluid-migration requirement of the Safe Drinking Water Act" (EPA 2005-TN4766). EPA considered this alternative to be "as effective as confinement of fluids in protecting USDWs

from contaminants in wastewater" (EPA 2005-TN4766) and stated that after additional treatment, "the movement of fluids into the USDWs, whether known or suspected, should not endanger the USDWs because the quality of the wastewater has been treated to a level that is no longer a threat to USDWs" (EPA 2012-TN4782). EPA indicated that it understood that FDEP, which oversees the UIC program in Florida would propose state regulations that were equally or more stringent.

On April 29, 2004, FDEP and MDWASD entered into a Consent Order to address issues including fluid movement at the SDWWTP (Miami-Dade County 2014-TN4758). In accordance with the 2004 Consent Order, MDWASD was to treat wastewater at the SDWWTP to a higher than secondary treatment, including additional filtration and high-level disinfection (HLD) before disposal via injection wells. The impacts of migration of injected wastewater receiving advanced treatment from the SDWWTP was evaluated prior to implementation of this system using numerical modeling conducted by the USGS (Dausman et al. 2008-TN4757) and is discussed below. The HLD Facility at SDWWTP was completed in FY2013 (Miami-Dade County 2014-TN4758) and reclaimed water received by FPL from the SDWWTP and injected into the Boulder Zone will receive both filtration and high level disinfection as part of this advanced treatment. Additional sampling performed at the SDWWTP from 2013 to 2014 to determine seasonal variability of the concentrations of heptachlor, ethylbenzene, tetrachloroethylene and toluene, which are constituents in treated wastewater, also provide insight into the effect of this treatment on constituent concentrations. Concentrations for these constituents determined through this more recent sampling were below both EPA maximum contaminant levels and laboratory method detection limits, as indicated in the footnotes to Table 3-5 (NRC 2015-TN4773). These were lower than the values reported in Table 3-5 and may better represent the concentrations expected in reclaimed water that will be received by Turkey Point. The concentrations do not reflect the additional reduction which would occur due to treatment, volatilization, and dilution at the Turkey Point site before injection. In view of the above, the treatment that the reclaimed wastewater will receive at the SDWWTP will provide protection to the USDW even in the event of upwelling. Confinement of the wastewater below the USDW, which is discussed below, will provide an additional level of protection.

Evaluation of Confinement of Injected Wastewater in the Saline Lower Floridan Aquifer

The purpose of the evaluation of deep well injection presented in the FEIS is to determine the impacts to water resources that might reasonably occur if Units 6 and 7 are licensed. The responsibility to demonstrate that plant effluent injected in to the Boulder Zone will not impact overlying USDWs is that of FPL and is required as part of the FDEP UIC permit. To evaluate the impacts of deep well injection at the Turkey Point site, the review team 1) reviewed studies that characterized the confining ability of the MCU and the causes and extent of upwelling at other deep well injection sites, 2) compared hydrogeological conditions and parameters at the sites at which upwelling occurred to conditions and parameters at the proposed site, 3) evaluated numerical modeling of flow of injected wastewater presented by the applicant and performed confirmatory calculations, and 4) considered the injection well testing and groundwater monitoring requirements of the FDEP UIC program. As a result of this evaluation, the review team concluded that significant upwelling of injected wastewater is not likely at the Turkey Point site and that, if upwelling did occur it would not noticeably impact overlying USDW aquifers.

As described in Section 2.3.1.2, the Boulder Zone contains saline water and is regionally isolated from the overlying Upper Floridan aquifer by a thick section of low-permeability sediments of the middle confining unit (MCU). Information from an exploratory well constructed at the Turkey Point site identified highly porous and permeable rocks that form the upper portion of the Boulder Zone at a depth of 3,020 to 3,232 ft below the drill pad.

Almost all of the injected wastewater is expected to be from periods when Units 6 and 7 are using reclaimed water as a cooling-water source. Because the injected wastewater would have a lower TDS content and an elevated temperature compared to the native water in the Boulder Zone, the injected wastewater would have a lower density than that native water, resulting in buoyancy. Wastewater from periods when the plants are using water from the RCWs is expected to have a higher density than the native Boulder Zone water, resulting in negative buoyancy. These periods are expected to be rare and of short duration.

As described in Section 2.3.1.2 of this EIS, the naturally-occurring hydraulic gradient in the Boulder Zone is small and water flows slowly to the west. The natural gradient is very small compared to the pressure developed at the injection point into the Boulder Zone by the injection pumps, as discussed below. Accordingly, the injected reclaimed wastewater will be forced in all directions from the injection point into the Boulder Zone. In addition, when reclaimed wastewater is used, buoyant forces will dominate the small natural gradient due to the lower density warm injectate, resulting in an overall upward hydraulic gradient in the Boulder Zone. Upward flow of injected wastewater would nonetheless be inhibited by the more than 1,465 ft thick sequence of predominately low-permeability rocks that lie between the Boulder Zone and the USDW aquifer (FPL 2012-TN1577).

FPL performed an analysis of the pressure buildup by the injected wastewater (FPL 2014-TN3932). FPL calculated a maximum total pressure increase of 158 psi in the injection formation from the combined injection pressure of 12 injection wells plus buoyancy of the injectate based on a reclaimed water source. This is much lower than the calculated 1,235 psi minimum pressure that could create or open a fracture in the overlying confining zone (FPL 2013-TN3931).

Based on the above evaluation, the review team concluded that in general the matrix of the MCU would confine injected effluent and that incidences of upwelling at other sites have been coincident with features that provide vertical pathways for upward migration such as fractures or improperly completed wells. Site data indicates that substantial fracturing of the confining layers is not evident at the Turkey Point site and well construction related issues are not expected to create potential for upwelling at the Turkey Point site because of improved understanding of the confining zones within the MCU and improved construction techniques. However, studies of other injection sites indicate that if rapid vertical migration occurs, it is not likely to reach the Upper Floridan aquifer and that, if it did, it would not noticeably impact drinking water quality. This is discussed in greater detail in Sections 2.3.1.2 and 5.2.3.2 and within the following portions of this section.

Extent of Upwelling at Deep Well Injection Facilities

Maliva et al. (2007-TN1483) reports that of the more than 180 Class I UIC wells, "in the majority of injection well systems, no vertical movement of injected fluids has been detected in the monitoring zones." Seventeen sites have experienced migration, however upwelling into the USDW had occurred at 8 of those sites. Three of these sites are in southeast Florida and include the SDWWTP, which is north of the Turkey Point site. Previous reports indicated that injectate had migrated into the Upper Floridan aquifer (Starr et al. 2001-TN1251; 68 FR 23673 [TN3658]; EPA 2003-TN4759). However, more recent studies, such as Maliva et al (2007-TN1483) and Walsh and Price (2010-TN3656) have clarified that while migration has reached the USDW at some Class I injection facilities, no impact has been reported for the Upper Floridan aquifer in southeast Florida including at the SDWWTP. As discussed in Section 2.3.1.2, this is likely because the earlier studies referenced above considered the APPZ, where upwelling was detected, to be the lower part of the Upper Floridan aquifer. As a result of more recent characterization of the Floridan aquifer in south Florida (such as Reese and Richardson 2008-TN3436), it is now understood that the APPZ is separated from the Upper Floridan aquifer in south Florida by the upper confining unit of the MCU. Results from characterization at EW-1 indicate that the upper confining unit of the MCU may separate the APPZ from the Upper Floridan by approximately 250 ft.

Also, the base of the USDW is defined by the depth at which TDS exceeds 10,000 mg/L. The depth at which groundwater TDS exceeds 10,000 mg/L may occur beneath the base of the Upper Floridan Aquifer as it does at the SDWWTP. Therefore, upwelling into the USDW does not necessarily indicate that upwelling has reached the Upper Floridan aquifer. However, review of data from well EW-1 indicate that the base of the USDW and Upper Floridan aquifer occur around the same depth at the Turkey Point site.

Potential Causes of Upwelling of Injected Wastewater through the Middle Confining Unit

Many studies have been conducted to characterize the confining nature of the MCU and determine the causes of upwelling, where it has been observed. Studies have evaluated whether observed migration was caused by flow through the matrix of the MCU or through pathways provided by either natural geologic features or well-related problems. These studies generally conclude that the MCU matrix provides adequate confinement, that rapid flow results may result primarily from well-related issues, and that significant upwelling has not occurred at injection sites. These studies are summarized in the following paragraphs.

Starr et al. (2001-TN1251) reviewed "existing information that describes geology, hydrogeology, and geochemistry at the South District Wastewater Treatment Plant" to determine "the ability of the confining layer above the saline aquifer to prevent fluid migration into the overlying freshwater aquifer." The aquifers referred to are the Boulder Zone (the "saline aquifer") and the Upper Floridan aquifer (the "freshwater aquifer"). However, the Upper Floridan aquifer is brackish, not fresh, in the vicinity of the site. The Starr study expressed concern over the adequacy of the data set being evaluated and concluded that "the geologic data provided for review are not sufficient to demonstrate that the Middle Confining Unit is a competent, low hydraulic conductivity layer that is capable of preventing upward migrations of fluids from the

Boulder Zone into the overlying underground source of drinking water" or USDW. According to the report:

- "Although the confining layer above the Boulder Zone may in fact be competent, these data sets are not adequate to draw this conclusion."
- "A caveat to this interpretation is that the hydraulic characterization test methods employed may not adequately represent the less permeable hydrostratigraphic units, and hence the hydraulic data set may not adequately describe the actual site conditions."
- "…the geochemical data do not show a spatial pattern of contamination that is consistent with widespread upward migration of contaminated water through a highly permeable confining layer."

Rather than indicating a lack of confinement by the MCU, the study concludes that "the Middle Confining Unit and/or upper portion of the Lower Floridan Aquifer is a better confining unit than indicated" by the data that was provided for review. The study concluded that overall the spatial distribution of contaminants "suggests that isolated conduits, such as inadequately sealed wells or natural features, provide pathways for contaminated water to migrate upward from the Boulder Zone, but contaminants are not migrating upward through the Middle Confining Unit across a broad area."

This lack of observed migration across a broad area was also investigated by Maliva et. al. (2007-TN1483). Maliva, et al., studied vertical hydraulic conductivity data from core plugs from the MCU at 29 South Florida injection well sites (including the SDWWTP) and performed variable density solute-transport modeling. They observed that "matrix hydraulic conductivities of the limestone and dolostones that constitute the confining strata between the injection zone and the base of the USDW in South Florida are sufficiently low to retard significant vertical fluid movement" and that minimal vertical migration would occur through sections where vertical hydraulic conductivity was 10^{-6} cm/sec or less. As discussed in Section 2.3.1.2, intervals of dolomitic limestone and dolomite with hydraulic conductivities measured as low as 10^{-6} cm/sec occur within the MCU at well EW-1 at the Turkey Point site. As a result, these intervals at the Turkey Point site would be expected to prevent or limit vertical migration.

McNeill (2002-TN4571) recognized a thin "important low-permeability interval" which "appears to act as a competent confining unit" between the Boulder Zone and Middle Confining Unit throughout southeastern Florida. He referred to this interval as the Dolomite Confining Unit and identified characteristics of the unit that were indicative of confinement. These included zones in which the data showed high core recovery and low hydraulic conductivity, and other confining characteristics as indicated by geophysical logs. The review team observed zones with similar confining characteristics at several depths within the MCU at well EW-1 at the Turkey Point site.

Several studies indicated that upwelling may result from natural features or well-related issues. Dausman et al. (2010-TN4760) agreed that MCU "heterogeneity cannot explain all the effluent migration" and indicated that upwelling at the SDWWTP can generally be attributed to "…flow through a channelized pathway caused by well construction." At the SDWWTP, McNeill (2002-TN4571) indicated that upwelling likely occurred because 10 of 17 injection wells were drilled

through but completed above the Dolomite Confining Unit at the base of the MCU, effectively leaving an open hole and upward pathway through which injected effluent could migrate.

Lastly, Walsh and Price (2010-TN3656) evaluated well logs and water chemistry data at the SDWWTP and determined that while natural features could not be ruled out, enhanced vertical flow pathways that allowed upwelling likely resulted from issues related to well installation or failure because effluent appeared to bypass deeper monitored intervals before being detected at higher depths.

Even if the MCU matrix is generally confining and wells are installed properly, upwelling may still result from fracturing or other natural geologic features within the confining zone. Cunningham (2012-TN4576; Cunningham 2013-TN4573; Cunningham 2014-TN4051; Cunningham 2015-TN4574) evaluated injection sites for natural vertical high conductivity features (such as karst collapse structures) using seismic-reflection data. He stated that "if present at or near wastewater injection utilities, these features represent a plausible physical system for the upward migration of effluent injected into the Boulder Zone to overlying EPA-designated USDW in the upper part of the Floridan aquifer system." In the most recent study, karst collapse features have been identified in the vicinity of the North and South District Wastewater Treatment Plants as well as locations beneath Biscayne Bay and have been found to extend from the MCU to above the Upper Floridan aquifer (Cunningham 2015-TN4574). These structures are beyond the zone of influence of the injection wells proposed at the Turkey Point site, as described below. At an injection well operated by the City of Sunrise in Broward County a collapse structure was implicated in the observed migration of injected wastewater from the Boulder Zone to the uppermost permeable zone within the Lower Floridan aquifer however migration of contaminants above the Lower Floridan aquifer was not observed at this site (Cunningham 2014-TN4051). Migration above the APPZ and into the Upper Floridan aquifer resulting from natural features has not been identified at any site in south Florida.

Deep seismic data has not been collected at the Turkey Point site. In the absence of seismic data, Cunningham (2015- TN4574) suggests that, "other evidence for karst collapse includes borehole log signatures that indicate highly fractured rock," and that fractures would be indicated by "..high travel times measured on borehole sonic log data." Walsh and Price (2010-TN3656) reported that at the SDWWTP "no fracturing of the confining strata had been reported." Using geophysical (sonic) logs from injection sites in south Florida, Maliva et al (2007-TN1483) and McNeill (2002-TN4571) described signatures and travel times for fractured rock. Staff evaluated travel times and signatures on sonic logs obtained at well EW-1 at the Turkey Point site and found sections of the MCU to have log signatures and transit times consistent with unfractured rock. Dissolution rates for limestone and dolostone presented by Palmer (2016-TN4755) are low, indicating that if fractures in the MCU at the Turkey Point site are absent or poorly developed, such fractures are not likely to become conduits capable of upwelling over the life of the plant. In order for rapid flow of injected effluent to occur from the Boulder Zone through the MCU as a result of these natural features, they would have to occur within the zone of influence of an injection site and create a set of pathways that compromise the approximately1500 ft thick MCU. However, characterization data indicates that these features are not evident at the site and modeling suggests that the expected zone of influence of injected wastewater is not expected to extend far beyond the boundaries of the Turkey Point site, as described below.

The review team evaluated the potential for upwelling due to flow through a competent MCU matrix or pathways created by natural features or well-related issues. Review of hydrogeological parameters at the site indicate that the MCU would be expected to offer confinement absent the presence of conduits. Results of borehole characterization activities at exploratory well EW-1 (FPL 2012-TN1577) and DZMW-1 (MHC 2014-TN4052) indicated that there were thick sections of low permeability sediments between the Boulder Zone and the Upper Floridan aquifer at the proposed Turkey Point injection site. Monitoring results from the water-injection testing at these wells above these low permeability strata did not indicate pressure fluctuations indicative of lack of confinement due to matrix flow or flow through pathways caused by either improper well construction or natural features (FPL 2014-TN4052). Installation, testing and monitoring required by the FDEP UIC permit are designed to prevent upwelling resulting from improper well construction and detect upwelling associate with the wells if it occurs. The review team notes that the one injection well has been drilled and characterization of the thickness and competency of the MCU is also required at each subsequent well location by the UIC permit process. The UIC permit for each well may not be issued unless adequate confinement has been demonstrated by the well-specific characterization data. The review team believes that enhanced vertical flow through the confining units to the Upper Floridan aquifer is extremely unlikely, and if leakage associated with an injection well did occur it could be detected and mitigated as required by the FDEP UIC program.

Extent of Injected Wastewater Migration at the Turkey Point Site

In order to understand the fate of injected wastewater at the Turkey Point site the review team evaluated local and regional site studies and modeling of the SDWWTP site, modeling conducted at the Turkey Point site by FPL, and independent confirmatory modeling by the review team.

Dausman et al. (2008-TN4757) modeled migration of two plumes from the SDWWTP of wastewater injected into the Boulder zone: one comprised of secondarily treated wastewater and another of wastewater receiving HLD, which has since been implemented along with additional filtration at the SDWWTP site. The Dausman study concluded that over a projected 148-year injection period (from 1983 forward) the resulting plume would extend "…outward about 13 mi from the site in the MFA, just beneath the UFA." The MFA, or Middle Floridan aquifer, is another name for the APPZ. Modeling also indicates that the initial concentration of constituents in the plumes would be significantly reduced through dilution, to less than 5 percent of the original injected concentration by the end of the modeling timeframe.

This prediction of limited vertical and horizontal effluent migration is supported by modeling and analysis performed by FPL and independent confirmatory analysis performed by the review team. FPL provided information about modeling and analysis of several scenarios of potential upward migration of injectate (FPL 2013-TN3931) in support of the safety analysis of the proposed plants. The scenarios in the analysis focused on the fate and transport of radionuclides over a 61-year injection period followed by a 41-year period with no injection, and used conservative assumptions that would tend to maximize the upward migration of effluent. In each scenario, injected wastewater was predicted to expand radially around the point of injection since injection rates would exert a stronger influence on flow than the negligible flow

rates naturally occurring within the Boulder Zone. Injected wastewater was not predicted to extend more than around 4 mi beyond the point of injection over the modeled timeframe. This is bounded by the transport distance of 13 mi predicted by Dausman et al. (2008-TN4757). The extent of migration resulting from injection at Turkey Point would be expected to be less because injection rates would be around 20 percent of those at the SDWWTP and the injection period would be less than half that which was modeled by Dausman et al. (60 years vs 148 years).

One scenario evaluated by FPL determined that, in the absence of well-developed pathways, upward movement of injectate would be limited to approximately 300 ft into the MCU. The primary confinement portion of the MCU above the injection zone is 985 ft thick (FPL 2012-TN1577) and is overlain by an additional 480 ft thickness of moderate- to low-permeability layers of rock below the Upper Floridan aquifer. The staff performed a separate confirmatory analysis (Appendix G) and found that upward migration of injectate from the Boulder Zone would likely be less than 300 ft. These estimates of limited upward migration are supported by the conclusions from the studies of matrix flow through the MCU discussed earlier in this section.

FPL's safety analysis also considered a scenario in which a pathway through the MCU exists. In this scenario, a hypothetical water-supply well located 2.2 mi from the reclaimed wastewater injection site was drilled into the USDW aquifer and an instantaneous bypass/failure of the MCU occurred at the water supply well. The 2.2 mi distance is based on the nearest privately owned parcel of land. The FPL analysis showed that the transit time through the Boulder Zone from the injection well to beneath the offsite location would be at least 10 years, and the maximum radionuclide concentrations for tritium would not occur until year 21 (FPL 2013-TN3931). This analysis was conservative in that it did not account for transit time through the MCU and did not account for dilution of effluent within the Boulder Zone or Upper Floridan aquifer. It assumed that 100 percent of the water pumped by the water-supply well would be from the Boulder Zone with no dilution in the Avon Park Permeable Zone (APPZ) or the Upper Floridan aquifer. The review team performed a separate confirmatory analysis of this scenario (Appendix G), which predicted concentrations of radionuclides at the hypothetical well that were similar to those calculated by FPL. The assumptions of vertical migration in this scenario were made to determine a bounding dose. The conditions and parameters in this scenario have not been observed at operating injection sites and are not reasonably foreseeable based on the hydrogeology at the Turkey Point site.

FPL also considered impacts at the nearest user of brackish Upper Floridan aquifer groundwater, which is the Ocean Reef Club located on Key Largo 7.7 mi from the injection site. This scenario conservatively assumed that water from the existing irrigation supply well is used for drinking and other domestic purposes and there is a failure of confinement between the Boulder Zone and the Upper Floridan aquifer at the location of the water-supply well. FPL's radiological safety analysis at the Ocean Reef Club showed that radionuclide levels in the Upper Floridan aquifer would remain at inconsequential levels throughout the 100-year analysis period. This is expected since the wastewater is not predicted to travel this far beyond the injection well. Estimates of potential doses resulting from each of these scenarios are discussed in Section 5.9 of this EIS. While this evaluation considered the transport of radionuclides, predictions related to flow direction and horizontal extent would also apply to non-radiological constituents in the injected water.

The review team evaluated the impacts of this and other scenarios (direct injection into the Upper Floridan aquifer, upward migration through the MCU and rapid migration through preferential pathways through the MCU) using results from published risk assessments and modeling studies as well as expected constituent concentration data from reclaimed water at the Turkey Point site. The results are set forth in Section 5.2.3.2.

Another controlling factor on the direction of flow of injected wastewater was determined to be the structure of the confining layers that overly the Boulder Zone. McNeill (2002-TN4571) evaluated the structure and extent of a unit he called the Dolomite Confining Unit, which occurs at the base of the MCU in southeast Florida. McNeill indicated that while there is local variability in the bottom depth of the Dolomite Confining Unit, the overall dip of the unit is to the southwest. This implies that as distance beyond the injection well increases, flow of buoyant injected effluent may be more influenced by the structure of the base of the confining unit rather than injection pressure. As a result, any migration within the Boulder Zone beyond the site would move northeast toward (but beneath) the bay and away from areas in which the upper aquifers are used. As mixing, cooling and dilution occur, buoyancy of the injectate will decrease, causing it to eventually be subjected to the slow westward movement of the native water within the Boulder Zone (Meyer 1989-TN2255).

Finally, as described in Section 2.3.1.2 of the EIS, treated municipal wastewater injected into the Boulder Zone has migrated into relatively permeable zones within the MCU at the SDWWTP north of Turkey Point site, but has not reached the Upper Floridan aquifer. Studies have indicated that this migration could have resulted from well construction issues. Walsh and Price (2010-TN3656) presented a conceptual model that postulates the vertical migration through the lower portion of the MCU, below the APPZ, is fluid-density driven. Walsh and Price also determined that if migration into the APPZ occurred, “the transport mechanism appeared to be a horizontal flow with mixing of ambient waters” which would likely diminish the buoyant forces and reduce the impact above the APPZ. This conceptual model of horizontal flow in the APPZ overcoming the vertical flow component that dominated flow within the more confining MCU strata was also illustrated in a numerical modeling scenario by Maliva et al (2007-TN1483). This indicates that even where migration through the bottom portion of the MCU has occurred, upwelling to the upper MCU and the overlying Upper Floridan aquifer is not likely. This could partially explain why recent studies have indicated that upwelling to the Upper Floridan aquifer has not occurred at injection sites.

Based on the foregoing, the review team has determined it is reasonable to conclude that injected wastewater is not expected to migrate far beyond the site in the Boulder Zone, that upwelling to the Upper Floridan aquifer is not likely at the site, and that if significant upwelling through the MCU did occur, horizontal flow and mixing within the APPZ would likely prevent upwelling above the MCU. While not quantified by the review team, modeling near the site indicates that natural dilution of injected wastewater could significantly reduce the concentrations of constituents in wastewater. There are no users of groundwater within the Boulder Zone near the site, there are no users of groundwater within the Upper Floridan aquifer overlying the predicted extent of wastewater migration, and wastewater is not expected to migrate upward into the Upper Floridan aquifer.

Lastly, relative risk assessments of wastewater disposal methods in southeast Florida indicate that "distance has a major impact on risk" with the already low risk decreasing dramatically as distance from the injection well increases (Bloetscher et al. 2005-TN4756). The study considered scenarios that included breach of the MCU and determined that risk to receptors up to 5 mi from the injection well was minimal, which is similar to the migration distance indicated by site and regional modeling, as discussed above. Risk assessments that consider deep well injection are discussed in greater detail in Section 5.2.3.2.

5.2.1.4 Industrial Wastewater Facility (Cooling Canals)

Hydrological alterations affecting the IWF cooling canals, that would be associated with the operation of the proposed Turkey Point Units 6 and 7, may occur due to (1) drift deposition of contaminants on in the IWF (2) stormwater discharge to the IWF, (3) runoff from spoils piles, and (4), withdrawal of water from the IWF due to radial well operation.

Drift Deposition

The review team has conducted analyses to estimate drift deposition of chemical contaminants on aquatic and terrestrial habitats; these estimated depositions would be used for determining aquatic and terrestrial ecological effects. The methods of estimating drift deposition are discussed in the Biscayne Bay section above, and the estimated deposition rates are provided in Table 5-1, which includes the IWF cooling canals. Table 5-1 provides deposition rates with the use of reclaimed water as cooling-tower makeup water. The table includes concentrations in wastewater (or Biscayne Bay), ratios of constituent concentration to TDS concentration, and calculated deposition rates for each constituent to areas around the cooling towers.

The potential concern for the cooling canals, while not a water body regulated for water quality, is related to the potential impact on Federally protected crocodiles, which nest on the cooling-canal berms at several locations of the IWF. Most of the IWF is also designated critical habitat for the crocodile.

As noted in the section about Biscayne Bay, with the use of either the reclaimed water or RCWs, the deposition rates of potentially associated chemical contaminants is extremely low. Only TDS, chloride, and sulfide have deposition rates greater than 10^{-6} g/m^2/mo, and the IWF has concentrations of those that are greater than marine waters.

Using water and mass balance methods, the review team also calculated the equilibrium concentrations of contaminants within the cooling canals from drift deposition. To compute the mass balance, the review team first calculated a water balance using the cooling-canal storage information from the *Cooling Canal System Modeling Report* (Golder 2008-TN1072) and the FPL 2012 *Uprate Report* (FPL 2012-TN3439). The water balance data from FPL (2012-TN3439) was averaged by month and repeated over a 9-year period to provide inflows and outflows to the cooling canals for use in the mass balance calculations. Loading to the IWF and the flow balance of the IWF is discussed in Section 4.2.1.4. Figure 5-1 shows the review teams computed cooling-canal volumes for this period.

For the next step, the review team calculated the mass balance of each constituent in Table 5-1 using the hydrologic fluxes of the IWF to account for dilution of contaminant concentrations from drift deposition. For a conservative estimate, no loss of contaminants was assumed in the cooling canal from degradation or volatilization. Figure 5-2 provides an example of contaminant concentrations calculated from the mass balance of 1,4-dichlorobenzene, which is an insect repellent. Concentrations increase from the initial value of 0 µg/L and reach a dynamic equilibrium within approximately 4 years. The only input of contaminant is from cooling-tower drift, and the primary loss is via the seasonal inflows and outflows of groundwater, which produces the variation in volume shown in Figure 5-1. The maximum computed increase in concentration was 0.00070 µg/L. The same calculation was made for other potential contaminants deposited in the cooling canal from drift; the maximum concentrations attained are listed in Table 5-2. Comparison of the contaminant concentrations with detection limits indicates that all of the concentrations from this mass balance calculation are below current detection limits. Other chemical constituents with concentrations that were not measured in the reclaimed water, but which could have concentrations similar to those measured by MDWASD, would be expected to result in concentrations in the IWF as found above.

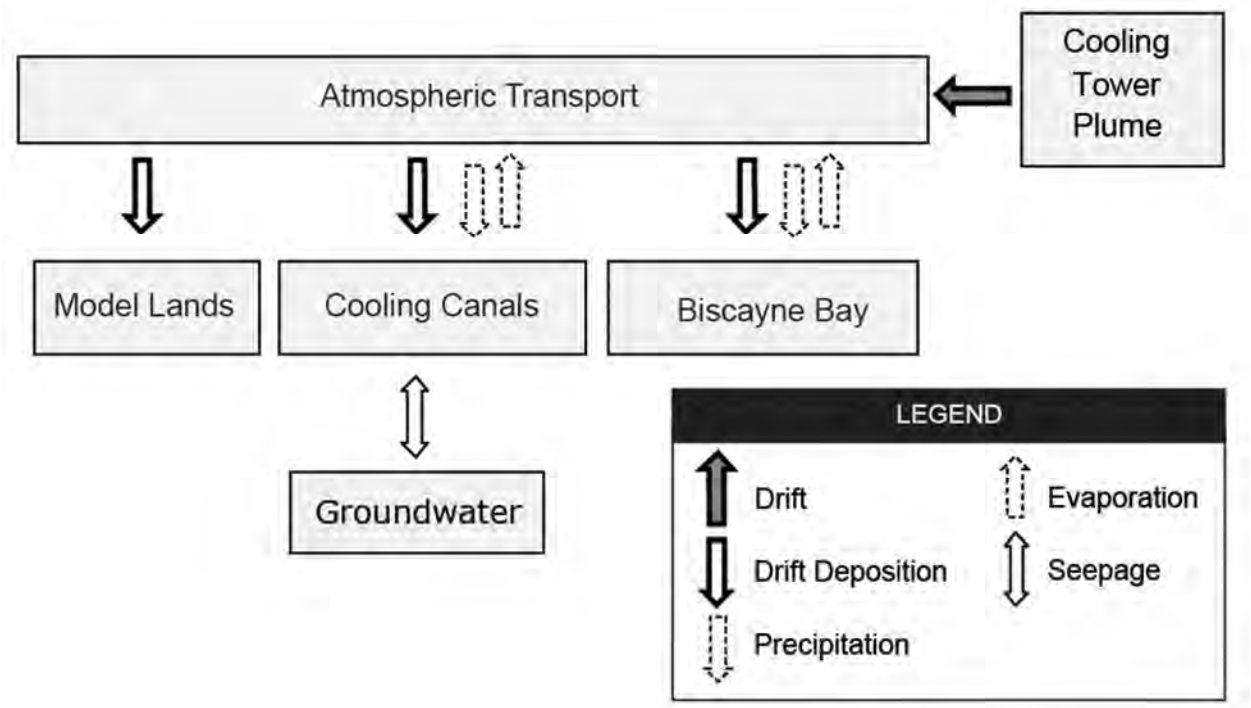


Figure 5-1. Schematic of Hydrologic and Mass Exchange Processes Considered in Estimating the Effects of Drift Deposition on the IWF Cooling Canals, Model Lands, and Biscayne Bay

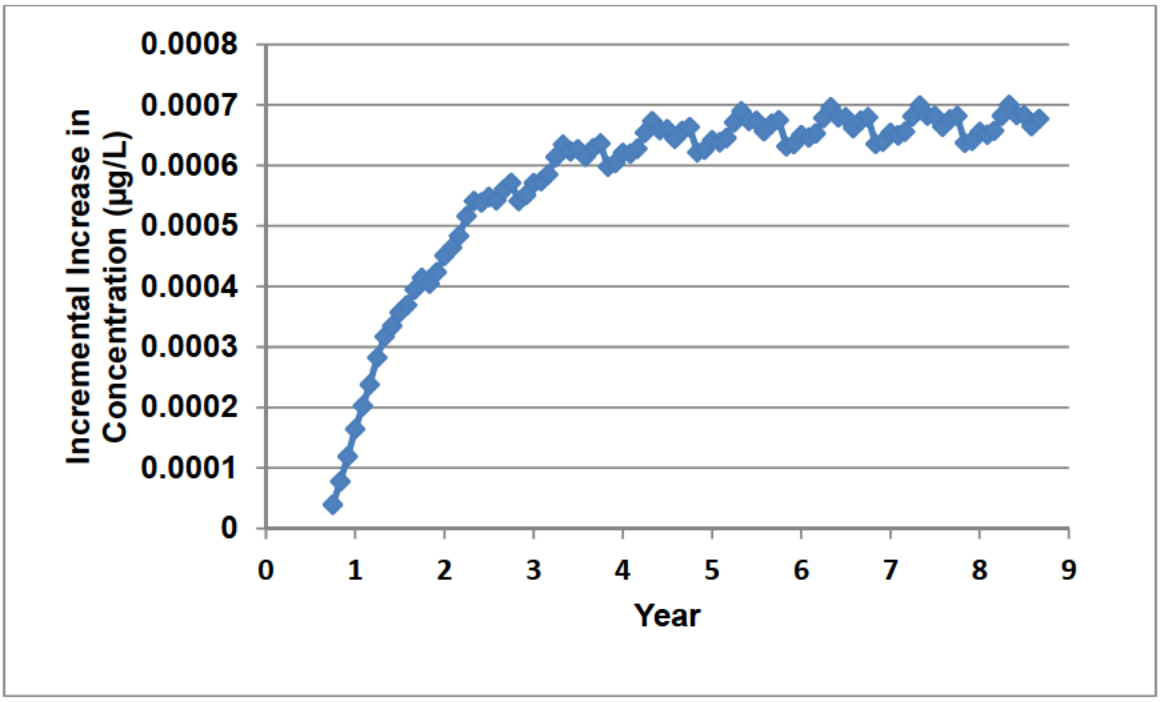


Figure 5-2. Concentrations of 1,4-Dichlorobenzene Based on Annual Average Drift Flux from the Cooling Towers over a 9-Year Period. ***Hydrologic conditions are those used to estimate the cooling-canal volumes shown in Table 5-2.***

Table 5-2. Estimated Contaminant Concentrations in the Cooling Canal from Drift Deposition. ***Detection or reporting limits are provided for comparison. Drift deposition is assumed to be the only source of contaminants.***

Contaminant	Method Detection Limit (µg/L)	Maximum Incremental Increases of Concentration in Cooling Canals (µg/L)	Category
Reclaimed Water			
1,4-Dichlorobenzene	0.1[(a)]	0.00070	Insect repellant
3 Beta-coprostanol	0.52[(a)]	0.0011	Human digestion
4-Nonylphenol	0.64[(a)]	0.0022	Detergent metabolite
Acetyl-hexamethyl-tetrahydro-naphthalene (AHTN)	0.08[(a)]	0.0022	Polycyclic musk (e.g., tonalide)
Hexahydrohexamethylcyclo-pentabenzopyran (HHCB)	0.12[(a)]	0.00027	Polycyclic musk (e.g., galaxoide)
Phenanthrene	0.08[(a)]	0.00032	Polycyclic aromatic hydrocarbon (PAH) compound
Warfarin	0.012[(b)]	0.000064	Pharmaceutical
17 Beta-estradiol (E2)	2[(b)]	0.000019	Hormone
Triclosan	Unknown	0.060	Antimicrobial
Copper	6.0[(c)]	0.0052	Metal

(a) Lietz and Meyer 2006-TN1005.
(b) reporting limit
(c) FPL 2012-TN263.

Effect of Stormwater Discharge

Section 3.2.2.1 discusses stormwater drainage for the plant area which includes a proposed makeup-water reservoir (FPL 2011-TN303). Stormwater discharge locations are shown in Figure 3-4. The site hydrology prior to building is discussed in Section 2.3.1.1. According to Table 2-10, the average annual runoff to the IWF cooling canals from the plant area prior to building would be is 1,163 ac-ft from an annual average precipitation depth of 57.15 in. The review team estimated after building the annual stormwater runoff from the same area would be 1,141 ac-ft, considering that the makeup-water reservoir would collect rainfall but not contribute to the stormwater runoff to the IWF.

Because of the reduction in volume of stormwater and the use of the BMPs for stormwater management, as discussed in Section 3.4.2.1, the review team concludes that the hydrological alterations to the IWF due to stormwater discharge would be undetectable.

Runoff from Spoils Piles

As indicated in Section 3.2.2.3, spoils would be disposed of along sections of the IWF berms. The effect of pore-water drainage from spoils piles is discussed in Section 4.2.1.4 and the review team calculated the maximum incremental increase in concentration of total Kjeldahl nitrogen (TKN) and total phosphorus (TP). During operation of Turkey Point Units 6 and 7, runoff from precipitation could leach TKN and TP from the spoils piles. There is a potential for the runoff to discharge into the IWF. While not a water body regulated for water quality, there is concern related to the potential impact on Federally protected crocodiles, which nest on the cooling-canal berms at several locations of the IWF.

Based on the review team's independently calculated disposal area of 222 ac, an annual precipitation depth of 77.43 in. (SFWMD 2012-TN1523), and assuming that all precipitation runs off the spoils pile, the review team estimated the annual volume of runoff to be 1,430 ac-ft. This gives an annual average discharge of 1.98 cfs. For the evaluation of the potential maximum impact, the review team made several assumptions: (1) the volume of runoff drainage was added to the IWF continuously until a dynamic equilibrium was established, (2) the nutrient concentrations in the pore-water drainage were represented by average concentrations reported in the Round 2 SCA documentation with conservatively no decrease in average concentration over time, and (3) the constituents were conservative (no loss except by dilution). Round 2 of the Florida SCA review (FPL 2010-TN3664) reports nutrient concentrations measured from muck leachate samples. The average nutrient concentration measured in the muck leachate for TKN was 0.31 mg/L (FPL 2010-TN3664). TP was not detected, so half the detection concentration was used, that is, 0.15 mg/L (FPL 2010-TN3664). Using the estimated average discharge and the concentrations, the review team computed the daily load of TKN to be 1.50 kg/d and of TP to be 0.73 kg/d.

To compute the maximum incremental increases of concentrations, the review team used the same water and mass balance methods discussed under Drift Deposition above. Based on the estimated daily loads for TKN and TP, the maximum incremental increase in concentration for TKN would be 32 µg/L and for TP would be 16 µg/L.

5.2.1.5 Effect of Radial Collector Well Operation

As described in the Section 2.3.1.2, the IWF cooling canals interact with groundwater in the underlying Biscayne aquifer. Operation of the RCWs will reduce hydraulic head in the aquifer under Biscayne Bay in the vicinity of the wells and is likely to cause groundwater under the IWF to move northeast during the brief and infrequent periods that the RCWs are pumped for either a backup supply of makeup water or for well maintenance. The review team determined, based on the reliability of the components of the reclaimed water system, that the RCWs would be called into use infrequently and for limited durations.

5.2.1.6 Offsite/Adjacent Areas

Hydrological alterations affecting the offsite/adjacent areas that would be associated with the operation of Turkey Point Units 6 and 7 may occur as a result of (1) drift deposition from cooling towers, and (2) stormwater runoff.

Effect of Drift Deposition

The review team has conducted analyses to estimate drift deposition of chemical contaminants on aquatic and terrestrial habitats; these estimated depositions would be used for determining aquatic and terrestrial ecological effects. The methods of estimating drift deposition are discussed in the Biscayne Bay section above, and the estimated deposition rates are provided in Table 5-1, which includes offsite areas west of the site. The potential concern for offsite areas is the accumulation of salt and contaminants in terrestrial and wetland habitats.

Table 5-1 provides deposition rates with the use of reclaimed water and marine water from Biscayne Bay as cooling-tower makeup water. The table includes concentrations in wastewater (or Biscayne Bay source water), ratios of constituent concentration to TDS concentration, and calculated deposition rates for each constituent to areas around the cooling towers. The focus in this section is the offsite areas. In the area west of the project area, which includes a portion of the Model Lands, the deposition rate for TDS is 0.0146 $g/m^2/mo$, and as noted in the Biscayne Bay section, the deposition rate of potentially associated chemical contaminants is extremely low ($<2.0 \times 10^{-7}$ $g/m^2/mo$).

Regions further west (including Everglades National Park) would be expected to have exponentially lower deposition rates; those rates are not calculated in the deposition analysis. The upper bound would be a salt-deposition rate of approximately 0.01 $g/m^2/mo$ at the edge of the modeled deposition area, which is lower than the average deposition rate of 0.0146 $g/m^2/mo$ for areas west of the site. Also, there is an exponential rate of decrease in salt deposition with increasing distance from the cooling towers, so that an upper bound of 0.01 $g/m^2/mo$ is likely much too large. Estimated deposition rates for the chemical contaminants would be on the order of 10^{-7} to 10^{-11} $g/m^2/mo$. For comparison, this is approximately equivalent to one 3 oz bottle of 100 percent DEET applied to 10,000 ac (15.6 mi^2) over 1 month.

Effect of Stormwater Discharge

Section 3.4.2.1 discusses stormwater drainage from the RWTF area. Stormwater discharge locations are shown in Figure 3-4. The local site hydrology prior to building is discussed in

Section 2.3.1.1. According to Table 2-10, the average annual runoff from the RWTF area prior to building is 207 ac-ft from an annual average precipitation depth of 57.15 in. calculated for the period from 2000 to 2010. The review team estimated stormwater discharge from the RWTF area after building to be 169 ac-ft, assuming 100 percent runoff of precipitation. The annual average runoff following building decreases largely due to the removal of the open basins as contributing areas. The maximum annual precipitation during the period was 71.53 in. during 2005, which produces 212 ac-ft of runoff after building compared to 259 ac-ft (Table 2-10) prior to building.

The review team discussed stormwater management with SFWMD experts and they identified no conditions to suggest that stormwater mitigation could not be achieved with the BMPs discussed in Section 3.4.2.1. The review team concludes that the alteration of the hydrology outside of the site due to stormwater discharge from the RWTF would be minimal.

5.2.2 Water-Use Impacts

A description of water-use impacts on surface water and groundwater is presented in the following sections. Overall, the water resource usage for proposed Turkey Point Units 6 and 7 operations would be limited because of the use of reclaimed water from Miami-Dade County for cooling-system makeup-water needs during normal operations. The use of RCWs to collect saltwater from Biscayne Bay at the Turkey Point site would serve as a backup supply of makeup water. In addition, water would be provided by the MDWASD for general plant operations, including potable-water supply, raw water to the demineralizer, firefighting water, and media filter backwash. The MDWASD obtains its water from groundwater supply wells.

5.2.2.1 Surface-Water-Use Impacts

As indicated in Chapter 3, the primary makeup-water supply for cooling water is reclaimed water from the MDWASD. This reclaimed water is considered a freshwater source, and because it is being reused, its use causes no withdrawals from surface waters, so there is no impact on surface-water users. Therefore, the NRC staff determined that the impact of operation of the proposed Units 6 and 7 on surface-water users would be SMALL and no mitigation would be required.

5.2.2.2 Groundwater-Use Impacts

The use of reclaimed water from the MDWASD as a makeup-water supply would cause no new withdrawals from groundwater, so there would be no impact on groundwater users from the use of reclaimed water.

During the irregular and brief durations that the RCWs installed beneath Biscayne Bay could be used as a backup supply of makeup water, most water would be drawn into the wells from the bay. However, some fraction of water would be withdrawn from the inland portion of the Biscayne aquifer. The RCWs would only be used when reclaimed water from the MDWASD is not available in sufficient quantity or quality. The review team determined, based on the reliability of the components of the reclaimed water system, that the RCWs would be called into use infrequently and for durations much shorter than the 60-day maximum allowed per year

under the FDEP final Conditions of Certification (State of Florida 2014-TN3637). This limited use greatly reduces potential RCW impacts on groundwater users.

An important question in evaluating the potential impacts of pumping the RCWs is the relative fraction of water that would come from the inland aquifer and freshwater canals to the west of the bay compared to the fraction coming from saltwater in the bay. The aquifer performance test conducted on the Turkey Point peninsula (see Section 2.3.1.2), where the RCWs would be installed, indicated that the Biscayne aquifer was a "leaky" aquifer separated from a constant-head water source by a partially confining layer of lower permeability material (bay-floor sediment and upper layers of the Miami Limestone). The bay-floor sediment was estimated by FPL to have an average vertical hydraulic conductivity of 0.7 ft/d (FPL 2009-TN1263). A separate analysis of the aquifer performance test by the review team resulted in an average vertical hydraulic conductivity of 0.6 ft/d for the bay-floor sediment. These vertical hydraulic conductivity values are high enough to allow a significant amount of leakage from Biscayne Bay (saltwater) to flow vertically through the sediments and reach the radial collector laterals between 25 and 40 ft below the bottom of the bay.

The review team evaluated the potential impacts of the maximum 60 d/yr pumping of the RCWs with regard to other users of Biscayne aquifer groundwater. FPL specified a RCW pumping rate of 86,400 gpm (FPL 2014-TN4058) during times that the RCW backup supply is needed. A maximum volume of 7.5 billion gallons (28,000,000 m^3) of water would be pumped during the 60-day period that would be allowed per year. Because of the large uncertainty in calculating or modeling the fraction of groundwater that would potentially be removed from freshwater resources, including the inland portion of the Biscayne aquifer and freshwater canals, the review team took a conservative approach and estimated that 5 percent of the water produced from RCWs would come from the freshwater inland portion of the Biscayne aquifer. This would equate to removing 375 million gallons per year of water from the inland aquifer and/or freshwater canals during 60 days of backup pumping. By comparison, about 31.4 billion gallons of groundwater were pumped from the Biscayne aquifer in Miami-Dade County during 2005 (Marella 2009-TN1521). The review team estimated that the volume that could be removed from the aquifer per year by 60 days of pumping of the RCWs is about 2 percent of the approximately the 19.3 billion gallons of annual groundwater discharge to the Biscayne Bay estimated by Langevin (2001-TN1338) for a 100 km length of southeast Florida coastline.

The rates and durations of maximum permitted RCW use are unlikely to cause a significant decrease in groundwater levels or in freshwater canal discharge rates (see Appendix G). As stated above, the RCWs are expected to be used infrequently as a backup water supply and for durations much shorter than 60 days based on the staff's evaluation of the reliability of the reclaimed water system. Therefore, the impact on groundwater users from the planned pumping of the RCWs for maintenance or their infrequent pumping to supply backup water for less than 60 d/yr would be minor.

Changes to the environment could be affected by the operation of Turkey Point Units 6 and 7 and have happened since the publication of the draft EIS. Those which are expected to continue in conformance with recent regulatory actions are discussed in Section 2.3.1. The review team determined that the hydrological alterations resulting from operating the RCWs in this potentially altered environment are consistent with those described above (and see

Appendix G.2). This determination is based on the FPL numerical model analysis, the review team's independent numerical modeling analysis, and the review team's knowledge and expertise. The conceptual models that served as the basis for the numerical models are based on available characterization information for the Turkey Point site and surrounding region. Uncertainties in the information and conceptual model were addressed in some cases by performing multiple model runs while varying key parameters in the model and in other cases by using conservative parameter values. However, uncertainties remain that do not allow the review team to assert that no other conceptual models that may result in more adverse impacts from RCW operation are plausible. Heterogeneity in subsurface parameters, lack of experience with RCW systems in carbonate strata, and uncertainty in the future site environment (e.g., freshening of IWF, remediation of subsurface hypersaline plume, sea-level rise) all warrant the review team to exercise care to avoid relying on numerical models alone.

Maintenance of facilities, including roads, pipelines, transmission lines, underground utilities, and others, may require occasional dewatering of excavations. The volumes of water that would be extracted from the Biscayne aquifer for these activities would be limited and regulated by the State or local agencies. Based on the information provided by FPL and the review team's independent evaluation, the impact of these activities on groundwater users would also be minor.

Because reclaimed water from the MDWASD would be used as the primary makeup-water supply for cooling water and the limited use of the backup RCWs would extract a very small fraction of pumped water from the inland Biscayne aquifer, the expected operational usage of groundwater is not expected to have a noticeable effect on saltwater intrusion, migration of the hypersaline plume from the IWF, or on water levels at freshwater supply wells. Additional extraction of groundwater by MDWASD to meet plant requirements for potable and service water is negligible compared to the current demand.

The review team did not rely solely on the output of numerical models. Numerical models are numerical representations of complex processes occurring in three dimensions over time. Such models were never intended to be exact representations of the system being modeled. The appropriate role of a numerical model is to test assumptions of the behavior of complex systems. Even running a numerical model numerous times with different parameters cannot reveal the impact of all uncertainties on the possible outcome. In this assessment, the review team also used numerical models to test possible consequences of changes in the affected environment and uncertainty in some subsurface parameters (see Appendix G.2). This information was combined with the review team's knowledge of the geography of the RCW field (e.g., the relatively short distance from the laterals to the bay bottom relative to distance from the RCW laterals to the canals and the Homestead well fields, elevation of water in the IWF near the RCWs, etc.) and the expectation that the monitoring program and mitigation options required by the Conditions of Certification (State of Florida 2014-TN3637) will be implemented.

In making its impact determination, the review team relied on the requirement of a monitoring program and a reasonable expectation that timely detection and mitigation of impacts would prevent the occurrence of impacts greater than those described above. The review team determined that the proposed monitoring of RCW construction and operation included in the Conditions of Certification would be sufficient to detect unexpected behavior in a timely manner.

While all possible mitigation measures have not yet been spelled out, in accordance with the Conditions of Certification, "When harm occurs, or is imminent, SFWMD will require [the] Licensee to modify withdrawal rates or mitigate the harm" (State of Florida 2014-TN3637). The review team considers that the ultimate mitigation of ceasing operation of the RCWs will prevent unacceptable impacts in a timely manner.

The review team assessed the impact of operating Units 6 and 7 in the affected environment that was present in 2013 and described in Revision 6 of the ER and found the impacts to be small. The staff analyzed the impacts of operating Units 6 and 7 on a variety of conditions representing possible future affected environments that could occur depending on the efficacy of the actions prescribed by the Administrative Order and the Consent Agreement. Regardless of which of these possible futures actually occurs, the impact of operating Units 6 and 7 would be minor. Therefore, the staff concludes that operational groundwater-use impacts would be SMALL, and mitigation beyond the FDEP final Conditions of Certification (State of Florida 2014-TN3637) would not be warranted.

5.2.3 Water-Quality Impacts

This section discusses the impacts on the quality of water resources from the operation of proposed Turkey Point Units 6 and 7. Surface-water impacts include chemical, radiological, and physical changes to nearby bodies of surface water including Biscayne Bay. Impacts on groundwater quality include chemical, thermal, and radiological impacts from the discharge of blowdown water from the proposed Units 6 and 7 cooling towers and other treated wastes to the Boulder Zone.

5.2.3.1 Surface-Water-Quality Impacts

As described in Section 3.4, liquid effluents from the proposed Units 6 and 7 operations would be disposed of via UIC (deep-injection) wells. Wastewater from the sanitary and potable-water systems would be treated at a planned sanitary waste-treatment plant, mixed with cooling-tower blowdown, and discharged to the Boulder Zone through the deep-injection wells. Because liquid effluents would not be disposed to bodies of surface water, there would be no impacts on surface-water quality from Units 6 and 7 operations.

A SWPPP and an erosion and sedimentation control plan, similar to those used at other large industrial facilities, would be in place during the operation of proposed Units 6 and 7 (FPL 2014-TN4058). During operation of Units 6 and 7, stormwater runoff from the plant area would be directed to the IWF. Because BMPs would be used to manage stormwater runoff and minimize the discharge of contaminants to the IWF, the staff considers the water-quality impact of stormwater runoff from the site on the IWF to be minimal.

During operation of Units 6 and 7, stormwater runoff from the RWTF area would be routed to two stormwater management basins before being released to its surrounding wetland area via riprapped aprons to reduce erosion potential (Section 3.2.2.1). Because the stormwater basins would be designed to meet the water quality criterion of Miami-Dade County, the staff considers the impact of stormwater runoff from the RWTF area on the water quality of the receiving wetlands to be minor.

Operation of the RCWs, if and when needed during operation of Units 6 and 7 would not result in discharges to Biscayne Bay because they are used only to withdraw saltwater. Therefore, the staff determined that the impact of any potential changes in surface-water chemistry as a result of the use of the RCWs on Biscayne Bay water quality would be minor.

Section 3.2.2.3 states that spoils will be disposed on the berms of the IWF. Runoff from precipitation on the spoils piles at disposal area B along the C-107 canal has the potential to enter Biscayne Bay via the C-107 canal and Card Sound. To evaluate the potential water-quality impact from runoff from spoils piles, the review team calculated the maximum incremental increase of concentration from a discharge into Card Sound. As discussed in Section 4.2.3.1, the review team determined that approximately 5 percent of the disposal area lies adjacent to the C-107 canal. As used in Section 5.2.1.4, the review team's calculation of discharge used an annual precipitation depth of 1,967 mm (77.43 in.) (SFWMD 2012-TN1523). Using the disposal area, precipitation depth, and assuming 100 percent runoff, the review team estimated an average discharge rate of 0.0028 m^3/s. The average nutrient concentration measured in the muck leachate for TKN was 0.31 mg/L (FPL 2010-TN3664). TP was not detected, so half the detection concentration was used, that is, 0.15 mg/L (FPL 2010-TN3664). As discussed in Section 4.2.3.1, the review team used the Hydrologic Engineering Center's River Analysis System (HEC-RAS) water-quality model (USACE 2014-TN4128) and available bathymetry for Biscayne Bay and Card Sound (NOAA 2014-TN3665) to estimate the maximum incremental increase in concentration in Card Sound. Using the discharge rate, concentrations, and flow and mass balance approach, the review team computed the maximum incremental increase in concentration to be 1.11×10^{-6} mg/L for TKN and 7.67×10^{-7} mg/L for TP. For reference, the maximum TP concentration of 40 samples taken in Card Sound by the NPS for the period October 30, 2006 through June 30, 2008 was 8.8×10^{-3} mg/L. The review team determined that the conservatism in this analysis bounded the incremental impacts and that the changes would be undetectable. Because any inflow to Biscayne Bay from Card Sound would be subject additional dilution by tidal exchange, maximum incremental increases of concentration in Biscayne Bay would be even smaller due to mixing from tidal exchange.

The review team determined that there were no surface-water users that would be affected by changes in water chemistry because of the operation of the proposed Turkey Point Units 6 and 7. Therefore, the impacts of surface-water quality would be SMALL, and mitigation for water quality would not be warranted beyond the FDEP final Conditions of Certification (State of Florida 2014-TN3637).

5.2.3.2 Groundwater-Quality Impacts

Radial Collector Well Impacts

As discussed above, operation of the RCWs could remove some groundwater from the inland portion of the Biscayne aquifer, thereby resulting in an increase in the amount of saltwater intrusion into the aquifer. However, the review team determined that the volume removed from the inland aquifer would be a small fraction of the pumped volume, and based on the reliability of the components of the reclaimed water system, the RCWs would be called into use infrequently and for durations much shorter than the 60-day maximum allowed per year under

the FDEP final Conditions of Certification (State of Florida 2014-TN3637). This limited use greatly reduces potential RCW impacts on saltwater intrusion.

Changes to the environment could be affected by the operation of Turkey Point Units 6 and 7 and have happened since the publication of the draft EIS. Those which are expected to continue in conformance with recent regulatory actions are discussed in Section 2.3.1. The review team determined that the hydrological alterations resulting from operating the RCWs in this potentially altered environment are consistent with those described above (and see Appendix G.2). This determination is based on the FPL numerical model analysis, the review team's independent numerical modeling analysis, and the review team's knowledge and expertise. The conceptual models that served as the basis for the numerical models are based on available characterization information for the Turkey Point site and surrounding region. Uncertainties in the information and conceptual model were addressed in some cases by performing multiple model runs, while varying key parameters in the model, and in other cases by using conservative parameter values. However, uncertainties remain that do not allow the review team to assert that no other conceptual models that may result in more adverse impacts from RCW operation are plausible. Heterogeneity in subsurface parameters, lack of experience with RCW systems in carbonate strata, and uncertainty in the future site environment (e.g., freshening of IWF, remediation of subsurface hypersaline plume, sea-level rise) all warrant the review team to exercise care to avoid relying on numerical models alone.

UIC Impacts

Injection of blowdown water and other liquid waste streams into the Boulder Zone creates a potential for contamination of groundwater in the overlying Floridan USDW aquifer. The top of the injection zone is estimated to be 2,915 ft below ground surface and 1,465 ft below the base of the deepest USDW, based on information collected at the EW-1 well completed in May 2012 (FPL 2012-TN1264). The expected lower density of injectate compared to native water in the Boulder Zone will result in an upward flow potential.

Injected contaminants would have to move upward through a 985 ft thickness of the middle Floridan confining unit to reach potentially permeable saline intervals including the APPZ, if it is present at the site. Contaminants would then have to migrate upward through another 480 ft of mostly low-permeability rock to reach the lowermost USDW aquifer. The review team determined that without a preferential flow path such as an open borehole or permeable fracture zone, the rate of contaminant migration through the estimated 985 ft of overlying low-permeability sediments within the MCU would be extremely slow, dilution of the contaminants would occur through the process of dispersion, and injected contaminants are unlikely to reach the deepest USDW aquifer.

FPL determined hydrologic properties of aquifers and confining units during the drilling and completion of EW-1 (FPL 2012-TN1577) and DZMW-1 (FPL 2012-TN4053). The borehole information and flow tests did not indicate the presence of enhanced vertical flow paths from either improper well construction or natural vertical pathways. As required by FDEP's UIC program, a short-term injection test was performed on EW-1 following its conversion to deep-injection well DIW-1. Pressures were monitored at the injection well head and within the water columns of both zones of the dual-zone monitoring well located approximately 75 ft from the

injection well. The monitored interval depths are: 1) 1,400−1,420 ft within the Upper Floridan aquifer, and 2) 1,850−1,870 ft within the middle Floridan confining zone. Water was pumped into the injection zone for a total of 9 hr and 33 min at approximately 7,000 gpm. The results showed that there was a pressure increase of about 4 psi in the injection zone. The only measurable pressure response observed in either monitored interval was attributable to tidal influence (FPL 2014-TN4052).

The lower portion of the MCU from about 1,900 ft to 2,915 ft below ground surface contained water with high TDS content, indicating a lack of communication with the Upper Floridan USDW aquifer. Data from geophysical logging, core analyses, and in situ flow (packer) tests also indicated that the interval from 1,900 to 2,900 ft consists of dense limestone and dolomite with low permeability. The review team's evaluation of these data confirmed the presence of confining layers and a lack of evidence for extensive vertical pathways through the MCU. This is discussed in greater detail in Section 5.2.1.3.

Upward migration of wastewater within the MCU has occurred at the Miami-Dade SDWWTP and was attributed to enhanced vertical flow likely caused by a well construction problem (Walsh and Price 2010-TN3656; McNeill 2000-TN4572; McNeill 2002-TN4571). Such a construction problem is not expected at the Turkey Point site because the pilot hole would be cemented before reaming and tests would be performed every 5 years to verify well integrity (FPL 2011-TN51). As discussed in Section 2.3, lower injection rates planned for the proposed site relative to the SDWWTP (20 Mgd vs 97 Mgd) would also aid in limiting formation pressures and the potential for vertical movement of effluent. While it is possible that an unknown vertical pathway could exist within the area of influence of the injection wells that could lead to eventual upward migration of wastewater, such a pathway is not indicated by site specific data.

Because of the relatively low concentrations of contaminants the impacts of upward migration, if it occurred, would be expected to be minor. The monitoring requirements of the FDEP UIC program are also designed to detect for leaks before significant releases to upper aquifers may occur.

In addition, several assessments have been conducted to evaluate the risk to human and ecological health from wastewater disposal methods utilized in South Florida, including deep well injection. One assessment published by the EPA incorporated site characterization data and concentrations of "representative stressors" present in injected wastewater into fate and transport models, one of which was specific to Dade County. These models evaluated two scenarios of flow of injected wastewater through the MCU; flow through the MCU matrix (referred to as "porous media flow") and rapid flow through preferential flowpaths (such as a failed well or natural conduit). Final concentrations of stressors were determined at receptor locations that included the USDW and also wells screened higher within the Upper Floridan aquifer. The stressors that were evaluated included three constituents that are also present in wastewater to be injected at Turkey Point and listed in Table 3-5. These are ammonia, nitrate, and PCE (tetrachloroethylene). The models indicated that concentrations that may reach receptor locations would be below the maximum contaminant level in all cases. In these scenarios, the initial injected concentration of PCE was slightly lower than the maximum contaminant level but higher than the concentration expected for injected effluent at Turkey Point (Table 3-5). For PCE specifically, the initial concentrations were calculated to be reduced

by 95 percent to 100 percent when they reached the USDW and the well within the Upper Floridan aquifer. As a result, the study concluded that overall risk to human health from deep well injection was "low where there have been impacts to USDWs; however, exposure of current water supplies is unlikely" and that "risks would be furwther reduced when the injected wastewater is treated to reclaimed water standards" (EPA 2003-TN4759). The reduction in concentration during migration of injected wastewater estimated by this risk assessment is large and correlates well with that presented by Dausman et al. (2008-TN4757), who estimated dilution amounts of up to 95 percent, as discussed in Section 5.2.1.3. If the concentrations calculated for Turkey Point effluent were used as the initial concentration in this analysis, the expected final concentrations expected at the USDW or Upper Floridan aquifer well would also be so low as to be undetectable. Final concentrations could be further reduced due to advanced treatment received by reclaimed water at SDWWTP, as discussed in Section 5.2.1.3.

Another comparative assessment of wastewater disposal methods in southeast Florida evaluated impacts of deep well injection to a variety of receptors based on multiple exposure routes (Bloetscher et al 2005-TN4756). These routes included direct leakage of injection wells into the Biscayne Aquifer and the Upper Floridan aquifer, as well as rapid vertical migration from deep injection wells into the Upper Floridan aquifer. This study concluded that risk were "lower, in general, for injection well disposal, due to natural barriers between the injection point and population centers." The study also suggested that as distance from the injection well increased, risk to receptors decreased, with the lowest relative risk at distances of 5 mi (or greater). This distance bounds the migration distance expected for wastewater injected at Turkey Point as predicted by modeling studies and discussed in Section 5.2.3.1.

These risk assessments, which included evaluations of impact to the Upper Floridan aquifer, indicate that, even if upwelling of injected wastewater were to occur, offsite concentrations would be below applicable drinking water limits or even laboratory detection limits and impacts would be negligible. As mentioned above, the Boulder Zone is not used as a groundwater source and the Upper Floridan aquifer, which is brackish, is not used as a source of groundwater in the area in which migration of the injected cooling water may reasonably be expected.

The Boulder Zone UIC wells would be permitted by FDEP as Class I UIC wells with a total capacity of 90 Mgd. Locations of the injection and monitoring wells and additional details about well construction are described in Section 3.2.2.2 of this EIS. UIC permits issued by FDEP require institutional controls and monitoring programs to detect upward migration of injected wastewater. Detection of contaminants at monitoring wells completed in the confining zone or in the Upper Floridan aquifer would require remedial action (Fla. Admin. Code 62-4-TN1084). The EPA risk assessment states that the UIC permit process, "offers better opportunities to evaluate the suitability of specific well sites and injection zones. The permit process is also designed to anticipate and prevent potential problems related to well operation (and adverse impacts resulting from injection)" (EPA 2003-TN4759). Characterization, monitoring, and testing required by the UIC permit process would be completed for each of the 12 planned injection wells at the Turkey Point site.

Because of the evidence of adequate isolation of the Boulder Zone from the overlying USDW by layers of low-permeability rock, the potential effect of advanced treatment received by reclaimed

wastewater before leaving the SDWWTP, the evaluation of the extent and fate of injected effluent at the Turkey Point site, risk assessments of deep well disposal, and the UIC monitoring requirements, the review team determined that the Upper Floridan aquifer USDW would be protected from degradation. Contaminants would be introduced to the Boulder Zone from the injected wastewater. However, because the salt content of ambient groundwater in the Boulder Zone is similar to seawater, this aquifer is not considered a potential, current, or future source of irrigation or drinking water. Impacts of the limited operation of the RCWs on saltwater intrusion in the Biscayne aquifer are also minor. Therefore, the staff concludes that operational groundwater-quality impacts would be SMALL, and mitigation beyond the FDEP final Conditions of Certification would not be warranted.

5.2.4 Water Monitoring

Section 6.3 of the ER (FPL 2014-TN4058) describes the hydrologic monitoring program that would be used to control potential adverse impacts of Turkey Point operations on surface water and groundwater, and it identifies alternatives or engineering measures that could be implemented to reduce these impacts. Because this section primarily describes FPL's plans for future monitoring, its language is based closely on FPL's description of the monitoring program in the ER.

5.2.4.1 Surface Water

Because there are no freshwater streams on the Turkey Point site, no operational monitoring of streams is necessary. Based on the modeling analyses of the effect of backup RCWs pumping on the adjacent nearshore area of Biscayne Bay and on the reliability analysis of the availability of reclaimed water, the operations of Turkey Point Units 6 and 7 would not affect the nearby waters of Biscayne Bay. Several stations in Biscayne Bay are currently monitored for salinity, including those near Turkey Point: BISC 12/13, BISC18/19, BISCA6, and BBCW10 (Bellmund 2012-TN4118).

5.2.4.2 Groundwater

Most pre-application monitoring wells are within the footprint of the proposed construction area on the Turkey Point site and would need to be decommissioned before construction activities begin. Permanent wells completed in the Biscayne aquifer would continue to be monitored during and after the plant construction period to establish a pre-operational baseline for the shallow groundwater flow system. FPL (2014-TN4058) proposes to install monitoring wells near the location of the RCWs and inshore from the RCWs to monitor groundwater quality and hydraulic head during RCW operation. Groundwater monitoring requirements related to the RCW system are also imposed by the State of Florida final Conditions of Certification (State of Florida 2014-TN3637).

A monitoring program including measurements of groundwater hydraulic head and groundwater-quality parameters in aquifers overlying the Boulder Zone would also be implemented to comply with requirements of the FDEP UIC permits and ensure that injected wastewater does not migrate into the USDW within the Upper Floridan aquifer. As described in Section 3.2.2.2 of this EIS, a minimum of six dual-zone monitoring wells would be installed so that a dual-zone monitoring well is between each pair of injection wells to provide samples of

groundwater in the deepest USDW aquifer (defined as containing groundwater with less than 10,000 mg/L TDS) and in the zone below the deepest USDW.

Section 6.6 of the ER (FPL 2014-TN4058) describes the chemical monitoring program. The objective of chemical monitoring is to identify changes in water quality that may result from the proposed Turkey Point operations.

As described in Section 3.2.2.2 of this EIS, 10 primary UIC wells and 2 backup UIC wells are planned.

5.3 Ecological Impacts

This section describes the potential impacts on ecological resources from the operation of two new reactor units at the Turkey Point site, as well as the operation of the associated offsite facilities, which include new transmission lines and potable- and reclaimed water pipelines. The operational impacts for terrestrial and wetland ecosystems are discussed in Section 5.3.1, and those for aquatic ecosystems are addressed in Section 5.3.2. The evaluation of potential impacts on terrestrial and aquatic biota from radiological sources is discussed in Section 5.9.5

5.3.1 Terrestrial and Wetland Impacts Related to Operations

The greatest potential for impacts on terrestrial habitats and species from operation of proposed Turkey Point Units 6 and 7 is expected to be caused by cooling-system operations and the operation and maintenance of the transmission lines and pipelines. Issues considered by the review team include local deposition of dissolved solids (commonly referred to as salt deposition); deposition of chemical contaminants with the use of reclaimed water; increased local fogging, precipitation, or icing; increased local noise levels; a risk of avian mortality caused by collision with tall structures; and possible hydrological changes to shoreline habitats adjoining Biscayne Bay. The review team also considered whether increased traffic and nighttime lighting associated with operation could affect wildlife. These operational impacts are discussed further in Section 5.3.1.1. Issues considered with respect to the operation and maintenance of the transmission system include collision mortality and electrocution, exposure to electromagnetic fields (EMFs), and the vegetation maintenance within transmission line corridors. Impacts of the transmission lines on terrestrial resources are discussed in Section 5.3.1.2. The potential effect of these operational impacts on important species and their habitats, including Federally and State-listed species, is addressed in Section 5.3.1.3.

As described in Chapter 3, the cooling system proposed for Turkey Point Units 6 and 7 includes a reclaimed water pipeline and treatment facility as well as a RCW system embedded under Biscayne Bay. It is anticipated that most of the makeup water would be reclaimed water from the MDWASD, but that the RCWs would also withdraw seawater from the Biscayne Bay when necessary to meet operational demands. The ratio of water supplied by the two makeup-water sources would vary based on the quantity and quality of reclaimed water available. The heat would be transferred to the atmosphere in the form of water vapor and drift. Vapor plumes and drift, including salts and other solutes in the drift, can affect crops, ornamental vegetation, and native plants. The review team considered whether water withdrawals could increase salinity levels in the Biscayne Bay and alter shoreline vegetation and habitats. In addition, the review team considered whether bird collisions were possible with the proposed mechanical draft

cooling towers and other tall structures, and whether wildlife could be affected by noise generated by operation of the cooling towers.

Potable water for operations would also be supplied by MDWASC. The MDWASC obtains water from the Biscayne aquifer and its water withdrawals are regulated under the County's consumptive use permit from the SFWMD. The high salinity of the Biscayne aquifer in the immediate vicinity of proposed Units 6 and 7 excludes local groundwater as a source of potable water and thus would preclude dewatering of local wetlands (FPL 2014-TN4058). See Section 2.3 for a complete description of hydrologic features within the region. Electric transmission systems have the potential to affect terrestrial ecological resources through corridor maintenance, bird collisions with transmission lines, and EMFs (NRC 2013-TN2654). New transmission lines (500 kV and 230 kV) would be installed to incorporate power generated by proposed Units 6 and 7 into the Florida electric grid system.

5.3.1.1 Terrestrial Resources – Site and Vicinity

Impacts on the FPL Turkey Point site and vicinity from the proposed operation of two new units are described in this section.

Impacts of Cooling-System Operations

The following discussion addresses possible impacts on vegetation from cooling-tower drift, icing, fogging, and increased humidity. No residential areas or row crop agricultural land exists on or adjacent to the Turkey Point site. Proposed Units 6 and 7 would use a closed-cycle circulating-water system. Three mechanical draft cooling towers would be used to remove excess heat from each unit by transferring it to the atmosphere. An additional mechanical draft cooling tower would be used to remove heat from the service-water system for each unit. Water droplets blown from the cooling towers (i.e., cooling-tower drift) would unavoidably be released into the atmosphere as fine droplets.

Cooling Tower Drift – TDS: Cooling-tower drift contains dissolved solids (known as "salt") that can be deposited on nearby vegetation. Depending upon the source of makeup water, the TDS concentration in the drift can contain high levels of salts that damage exposed vegetation. Vegetation stress can be caused by salt deposition from drift, deposited either directly onto foliage or from accumulation in soil (NRC 2013-TN2654). Dissolved salts within makeup water obtained from the RCWs would far exceed salts dissolved within the reclaimed water, and the maximum levels expected in saltwater would be 34,000 mg/L (Section 5.7.2). Assuming that the makeup water would be obtained entirely from the RCWs and the cooling system would be operated at 1.5 cycles of concentration, the maximum rate of saltwater droplets at approximately 50,000 mg/L expected to escape the cooling towers would be 70 g/s from each cooling tower during normal operation. Salt drift would be deposited in various directions from the cooling towers, with most of it falling over the IWF on FPL's Turkey Point site and over Biscayne Bay. The highest deposition would occur near the makeup-water reservoir on the island that composes the plant area and could be as high as 105 kg/ha/mo (kilograms/hectare/month) (see Section 5.7.2). However, salt deposition is expected to decrease rapidly with increasing distance from the cooling towers and the maximum estimated

offsite deposition over naturally vegetated land would be about 4 kg/ha/mo in the Everglades Mitigation Bank (EMB) Phase II immediately west of the IWF (Figure 5-3) (FPL 2014-TN4058).

Stress to local plant life could be caused by high salt deposition from drift, either directly onto foliage or indirectly from salt accumulation in soils. Visible leaf damage has been observed when TDS are deposited at a rate as low as 10 kg/ha/mo (NRC 2013-TN2654). TDS deposition at this rate would be expected to occur on the proposed Units 6 and 7 plant area, within the IWF, and on nearshore areas of Biscayne Bay immediately southeast of the cooling towers (FPL 2014-TN4058). The predominant vegetation within the expected zone of high salt deposition on the Turkey Point site is mangrove, particularly the red mangrove (*Rhizophora mangle*). Mangroves are salt-tolerant species that occur only in saline and brackish environments in South Florida. Salt deposition at rates that could affect plant life would only occur very near the cooling towers and decrease rapidly with distance from the cooling towers (Figure 5-3). Visible leaf damage may occur from salt deposition very near the cooling towers or on the island containing the plant area. Almost all of the area of high salt deposition would be developed and little vegetation is expected to remain. Some vegetation found on berms within the northern quarter of the IWF may be affected by salt deposition, but most plants occurring there would be salt-tolerant species because the industrial wastewater already contains elevated salt concentrations. Salt deposition outside the Turkey Point site boundary, including lands within the EMB, is not expected to occur at levels that might affect vegetation. Many piscivorous birds use the IWF for foraging and loafing (FPL 2014-TN4058). Salt deposition from drift is not expected to affect the distribution and abundance of fish within the facility. Therefore, impacts on terrestrial resources from salt drift within the proposed Units 6 and 7 plant area and offsite are expected to occur, but considering the existing hypersaline environment the effects are expected to be minimal.

Adverse impact on vegetation from soil salinization is not expected to be an issue within the areas receiving salt-drift deposition. Much of this area is already considered hypersaline due to operation of the existing facilities and the IWF. Potential soil salinization problems at energy facilities are generally limited to arid regions (NRC 2013-TN2654). The review team considered whether cooling-tower drift could increase the salinity of surface water in wetlands on the FPL Turkey Point site. Surface water is seasonally present within wetlands on the site, but much if not all of the wetlands within the proposed Units 6 and 7 plant area and those associated with the IWF are brackish or marine. Substantial freshwater wetlands are only located to the west of the site. Considering the very low contribution to surface-water salinity from cooling-tower drift and the low likelihood for substantial concentration of salts in surface waters, cooling-tower drift is not expected to impair freshwater ecosystems on, or in the vicinity of, the Turkey Point site.

Cooling Tower Drift – CECs: The reclaimed water serving as the primary makeup-water supply contains various chemical contaminants, including CECs and metals. Cooling-system configuration during operation using reclaimed water would achieve four cycles of concentration (FPL 2014-TN4058), further concentrating contaminants within the cooling water. Much like TDS, CECs and metals would also be deposited in the environment through cooling-tower drift. A previous evaluation of organic compounds, CECs, and metals within Miami-Dade wastewater was conducted. This evaluation included efforts to detect 129 different compounds, including 65 organic wastewater compounds, 24 pharmaceutical compounds, 37 antibiotic compounds, and 3 hormones (Lietz and Meyer 2006-TN1005). Effluent samples were analyzed, and

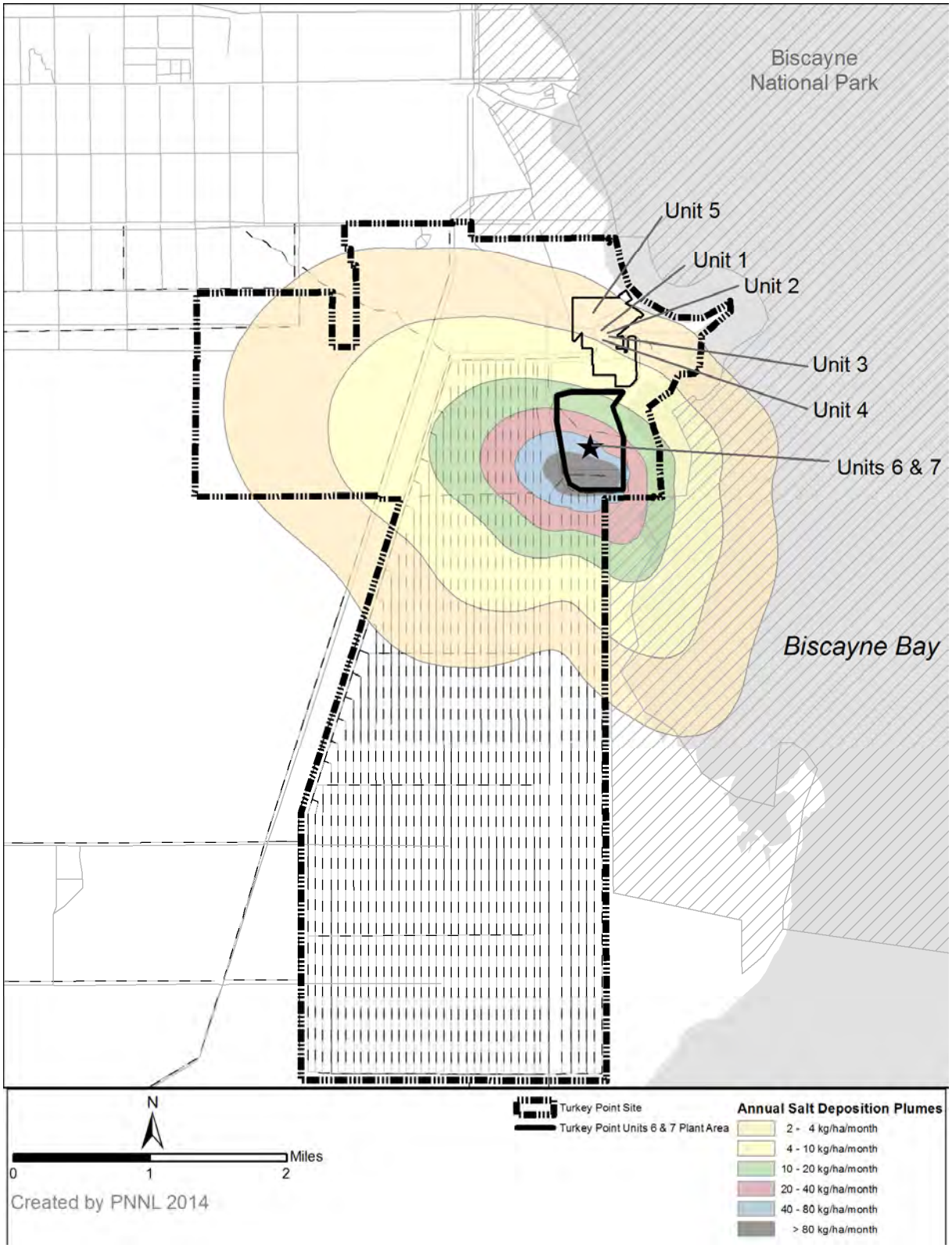


Figure 5-3. Predicted Monthly Salt Deposition from Cooling-Tower Operation Using Makeup Water Only Supplied by the Radial Collector Wells (Source: FPL 2014-TN4058).

compounds detected included 20 organic compounds, 11 pharmaceutical compounds, 8 antibiotic compounds, a hormone and a metal (Table 5-1). The NRC staff acknowledges this list of contaminants is not exhaustive but is a representative list of different chemical classes known to occur in the reclaimed water from SDWWTP (FPL 2012-TN263; Lietz and Meyer 2006-TN1005; Miami-Dade County 2011-TN1006). The mode for ecological effects of environmental pollutants on terrestrial biota would be primarily through bioaccumulation into the tissues of plants and small aquatic organisms and biomagnification through the food chain to higher-level consumers such as insect- or fish-eating birds. Concentrations of many predicted contaminants would be orders of magnitude (less than one in several hundred to several thousand) below current analytical method detection limits, and they are much lower (4 to 40,000 times) than the toxicological benchmarks used in the screening assessment (see Table 5-3 and Sections 5.2.2.1 and 5.3.2.3 for effects modeling on aquatic organisms). Furthermore, the reclaimed water used for cooling would receive high-level disinfection at the SDWWTP prior to entering the Turkey Point reclaimed water-treatment facility. This level of disinfection is greater than the secondary treatment required for reclaimed water used for irrigation for public and private use (Fla. Admin. Code 62-610-TN1269). Additional treatment of the reclaimed water would occur at the RWTF, to include additional filtration, prior to being used as cooling water (FPL 2014-TN4058). The review team acknowledges that the list of CECs assessed, while representative, does not exhaustively address every contaminant that may potentially occur within the reclaimed water, and that the potential for bioaccumulation and biomagnification of even minute amounts of contaminants still exists. However, assessing exposure effects of contaminant combinations in real-world conditions is an emerging research area that will call for reliance on observable adverse outcomes through monitoring.

Icing, Fogging, and Humidity: Increased localized fogging and relative humidity near cooling towers have not been reported to affect native vegetation (NRC 2013-TN2654). However increased fogging in combination with lighting could increase the incidence of bird collision with elevated structures. FPL modeling showed the most frequent visible cooling-tower plumes would occur in winter and the least frequent would occur in summer (FPL 2014-TN4058). Expected median plume heights in winter would be approximately 820 ft; they would be visible for 719 hours and would only exceed about 33,000 ft about 93 hours a year. The cooling-tower plume would also be visible mostly at night. Outdoor lighting would be necessary for worker safety. FPL would follow industry standards to the extent practicable to limit upward light when designing outdoor lighting (FPL 2014-TN4058). Increased collision potential would be minimal due to the limited extent of a visible plume and the application of industrial lighting standards. Ice-induced damage to native vegetation could theoretically result from ice buildup due to increased fogging during winter, but temperatures below freezing are very rare in South Florida.

Bird Collisions with Cooling Towers and Structures

Typically, the cooling tower and meteorological tower are the structures at nuclear power plants (other than transmission towers) that pose the greatest risk for bird collisions. Proposed Units 6 and 7 would each be supported by three mechanical draft cooling towers, each approximately 67 ft high and 246 ft in diameter. Each unit would also have a single cooling tower for the service-water system located near the turbine building. In a review of bird collisions with cooling towers at nuclear plants, the NRC (2013-TN2654) determined that avian mortality was negligible

Table 5-3. Comparison of Predicted Concentrations of Chemicals from Cooling-Tower Deposition during Reclaimed Water Use to Analytical Method Detection Limits and Toxicological Criteria or Benchmarks

Chemical Name	Description	Maximum Incremental Increases of Concentration in IWF (ug/L)	Method Detection Limit (ug/L)	Environmental Criteria or Benchmark (ug/L)[a]	Endpoint and Species
1,4-Dichlorobenzene	Insect repellant	0.00070	0.1	0.7	EC50[b] Immobilization *Daphnia magna*
3 beta-coprostanol	Human digestion marker	0.0011	0.52	0.04	Unspecified
4-Nonylphenol	Detergent metabolite	0.0022	0.64	0.01	LOEC[c] Gene expression *Danio rerio*
Acetyl-hexamethyl-tetrahydro-naphthalene (AHTN)	Musk compound	0.0022	0.08	7.2	EC10[d] Development *Acartia tonsa*
Hexahydrohexamethyl-cyclopentabenzopyran (HHCB)	Musk compound	0.00027	0.12	11.0	NOEC[e] Growth, survival *Daphnia magna*
Phenanthrene	Polycyclic aromatic hydrocarbon (PAH)	0.00032	0.08	0.125	NOEC Growth *Daphnia magna*
Warfarin	Pharmaceutical	0.000064	0.012	0.288	EC50 Immobilization *Daphnia magna*
17 beta-estradiol (E2)	Hormone	0.000019	2	0.0004	NOEC Morphology *Oryzias latipes*
Triclosan	Antibiotic	0.060	Unknown	0.2	NOEC Growth *Pseudokirch-neriella subcapitata*
Copper	Heavy metal	0.0052	6.0	4.8	EPA Aquatic Life Criteria, Saltwater

(a) Environmental benchmarks obtained from EPA ECOTOX (EPA 2012-TN1525); aquatic life criteria from EPA (2014-TN3295).
(b) EC50: effective concentration required to induce a 50% effect.
(c) LOEC: lowest-observed effect concentration.
(d) EC10: effective concentration required to induce a 10% effect.
(e) NOEC: no-observed effect concentration.

for mechanical draft cooling towers, which are typically not nearly as high as natural draft cooling towers. The NRC has previously concluded that avian collisions are unlikely to pose a biologically significant source of mortality because only a small fraction of total bird mortality has been attributed to collision with nuclear power plant structures (NRC 2013-TN2654). Tall structures exist elsewhere on the Turkey Point site as part of the power production from Units 1 through 5. Although peninsular Florida may serve as a funnel for neotropical migrant birds crossing the Gulf of Mexico, the operation of six additional cooling towers only 67 ft in height as well as the addition of the power block and associated buildings is not expected to result in substantial increased mortality of birds. Therefore, mortality from birds colliding with structures, including the cooling towers, containment buildings, and the meteorological tower, is expected but would be inconsequential at a population level for bird species.

Noise Impacts of Operation

Noise pollution in natural environments is recognized as a stressor that may disturb or displace wildlife, thus affecting habitat suitability and subsequent animal density in some environments. However species-specific responses to noise and the mechanisms that drive responses are poorly understood (Francis et al. 2009-TN4046). The NRC concluded operational noise would be of small significance to wildlife adapted to a landscaped and urbanized environment typically found around nuclear reactors (NRC 2013-TN2654). However, the proximity of the proposed units to Biscayne and Everglades National Parks may not represent the typical environment.

The dominant sources of noise likely to affect wildlife during normal operation of proposed Units 6 and 7 and associated facilities would be the mechanical draft cooling towers and cooling-water pumps. These features would be located on the Turkey Point site close to Biscayne National Park. Cooling-water pumps and other plant equipment capable of generating relatively high noise levels would be located within buildings (FPL 2014-TN4058). Expected cooling-tower noise levels would be approximately 73 dBA at a distance of 200 ft from the cooling towers and would be mitigated by the use of splash guards on air inlets and stacks on mechanical fans to direct noise vertically (FPL 2014-TN4058). Although much of the area around the cooling towers would be developed and offer limited wildlife habitat value, wildlife could still be present, and the 37 ac makeup-water reservoir could serve as an open-water refugium that could attract additional wildlife such as wading birds. Noise at these levels may displace wildlife very near the cooling towers or wildlife near the makeup-water reservoir. Cooling-tower noise would lessen to below the 65 dBA level at 400 ft from the source. Areas within 400 ft of the cooling towers would be outside of Biscayne National Park and other parkland.

It is not clear what effect chronic noise at these levels would have on wildlife at any distance from the noise source because some wildlife species adapt and some decrease in response to habitat degradation, and others may actually benefit from anthropogenic noise through decreased competition or predation (Barber et al. 2009-TN4045; Francis et al. 2009-TN4046). Local wildlife species may be displaced by operational noise from the immediate vicinity of the cooling towers, including the makeup-water reservoir, while others may adapt to these noise levels. Noise generated during operation of proposed Units 6 and 7 and the associated cooling towers is not expected to noticeably affect local wildlife beyond a limited distance and would not be expected to noticeably affect any wildlife species at a population level.

Impacts on Wetlands from Storm Water Runoff

Most undeveloped areas on the FPL Turkey Point site consist of various types of wetlands. After site preparation and development of proposed Units 6 and 7 are complete, extensive areas of wetlands would remain in undeveloped areas on and adjacent to the new facilities. Development would increase the amount of impervious surfaces, but the design calls for detention of stormwater runoff by the makeup-water reservoir and detention basins. Stormwater from the proposed Units 6 and 7 plant area (including the power block, Clear Sky substation, and associated parking), western laydown area, administration and training buildings, and parking areas would be directed to drain into the IWF rather than into surrounding wetlands (FPL 2014-TN4058). Detention basins would capture the first inch of runoff from the RWTF. However, the detention basins would discharge into surrounding wetlands. BMPs, including oil-water separation and discharge over riprap aprons, would be used to limit adverse impacts on wetlands (FPL 2014-TN4058; FPL 2011-TN303). Stormwater runoff during plant operation may cause localized areas of depressed salinity in mangrove forests directly adjacent to plant facilities for brief periods following heavy rainfall events but generally is not expected to adversely alter wetland biota or function on or in the vicinity of the Turkey Point site.

Biscayne Bay Shoreline Habitat

Water pumped from Biscayne Bay through the RCWs would sometimes be used as makeup water to replenish water lost to evaporation, blowdown, and drift. Because of the sheer volume of Biscayne Bay and its connectivity with the Atlantic Ocean full-time use of the RCWs to supply both units with cooling water would not result in noticeable changes in shoreline elevation. The operation of proposed Units 6 and 7 is therefore not expected to noticeably alter shoreline habitats on Biscayne Bay.

Impacts of Increased Vehicle Traffic

Increased traffic associated with operation of proposed Turkey Point site Units 6 and 7 may result in increased wildlife mortality from vehicle-wildlife collisions. FPL expects the operation workforce at proposed Units 6 and 7 to be 806 persons. This would result in an estimated increase in traffic of 86 percent over current levels. Refueling outages for each unit would occur every 1.5 years and would require a maximum of 1,000 temporary workers for 30 days. FPL assumed a conservative estimate of a maximum temporary outage workforce of 2,000 staff during its traffic analysis and concluded this level of staffing would increase traffic by 213 percent over current levels (FPL 2014-TN4058). Additional traffic would likely result in a proportional increase in animal mortalities on area roads. Although wildlife would experience some direct mortality, the review team does not expect that the levels expected would destabilize local wildlife populations (see Section 5.3.1.3 for increased traffic, the Florida panther, and other important species discussion). Roadways that were improved only to build proposed Units 6 and 7 could be removed (FPL 2014-TN4058). This would include a portion of SW 359th Street. Traffic volume on these roads would be reduced or eliminated as would the likelihood of potential road-killed animals, thereby reducing the overall impact of increased traffic (FPL 2014-TN4058). However, the removal, re-grading, and restoration of construction access roads have not yet been determined. The extent of the effects of road improvement on wildlife is contingent upon the decision to restore roads to the preexisting condition and traffic levels.

Consequently, the review team concludes that these impacts may not be detectable beyond the local vicinity and could not destabilize regional wildlife populations. However, if roads are not restored or traffic not restricted during operation to baseline levels, the uncertainty of risk and subsequent impact on wildlife from vehicle collisions would increase.

Light Pollution During Facility Operation

Light pollution during facility operation could affect wildlife residing on or migrating through the Turkey Point site and immediately adjoining areas of Biscayne National Park. Research has shown that artificial nighttime lighting can alter behaviors, foraging areas, and breeding cycles of a wide variety of wildlife, including insects, turtles, frogs, birds, and bats (Chepesiuk 2009-TN1326). Increased polarization of natural and artificial light from artificial surfaces such as buildings and parking lots could also affect wildlife that use naturally polarized light as a visual cue (Horvath et al. 2009-TN897). The behavior of night-migrating songbirds can be disrupted by nighttime lighting systems, particularly during inclement weather. FPL has proposed to incorporate Illuminating Engineering Society of North America guidelines (IES 2012-TN1044) when designing outdoor lighting systems. Design criteria could include minimization of upward lighting, turning off unnecessary lighting between 11 p.m. and sunrise, and luminary selection and mounting to provide light only where needed (FPL 2014-TN4058). If these actions are taken impacts from light pollution on wildlife would be minimal and would not be expected to noticeably affect wildlife populations at even a local scale.

5.3.1.2 Terrestrial Resources – Associated Offsite Facilities

Power generated by proposed Units 6 and 7 would be provided via new transmission lines installed within approximately 89 mi of new and existing transmission line corridors (FPL 2014-TN4058). Environmental impacts resulting from the development and installation of transmission lines are discussed in Section 4.3 of the EIS. Impacts related to maintenance and operation of the new transmission lines are discussed below.

Impacts from Transmission Line Operation and Maintenance

The primary transmission line corridor maintenance activity that may affect terrestrial resources is vegetation control. Transmission line rights-of-way must be kept clear of woody growth through maintenance practices that prevent outages and prevent the growth from becoming a safety hazard. FPL would maintain the transmission rights-of-way supporting proposed Units 6 and 7, including the application of herbicides, in compliance with applicable Federal, State, and local laws, regulations, and permit requirements (FPL 2014-TN4058).

FPL states that it uses a site-specific maintenance program that accounts for local factors including terrain and vegetation. The primary methods FPL would use to control vegetation include trimming, mowing, and chemical control using herbicides and/or plant growth regulators (FPL 2014-TN4058). Plant growth regulators are chemicals applied to plants to purposefully alter their growth rates or patterns. Plant species that could grow taller than 14 ft would be removed. Areas dominated by low-growing plants, including agriculture and sawgrass marsh, would require less maintenance than areas with taller vegetation. However, the use of chemical plant controls would change the plant composition within the corridors and reduce habitat available to native flora and fauna. Native plants could be displaced with planted grass cover

within the corridor, further decreasing habitat value. The landscape in South Florida is dominated by wetlands, and most of the transmission lines not crossing agricultural land would traverse wetlands. In addition to Federal, State, and local laws, regulations, and permit requirements, restrictive clearing would be performed within sensitive areas, including wetlands, pine rocklands, and Miami-Dade County designated Natural Forest Communities (FPL 2015-TN4442). Restrictive clearing includes hand pulling and cutting with chain saws and rotary cutters with low ground pressure to minimize soil disturbance and compaction. Tree species that could exceed 14 ft in height would be pruned or cleared with restrictive cutting (State of Florida 2014-TN3637). Transmission rights-of-way would be managed to regenerate pine rockland plant species where appropriate and non-pine rockland species would be discouraged to the extent practicable (FPL 2015-TN4442).

The presence of the new transmission line corridors could affect small areas within adjoining remnant patches of pine rockland habitats in the southern Florida agricultural and urban landscapes. Pine rocklands are an arrested successional community that requires periodic disturbance to perpetuate. Fire was the periodic disturbance with which pine rocklands have evolved; without fire, pine rocklands tend to become dominated by upland hammock vegetation or (worse) by invasive upland species. Human habitation has required fire suppression in much of South Florida. Fire is also incompatible with overhead transmission conductors because the smoke can cause electricity to arc from the conductors to the ground. The inability to use controlled fire (or allow natural fires) to reverse conversion of pine rocklands to hammocks may ultimately contribute to the degradation of the few remaining pine rockland patches.

Vegetation-maintenance practices within the rights-of-way could result in mortality to less mobile animals, such as reptiles, amphibians, and small mammals that are unable to escape mowers, vehicles, spray rigs, and other equipment. If vegetation maintenance occurs during the spring and/or early summer nesting period, ground-nesting bird nests could be affected. Noise and human presence may temporarily displace wildlife from areas within or adjoining the corridors until maintenance activities are completed. In general, these impacts are expected to be minor. Maintenance of early-successional habitat and habitat edge (i.e., forest and/or clearing interface environments) within transmission line corridors could be beneficial to wildlife favoring these habitats while adverse to wildlife favoring larger contiguous areas of forest cover.

The NRC evaluated the impact of transmission line corridor maintenance on wildlife and habitats, including wetlands, and generally found it to be of small significance at operating nuclear power plants with associated transmission line corridors of variable widths (NRC 2013-TN2654). While conducting transmission line operation and maintenance in support of proposed Units 6 and 7, FPL would be required to comply with all Federal, State, and local laws, regulations, and permits. FPL would also use environmental BMPs, such as commonly used erosion and sediment control measures, while maintaining transmission rights-of-way. Co-location of proposed transmission lines within existing corridors would limit disturbance of natural communities and reduce the amount of new access roads needed. The use of site-specific measures to manage vegetation would serve to limit impacts on sensitive habitats such as wetlands and pine rocklands. Consequently, the review team concludes that potential effects on terrestrial ecology from maintenance practices within the new and existing transmission line corridors would be minor.

Avian Mortality Impacts from Power Transmission

At least 41 species of birds are known to have been killed by interaction with electrical utility structures in the State of Florida, 20 of which have been killed by FPL electrical utility structures (FPL 2011-TN1283). Transmission line structures, conductors, and guy wires all pose a potential avian collision hazard for all resident birds that live in the vicinity of the transmission lines and for migratory birds that may pass through these areas. The 230 kV transmission lines would be supported by single-pole concrete structures approximately 80 to 90 ft tall. The substation pulloff towers would be galvanized steel or concrete. The 500 kV transmission towers would be 140 to 160 ft tall, made of concrete, galvanized lattice steel, or tubular steel. Tower spans would vary between 900 and 1,000 ft, although FPL states that the distance might vary with site-specific conditions; e.g., to avoid and minimize impacts on wetlands or cultural resources. If tower structures are tubular steel, similar structures with larger gauge steel would be used where the transmission lines turn light angles (15 degrees or less), and three-pole structures with supports would be used where the lines turn heavy angles (55 to 90 degrees).

Transmission line strikes are one of many human-caused sources of avian mortality in the United States (FWS 2002-TN1327). Generally, collision mortality appears to represent only a small fraction of total avian mortality, and the NRC has concluded that bird collisions with transmission lines at existing U.S. nuclear power plants are of small significance, including transmission line corridors with variable numbers of transmission lines (NRC 2013-TN2654). Because some of the new transmission lines proposed for Units 6 and 7 would be collocated with existing transmission lines, either immediately adjacent to or within existing rights-of-way, the potential for bird collisions would be lower than if all of the new transmission lines followed new routes. However, even just increasing the number of lines within existing corridors may still increase the potential for strike mortality. The greatest risk for avian collision is likely to occur for larger-bodied birds, such as raptors, waterfowl, and wading birds (NRC 2013-TN2654). All of these bird types would be expected to occur near suitable habitats in South Florida including habitats traversed by the new transmission lines serving Units 6 and 7. Wading birds are mostly colonial nesting species identified as a biological indicator in South Florida. Eighteen species have been injured or killed by electric utility structures in Florida (FPL 2011-TN1283). Transmission lines for Units 6 and 7 are expected to kill birds as a result of collision mortality, and lines erected near nesting colonies could have a measurable effect on survival of adults and young at that colony.

FPL has provided a corporate Avian Protection Plan as part of its Threatened and Endangered Species Evaluation and Management Plan (FPL 2011-TN1283). This plan provides a decision hierarchy in the event a bird collision or electrocution is discovered; the hierarchy includes event reporting and cause determination. FPL construction and design standards include the use of bird discouragers, perch guards, and insulator shields to limit the potential for electrocution. FPL also uses risk assessment methodology when siting new lines to reduce avian interaction with transmission line systems. This methodology includes understanding bird size, habitat use, and bird behavior such as foraging behavior and flight characteristics.

The addition of new transmission lines and corridors may lead to an incremental increase in number of bird collisions during operation of proposed Units 6 and 7. However, considering the measures prescribed by FPL's Avian Protection Plan, the new lines would not be expected to cause a measurable reduction in robust bird populations (see Section 5.3.1.3 for important

species and collision mortality discussion). Consequently, the review team concludes that the potential for impacts on birds due to collision with transmission lines for the proposed Turkey Point site project may noticeably affect some less than robust bird species populations but would not be severe enough to destabilize local bird populations, including local wading bird colonies.

Impacts of Electromagnetic Fields and Coronal Discharge on Flora and Fauna

EMFs are unlike many other agents that have an adverse impact (e.g., toxic chemicals, ionizing radiation) in that dramatic acute effects cannot be demonstrated and long-term effects, if they exist, are subtle (NRC 2013-TN2654). As discussed in the Generic Environmental Impact Statement (GEIS) for license renewal (NRC 2013-TN2654), a careful review of biological and physical studies of EMFs did not reveal consistent evidence linking harmful effects with field exposures. Power transmission lines in the United States produce EMFs of nonionizing radiation at 60 Hz, which is considered to be an extremely low frequency (ELF) EMF. The transmission lines connected to the proposed reactors would be 500 kV and 230 kV. The EMFs produced by operating transmission lines up to 1,100 kV have not been reported to have any biologically or economically significant impacts on plants, wildlife, agricultural crops, or livestock (Miller 1983-TN1328). Minor damage to plant foliage and buds, caused by heating of the leaf tips and margins, can however occur near strong electric fields. Damage does not appear within the main stem and root systems of the plants and would not significantly affect growth (NRC 2013-TN2654).

The conclusion presented in the GEIS for license renewal (NRC 2013-TN2654) was that the impacts of EMFs on terrestrial flora and fauna were of minimal significance at operating nuclear power plants, including transmission systems with variable numbers of transmission lines. Since 1997, more than a dozen studies have been published examining cancer in animals exposed to EMFs for all or most of their lives (Moulder 2005-TN1329). These studies have found no evidence that EMFs cause any specific types of cancer in rats or mice (Moulder 2005-TN1329). Therefore, the review team concludes that the increased EMF impact on fauna posed by the operation of new 500 kV and 230 kV transmission lines proposed for the Turkey Point project would be negligible.

The phenomenon of corona discharge from energized transmission lines has been linked to effects on wildlife. Animals may be reluctant to travel under transmission lines and may be displaced from habitats near transmission lines during conditions of increased coronal discharge (Canfield 1984-TN4548). Mammals that are at least partially nocturnal have eye structures that transmit ultraviolet light, possibly enabling some species to see flashes of ultraviolet light during corona discharge (Douglas and Jeffery 2014-TN4547). It is not known how much sound or visible ultraviolet light from transmission lines supporting Units 6 and 7 might affect wildlife travel patterns and habitat use. The review team has accounted for the potential of the transmission lines to affect the movement of wildlife across the landscape in its conclusions regarding impacts of the project on terrestrial ecology.

5.3.1.3 Impacts on Important Terrestrial Species and Habitats

This section describes the potential impacts on important terrestrial species, as defined by the NRC in NUREG−1555 (NRC 2000-TN614), including Federally listed or proposed threatened and endangered species; State-listed species; and other ecologically important species and

habitats resulting from operation of the proposed Units 6 and 7 and associated offsite facilities as well as transmission lines.

Turkey Point Site

The following sections address categories of important species and habitats on the 218 ac plant area and other affected areas on the Turkey Point site.

Federally Listed Species

None of the Federally listed endangered, threatened, and candidate plant species known to occur in the vicinity of FPL's Turkey Point site have been found on the site (see Section 4.3.1.3 for survey methods). Sand flax (*Linum arenicola*) has been found at Homestead Bayfront Park that is located about 1 mi north of Turkey Point site. However, the review team believes this plant is likely at a sufficient distance to preclude any impact from proposed Units 6 and 7 operations. None of the other species would be affected by the operation of proposed Units 6 and 7.

Five Federally listed terrestrial animal species—the eastern indigo snake (*Drymarchon corais couperi*), piping plover (*Charadrius melodus*), wood stork (*Mycteria americana*), rufa red knot (*Calidris canutus*), and Florida panther (*Puma concolor coryi*)—occur on or in the vicinity of the Turkey Point site and have the potential to be affected by operation of proposed Units 6 and 7. The Florida bonneted bat (*Eumops floridanus*) may also be present and potentially be affected. Cooling-tower drift, fogging, and icing are expected to have little impact on habitats and should not affect these listed species. Increased noise levels near the cooling towers, as well as increased human activity and traffic, may cause these wildlife species to avoid habitats immediately adjacent to the operating facilities. However, some level of habituation to ongoing operational disturbances (from proposed Units 6 and 7 as well as the older facilities on the site) would likely occur. If permanent displacement of listed wildlife into adjacent habitats occurred, competition for finite resources could result in small declines in the local populations.

Eastern indigo snakes rely on a matrix of habitats to survive, and movement among habitats that contain roads increases the potential for vehicle collision mortality. FPL expects the increased operations workforce on the Turkey Point site due to operation of proposed Units 6 and 7 to increase traffic levels by approximately 86 percent over current levels, and FPL expects that a maximum temporary outage would increase traffic by 213 percent over current levels (FPL 2014-TN4058). Snakes in general are prone to collision mortality, because they use road surfaces for thermoregulation and their shape, coloration, and low profile make them difficult for automobile drivers to see. Increased traffic would likely result in a proportional increase in road-killed indigo snakes on area roads. It is not known whether the increase in mortality attributable to increased traffic from the operation or refueling of proposed Units 6 and 7 would be measureable within the eastern indigo snake population.

Piping plovers and red knots are shorebirds that use open habitats, such as beaches and mudflats, during winter in South Florida. Both are small birds not known to be exceptionally prone to collision mortality, so the likelihood of collision with the mechanical draft cooling towers and other tall structures is expected to be minimal as is collision with vehicles. This species is therefore not likely to be affected by operation of proposed Units 6 and 7.

Wood storks occur in a variety of wetlands and have been observed foraging in shallow portions of the IWF. Stormwater runoff into the IWF is expected to increase. Water within the system is hypersaline, and the prey items wood storks consume are adapted to this environment. Conversely, salt deposition from cooling-tower drift would also occur on portions of the wastewater system near the cooling towers. The effect of increased runoff and salt deposition on wood stork prey populations within the IWF is unknown. However, wood storks have not been observed in great numbers within the IWF and it is not believed to be a major foraging area (FPL 2014-TN4058). Although juvenile wood storks are not particularly adept at flying, the likelihood of avian collision with the mechanical draft cooling towers and other tall structures is expected to be minimal. Therefore, the operation of proposed Units 6 and 7 is not expected to noticeably affect the wood stork population growth in the region.

The U.S. Fish and Wildlife Service (FWS) recognizes much of Miami-Dade County and South Florida as a Florida Panther Focus Area. Although the focus area excludes the Turkey Point site, lands immediately adjacent the Turkey Point site to the south and west are contained within the focus area and are also considered to be within the panther's primary zone (FWS 2007-TN230). Florida panthers are susceptible to vehicle collisions; one in five deaths of or major injuries to radio-collared panthers resulted from a collision with a vehicle (Schwab and Zandbergen 2011-TN4047). An incremental increase in traffic from operation of proposed Units 6 and 7 may increase the risk of vehicle collisions for local panthers. It is not known whether the increase in collision risk attributable to increased traffic from the operation or refueling of proposed Units 6 and 7 would result in a vehicle-panther collision event.

State-Listed Species

At least 111 plant species listed by the State of Florida are known to occur within the vicinity of the Turkey Point site (Table 2-14). Many occur in habitats not found on the Turkey Point site. Some of these plants, such as Small's flax (*Linum carteri var. smallii*) and the Bahama ladder brake (*Pteris bahamaensis*) are known to occur in disturbed habitat, and the banded wild-pine (*Tillandsia flexuosa*) is an epiphyte that grows on a variety of other plants that occur in a wide range of habitats. The range of habitats the State-listed plants represent indicates that some of the species could occur within the proposed plant area on the Turkey Point site, but the extent of their occurrence is undetermined. Species that occur very near the cooling towers could be exposed to elevated levels of salt from cooling-tower drift. However, as noted above in Section 5.3.1.1, the highest salt-deposition rate expected to affect naturally vegetated areas off of the island containing the plant area is 4 kg/ha/mo, too low to potentially injure vegetation, including State-listed plant species.

An additional 23 State-listed animal species can also be found on or near the Turkey Point site. This list includes 1 amphibian, 3 reptile, 16 bird, and 3 mammal species. Survey information indicates that many of these species have been observed using habitats within the proposed project area, and life histories as well as habitat preferences indicate that many of them would be expected to occur there. The Florida Fish and Wildlife Conservation Commission (FFWCC) determined that only the limpkin (*Aramus guarauna*), Florida burrowing owl (*Athene cunicularia floridana*), little blue heron (*Egretta caerulea*), reddish egret (*E. refescens*), snowy egret (*E. thula*), tricolored heron (*E. tricolor*), white ibis (*Eudocimus albus*), roseate spoonbill (*Platalea ajaja*), American oystercatcher (*Haematopus palliatus*), white-crowned pigeon (*Pagagioenas*

leucocephala), brown pelican (*Pelecanus occidentalis*), black skimmer (*Rynchops niger*), least tern (*Sterna antillarum*), and Everglades mink (*Neovison vison evergladensis*) have the potential to be affected by the proposed project activities because only these species are known or suspected to occur in the Turkey Point site vicinity.

The limpkin is a resident wading bird found in a variety of wetland types throughout southern Florida. Operational noise could displace individual limpkins that may occur on the site and in the vicinity. However, wetlands near the proposed Units 6 and 7 plant area are not habitat favored by limpkins in South Florida and any effects from the operation of Units 6 and 7 would therefore be negligible.

One Florida burrowing owl was observed one time within the Turkey Point site IWF (FPL 2014-TN4058). Florida burrowing owls are found in open upland habitat and cleared areas (FFWCC 2014-TN3570). Although berms among the canals of the IWF could be considered to be potential habitat because they are mostly non-vegetated and the deposition of fill raised them to upland elevations, the occurrence of a single burrowing owl does not necessarily indicate habitat suitable for Florida burrowing owls is present within the IWF. If these berms were in fact suitable for burrowing owls, one would expect more than a single observation. Therefore, lands that would be affected by proposed Units 6 and 7 operations are not considered burrowing owl habitat and the likelihood that this species would be affected is very low.

Little blue herons, reddish egrets, snowy egrets, tricolored herons, and roseate spoonbills are all piscivorous wading birds. They all have been observed on the Turkey Point site in shallow wetland habitats. Increased runoff and salt deposition may alter habitat within the IWF, but would not be expected to noticeably change the suitability of this facility as habitat for these four species. Operational noise could displace some individuals, but their occurrence within suitable habitats despite the current operation of existing plants indicates most would be expected to adapt to increased noise, activity, and artificial light levels. Operation of proposed Units 6 and 7 is not expected to noticeably affect populations of these species.

The white ibis is also a wading bird that uses a variety of wetlands on the Turkey Point site. This species is known for nomadic behavior and will move seasonally and annually to take advantage of locally abundant resources. Although noise could exclude birds from some wetlands, the predisposition of this species to relocate would likely preclude any measurable impacts from proposed Units 6 and 7 operations on the white ibis population.

The American oystercatcher occurs on large open expanses and forages in shellfish beds. No known shellfish beds would be affected by the operation of proposed Units 6 and 7. Other operational effects including noise, salt deposition, and artificial lighting are not expected to affect American oystercatchers.

White-crowned pigeons forage on fruit-bearing trees especially poisonwood (*Metopium toxiferum*). Salt deposition could affect poisonwood trees growing near the cooling towers. Poisonwood is known to occur near saltwater, which indicates some level of salt tolerance. Regardless of the tolerance of poisonwood to salt, the limited extent of salt deposition from proposed Units 6 and 7 cooling-tower drift would limit any impacts on poisonwood trees and thus any impact on white-crowned pigeons.

The brown pelican is a coastal species that may roost or loaf within Turkey Point site wetlands. Operational noise may displace local brown pelicans, but pelicans may also adapt to any new noise levels as indicated by their continued presence on the site despite operation of the existing units. Roosting and loafing habitats are not known to be limited and thus operation of proposed Units 6 and 7 would not be expected to noticeably affect brown pelican populations.

Black skimmers and least terns forage over open water. Least terns have been observed on the Turkey Point site and dredge spoil may provide suitable nesting habitat for both species. Operational noise may displace skimmers and terns from dredge spoil within the IWF that is near the cooling towers. Skimmers and terns are not currently known to nest near the proposed cooling-tower locations, and it is likely impacts from noise would be negligible to both black skimmers and least terns.

The Everglades mink would be expected to use wetlands within the Turkey Point site. Little is known about the Everglades mink, but as with other species operational noise may deter mink from using parts of the site nearby the proposed facilities. Mink are primarily active at night. The effects of artificial lighting on mink are not known. However, the effects of proposed Units 6 and 7 operations on wetlands would be extremely limited in scope and would not be expected to alter availability or suitability of wetland habitats for the Everglades mink.

FPL would be required to comply with all applicable Federal, State, and local laws, regulations, and permitting requirements to minimize potential impacts on listed species. If operational impacts on State-listed wildlife cannot be avoided, FPL would be required to coordinate with the FWS and the FFWCC on the need for appropriate mitigation. A biological assessment currently is being prepared by the review team to address impacts on Federally listed species that may be affected by the operation of proposed Units 6 and 7. FPL would be obligated to implement any mitigation required through this process.

Other Important Species and Habitats

In addition to Federally and State-listed species and those proposed for listing, the NRC (2000-TN614) identifies important species as those that are commercially valuable, recreationally valuable, essential to the maintenance or survival of commercially or recreationally valuable species, critical to the structure and function of local terrestrial ecosystems, and those that serve as biological indicators. Important habitats include wildlife refuges, sanctuaries, preserves, FWS-designated critical habitat, other State or Federally protected habitats, wetlands, and floodplains.

Mangrove forests are an integral part of South Florida ecology and occur within the area expected to be affected by salt deposition from cooling-tower drift. Mangroves represent the link between upland and marine environments and are adapted to survive in a saline environment. They must be salt-tolerant to thrive in this environment. However, it is not known whether the levels of salt deposition very near the cooling towers could exceed the tolerance level for the three mangrove species found here. The limited extent to which elevated salt levels are expected to be deposited around the proposed Units 6 and 7 cooling towers would limit any impact on local mangrove stands.

Everglades National Park is several miles west of the Turkey Point site. Salt deposition from cooling-tower drift is expected to extend onto offsite areas west of the cooling towers and may reach lands within the park. However, levels are expected to be far below levels known to affect sensitive plant species. Operational noise may displace some individual animals from the Turkey Point site to the park thereby increasing competition for resources. Displacement would likely be very low if detectable and would not destabilize local wildlife populations that may occur in the Everglades National Park adjacent to the Turkey Point site.

Terrestrial resources within Biscayne National Park are not expected to be affected by operation of proposed Units 6 and 7. See Section 5.3.2 for impacts on aquatic resources within Biscayne Bay.

Commercially and recreationally valuable species, including white-tailed deer (*Odocoileus virginianus*), mourning dove (*Zenaida macroura*), and cottontail rabbit (*Sylvilagus floridanus*), are present within the Turkey Point site. Waterfowl are also likely present. Increased traffic from proposed Units 6 and 7 operations would likely result in a proportional increase in road-killed deer and rabbits but is not expected to substantially affect regional populations of these locally common species. Increased activity and noise may displace some deer and waterfowl offsite where they may be exposed to increased hunting mortality. However, displacement and increased mortality are not expected to noticeably change local deer and waterfowl populations.

Disease vectors and pest species in this region include insects, mammals, reptiles, and invasive plant species. Like other animals, increased vehicle traffic during operation and refueling of proposed Units 6 and 7 would likely cause increased collision mortality of raccoons (*Procyon lotor*), skunks (*Mephitidae*), and Burmese pythons (*Python molurus bivittatus*). Raccoons and skunks are native wildlife species that are known disease vectors. Increased mortality is not expected to noticeably alter populations of these two animals or the frequency of diseases they may carry. The Burmese python is non-native, and any road-killed pythons would ultimately help ongoing control efforts, albeit likely an immeasurable amount. Changes in the salinity of wetlands in the vicinity of the cooling towers would not likely change population levels of waterborne insect vectors.

Associated Offsite Facilities Including Transmission Facilities

The primary transmission line corridor maintenance activity that may affect terrestrial resources is vegetation control. Transmission line rights-of-way must be kept clear of woody growth through maintenance practices that prevent it from either affecting the distribution of power or becoming a safety hazard. FPL uses a site-specific maintenance program and accounts for local factors including terrain and vegetation. The primary methods FPL would use to control vegetation include trimming, mowing, and chemical control including herbicides and plant growth regulators (FPL 2014-TN4058). Plant species that could grow taller than 14 ft would be removed. Areas dominated by low-growing plants, including agriculture and sawgrass marsh, would require less maintenance than areas with taller vegetation.

Federally Listed Species

FPL estimated up to 14 Federally listed plant species may occur within the entire project area (FPL 2011-TN1283). The FWS lists many endangered, threatened, or candidate plant species

in Miami-Dade County (FWS 2014-TN2918) and still others are proposed for listing. One Federally endangered plant species has been observed within the proposed or existing transmission line corridors that would support proposed Units 6 and 7, and two other species listed or proposed for listing were also found (FPL 2014-TN4058). The endangered Florida brickell-bush (*Brickellia mosieri*), proposed endangered sand flax (*Linum arenicola*), and the candidate pineland sandmat (*Chamaesyce deltoidea ssp. pinetorum*) were all observed within a 9 ac fire-maintained pine rockland area within the first leg of the proposed West corridor known as the King's Highway Pineland (FPL 2009-TN657). Other State-listed plant species were also observed in the same location (FPL 2014-TN4058). The King's Highway Pineland has been proposed as critical habitat for the Florida brickell-bush and Carter's small-flowered flax (*Linum carteri* var. *carteri*) (78 FR 61293) (TN2912). The following paragraph describes the potential impacts from operation and maintenance of proposed Units 6 and 7 associated offsite facilities, including transmission lines, on these species.

The maintenance of transmission line corridors would negatively affect both Federal and State-listed plant species and would negatively affect proposed critical habitat for the endangered Florida brickell-bush and the listed endangered Carter's small-flowered flax. Because none of the listed plant species are trees, they would not be the direct targets of trimming or spraying but could experience indirect exposure and drift from spraying of adjoining vegetation and could be inadvertently trampled by maintenance vehicles and spray rigs. Pine rockland and marl prairie are early-successional habitats that were historically maintained by periodic fire. The presence of transmission infrastructure would likely preclude the use of fire to maintain vegetation because FPL does not list fire as a tool for vegetation management within its transmission line corridors. Periodic mowing has replaced fire as the primary management tool for early-successional habitats within FPL's transmission corridors, including pine rocklands and marl prairie, and may in part simulate fire disturbance. Periodic mowing is also a management technique FPL uses for vegetation control within transmission line corridors. The continued occurrence of early-successional fire-dependent plant species within existing transmission line corridors would indicate that current management of the corridor could preserve fire-dependent habitats and species present. However, the abundance of fire-dependent plants managed with mowing is unknown and many other listed plant species that would be expected to occur within pine rocklands and marl prairies have not been observed during previous plant surveys of the corridors. This may indicate that either these plants had not previously occurred within the corridors or that current management using periodic mowing is not an adequate fire surrogate to maintain these species over the long term. The effects of herbicides to control vegetation within transmission line corridors on listed plants is unknown but would not be expected to be beneficial. Overspray of herbicides could affect adjacent habitats, but the use of restrictive clearing and cutting near or within wetlands and pine rocklands should limit this impact to the extent practicable (FPL 2015-TN4442). Also, the use of vehicles on transmission access roads creates a means by which non-native plants may be spread into sensitive habitats. Non-native plants can outcompete native species, thereby reducing or eliminating listed plant populations as well as decreasing habitat value. Impacts on Federally or State-listed plants would occur as a result of the maintenance of transmission line corridors, but their extent would be difficult to quantify without more information describing plant populations throughout the proposed transmission line corridors and proposed management techniques that would be used where listed plants occur. Transmission line rights-of-way supporting proposed Units 6 and 7 would be

maintained by FPL in compliance with applicable Federal, State, and local laws, regulations, and permit requirements (FPL 2014-TN4058). It is not known whether the FWS would place restrictions on vegetation-management protocols in locations known to support Federally listed plants.

The FFWCC identified 29 Federally and/or State-listed terrestrial wildlife species that at times may occur on or near the associated offsite facilities (reclaimed water-supply system, potable-water supply system), including transmission lines (Table 2-16). This list includes 6 Federally and 23 State-listed species. Each of these species could potentially be affected by operation and maintenance activities. The following discussion describes the potential impacts from operation and maintenance of offsite facilities associated with proposed Units 6 and 7, including transmission lines, on these species.

The worldwide population of the Cape Sable seaside sparrow (*Ammodramus maritimus mirabilis*) is limited to fewer than 3,000 individuals (FWS 2010-TN256). This species thrives in marl prairie habitat and is limited to six subpopulations located south and west of the proposed transmission lines (FWS 2010-TN256). Impacts on this species are therefore not expected to occur from operation or maintenance any offsite facilities or the proposed transmission system.

Eastern indigo snakes occur in a wide variety of habitats and thrive in a mosaic of different habitat types. This species has been observed at two locations within the eastern transmission line corridor and suitable habitat is present at many locations within both the eastern and western transmission line corridors. Eastern indigo snakes use burrows and other underground refugia and are vulnerable to mortality while underground during ground-clearing and infrastructure installation activities that require off-road use of vehicles. Mechanical vegetation control within the transmission line rights-of-way could affect this species by causing direct mortality. The FWS has required FPL to adhere to standardized protection measures for the eastern indigo snake. These measures include a snake protection plan that would include education of construction personnel to limit impacts and provide a reporting protocol for indigo snake observations and take (FWS 2004-TN779). Institution of these measures will not eliminate impacts on the eastern indigo snake, but should minimize the potential impacts to the extent practical.

The Florida panther has been observed within the proposed West Preferred and West Consensus corridors (FPL 2014-TN4058). Vegetation-control measures would have negative effects on local panthers by maintaining habitat fragmentation that occurred when transmission line corridors were developed and by not allowing natural succession to reclaim previously disturbed areas. Operation of the potable and reclaimed water-supply systems could also serve to maintain habitat fragmentation that occurred when the pipeline was built.

The piping plover is a migratory shorebird species that occurs in Florida during winter in beach-like habitats. No suitable piping plover habitat exists within, at, or along offsite facilities associated with proposed Units 6 and 7. Any potentially suitable habitat present before facilities were built would be eliminated and no impacts on this species are therefore anticipated.

The Everglade snail kite (*Rostrhamus sociabilis plumbeus*) is susceptible to collision or electrocution mortality (FPL 2011-TN1283) and the operation of transmission lines within the

West corridor could pose a risk of electrocution or collision mortality. Transmission lines within the Preferred corridor border suitable habitat where the FFWCC has observed numerous snail kites and documented successful nesting. Snail kites spend the majority of time perching, fly about 25 percent of daylight hours to forage for snails, and travel to and from the nest location as well as between perch locations (Beissinger 1983-TN2383). They also spend a minor amount of time flying to defend territory. Most of the flight time is spent foraging. To forage, they fly over suitable marsh habitat at an elevation of 10−16 ft above the vegetation (Beissinger 1983-TN2383). They also forage by perching at elevated locations within suitable habitat to look for snails, rest on perches to consume captured snails, and perform various maintenance activities while perched (Beissinger 1983-TN2383). Forage flights would occur well below the expected transmission line heights of 80−90 ft (230 kV) and 140−160 ft (500 kV) (FPL 2014-TN4058) but would not preclude collision with guy wires. Collision mortality related to transmission lines and guy wires could also occur during non-foraging flight. Raptors generally must be very agile in flight to enable them to capture prey. Snail kites may not necessarily have to be as agile as other raptors because they prey on slow-moving snails, but the review team still regards them as agile enough to generally avoid collision with transmission wires. The fact that no known snail kites have been reported as injured or killed from interaction with utility structures in Florida lends limited support to this conclusion (FPL 2011-TN1283). The wing span of snail kites is approximately 42 in. and could not span the minimum of 120 in. for typical single-circuit 230 wires as indicated by FPL (FPL 2011-TN94). Distances for 500 kV circuits would be even greater. Thus electrocution of snail kites by new transmission lines supporting proposed Units 6 and 7 would not be expected to occur. The occurrence of snail kites along the West corridors coincides with the location of wood stork nesting colonies. Use of non-guyed transmission poles in suitable foraging habitat near snail kite nesting areas could also reduce risk of collision mortality. Transmission line poles could also pose a risk to snail kites as perch locations for snail kite nest predators. Snail kite eggs are predated by fish crows (*Corvus ossifagus*) and boat-tailed grackles (*Quiscalus major*) (FWS 1999-TN136), and these species could use transmission line poles as elevated hunting perches in otherwise open marsh habitat. Transmission line poles could also serve as perches for large hawks and eagles that may prey on adult Everglade snail kites (PNNL 2013-TN2466). Increased predation on breeding adults and nests would likely decrease productivity on an already depressed snail kite population and could result in decreased habitat suitability if the kites move elsewhere to nest where elevated perches do not exist. Use of perch discouragers could reduce predation and may be required as mitigation by either the FFWCC or FWS. Maintenance of vegetation within sawgrass habitat would be minimal because this vegetation does not exceed 14 ft in height. Any negative impact on a depressed population such as the Everglade snail kite from operation and maintenance of the proposed transmission line corridors could be noticeable. Increased predation on kites and their nests in an area that is important to snail kite production in the southern portion of its range in Florida could be detrimental to snail kite recovery efforts. Operation of the potable and reclaimed water-supply systems would not be expected to affect snail kites because they are not known to occur within pipeline corridors or in adjacent habitats and the nature of pipeline operation and maintenance would not be would not be expected to affect to snail kites.

Bird attributes that contribute to avian collision with transmission lines include size, behavior, abundance, and habitat use. Birds with relatively large wing spans, including wood storks, are

more likely to be electrocuted because their wing length can bridge larger gaps between live circuits. Birds including wood storks that routinely perch or nest on utility structures also increase the risk of collision or electrocution. Large wading birds, such as wood storks, have wings that are relatively small compared to their large body size. This results in less agility while flying and a higher likelihood of collision with structures. Juvenile wood storks may be particularly vulnerable due to their flying at low altitudes, low agility, and little or no experience with transmission structures. Two wood stork nesting colonies exist within approximately 0.5 mi of the West Preferred corridor and one about 0.8 mi of the West Consensus corridor. This distance puts these corridors within the FWS-recommended maximum secondary protection zone for wood stork colonies. Two additional colonies are within 3 mi of the West Preferred corridor and three to the West Consensus corridor. Wood storks have been killed by collision with and electrocution by FPL electrical utility structures (FPL 2011-TN1283) and are at risk to collide with both proposed West transmission corridors. However, wood stork use of particular colonies varies annually and the colony farthest from the proposed West transmission corridors (Tamiami West approximately 2.8 mi away) is also the most commonly used. Wood storks were documented to use the three nearest colonies 4 or 5 years out of 20 (Table 2-13). FPL would conduct a detailed study along transmission line corridors to determine flight behaviors of storks nesting near the corridors. FPL would also investigate options and effectiveness of making smaller-diameter overhead ground wires that are strung higher than other wires visible to flying wood storks. Investigations to minimize impacts of transmission line operation on wood storks would be detailed within the biological assessment being prepared by the USACE as part of formal consultation with the FWS with respect to the Endangered Species Act (16 U.S.C. § 1531 et seq.-TN1010). Use of un-guyed poles could also reduce risk of collision. Mortality and impacts on the wood stork may not be totally avoidable. The review team anticipates that involvement of the FWS with respect to the effect of proposed Units 6 and 7 transmission line operation and maintenance would minimize any direct or indirect impacts on the wood stork to the extent practicable and may include the use of both flight diverters and perch discouragers. Operation of the potable and reclaimed water-supply systems would not be expected to affect wood storks.

Other Federally listed or migratory bird species may nest within low-growing vegetation within transmission line corridors and could be affected by vegetation maintenance. FPL would coordinate with the FWS to obtain necessary permits and guidance for direct impacts on State-listed species nesting within the proposed Units 6 and 7 transmission infrastructure. Electrocution would cause direct mortality. FPL would coordinate with the FWS to obtain necessary permits and guidance for direct impacts on Federally listed species found within the proposed Units 6 and 7 transmission infrastructure. Inactive nest removal would not be expected to noticeably affect healthy bird populations.

Although neither Bartram's scrub-hairstreak nor the Florida leafwing butterflies are known to be present within the proposed transmission line corridors, proposed critical habitat for both species lies within both West corridors and adjacent to the East corridor. Both of these species depend on the pineland croton (*Croton linearis*) as their sole host plant. The pineland croton depends on periodic fire for its continued existence, and the elimination of fire as a management tool within pine rockland habitat located in transmission corridors could decrease habitat value for these two butterflies. The control of vegetation with chemicals on rocklands within and

adjacent to transmission corridors could also have negative consequences on the pineland croton and ultimately Bartram's scrub-hairstreak and the Florida leafwing.

State-Listed Species

FPL estimated up to 174 listed plant species may occur within the entire project area (FPL 2011-TN1283). Impacts on valuable habitats including wetlands and pine rocklands resulting from the operation of associated offsite facilities including the proposed Units 6 and 7 transmission system would also affect many State-listed species. Vegetation maintenance within transmission line corridors would affect listed plant species that are present. Periodic mowing could simulate natural fire disturbance that maintains many listed plants, and may be beneficial. However, the timing and nature of mowing may not benefit all State-listed plant species. Use of herbicides within the corridors could also simulate disturbance, but would likely be equally detrimental to desirable plant species as it would to undesirable plant species. Transmission line rights-of-way supporting proposed Units 6 and 7 would be maintained by FPL in compliance with applicable Federal, State, and local laws, regulations, and permit requirements (FPL 2014-TN4058). It is not known whether the State of Florida would place restrictions on vegetation-management protocols in locations known to support State-listed plants.

Ospreys (*Pandion haliaeetus*), American kestrels (*Falco sparverius*), little blue herons, snowy egrets, and white ibis have been killed by interaction with FPL electrical utility structures (FPL 2011-TN1283). Osprey routinely nest and perch on FPL power transmission structures located near open water where fish are present. The FFWCC regulates osprey nest removal, and FPL would have to possess a permit to remove inactive osprey nests from transmission structures. The FFWCC permits require a replacement nest structure be erected by the permittee (FPL 2011-TN1283). Removal of inactive osprey nests and subsequent replacement of a suitable nest structure nearby would not have a substantial detrimental effect on osprey populations. Kestrels nest within cavities excavated by woodpeckers within wooden power poles. Cavities threaten the integrity of wooden power poles and would mandate replacement. FPL has proposed to install non-wood poles within transmission line corridors supporting proposed Units 6 and 7. Even if wood poles were used the number of replacement of poles containing cavities would not be expected to noticeably affect kestrel populations. Other State-listed birds may nest within low-growing vegetation within transmission line corridors. FPL would coordinate with the FFWCC to obtain necessary permits and guidance for direct impacts on State-listed species nesting within the proposed Units 6 and 7 transmission infrastructure. Electrocutions and inactive nest removal would not be expected to noticeably affect healthy bird populations.

Other Important Species and Habitats

Transmission-system operation would serve to maintain edge habitats that could benefit game species such as the white-tailed deer and cottontail rabbit, but could also predispose such species to increased hunting mortality by providing cleared areas for hunters. Regardless, operations would not be expected to noticeably affect populations of game species. Wading birds and other species considered biological indicators in South Florida that have been killed or injured from interaction with electrical utility structures in Florida include the double-crested

cormorant (*Phalacrocorax auritus*), great egret (*Ardea alba*), green heron (*Butorides virescens*), great blue heron (*A. herodias*), and both black- and yellow-crowned night herons (*Nicticorax nicticorax* and *Nictanassa violacea*) (FPL 2011-TN1283). Adding more transmission lines would likely result in increased collision risk and mortality. Populations of most wading bird species monitored in Florida have trended upward recently (SFWMD 2013-TN4034) and the incremental change in collision risk and mortality from the operation of a transmission system to support Units 6 and 7 would not be expected to noticeably affect populations of these species.

5.3.1.4 Terrestrial Monitoring

The FFWCC requires FPL to fund a Mitigation Effectiveness Study to evaluate mitigation measures to reduce the potential impacts of power transmission on wood storks. FPL's proposed evaluation effort would include mortality monitoring surveys and observation of wood stork flight behavior along transmission line corridors. These studies would be conducted prior to transmission line installation and during operation as required. These efforts may not constitute monitoring *per se*, but would account for wetland condition post-restoration and the estimated loss of prey biomass on an annual basis. Additional monitoring could be required by regulatory agencies.

5.3.1.5 Potential Mitigation Measures for Terrestrial Impacts

FPL would investigate the options for and effectiveness of making overhead ground wires visible to flying wood storks. FPL has not proposed other specific mitigation measures for terrestrial ecology impacts attributable to plant operations. Additional mitigation measures could be required by local, State, or Federal regulatory agencies and may include the installation of flight diverters and perch discouragers to lessen impact of transmission system operation on listed bird species.

5.3.1.6 Summary of Impacts on Terrestrial Resources

The review team evaluated the potential effects on terrestrial ecological resources of operating proposed Turkey Point Units 6 and 7, including onsite and associated offsite facilities. As described above, most potential impacts of operations on terrestrial resources would be minimal. Salt deposition from cooling-tower drift exceeding levels known to affect sensitive plant species would occur immediately around the cooling towers and into the existing IWF and nearshore areas of Biscayne Bay. However, the areas predicted to receive the potentially harmful salt deposition would lie within new or existing developed areas. Mangroves are the dominant vegetation in those areas and are highly salt-tolerant. Salinity within the IWF or other area wetlands would not change enough to alter prey populations consumed by wading birds. The climate of South Florida would preclude localized icing impacts. The addition of cooling towers and other tall structures is not expected to noticeably affect healthy bird populations in the local area. Cooling-tower noise would be limited using engineering controls and is not expected to measurably affect local wildlife. Water levels within Biscayne Bay would not be affected by water withdrawal for cooling.

Although building the proposed Units 6 and 7 facilities would increase the amount of impervious surfaces on the Turkey Point site, the new makeup-water reservoir and detention basins would adequately manage the resulting runoff. Reduced runoff and use of BMPs would limit impacts

from stormwater runoff to adjoining terrestrial habitats. Increased traffic during plant operation and refueling is expected to result in a proportional increase in wildlife mortality on local roadways. Although wildlife would experience some increased direct mortality, the levels expected would not destabilize healthy wildlife populations. Uncertainty exists however regarding potential increased mortality for the eastern indigo snake and Florida panther.

Deposition of emerging pollutants of concern from use of reclaimed water for cooling would be below levels expected to affect the terrestrial ecosystem. However, as explained above, the toxicological and bioaccumulative properties of these contaminants are not well understood. The review team therefore acknowledges uncertainty with respect to the potential impacts to terrestrial biota present in habitats subject to the highest levels of cooling tower drift.

The primary transmission line corridor maintenance activity that may affect terrestrial resources is vegetation control. As many as 174 listed plant species (14 Federally listed, 160 State-listed) could be present within the associated transmission line corridors. FPL would use mechanical and chemical methods of controlling vegetation within a site-specific maintenance program to limit adverse impacts to the extent practical. Periodic mowing of rights-of-way crossing pine rocklands may serve to maintain some level of ecological diversity. FPL's use of site-specific vegetation-control plans limits the uncertainty regarding impacts resulting from the use of herbicides on listed plants. Impacts would likely still result from transmission line vegetation maintenance. Vegetation control within the western transmission line corridor where it crosses the King's Highway pine rockland could directly harm the Florida brickell-bush and Carter's small-flowered flax, indirectly harm Bartram's scrub-hairstreak and Florida leafwing butterflies, and could decrease the value of proposed critical habitat for these species.

The presence of transmission lines poses a noticeable risk of collision injury or electrocution of birds, especially large birds with wide wing spans. Individuals of at least 41 bird species have perished as a result of transmission line operation in Florida either by trauma from collision or electrocution. Waterfowl, raptors, and wading birds including the wood stork are particularly vulnerable. Operation of the transmission lines serving Units 6 and 7 could result in further bird mortalities. Uncertainty exists regarding the possible effects of coronal discharges from high-voltage transmission lines on the ability of certain wildlife to cross transmission line rights-of-way. However, mortality caused by transmission lines is generally a small fraction of total avian mortality. Furthermore, FPL would use engineering controls to limit transmission line-related bird mortality and fund research and monitoring to determine impacts on wood storks. FPL's corporate Avian Protection Plan provides guidance and engineering controls to reduce and report avian mortalities.

Based on the review team's independent evaluation of the Turkey Point site project, including the ER, the SCA, FPL's responses to the review team's RAIs, interactions with State and Federal agencies, the public scoping process, and the identified mitigation measures and BMPs, the review team concludes that operational impacts on terrestrial ecological resources (including wetlands and listed species) would be MODERATE. This conclusion accounts for the potential effects of increased collision mortality on wood storks, Everglade snail kites, and other important wildlife, and impacts of vegetation control on listed plants, proposed critical habitats, and other important terrestrial resources. It also reflects the proximity of many of these impacts to the natural areas and wildlife contained within Biscayne and Everglades National Parks.

Additionally, the conclusion reflects uncertainties inherent in the review team's evaluation of potential toxicological effects on terrestrial biota from CECs present in drift originating from use of city wastewater in cooling towers.

5.3.2 Aquatic Impacts Related to Operation

This section discusses the potential impacts of the operation of proposed Turkey Point Units 6 and 7 on onsite and offsite aquatic resources. The NRC Environmental Standard Review Plan guidance for aquatic ecosystems (ESRP 5.3.1.2) (NRC 2000-TN614) directs the review team to conduct an independent analysis of the effects of the proposed plant intake system on aquatic ecosystems. As previously described, FPL would have access to two sources of cooling water: reclaimed water provided by Miami-Dade County and water obtained from four RCWs that would be installed on the Turkey Point peninsula. The primary water source for the proposed Turkey Point Units 6 and 7 cooling system would be reclaimed water from Miami-Dade County. RCW operation is limited by the State of Florida to not exceed 60 days per year during the operating license period (State of Florida 2014-TN3637). Water obtained from the RCW system is expected to be similar in salinity and chemical composition to the waters of Biscayne Bay near the Turkey Point site; reclaimed water from Miami-Dade County would require additional onsite treatment, including chlorination, to remove suspended solids prior to use in the cooling system but may still retain some contaminants that are not removed during the treatment process. Although the thermal and chemical effects of blowdown water on aquatic communities in surface waters are eliminated by deep-aquifer injection, such effects on potential aquatic communities that may exist in the receiving aquifer are unknown because no information on the presence of deep-aquifer biota is available.

5.3.2.1 Aquatic Resources – Site and Vicinity

Aquatic resources on the Turkey Point site include the IWF and numerous surface-water habitats consisting of small streams and ponds. Aquatic resources in the vicinity of the Turkey Point site include nearby canals and water-diversion systems, Biscayne Bay, Biscayne National Park and Aquatic Preserve, Card Sound, Florida Keys National Marine Sanctuary, Everglades National Park, and other areas, as shown in Figure 2-26. The ensuing sections provide a general discussion of how each proposed cooling-water source could affect onsite and offsite aquatic resources, followed by a detailed discussion of impacts on the important species and habitats identified and described in Section 2.4.2.

Onsite Surface-Water Habitats and Industrial Wastewater Facility

Potential impacts on onsite surface-water habitats and the IWF from operation of proposed Turkey Point Units 6 and 7 could include the following:

- deposition of conventional chemicals and CECs from cooling-tower drift into the IWF or other surface-water habitats when reclaimed water is used for cooling;
- hydrological alterations associated with the operation of the RCW that affect the IWF aquatic community structure or function;
- discharges from the stormwater system into the IWF; and

- salt deposition from cooling towers during the use of the RCW system that increases salinity within the IWF or other onsite surface-water habitats.

Use of Reclaimed Water

As described in the ER (FPL 2014-TN4058), the primary source of cooling water would be reclaimed water from the MDWASD. Approximately 60 Mgd would be needed to support the operation of proposed Units 6 and 7. Because FPL would rely on piped reclaimed water, no intake would be required, and cooling-tower blowdown would not be discharged into surface-water habitats, so entrapment, entrainment, impingement, and thermal impacts on onsite and nearby aquatic resources in surface waters primarily associated with thermoelectric power stations would not occur. There is, however, the potential for priority pollutants (e.g., metals and organic compounds) and CECs present in reclaimed water after treatment to disperse over the IWF and adjacent waterbodies as cooling-tower drift deposition. Because the threatened American crocodile (*Crocodylus acutus)* is present in the IWF, which is Federally designated critical habitat, the review team evaluated the potential for chemical deposition from cooling-tower operation to directly affect sensitive life stages of the crocodile, or indirectly affect this species by altering existing food webs in the IWF. As described in Section 5.2, to evaluate the potential effects of cooling-tower deposition on aquatic resources, the review team conducted a screening-level assessment that estimated likely chemical concentrations in influent reclaimed water and compared the concentrations to water-quality criteria or other environmental benchmarks to determine whether the chemicals pose a potential risk to aquatic environments. For chemicals with established water-quality criteria, those present in reclaimed water above limits considered protective of aquatic resources were retained in the screen and evaluated for fate and effects, as discussed in Section 5.2 and presented in Table 5-1. For chemicals without established water-quality criteria, including most CECs, those present at >1/10 of a toxicological benchmark were included in fate and effects evaluations (Table 5-1). These evaluations included the use of atmospheric and hydrodynamic models to predict chemical concentrations in the IWF, Biscayne Bay, Card Sound, and other surface-water environments adjacent to the Turkey Point site. The analysis was considered conservative in that the review team assumed no additional treatment of water would occur prior to its use in the cooling system even though the applicant plans to conduct additional treatment using the RWTF.

Use of Radial Collector Wells

FPL proposed to install four RCWs beneath Biscayne Bay to provide a secondary source of cooling water. This system would not use a surface-water intake structure and would be used when reclaimed water from MDWASD is not available (see EIS Section 3.2.2.2). FPL has proposed, and FDEP has permitted, that RCW use would be limited to a maximum of 60 days per year (FPL 2012-TN2688; State of Florida 2014-TN3637). Given that the RCW laterals (horizontal collector lines) would be 25 to 40 ft beneath Biscayne Bay, and the decision to discharge cooling-tower blowdown into a deep-aquifer formation, adverse effects on onsite surface-water habitats related to impingement and entrainment of organisms; or thermal discharges would be highly unlikely. Entrainment of water designated as essential fish habitat (EFH) could occur but as stated above would be limited to 60 days per year. Because the majority of the RCW water source is expected to be Biscayne Bay seawater, there is a potential for adverse effects on IWF communities related to salt drift and deposition from cooling-tower

operation while using the RCWs to supply cooling water. Because the threatened American crocodile inhabits the IWF, this species and the food web it depends on are the primary focus of the review team's assessment.

Aquatic Resources near the Turkey Point Site

Aquatic resources near the Turkey Point site include nearshore areas adjacent to the Turkey Point peninsula and the eastern boundary of the site property (including Biscayne Bay and Card Sound, which are portions of Biscayne National Park and Florida Keys National Marine Sanctuary, respectively) and Everglades National Park, which is southwest of the facility. Potential impacts on aquatic resources from the operation of proposed Turkey Point Units 6 and 7 could include the following:

- chemical deposition into nearshore waters and terrestrial areas adjacent to the Turkey Point site from cooling-tower drift;
- salt deposition into nearshore waters and terrestrial areas adjacent to the Turkey Point site from cooling-tower drift;
- entrainment, or impingement of aquatic organisms during operation of the RCW if limestone fracturing occurs above the well laterals (extending from the Turkey Point peninsula beneath Biscayne Bay);
- changes in nutrient or salinity levels in interstitial water in Biscayne Bay sediment that affect existing aquatic resources above RCW laterals; and
- potential hydrological changes related to RCW operation that could change local species composition or food web dynamics.

Use of Reclaimed Water

Under normal operations the use of reclaimed water from Miami-Dade County would eliminate the potential for intake-related effects on marine and estuarine species occurring near the Turkey Point site, and the use of deep-aquifer injection of cooling-tower blowdown would eliminate potential thermal impacts on biota in surface waters. Chemicals associated with cooling-tower drift are also unlikely to affect Biscayne Bay, Card Sound, Biscayne National Park or Everglades National Park because expected deposition patterns are generally to the southwest over the IWF, and any chemicals associated with cooling-tower deposition would likely be rapidly diluted and undetectable. Thus, the potential effects of reclaimed water use on the aquatic species described in Section 2.4.2 as living in Biscayne Bay, Card Sound, and other surface-water habitats near the Turkey Point site are expected to be minimal.

Use of Radial Collector Wells

The review team examined the operation of the RCW system to assess the potential for salinity alterations to affect aquatic resources near the Turkey Point site. To evaluate potential salinity impacts, the review team reviewed available historical information about salinity trends in Biscayne Bay from FPL, the NPS, available reports and peer-reviewed journal articles, and the numerical model developed by USGS to assess the effects of RCW operation on Biscayne Bay. Because of the system design, impingement and entrainment effects associated with RCW operation are unlikely, but could occur in a limited manner if the limestone above the RCW

laterals fractures, creating preferred flow pathways that increase downwelling velocities sufficient to impinge or entrain small fish and larvae. The review team also assessed the potential for impingement, entrainment, or detectable changes to sediment pore-water characteristics to occur under both normal and limestone fracture scenarios. The results of these evaluations formed the basis for the impact discussion provided below for recreationally, commercially, or ecological important species; species listed by Federal or State resource agencies; and species with designated EFH or habitat areas of particular concern (HAPCs).

5.3.2.2 Aquatic Resources – Transmission Line and Pipeline Corridors

Impacts on aquatic resources from transmission line and pipeline maintenance are expected to be minimal during the licensing period because most of the transmission lines and pipelines follow existing linear facilities or rights-of-way, or they traverse areas that have been previously disturbed. The exceptions to this are the proposed transmission lines near Everglades National Park, where maintenance of the transmission line rights-of-way has the potential to affect aquatic species inhabiting nearby drainage canals. In these areas, FPL has committed to following BMPs and would conduct threatened and endangered species monitoring consistent with State and Federal resource agency guidance.

5.3.2.3 Aquatic Species and Habitats

Commercially, Recreationally, or Ecologically Important Species

Commercially, recreationally, and ecologically important species that are likely to occur on or near the Turkey Point site are discussed in Section 2.4.2. Given the proposed cooling-system design, the review team evaluated the potential for impacts on these species from cooling-tower drift and radial collector well operation. When reclaimed water is used, cooling-tower deposition may contain chemicals not removed during treatment; use of the RCW system could also result in salt deposition that increases the salinity in bodies of surface water beneath the plume. It is also possible that fractures in limestone overlying the RCW laterals could open preferred flow pathways, resulting in limited impingement or entrainment of aquatic organisms during intermittent RCW operation. The review team also evaluated the potential for radial well operation to affect surface-water salinities in Biscayne Bay and changes in the benthic community environment above the radial well laterals. Potential impacts related to each proposed cooling-water source are described below.

Use of Reclaimed Water

As described above, the use of reclaimed water minimizes intake-related effects, and deep-well injection eliminates thermal impacts on commercially, recreationally, or ecologically important aquatic biota in Biscayne Bay and Card Sound. There is a potential, however, for cooling-tower drift containing priority pollutants and CECs to affect both onsite and offsite aquatic resources. The cooling-tower drift rate under normal two unit operation is expected to be 8 gpm. As described in Section 5.2 (Table 5-1), deposition rates for the chemicals and constituents included in the fate and transport screening assessment are generally low, ranging from 1.5×10^{-9} to 8.4×10^{-7} g/m^2/mo. Calculations for TP deposition were also estimated from reclaimed water and RCW water using the same information (FPL 2012-TN263) given in

Table 5-1. The annual deposition rates to the cooling canals were 1.5×10^{-3} g/m^2-yr and 1.6×10^{-4} g/m^2-yr, respectively. Annual deposition of TP to Biscayne Bay was estimated as 3.7×10^{-4} g/m^2-yr from reclaimed water and 4.0×10^{-5} g/m^2-yr from RCW water. The highest depositional rates for chemicals and constituents associated with the drift were predicted for the IWF cooling canals; lower depositional rates were expected in surface-water habitats near the site (e.g., Western Areas/Model Lands) and nearshore areas of Biscayne Bay. The low depositional rates are unlikely to adversely affect commercially, recreationally, or ecologically important species present at offsite locations because deposited chemicals, including TP, would be rapidly diluted and essentially undetectable. Because the highest depositional rates are expected to occur in the IWF cooling canals, which are Federally designated critical habitat for the threatened American crocodile, this potential adverse impact is discussed below.

Use of Radial Collector Wells

Based on the analysis described in Sections 5.2.1.4 and 5.2.1.5, salt drift from cooling towers during the use of the RCW system is expected to be extremely low, and the decision to use the RCWs primarily as a cooling-water backup that is limited to 60 days per year further reduces the impacts. Thus, salt deposition in the IWF, surface-water habitats within or adjacent to the Turkey Point site, or in nearshore areas of Biscayne Bay National Park, Biscayne Bay and Card Sound is expected to be undetectable. Effects on red mangroves (*Rhizophora mangle*) are unlikely because they are found in water with salinities ranging from 0 to 90 ppt (Hill 2001-TN1015). In contrast, turtle grass (*Thalassia testudinum*) requires water salinity of 20 ppt or higher, so hydrological changes that decrease bay salinities could affect this species (Dineer 2001-TN1013). Likewise, hydrological changes that increase nearshore water salinity could affect seagrasses requiring lower salinities. For instance, the salinity range for manatee grass (*Syringodium filiforme*) is 20 to 26 ppt; shoal grass (*Halodule wrightii*) is generally found in coastal waters with salinities ranging from 20 to 36 ppt (FMNH 2012-TN1014). A 2013 study (FPL 2015-TN4442) simulated the potential for RCW operations on seagrasses. Nutrient flux and salinity in the pore water was measured under simulated RCW operation, and even at a 95 percent reduction in nutrient concentrations, and a 4 ppt increase in salinity through pore-water migration, turtle grass growth and development was not affected. This 2013 study supports the assessment that operation of the RCW system would have minimal effects on seagrass beds near the Turkey Point site.

Although minimal, there is a potential for impingement or entrainment of juvenile or larval forms during RCW operation if the limestone above the well laterals fractures, creating preferential flow pathways sufficient to impinge or entrain aquatic biota. Species susceptible to impingement and entrainment include individual fish and invertebrate larvae, and eggs from various species. Use of the RCW system could also affect benthic organisms in the immediate vicinity of the well field by changing salinity. Examples of commercial, recreational, and ecologically important species that could be influenced by changes in nearshore salinity include juvenile Spotted Seatrout (*Cynoscion nebulosus*), mojarras (*Eucinostomus* spp.), juvenile Silver Perch (*Bairdiella chrysoura*), juvenile pink shrimp (*Farfantepenaeus duorarum*), and eastern oyster (*Crassostrea virginica*). The NPS identified these species as ecosystem indicators, and they generally have an optimum salinity range of 10 to 25 ppt (NPS 2006-TN183). Other benthic species that may be susceptible to salinity changes include polychaetes, amphipods,

mollusks, and other benthic macroinvertebrates present in nearshore locations above the RCW laterals. These species are described in Section 2.4.2.

To assess the potential for RCW operation to noticeably change nearshore salinity patterns and adversely affect sensitive species, the review team evaluated historical salinity data provided by the NPS and others to understand the inherent spatial and temporal variability at nearshore and offshore locations in Biscayne Bay near Turkey Point. The team also reviewed assessments of salinity impacts provided by FPL and the NPS, and a numerical model developed by the USGS that compared existing (base-case) salinity conditions to predicted conditions under three RCW operational scenarios: 1) continuous RCW pumping throughout the year (Scenarios A, B, and C), 2) repeated annual periods of pumping of 3 months duration during the dry season followed by 9 months with no pumping (Scenario D), and 3) repeated pumping periods of 30 days followed by 90 days of no pumping (Scenarios E, F, and G). The review team evaluated the base case and Scenarios A (continuous pumping) and D (3 months pumping followed by 9 months without pumping). A description of the USGS model results and updated variable density modeling is presented in Section 5.2.1.1; additional information is provided in Appendix G and in NRC 2014 (TN3078).

The review team's examination of time series indicated that variations in salinity from continuous pumping were mostly within ±1 psu, with only transient increases to near 2 psu (Appendix G, Figure G-9). When the review team examined the spatial distribution results at the time when salinity time-series differences had an increase (10/3/2003), the increase (which was less than +2 psu) was found to occur in a relatively small area north of Turkey Point (Appendix G, Figure G-10). When the review team examined the spatial distribution results at the time when salinity time-series differences had a decrease (10/25/2004), the decrease (which was greater than -2 psu) was also found to occur in a relatively small area north of Turkey Point (Appendix G, Figure G-11). Figure G-11 shows the relative saltwater balance and flow changes for Biscayne Bay and the Turkey Point site during RCW operations. These results show that the variation in salinity was minimal with continuous RCW pumping. The review team noted that the actual duration of pumping would not be continuous because the FDEP permit conditions require that pumping be limited to 60 days or less per year (State of Florida 2014-TN3637). A shorter duration would allow time for the groundwater system to recover following RCW pumping and limit the entrainment of saltwater from Biscayne Bay. Any drift deposition during RCW operation would not noticeably affect salinity in Biscayne Bay as described in Section 5.2.1 (Table 5-1). Therefore, the effect on Biscayne Bay salinity from any permitted pumping would be much reduced from the already minimal salinity change predicted by the USGS modeling analyses.

Using the same operational scenarios evaluated by USGS and described in Section 5.3.2, the review team assessed the potential for impingement and entrainment of larval fish and invertebrates from RCW operation. Based on the assumption that the RCW laterals would be located 25 to 40 ft beneath Biscayne Bay, the team estimated the average vertical velocity of saltwater approaching the bay bottom to be 0.0003 ft/min (0.000152 cm/sec) if all the pumped water flowed into the bay bed within a polygon encircling the RCW laterals. A worst-case approach velocity was estimated to be 0.3 ft/min (0.0152 cm/sec or 0.005 fps) using assumptions similar to those described above and substrate permeability 1,000 times greater than the average permeability (EIS Section 5.2.1.2). This is significantly less than EPA's 0.5 fps

intake through screen velocity limit for new facilities under 316 (b) Phase I requirements specified in 40 CFR 125.84 (TN254). Because these estimated vertical velocities are orders of magnitude smaller than the near-bottom current speeds measured by McAdory et al. (2002-TN1155) during ebb and flood events at nearshore locations in Biscayne Bay, tidal and wind-driven currents would provide a much greater influence at the sediment-water interface, and impingement and entrainment impacts would be negligible during RCW operation. If, however, the limestone above the RCW laterals were to fracture, preferential flow patterns associated with RCW operation could noticeably alter flow dynamics at some locations surrounding the Turkey Point site, and the potential for impingement and entrainment is possible. Required monitoring of water quality, benthic organisms, and submerged aquatic vegetation during operation of the RCWs should detect any adverse effects that would require mitigation (State of Florida 2014-TN3637), and is discussed in greater detail in Section 5.3.2.4. Any operational effects would likely be confined to a small portion of Biscayne Bay above the RCW laterals, which would be operated no more than 60 days per year (State of Florida 2014-TN3637). Thus, the effects of RCW operation on impingement and entrainment are expected to be minimal during the licensing period.

A study of benthic communities in Biscayne Bay and Card Sound conducted by Ecological Associates, Inc. in 2008-2009 (EAI 2009-TN97) found assemblages of crustaceans, echinoderms, mollusks, polychaetes, and other taxa consistent with previous studies (Table 2-20 in Section 2.4.2.1 [EAI 2009-TN97]). The horizontal and vertical distributions of these taxa are influenced by a variety of factors, including sediment grain size, salinity, oxygen, light intensity, and nutrients (Gray and Elliot 2009-TN1007). In general, the bulk of meiofauna and microfauna are found in the upper few centimeters of the sediment near the sediment-water interface (Gray and Elliot 2009-TN1007; Hines and Comtois 1985-TN1004; Flint and Kalke 1986-TN1003). A 2013 mesocosm study (FPL 2015-TN4442) supports the unlikelihood of noticeable pore-water changes that could affect benthic communities. Thus, the any adverse impacts on benthic communities from RCW operation are expected to be undetectable during the licensing period. As described above, monitoring of benthic communities during operation of the RCWs will be required by FDEP to detect any adverse effects, and determine additional measures to mitigate any impacts if any are detected (State of Florida 2014-TN3637).

Radial collector well operation is also unlikely to affect currently Federally listed corals or those proposed for listing or reclassification by the National Oceanic and Atmospheric Administration (NOAA 2014-TN3712). The nearshore (western) regions of Biscayne Bay near Turkey Point provide only marginal habitat for these species in comparison to mid-bay, eastern, and offshore locations (Lirman et al. 2003-TN1519).

Based on the above analyses, the review team concludes that operation of the RCW is unlikely to noticeably alter or destabilize commercially, recreationally, or ecologically important species inhabiting Biscayne Bay. USGS modeling results suggest that although episodic increases in salinity are possible under continuous RCW operation, the effects would be localized and of short duration. Further, the continuous pumping scenario is the least likely to occur, based on FPL statements that the RCW is to be used as a backup system only and no more than 60 days per year. Impingement, entrainment, and changes in sediment pore-water characteristics are also unlikely, given comparisons of the estimated downwelling water velocity during RCW operation to the sweeping currents at near-bottom locations in Biscayne Bay during ebb and

flood tide events. Thus, the review team concludes that any adverse effects on the aquatic resources of Biscayne Bay are expected to be minor.

Federally or State-Listed Species, Species of Concern, and Designated Critical Habitat

Federally or State-listed aquatic species likely to occur at or near the Turkey Point site include the Florida manatee (*Trichechus manatus latirostris*), Hawksbill sea turtle (*Eretmochelys imbricata*), Leatherback sea turtle (*Dermochelys coriacea*), Green sea turtle (*Chelonia mydas*), Loggerhead sea turtle (*Caretta caretta*), Kemp's ridley sea turtle (*Lepidochelys kempii*), American crocodile (*Crocodylus acutus*), American alligator (*Alligator mississippiensis*; because of its similarity in appearance to the crocodile), Smalltooth Sawfish (*Pristis pectinata*), and Johnson's seagrass (*Halophila johnsonii*). Species likely to be affected by operation of the proposed Turkey Point Units 6 and 7 cooling system include the American crocodile, which resides in the IWF and has designated critical habitat within the Turkey Point site, and potentially the Smalltooth Sawfish, which has been reported in nearshore areas of Biscayne Bay and Card Sound but does not have designated critical habitat near the Turkey Point site. Sawfish would only potentially be affected during the operation of the RCW system, and then only if they occurred in areas that may be susceptible to short-term salinity fluctuations. Because suitable habitat for this species exists elsewhere in Biscayne Bay, effects are not expected to be noticeable. Because manatees are generally found near the barge-unloading area and in warm-water canal areas to the north of the facility, they would not interact with the closed-cycle cooling system. Sea turtles would also likely be unaffected by operation of the proposed Turkey Point Units 6 and 7 cooling system, given their infrequent visits to nearshore areas adjacent to the Turkey Point site based on stranding data from FFWCC (2012-TN4120) and NOAA. Johnson's seagrass, while present in Biscayne Bay, has not been reported in nearshore areas near the Turkey Point site and, thus, would be unlikely to be affected by operation of the cooling system.

Federal and State of Florida Species of Concern likely to occur at or near the Turkey Point site include the Mangrove Rivulus (*Rivulus marmoratus*), Dusky and Sand Tiger Sharks (*Carcharhinus obscurus* and *Carcharias taurus*, respectively), Opossum Pipefish (*Microphis brachyurus lineatus*), and Speckled Hind (*Epinephelus drummondhayi*) (Section 2.4.2). With the exception of the Mangrove Rivulus, none of the Federally and State-listed Species of Concern is expected to be affected by the operation of the proposed Units 6 and 7 RCW cooling system because, although they are present in Biscayne Bay, they have not been reported in the vicinity of the Turkey Point facility or captured in recent collections. Although the Mangrove Rivulus is able to tolerate a salinity range of 0 to 68 ppt (FMNH 2010-TN165), noticeable hydrological alterations resulting from RCW operation could affect the coastal marsh and mangrove habitat necessary to support the fish in the immediate vicinity of the wells. A discussion of the potential effects of the proposed Units 6 and 7 cooling system on susceptible species follows.

Use of Reclaimed Water

The use of reclaimed water as a cooling source eliminates the potential for changes in Biscayne Bay salinity values and impingement or entrainment of protected aquatic species but may result in adverse effects from cooling-tower drift deposition of chemicals present in Miami-Dade

reclaimed water after final treatment. Because cooling-tower drift deposition is expected to be confined primarily to the IWF, potential effects on the threatened American crocodile could occur if chemical loading is sufficient to directly affect adults or juveniles, or indirectly affect this species through alteration of the food web present in the IWF. The reclaimed water used for cooling would receive high-level disinfection at the SDWWTP prior to entering the Turkey Point reclaimed water-treatment facility. This level of disinfection is greater than the secondary treatment required for reclaimed water used for irrigation for public and private use (Fla. Admin. Code 62-610-TN1269). Additional treatment of the reclaimed water would occur at the RWTF, to include additional filtration, prior to being used as cooling water (FPL 2014-TN4058). While the combined treatment of reclaimed water may remove or reduce concentrations of many CECs, the NRC staff performed a conservative screening-level assessment that compared the expected concentrations of priority pollutants and CECs in reclaimed water to appropriate toxicological data if numerical criteria were unavailable. The screening-level assessment included organic compounds, metals, and CECs. A number of sources of information were used to determine the potential concentrations in reclaimed water (FPL 2012-TN263; Lietz and Meyer 2006-TN1005; Miami-Dade County 2011-TN1006). Expected chemical concentrations derived from these sources of information were compared to Federal water-quality criteria (EPA 2014-TN3295) or to toxicological effects available from EPA Ecotoxicology (ECOTOX) (EPA 2012-TN1525). Recent work by Brausch and Rand (2011-TN1002) was also used to assess the toxicological effects of CECs, because water-quality criteria have not been established for many of these chemicals. When toxicological benchmarks were used, no-observed effect concentration (NOEC) levels were chosen for sensitive, representative aquatic species to provide a conservative assessment. When possible, the NOECs for mortality of the water flea (*Daphnia magna*) were used as a toxicological benchmark because this species has been used extensively to support water-quality studies, and is commonly used as a sensitive surrogate for toxicity studies. As described above, for chemicals with established water-quality criteria, those present in reclaimed water above limits considered protective of aquatic resources were retained in the screen and evaluated for fate and effects, as discussed in Section 5.2 and presented in Table 5-1. For chemicals without established water-quality criteria, including most CECs, those present at >1/10 of a toxicological benchmark chosen by the review team to be protective of aquatic resources were included in fate and effects evaluations (Table 5-1). Based on fate and effects modeling results summarized in Table 5-1, adverse effects on IWF species (including the threatened American crocodile) are highly unlikely because many predicted contaminant concentrations in IWF water are orders of magnitude (less than one in several hundred to several thousand) below current analytical method detection limits, and they are much lower (4 to 40,000 times) than the toxicological benchmarks used in the screening assessment. Cooling-tower deposition during reclaimed water use is also not expected to adversely affect Smalltooth Sawfish and Johnson' seagrass—listed species that may occur in Biscayne Bay—because the cooling-tower deposition occurs predominantly west and south of the Turkey Point site, and any chemicals entering Biscayne Bay and Card Sound from cooling-tower deposition would be rapidly diluted due to the tidal exchange of water over a day. The NRC staff acknowledge that the list of CECs assessed is not exhaustive, but is a representative list of different chemical classes, and are known to occur in the reclaimed water from SDWWTP (FPL 2012-TN263; Lietz and Meyer 2006-TN1005; Miami-Dade County 2011-TN1006). In addition, the toxicological benchmarks described here are assessed for single chemical exposures, often under laboratory controlled conditions where

they do not combine with other organic or inorganic substances or may become less bioavailable through sedimentation. There is a growing research area in assessing combinatorial exposure effects of contaminants by measuring adverse outcome pathways (Knapen et al. 2015-TN4449), or effects-directed analysis (Brack et al. 2016-TN4448), but a general acknowledgement that real-world conditions where exposures occur under varying water-quality conditions to hundreds of natural and anthropogenic compounds, even in known contaminated areas, will require reliance on observable adverse outcomes through monitoring.

Use of Radial Collector Wells

Because RCW laterals are located 25 to 40 ft below Biscayne Bay, impingement and entrainment of listed species is highly unlikely. Salt-drift deposition from cooling-tower operation, however, could affect resident American crocodile, their prey residing in the IWF, and the critical habitat. To assess these potential impacts, the review team used a fate and effects modeling approach similar to the one described for reclaimed water chemicals to estimate the salt-drift deposition likely to occur within the IWF or freshwater refugia on IWF berms. A complete discussion of the modeling approach, assumptions, and results is found in Section 5.2 and Appendix G.

Based on the modeling results presented in Appendix G and discussed in Section 5.2.1.1, salt-drift deposition would not noticeably change the existing salinity in the IWF or freshwater refugia ponds. Deposition of trace chemicals present in Biscayne Bay water also would pose no threat to species inhabiting the IWF because predicted concentrations are orders of magnitude lower than analytical method detection limits (Table 5-3), and those entering Biscayne Bay and Card Sound would be rapidly diluted.

As described above, continuous RCW operation would not noticeably alter salinity patterns in nearshore areas. Moreover, the 60-day limitation (State of Florida 2014-TN3637) on operation of the RCW would result in less impact than continuous operation. Short-term salinity changes of ±2 psu for a short period of time are not expected to adversely affect aquatic biota, such as the Mangrove Rivulus, that spend some of their time in nearshore areas of Biscayne Bay near Turkey Point.

Storage of Excavated Muck on IWF Berms

Excavated muck from the construction of the nuclear island would be placed on IWF berms as described in Section 4.3.2.1. FPL plans to stabilize the addition of material to the berms by using control measures such as silt fences and/or gravel filters to prevent muck and runoff from entering the canals (FPL 2015-TN4442). The location of the muck additions also would not be in preferred crocodile nesting areas, as determined from historic nesting locations (Figure 2-31). Therefore, the permanent storage of excavated muck on the IWF berms is expected to have a negligible effect on aquatic resources within the canal system, including the American crocodile. Rainfall and runoff from the site could cause leaching of nutrients such as nitrogen and phosphorus from the stored muck into the IWF. As described in Sections 5.2.1.4 and 5.2.3.1, a conservative analysis was used to determine the maximum incremental increase to the IWF (i.e., if all the muck was washed into the cooling canals from a storm) in concentration for TKN as 32 µg/L and for TP as 16 µg/L, even though phosphorus was not detected in muck leachate

samples. Nutrients from the muck leachate that may reach Card Sound were estimated as 1.11×10^{-6} mg/L for TKN and 7.67×10^{-7} mg/L for TP, which is almost 4 orders of magnitude less than TP observed in water samples from Card Sound between 2006 and 2008. Given this conservative estimate and the additional dilution of tidal exchange in Card Sound and Biscayne Bay, the addition of TKN and TP to the environment from muck leachate would be negligible.

Species with Designated Essential Fish Habitat

The effects of the operation of the proposed Turkey Point Units 6 and 7 cooling system on designated EFH or HAPC would likely be similar to those described above for recreationally, commercially, or ecological important species, except that by definition, any Biscayne Bay seawater entering the RCW system would affect EFH. A complete description of potential impacts on EFH and HAPCs is provided in Appendix F-3 (EFH Assessment).

Deep-Aquifer Communities

Because there is no available information about biological communities that may be present in deep-aquifer formations near Turkey Point, it is not possible to determine whether a complete exposure pathway is present or assess potential impacts. Thus, the potential risk of chemical exposure resulting from deep-aquifer injection of cooling-tower blowdown cannot be determined.

5.3.2.4 Aquatic Monitoring During Operation

It is assumed the existing aquatic resources monitoring programs conducted by FPL at the Turkey Point site would continue during the operation of proposed Units 6 and 7, including the comprehensive program that protects the American crocodile populations in the IWF and the monitoring procedures used during barge deliveries to reduce the potential for barge/tug collisions with manatees or sea turtles. FDEP also requires additional monitoring during the operation of proposed Units 6 and 7 to ensure the proposed facilities and systems operate as permitted. This includes 2 years of post-installation monitoring including the first two RCW operational events for seagrass and benthic communities in areas adjacent to the RCWs, and a mitigation plan in the event adverse impacts are detected (State of Florida 2014-TN3637), as described in the applicant's Radial Collector Well System Monitoring Plan (see Section 4.3.2.4).

A monitoring program could be developed to assess the condition and ecological resources associated with proposed transmission line and pipeline corridors, and to guide maintenance procedures. Federal or State regulatory agencies may require additional monitoring that confirms the predicted effects of the cooling system described in the applicant's ER, the SCA submission, and this EIS. In addition, monitoring of the condition of channel markers in the private entrance channel to the Turkey Point site is already required by the U.S. Coast Guard, and is expected to continue during operation of proposed Units 6 and 7. Although this is not considered ecological monitoring, the maintenance of the markers would protect seagrass and benthic resources from vessel groundings near the Turkey Point site.

5.3.2.5 Summary of Operational Impacts on Aquatic Resources

The independent assessment conducted by the review team included evaluation of information provided by FPL, review of relevant technical reports and scientific journal articles, consultation with State and Federal resource agencies, and incorporation of scoping comments into the review process, when applicable. In addition, the team reviewed the salinity models and results provided by FPL, the NPS, and USGS, and performed a screening-level assessment and fate and effects modeling to better understand the potential for adverse impacts from cooling-tower deposition for both cooling-water options. Based on these assessments, the review team concludes the use of reclaimed water from Miami-Dade County to operate the cooling system, operation of RCWs compliant with State of Florida requirements (State of Florida 2014-TN3637), and permanent storage of muck on IWF berms would result in SMALL impacts on onsite and offsite aquatic resources, including commercially, recreationally, and ecologically important species; those listed by State or Federal resource agencies; and those with designated as EFH or HAPC in Biscayne Bay or Card Sound.

5.4 Socioeconomic Impacts

Operations activities can affect individual communities, the surrounding region, and minority and low-income populations. This evaluation assesses the impacts of operations-related activities and the operations workforce on the region.

Although the review team considered the entire region within a 50 mi radius of the Turkey Point site when assessing socioeconomic impacts, the primary socioeconomic impact area is Miami-Dade County. Based on commuter patterns, populations, and the distribution of residential communities in the area, the review team anticipates minimal impacts on other counties within the 50 mi radius in Florida.

5.4.1 Physical Impacts

This section identifies and assesses the direct physical impacts of operations-related activities on the community, including the disturbances from noise, odors, exhausts, visual intrusions, and thermal emissions. It includes consideration of impacts resulting from plant operations, transmission line corridors and access roads, other offsite facilities, and project-related transportation of goods and materials in sufficient detail to predict and assess potential impacts and to show how these impacts may be mitigated.

The following sections assess the potential operations-related physical impacts of two new units on specific segments of the population, the plant, and nearby communities.

5.4.1.1 Noise Impacts on Workers and the Local Public

The main sources of noise from plant operations are from the cooling towers of the circulating-water system (CWS) (NRC 2000-TN614). Also, noise would be generated by the operation of the Units 6 and 7 transmission system, substation operations, and increased traffic of the operations workforce on access roadways and onsite roads. Noise from transmission system and substation operations would be in accordance with State and local code requirements.

FPL must meet all applicable Occupational Safety and Health Administration (OSHA) noise requirements. Workers would use noise protection as required by OSHA when engaging in work subject to noise hazards. There are no residential areas or public roads on the Turkey Point site.

Offsite, one residence is approximately 3.9 mi from proposed Units 6 and 7 and the transient population includes Turkey Point Units 1–5 workers and visitors to nearby recreational facilities such as Biscayne National Park, Homestead Bayfront Park, and Homestead Miami Speedway. The Homestead Air Reserve Base lies within the 6 mi vicinity of the site. The closest public access points to the site are 1.6 mi northwest and 2 mi north of the existing units (FPL 2014-TN4058). FPL conducted an ambient noise survey and an operations noise analysis for the operations of Units 6 and 7 (for details, see Section 5.8.2). These analyses showed that there would be no noticeable alteration in noise in the current environment surrounding the proposed site, and that noise levels at the boundary of the site would be lower than 60 dBA, a level at which noise impacts would be of small significance.

Based on the above analysis, the review team concluded that the operations-related impact from noise would be minor and mitigation would not be warranted.

5.4.1.2 Air-Quality Impacts on Workers and the Local Public

In Section 5.7, the review team assessed the impacts on air quality from operations at the Turkey Point Units 6 and 7. The new units would have standby diesel generators that would be operated periodically on a limited short-term basis accompanied by intermittent related emissions. The emissions would be mostly due to periodic testing of diesel generators and normal plant operations; the rest would be mostly due to workforce transportation. In Section 5.7, the review team determined there would be minor air-quality impacts and mitigation would not be warranted.

5.4.1.3 Buildings

Operations activities would not affect offsite buildings. Onsite safety-related buildings have been constructed to safely withstand any possible impact, including shock and vibration, from operations activities associated with the proposed activity (10 CFR Part 50) (TN249), Appendix A). The closest structures are those of the Homestead Bayfront Park marina, approximately 2 mi north of the proposed site for Units 6 and 7. Except for Turkey Point site structures, no other industrial, commercial, or residential structures would be affected. Consequently, the review team determined there would be no operations-related impacts on onsite and offsite buildings.

5.4.1.4 Roads

Roads within the vicinity of the Turkey Point site would experience an increase in traffic at the beginning and the end of each operational shift and the beginning and end of each outage support shift. The increase in traffic volume would have negligible impacts on road conditions. No road improvements other than those already proposed for construction would be warranted.

After completion of construction, FPL would remove a portion of the roadway improvements on SW 359th Street that was used during construction and return it to its status as a transmission line patrol road (FPL 2014-TN4058). All other road improvements made for the construction period would remain in place. From a socioeconomic perspective, the review team considers the remaining road improvements derived from increasing lanes, signalization, and police control to represent noticeable beneficial changes. However, these changes would continue to have the potential for impacts on land use and terrestrial ecology. For an analysis of those impacts, see Sections 5.4.1, 5.4.3, and Chapter 7.

Traffic impacts are analyzed in Section 5.4.4.1.

5.4.1.5 Waterways

During operations, large components necessary for maintenance or uprates would arrive by barge. These shipments would be infrequent and therefore have minor impacts on waterways from these activities.

5.4.1.6 Aesthetics

Parts of the two proposed reactors would be visible from surrounding roadways and recreational areas, but existing vegetation would often screen Units 6 and 7 from public view. Commercial and recreational boating traffic on the eastern side of the property would have a broad view of proposed Units 6 and 7. Because Units 6 and 7 would be built adjacent to existing units, the contrast with the existing landscape would be reduced. Units 6 and 7 would be built with materials that are architecturally similar to Units 1 through 4 to provide an aesthetically comparable effect (FPL 2014-TN4058).

The plumes from the cooling towers would be seen during the early morning in cool weather, generally during the winter months, and would extend only a short distance from the site during most days. Results from the CALPUFF (EPA 2007-TN1474) modeling analysis showed that during a little over 1 percent of daylight hours the plumes would have lengths exceeding 10,000 m downwind from the cooling towers. This would occur with high relative humidity and a nearly saturated atmosphere (see Section 5.7 for details).

Guidelines from the Illuminating Engineering Society of North America would be incorporated into the outdoor lighting design while meeting NRC and OSHA requirements for security and worker and plant safety. Typical practices to be incorporated include minimizing upward light from lighting fixtures, minimizing upward light in general so that light reaches its intended target, turning off lighting not needed for safety and security between 11:00 p.m. and sunrise, and containing light within its intended target area (by the suitable choice of fixtures for light distribution, by selection of mounting height and physical location, and by minimization of glare in the horizontal or vertical directions) (FPL 2014-TN4058). Light from current Turkey Point site units is visible from several locations surrounding the site, so sky glow from them is visible from urban areas as far as Miami (Section 2.5.2.4). Based on the mitigating factors listed above, the review team concluded that the visual impact of the operations of proposed Units 6 and 7 would be minor.

Transmission lines in established transmission line corridors would have little visual contrast with the existing environment. The transmission line from Clear Sky to Turkey Point would be fully contained on the Turkey Point site and the view would be similar to the existing lines between the Turkey Point switchyard and the McGregor switchyard (FPL 2014-TN4058). The segments of the western transmission line corridor between Everglades National Park and the Levee substation would be adjacent to the Everglades National Park. These transmission lines would be visible to recreational users of the park up to a distance of 20 mi (FPL 2014-TN4058). The transmission line along the borders of the Everglades National Park would follow SW 187th Avenue and the presence of the road would attenuate any visual contrast with the national environment.

5.4.1.7 Summary of Physical Impacts

Based on the information provided by FPL (2014-TN4058) and the review team's independent analysis, the review team concludes that the overall physical impacts of operations on workers and the local public, buildings, and aesthetics near the Turkey Point site would be SMALL and adverse, although there would be MODERATE and beneficial socioeconomic impacts on roads near the existing Turkey Point site.

5.4.2 Demography

For analytical purposes, Unit 6 is scheduled to start operation by 2025 and Unit 7 by 2026. Operations staffing would begin 2 years before fuel loading of Unit 6, increasing to its full size by November 2025(1).

FPL determined the total number of operations workers for the proposed project would be 806, and that the in-migrating workforce for operations would be 50 percent of all operations workers, or 403 workers (FPL 2014-TN4058). Also, FPL assumed that in-migrating workers would settle into the socioeconomic impact area in the same pattern as the current FPL employees and all of the in-migrating operations workers would bring families. Using an average family size for the workforce of 3.25 people (Malhotra and Manninen 1981-TN1430), this would bring the total in-migrating project-related population to 1,310 (403 workers and 907 additional family members).

The review team believes that the above assumptions are plausible and incorporated them into the current analysis. The estimated size of the operations workforce for each unit and the average family size of the in-migrating workers are based on existing studies (FPL 2014-TN4058). The assumption that 50 percent of the workforce would migrate into the 50 mi region may be an upper-bound estimate given that the total number of operational workers employed (806) is less than one-tenth of 1 percent of the workforce available in Miami-Dade County (see Section 2.5.2.1). If the in-migrating population follows the same pattern as the existing workforce, then 42.78 percent of the in-migrating population (560) would live in the socioeconomic impact area of Homestead and Florida City and 83.3 percent (1091) in Miami-Dade County as a whole. With these assumptions, there would be a net population increase of

(1) From the time of this analysis, commercial operation dates have been moved to 2027 and 2028, respectively (FPL 2015 TN4502). The review team does not expect this change to affect the results of the current analysis.

less than one-tenth of 1 percent in the projected population for Miami-Dade County in 2020 and less than 1 percent increase in the current population of the Homestead and Florida City area.(2)

The operation of Turkey Point Units 6 and 7 would also require support of 600 to 1000 temporary workers every 18 months for each unit. In other words, there would be an outage for either Unit 6 or Unit 7 about every 9 months. Each outage would last approximately 30 days. This would more than double the number of in-migrating workers to the 50 mi area for short periods of time, but it would still represent a small fraction of the population in the area.

Based on its independent analysis, the review team concludes that the demographic impacts of operation in Miami-Dade County would be SMALL. Although the impacts may be larger in the Homestead and Florida City area than in the county as a whole, the impacts would still be SMALL for the demographics of the Homestead and Florida City area.

5.4.3 Economic Impacts on the Community

The impacts of station operation on the local and regional economy are dependent on the region's current and projected economy and population. The review team obtained insight into the projected economy and population by reviewing FPL's ER (FPL 2014-TN4058) and through its own independent study of the affected area through consultation with local authorities and analysis of publicly available data. The economic impacts over a 40-year period of station operation are qualitatively discussed. The primary economic impacts from employing 806 new workers to operate Units 6 and 7 at the Turkey Point site would be related to taxes, housing, and increased demand for goods and services; the largest impact would be associated with plant property tax revenues (discussed in Section 5.4.3.2).

5.4.3.1 Economy

The review team estimated the potential social and economic impacts on the surrounding region as a result of operating the proposed two new reactors at the Turkey Point site over a 40-year operating license. Social and economic impacts would occur from additional operation workforce jobs, tax revenue impacts, and the increased population of in-migrating workers and their families.

The 806-person operations workforce would support new indirect jobs in the area through an employment multiplier effect, by which each dollar spent on goods and services by an in-migrant becomes income to the recipient, who saves a portion but re-spends the rest. In turn, this re-spending becomes income to someone else, who, in turn, saves part and re-spends the rest. This iterated increase in local expenditures creates demand for new jobs. The U.S. Department of Commerce's Bureau of Economic Analysis (BEA) provides estimates for regional multipliers for industry jobs and earnings. For each new job created in the power generation and supply industry in Miami-Dade County an estimated 2.1696 indirect jobs would be created (FPL 2014-TN4058).(3) The review team determined all workers who would be employed in the operation of Turkey Point Units 6 and 7 would constitute "new employment" because workers already

(2) Based on a 59,866 population estimate for Homestead and 11,313 population estimate for Florida City (Section 2.5.1).
(3) RIMS II (Regional Input-Output Modeling System) direct effect employment multipliers for Miami-Dade County: 3.1696 for the power generation and supply industry.

residing and working in Miami-Dade County who left their jobs to work at Turkey Point Units 6 and 7 would leave a vacant position that would need to be filled by other workers.[4] Therefore, the review team applied the BEA employment multiplier to all direct operations workers residing in Miami-Dade County (83.3 percent of all operations workers) to estimate indirect employment.

Using the BEA employment multiplier, the review team estimated the 671 operation workers residing in Miami-Dade County (806 × 0.833) would support 1,456 indirect jobs in Miami-Dade County. Because most indirect jobs would be service or retail-related and not highly specialized, and because 1,456 indirect jobs represent approximately 1.3 percent of the number of unemployed workers in Miami-Dade County in 2013, the review team expects these jobs would likely be filled by local residents and any additional in-migration would be negligible.

The new operations workforce would have positive economic impacts in the region. If each new operations worker earned $116,579[5] a year, each year of salaries paid to operations workers would inject $78,224,509 (671 × $116,579) into the local economy. BEA estimates that for each dollar paid in the power generation and supply industry in Miami-Dade County, an additional 0.7880 dollars of earnings are generated in all industries (FPL 2014-TN4058). Therefore, the $78,224,509 of annual earnings of operation workers would generate an additional $61,640,913 in annual indirect earnings ($78,224,509 × 0.7880). The total annual earnings injected into the regional economy would be $78,224,509 plus $61,640,913 of indirect earnings, equaling $139,865,422 in total annual earnings.

The review team concludes that beneficial economic impacts could be experienced throughout the 50 mi region surrounding the site as a result of operational activities at the Turkey Point site. Because annual earnings would be less than three-tenths of 1 percent of total wage earnings in Miami-Dade County,[6] these beneficial impacts would not noticeably alter local earnings. Operations jobs and the jobs indirectly created by the workforce would total 671 + 1,456 = 2,127 new jobs. Because these new jobs would be less than two-tenths of 1 percent of the jobs in the Miami-Dade County (see Section 2.5.2-1), these beneficial impacts would be minor on local employment. The review team concluded that the beneficial economic impacts on the economic impact area and the 50 mi region would be minor.

5.4.3.2 Taxes

Several tax revenue categories would be affected by the operation of proposed Units 6 and 7. These include corporate income taxes, sales and use tax and other taxes on sales and services, and property taxes.

Personal and Corporate Income Taxes

As stated in Section 2.5.2.2, the State of Florida does not levy a personal income tax on individuals. Florida does levy a corporate income tax and in fiscal year (FY) 2010-2011, the State of Florida received $1.87 billion (6.3 percent of its total tax revenue of $29.7 billion) from corporate income and excise taxes (Table 2-42). The tax base is based on the Federal taxable

(4) For more information on BEA RIMS II regional economic multipliers, see BEA 2012-TN1569.
(5) BLS 2012-TN4083. Average Annual Pay in Nuclear Electric Power, all United States, 2012 (no data available for Miami-Dade County).
(6) BLS 2012-TN4084. $46,667 million annual estimate in 2012.

income with specific adjustments for the State of Florida and a $25,000 exemption (FDOR 2012-TN450). Many factors are involved in computing the amount of tax liability. However, the review team used the following analysis to determine the taxes paid on FPL's income from the operation of Units 6 and 7 would be a small fraction of the total corporate income taxes received by the State of Florida in 2010-2011:

- Each nuclear reactor would have a net output power of 1,100 MW(e).
- The units are expected to operate at a maximum capacity of 93 percent (FPL 2014-TN4058).
- If each reactor operated 8,148 hours a year (8,760 hours × 0.93), the amount of power generated would be 8,961,480,000 kWh/yr (1,100 × 93 percent × 8,760 × 1,000).
- As of January 2012, the average electricity price in the Miami area was $0.114 (11.4 cents) per kWh (BLS 2012-TN447). These are retail prices and the average wholesale price would be lower, which establishes this process as an upper-bound analysis.
- At these prices, the revenue generated by proposed Units 6 and 7 would be no higher than $2,043 million per year (8,961,480,000 × $0.114 × 2).
- Based on MIT 2009 (TN448), the review team estimates that the operating costs per kWh would be between 8.3 cents and 11.1 cents, assuming fuel costs at about seven-tenths of 1 cent per kWh. With an estimated 8,961,480,000 kWh/yr of power generated by each reactor, this would correspond to $743.8 million to $994.7 million per year in operating costs for each reactor or $1,488 million to $1,989 million per year for both Units 6 and 7.
- Annual corporate income from the operations of Units 6 and 7 would be no higher than $555 million per year ($2,043 million − $1,488 million).
- Annual corporate income taxes would be no higher than $31 million ($555 million × 5.5 percent).

Because corporate income taxes would account for less than 1.7 percent of the total corporate income taxes received by the State of Florida, the review team determined the corporate income tax impact on the State of Florida would be minor.

Sales and Use Taxes

The region would experience an increase in the sales and use taxes collected from purchases made for the operation of proposed Units 6 and 7. The area around the proposed site would also experience an increase in sales and use taxes generated by retail expenditures (e.g., restaurants, hotels, merchant sales, food) by the operations and outage workforces.

FPL does not currently have an estimate for its Units 6 and 7 annual operations expenses. Based on MIT 2009 (TN448), the review team estimates that the operating costs would be between 8.3 cents and 11.1 cents per kWh. With an estimated 8,961,480,000 kWh/yr of power generated by each reactor, this would correspond to $743.8 million to $994.7 million per year in operating costs for each reactor or $1,488 million to $1,989 million per year for both Units 6 and 7. The review team's experience indicates that about 10 percent of annual operations expenditures are spent locally (NRC 2011-TN3675). A State sales tax of 6 percent would

generate between $8.9 million ($1,488 million × 10 percent × 6 percent) and $11.9 million ($1,989 million × 10 percent × 6 percent). This would represent less than one-tenth of 1 percent of FY 2011 State sales and use tax revenues (Table 2-42). Similarly, a County sales tax of 1 percent would generate between $1.5 million and $2.0 million. This would represent less than 1 percent of FY 2012 County sales tax revenues (Table 2-41). Therefore, the review team expects the tax revenues generated by sales and use taxes from operations at Units 6 and 7 would be minor but beneficial to the State and Miami-Dade County.

Property Taxes

County and school district governments in Florida may levy taxes up to 10 mills each (1 percent of assessed value) (FDOR 2012-TN459). In 2014, Miami-Dade property appraiser proposed property taxes for FPL's two existing nuclear units were $37.9 million. Approximately 40 percent to be paid to the Miami-Dade School District ($15 million), 40 percent to Miami-Dade County ($15 million), and the remaining paid to unincorporated municipalities and other accounts (Miami-Dade County 2014-TN4079).

If property taxes paid by Turkey Point Units 6 and 7 were proportional to their net generating capacity, property taxes paid by Units 6 and 7 would be 1.33 times that paid by Units 3 and 4 (2,184 MW(e)/1,632 MW(e) = 1.33). Property taxes for Units 6 and 7 would be estimated at approximately $50.4 million (1.33 × $37.9 million). Of these property taxes, approximately $20 million would be paid to the Miami-Dade School District and $20 million would be paid to Miami-Dade County. These payments would correspond to up to 1.3 percent of the Miami-Dade School District 2011-2012 property tax revenues ($20 million out of $1,556 million), and up to 1.6 percent of Miami-Dade County 2011-2012 property tax revenues ($20 million out of $1,243 million) (Section 2.5.2.2). Property taxes paid by Turkey Point Units 6 and 7 would, therefore, be less than 10 percent of the total revenues of the collecting jurisdiction and would have a minor but beneficial impact.

Another source of revenue from property taxes would be housing purchased by some operations workers. However, there is such a large housing stock available in Miami-Dade County the review team does not expect upward pressure on housing prices. See Section 5.4.4.3 for the review team's discussion of housing. If incoming workers' families were to reside in Miami-Dade County, they would represent an increase of less than one-tenth of 1 percent over Miami-Dade County's projected 2020 population. If 43 percent of the in-migrants choose to reside in the Homestead and Florida City area, they and their families would represent a less than a 1 percent increase in the population of the Homestead and Florida City area (Section 5.4.2). However, some in-migrating workers could choose to have new homes built, which would add to the county's taxable property base. Therefore, the property tax impacts from new residents would be minor and beneficial to property tax revenues.

Summary of Tax Impacts

The review team expects tax revenue increases in the form of sales, corporate, and property taxes, because of the operation of the proposed Units 6 and 7 and the influx of operations workforce into the region. Because of the large Florida State, Miami-Dade County, and the Homestead and Florida City tax bases, relative to the estimated increases in revenues from

operations-related activities, the review team expects the tax-related impact on these governments would likely be minor and beneficial.

5.4.3.3 Summary of Economic Impacts on the Community

Based on its independent analysis, the review team concludes that the economic impacts of operating Turkey Point Units 6 and 7 would be SMALL and beneficial in the State of Florida, Miami-Dade County, as well as in Homestead and Florida City.

5.4.4 Infrastructure and Community Services

Infrastructure and community services include transportation, recreation, housing, public services, and education. The operation of two new units at the Turkey Point site would affect the transportation network because the additional workforce would use local roads to commute to and from work and additional truck deliveries would be made to support operation of the new units. These same commuters could also affect recreation in the area. As the workforce migrates into and settles in the region, there may be impacts on housing, education, and public sector services.

5.4.4.1 Traffic

After completion of construction, SW 359th Street would be returned to its status as a transmission line patrol road, but would remain paved and all worker access to the site would occur through SW 344th/Palm Drive (FPL 2014-TN4058). To assess the impact on traffic of the increase in operations workers at the site, a traffic study was conducted in 2009. The study assumed the following improvements at two key intersections made to accommodate construction traffic would be maintained during operations (Traf Tech 2009-TN1266):

- SW 328th Street/North Canal Drive and SW 117th Avenue:
  - All-way stopped control (no need for signalization or police control);
  - One separate northbound left-turn lane (no need for dual lefts).
- Construction of one eastbound right-turn lane.
- SW 344th Street/Palm Drive and SW 117th Avenue:
  - All-way stopped control (no need for signalization or police control);
  - Construction of one eastbound left-turn lane;
  - Construction of one westbound right-turn lane; and
  - Construction of one southbound left-turn lane.

With the above improvements maintained, the two most affected intersections would continue to operate adequately with the increase in operations traffic. This would remain true even during outages. Table 5-4 shows the expected level of service (LOS) of those two intersections with the estimated increase in traffic.

Table 5-4. Level of Service of Key Intersections during Normal Operations of Turkey Point Units 6 and 7 with Selected Intersection Improvements[(a)]

Intersection	AM Peak Hour	PM Peak Hour
SW 328th St. & SW 117th Ave	B (C)	B (B)
SW 344th St. & SW 117th Ave	A (B)	B (B)

(a) LOS in brackets indicates level of service during outages.

Source: Traf Tech 2009-TN1266

Based on the information provided by FPL (2014-TN4058) and the review team's independent analysis, the review team concludes that traffic on the roads surrounding the proposed site would noticeably increase relative to the current baseline during operations, particularly during outages. However, with the proposed mitigation measures described above, it would not destabilize traffic in the affected area and therefore, the review team expects the traffic-related impact during normal operations would be noticeable.

In addition to congestion impacts, operations-related traffic would result in an increase in the number of accidents, injuries, and fatalities. The costs associated with these incidents include workers' compensation premiums, lost productivity, environmental remediation, property damage, fines and penalties, insurance premiums, and medical costs. Section 5.8.6 presents an estimate of construction-related vehicular impacts on accidents, injuries, and fatalities. Because the review team expects the impacts on accidents, injuries, and fatalities to be low, the associated socioeconomic impacts would be minor.

5.4.4.2 Recreation

Several recreational facilities exist in the vicinity of the proposed site: Biscayne National Park, Homestead Bayfront Park, Homestead Miami Speedway, and Mangrove Preserve. In addition, the segments of the western transmission line corridor between Everglades National Park and the Levee substation would be adjacent to the park. To the extent that traffic, noise, air emissions, and the visual landscape are affected by the operation of Units 6 and 7, recreational activities in these facilities could be affected. Traffic impacts of operations are analyzed in Section 5.4.4.1. Traffic impacts would be unevenly distributed during the day and, based upon three shifts of operations workers per day (FPL 2014-TN4058), traffic would be greatest during peak commuting hours of 6:00 a.m. to 7:00 a.m. (Traf Tech 2009-TN1266). The use of the above recreational facilities would not generate substantial competing traffic during those hours and the impact from operations on recreation-related traffic would be minor.

Noise and air emissions impacts of operational activities are analyzed in Section 5.4.1.1. Visual impacts of operational activities are analyzed in Section 5.4.1.4. Transmission lines would be visible to recreational users of Everglades National Park up to a distance of 20 mi. The new units would be fully visible by recreational users of the Biscayne National Park, but would not contrast with the existing landscape because of the presence of existing Units 1–5.

The influx of operations-related population to Miami-Dade County, and to the Homestead and Florida City areas in particular, would increase the number of local users of recreational facilities. The review team assumes that the in-migrating workers would have recreational

preferences similar to the current population in Miami-Dade County. Because the in-migrating population would be less than one-tenth of 1 percent of the projected population for Miami-Dade County in 2020 and less than 1 percent of the current population of the Homestead and Florida City area, the review team expects the impact on the current recreational infrastructure to be negligible.

5.4.4.3 Housing

Section 5.4.2 of this chapter presents the assumptions behind the review team's estimated in-migration of workers. The review team assumed that 336 (403 × 0.833) workers would migrate to Miami-Dade County. All of these workers would bring families and would need housing. The operations workforce would typically require permanent housing, while a higher proportion of construction workers would prefer temporary housing (FPL 2014-TN4058).

As described in Section 2.5.2.5, the U.S. Census Bureau, in 2008–2012, estimated Miami-Dade County had 163,185 vacant housing units, 35,884 of which were for rent. Although these numbers may not be fully indicative of the housing market during the decades of operations, they suggest the demand from in-migrating operations workers would likely be a small share of the available housing (in 2008–2012 it would be three-tenths of 1 percent) and that the housing market in the county would be able to absorb the influx of operations workers with little to no perceptible impact on housing prices.

In Homestead and Florida City there were 26,215 housing units in the area in 2008–2012, 4,928 of which were vacant. If the distribution of residences of Units 6 and 7 operations workers were the same as that of present Turkey Point site employees, 173 workers (42.8 percent of the in-migrating workforce) would reside in the area. Because the demand from in-migrating operations workers would be for 3.5 percent of the available housing, the review team expects the housing market in the Homestead and Florida City area has a sufficient inventory of houses with the right amenities that it would be able to absorb the influx of operations workers and rental rates and housing prices to not suffer a perceptible increase because of this influx.

The operation of proposed Turkey Point Units 6 and 7 would also require the support of 600 to 1,000 temporary workers every 9 months, lasting approximately 30 days each time, during refueling outages. The group of workers would need temporary housing. Because of the short duration of the stay of these workers the review team expects the hotels/motels in Miami-Dade County would be sufficient to accommodate this influx. In the South Dade region alone, which includes the Homestead and Florida City area, 25 hotels/motels with approximately 1,683 rooms were available in 2007 and the average occupancy percentage for the area was 63.9 percent (FPL 2014-TN4058).

Based on its independent analysis, the review team concludes that the impacts of the operation of Units 6 and 7 on housing in Miami-Dade County would not be noticeable. Although the impacts may be larger in the Homestead and Florida City area than in the county as a whole, the impacts would still be minor for the local housing markets.

5.4.4.4 Public Services

Water Supply and Wastewater-Treatment Facilities

A detailed description of operations-related water requirements and their impacts is presented in Section 5.2 of this EIS.

Operations could bring as many as 1,091 new workers and family members to Miami-Dade County (1,310 total in-migrating operations workers and families × 0.833 residing in Miami-Dade County). According to the EPA, U.S. residents use about 100 gpd of water (EPA 2012-TN1267), which would result in an increase in the demand for potable water of approximately 0.11 Mgd for Miami-Dade County. This would represent a three-hundredths of 1 percent increase over the current demands of 347.81 Mgd on the MDWASD, which is currently operating at 71.92 percent of its capacity with 135.8 Mgd of available capacity (see Section 2.5.2.6 for a discussion of current demands). Therefore, review team concludes that increases in the demand for potable water due to operations of the proposed Turkey Point Units 6 and 7 would be negligible.

FPL plans include a packaged sanitary waste-treatment plant located on the Units 6 and 7 plant area for use by its operations workforce that would process waste from Units 1 through 7 (FPL 2014-TN4058). For analytical purposes, the review team assumed that 100 percent of the water consumed by individuals would be subject to wastewater treatment. If 2,082 people migrated into Miami-Dade County outside of Homestead and Florida City, their wastewater treatment would be handled by either the Northern or Southern District MDWASD facilities. An increase of about 109,100 gpd for the wastewater-treatment system would constitute an increase in capacity use of about five hundredths of 1 percent for the total capacity of the two district's systems. Florida City does not have its own sewage-treatment facility and relies upon the Southern District of the MDWASD to manage its waste. If all 2,201 people migrated into Homestead (and none to Florida City) the increase in demand of 0.1 Mgd would increase use from 102.2 percent of current capacity to 103.8 percent of current capacity. As explained in Section 2.5.2.6, the city's proposed 10-Year Water Supply Facilities Work Plan identifies and details the construction of a 3.45 Mgd high-level disinfectant wastewater-treatment plant upgrade, which would accommodate this increase in demand. In addition, Homestead uses the MDWASD system as a backup. The review team concludes that, with the proposed wastewater-treatment plant, or current use of MDWASD's system as a backup for Homestead, the increase in demand for wastewater treatment during operations of Turkey Point Units 6 and 7 would be negligible.

FPL plans to use up to 72.7 Mgd (50,481 gpm) of reclaimed water for the condenser cooling system of Turkey Point Units 6 and 7 (Section 3.4.2.2). As noted in Section 2.5.2.6, a study conducted for Miami-Dade County projected 374 Mgd of wastewater to be generated in Miami-Dade County by 2025 (Miami-Dade County 2007-TN1496). FPL could, therefore, be expected to use up to 19.4 percent of the wastewater generated. Because the 2007 study identified technically feasible projects to use somewhere between 25 percent and 33 percent of the total wastewater projected to be generated by 2025, and because FPL included the use of saltwater as an option when reclaimed water cannot be obtained in sufficient quantity or quality (FPL 2014-TN4058), the review team expects the demand of reclaimed water to not compete

with other existing or projected uses of reclaimed water and to not adversely affect the use of reclaimed water by other projects in Miami-Dade County.

Based on the information provided by FPL (2014-TN4058) and the review team's independent analysis, the review team concludes that the overall impacts of the operation of Units 6 and 7 on the water supply and wastewater-treatment facilities in the 50 mi region would not be noticeable with implementation of Homestead's 10-Year Water Supply Facilities Work Plan.

Police, Fire Protection, and Medical Services

For onsite security, FPL would employ its own security force. Offsite, residents-to-law enforcement officer ratios for Miami-Dade County are presented in Table 5-5. In 2012, the ratio of residents-to-law enforcement officers in Miami-Dade County was 575.8 to 1. If 1,091 workers and their families (1,310 × 83.3 percent) migrate into the county during operations, the population in-migration would increase that ratio to 576.1, a one-tenth of 1 percent increase. In the Homestead and Florida City area, the increase in residents-to-law enforcement ratio would be slightly less than 1 percent. These increases would not noticeably alter police protection services in Miami-Dade County or the Homestead and Florida City.

Table 5-5. Building Impact on Police Protection in Miami-Dade County and the Homestead and Florida City Area

	Miami-Dade County	Homestead and Florida City
Population (2012)[(a)]	2,512,219	71,179
Sworn law enforcement officers (2010)[(b)]	4,363	135
Ratio of residents per law enforcement officer	575.8	527.3
Population with operating related In-migration	2,513,310	71,739
Ratio of residents per law enforcement officer with operating related in-migration	576.1	531.4
Percent increase in residents-to-law enforcement ratio	0.1%	0.8%
Additional sworn law enforcement officers needed	5	2

(a) USCB 2012-TN4098
(b) FPL 2014-TN4058

Source: Review team calculations

Residents-to-firefighter ratios for Miami-Dade County are presented in Table 5-6. In 2012, the ratio of residents to firefighters in Miami-Dade County was 717.8 to 1. If 1,091 workers and their families migrate into the county during operation, the population in-migration would increase that ratio to 718.1, a 0.1 percent increase. In the Homestead and Florida City area, the increase in residents-to-firefighter ratio would be 0.8 percent. These increases would not noticeably alter fire protection in Miami-Dade County or the Homestead and Florida City.

The population increase in Miami-Dade County from operations-related in-migration would be less than six-tenths of 1 percent of the population. A two-tenths of 1 percent increase in the average daily census in Miami-Dade hospitals would be negligible compared to the current occupancy rate of 77.5 percent (for those hospitals for which a census is available). In addition, the increase in the annual admissions and the annual outpatient visits would not be noticeable or burden the existing medical service capacity.

Table 5-6. Operations Impact on Fire Protection in Miami-Dade County and the Homestead and Florida City Area

	Miami-Dade County	Homestead and Florida City
Population (2012)[(a)]	2,519,219	71,179
Active firefighters (2010)[(b)]	3,500	69
Ratio of residents per active firefighter	717.8	1,031.6
Population with operations-related in-migration	2,513,310	71,739
Ratio of residents per active firefighter with operations-related in-migration	718.1	1,039.7
Percent increase in residents-to-firefighter ratio	0.1%	0.8%
Additional active firefighters needed	4	1

(a) USCB 2012-TN4098
(b) FPL 2014-TN4058

Source: Review team calculations

Comments received from the Village of Pinecrest express concern about the electromagnetic interference of transmission lines along the East transmission line corridor interfering with emergency communications of the Pinecrest Police Department. NRC's *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (NRC 1996-TN288) concluded that the corona discharges occurring along transmission lines can result in radio and television interference, but that it is generally not a problem at voltages below 345 kV. Because the proposed transmission lines that cross the most urbanized areas are of lower voltages, the review team concludes that interference with communication systems should not be a problem. The West transmission line corridor does propose transmission lines with higher voltages but the lines are generally located at greater distances from urban populations. Potential interference of transmission lines with radio communications decreases rapidly with distance. In addition, FPL proposed to design transmission lines with hardware and conductors that minimize corona discharge (FPL 2014-TN4058). The review team concludes that interference of transmission lines with emergency communication systems would be minor.

The review team concludes that the impacts of construction on police and fire services and medical facilities would be minor.

5.4.4.5 Education

Based on a 1981 study of the migration of workers at nuclear power plant construction sites (Malhotra and Manninen 1981-TN1430), the review team assumed that if each in-migrating operations worker has eight-tenths of 1 school-age child, approximately 269 school-aged children would be part of the operations-related in-migration. If all of these children attended public schools, the additional 269 students would represent less than one-tenth of 1 percent of the 2011-2012 enrollment in Miami-Dade County Public School District. Because this amount is considerably less than the 1 percent average annual variation in public school enrollment in Miami-Dade County in past years and because Miami-Dade County public schools generally meet current mandated class sizes (see Section 2.5), the review team expects the education system in the county to be able to accommodate students that would accompany the operations workers.

The student population in the Homestead and Florida City area could increase by 138 students (403 in-migrating workers × 0.428 to Homestead and Florida City × 0.8 children per worker). This represents an increase of six-tenths of one percent of the 2011-2012 enrollment in the Homestead and Florida City area traditional public and charter schools. For this reason, and because Homestead and Florida City area public schools generally meet current mandated class sizes (see Section 2.5), the review team expects the education system in the Homestead and Florida City area to be able to accommodate students that would accompany the operations workers.

Approximately 15 percent of students in Miami-Dade County currently attend private schools (FPL 2014-TN4058). If the same share of in-migrating school-aged children were enrolled in private schools, this would further reduce the use of the expected public school capacity.

5.4.4.6 Summary of Infrastructure and Community Services

Based on information supplied by FPL, review team interviews and information solicited from public officials in Miami-Dade County, and review team review of data concerning the current availability of services and current State and community planning efforts, the review team concludes that the operational impacts on the regional infrastructure and community services would be SMALL with the exception of impacts on traffic that would be MODERATE.

5.4.4.7 Summary of Socioeconomic Impacts

Based on information supplied by FPL, review team interviews conducted with public officials in the socioeconomic impact area concerning the current availability of services, and additional taxes that would likely compensate the need for additional services, the review team concludes physical impacts and impacts on demographics, transportation, recreation, housing, public services, and education for Miami-Dade County and the Homestead and Florida City area would be SMALL, with the exception of MODERATE and adverse impacts on traffic, but MODERATE and beneficial socioeconomic impacts on road quality near the existing Turkey Point site.

5.5 Environmental Justice

Environmental justice (EJ) refers to a Federal policy under which each Federal agency identifies and addresses, as appropriate, any disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority or low-income populations. The NRC has a policy for the treatment of EJ matters in licensing actions (69 FR 52040) (TN1009). Section 2.6 discusses the locations of EJ populations of interest (as defined in Section 2.6.1) around the Turkey Point site, vicinity, and region.

The scope of the review, as defined in the NRC guidance, should include an analysis of the impacts on EJ populations of interest, the location and significance of any environmental impacts during operations on populations that are particularly sensitive, and any additional information pertaining to mitigation. The descriptions to be provided by this review should state whether the impacts are likely to be disproportionately high and adverse. The review also should evaluate the significance of such impacts.

The review team evaluated whether the health or welfare of EJ populations of interest in the census blocks identified in Section 2.6 of this EIS could be disproportionately affected by the potential impacts of operating two new reactors at the proposed site. To perform this assessment, the review team used the same process applied in Section 4.5. Figure 2-31 identifies minority populations within the 50 mi region surrounding the Turkey Point site, and indicates that several minority and low-income census block groups reside near the Turkey Point site. Therefore, the review team concluded that additional research on these populations, communities, and pathways was warranted.

5.5.1 Physical and Socioeconomic Impacts

Physical impacts of operations related to soil, water, air, and noise and socioeconomic impacts are described below.

5.5.1.1 Soil-Related Impacts

Operations activities would not affect soils at proposed Units 6 and 7, nor along proposed transmission and pipelines rights-of-way. There would be no impacts on nearby residents, and, therefore, no disproportionately high and adverse impacts on EJ populations of interest.

5.5.1.2 Water-Related Impacts

Water-related impacts are discussed in Section 5.2. The primary source of cooling water for proposed Units 6 and 7 would be reclaimed wastewater supplied by the MDWASD. A secondary source of water would be saltwater extracted from Biscayne Bay through RCWs. Other activities with potential water-related impacts would include stormwater runoff, deposition of drift from the Units 6 and 7 cooling towers, reduction of hydraulic head in the vicinity of the RCWs, and injection of blowdown water in the Boulder Zone. Section 5.2 does not identify any high and adverse impacts on water use and quality from the above activities. Because no special pathways for water-related impacts on EJ populations of interest were identified, the review team concludes that no disproportionately high and adverse water-related impacts would exist.

5.5.1.3 Air-Related Impacts

Section 5.7 discusses the potential impacts of the operations of Units 6 and 7 on air quality associated with criteria pollutants and greenhouse gas (GHG) emissions, as well as potential impacts from cooling-system emissions and transmission lines. Section 5.7 concludes that air-quality−related impacts would be minimal and identified no high and adverse air-quality−related impacts. Migrant agricultural workers were identified as being particularly vulnerable to air-quality impacts because of their outdoor presence. However, the closest agricultural areas to the proposed site would be located several miles away, and most agricultural areas within the 50 mi region would be located more than 10 mi away west of US-1. The review team concludes that no disproportionately high and adverse air-quality−related impacts would exist.

5.5.1.4 Noise Impacts

The highest noise levels during operation of proposed Units 6 and 7 would be caused by the operation of the mechanical draft cooling towers (FPL 2014-TN4058). At the plant property boundary the estimated noise level generated would be below current ambient noise. Migrant agricultural workers were identified as being particularly vulnerable to noise impacts because of their outdoor presence. However, the closest agricultural areas to the proposed site would be located several miles away, and most agricultural areas within the 50 mi region would be located more than 10 mi away west of US-1. The review team concludes that no disproportionately high and adverse noise-related impacts would exist.

5.5.1.5 Socioeconomic Impacts

Socioeconomic impacts are discussed in Section 5.4. The review team concluded that all socioeconomic impacts identified were small with the exception of moderate impacts on roads and traffic in the vicinity of the plant. The review team did not identify any special pathways through which any socioeconomic impacts would affect EJ populations of interest. Therefore, the review team concluded there would be no disproportionately high and adverse impacts on any EJ populations of interest.

5.5.2 Health Impacts

The review team determined through literature searches and consultations with NRC staff health experts that the expected operations-related level of environmental emissions is well below the protection levels established by NRC and EPA regulations and would not impose a disproportionately high and adverse effect on EJ populations of interest. The results of the normal operation dose assessments (Section 5.9) indicate that the maximum individual dose for these pathways would be insignificant, well below the regulatory guidelines in Appendix I of 10 CFR Part 50 (TN249) and the regulatory standards of 10 CFR Part 20 (TN283). Furthermore, the review team did not identify special pathways through which any EJ populations of interest would be more exposed to these minimal impacts. Therefore, the review team concluded that there would be no disproportionately high and adverse health impacts on minority and low-income members of the public from the release of radiological material from operations or from design basis accidents.

5.5.3 Subsistence and Special Conditions

5.5.3.1 Subsistence and Unique Pathways of Exposure to Environmental Effects

The NRC's EJ methodology includes an assessment of affected populations of particular interest or with unusual circumstances, such as minority communities that are exceptionally dependent on subsistence resources or identifiable in compact locations such as American Indian settlements. As discussed in Section 2.6.1, the review team concluded that subsistence activities such as subsistence fishing are typically not conducted by any identified minority or low-income group. However, the review team identified migrant agricultural workers as a low-income and mostly minority (Hispanic) group with potentially unique pathways for exposure to environmental effects because of their potential for greater exposure to outdoor air and noise pollution. Because the farming areas closest to the site are located mostly west of the

Homestead and Florida City urban area, migrant agricultural workers would be unlikely to be affected by noise and air pollution and no disproportionate human health or environmental effects on migrant agricultural workers would be expected.

5.5.3.2 High-Density Communities

Based on the analysis in Section 2.6, most of the 50 mi radius around the proposed site is an area of concentrated presence of minorities. Because of its proximity to the proposed site, the area surrounding the Homestead airbase, home to a low-income and African-American population, is of particular interest. Another area of particular importance is the Miccosukee area on the corner of Krome Avenue and Tamiami Trail, which is bordered by the preferred alignment for the western transmission line corridor (Western Preferred corridor). Areas crossed by the eastern transmission line corridor in the proximity of the Miami area also are often home to low-income and African-American populations. Because the review team did not find any special pathways through which health, physical, or socioeconomic impacts would disproportionately affect these high-density communities, the review team concluded there would be no disproportionately high and adverse impacts on EJ populations of interest.

5.5.4 Summary of Environmental Justice Impacts

The review team evaluated the extent to which potential adverse environmental and socioeconomic impacts would disproportionately affect EJ populations of interest. After reviewing the evidence presented in the various sections of this chapter, and after considering any special pathways through which EJ populations of interest could be more affected than other population groups, the review team did not identify any high and adverse human health or environmental impacts and concluded that there would be no disproportionately high and adverse impacts on EJ populations of interest.

5.6 Historic and Cultural Resources Impacts

The National Environmental Policy Act of 1969, as amended (NEPA) (42 U.S.C. § 4321 et seq.) (TN661), requires Federal agencies to take into account the potential impacts of their undertakings on the cultural environment, which includes archaeological sites, historic buildings, and traditional places important to local populations. The National Historic Preservation Act of 1966 (NHPA) (54 U.S.C. § 300101 et seq.) (TN4157) also requires Federal agencies to consider the impacts on those resources if they are eligible for listing in the National Register of Historic Places (NRHP) (54 U.S.C. § 300101 et seq.) (TN4157) (such resources are referred to as “Historic Properties” in the NHPA). The USACE is the lead Federal agency for compliance with Section 106 of the NHPA. The USACE’s NHPA Section 106 consultation for this project has been completed with the exception of the transmission line consultation with the SHPO and the THPOs for STOF and the Miccosukee Tribe which is ongoing.

Operating new nuclear power plants may affect either known or previously unidentified historic properties located within the site. In accordance with the USACE Regulatory Program’s Procedures for Protection of Historic Properties at 33 CFR Part 325, Appendix C, the USACE is required to make a reasonable and good faith effort to identify historic properties in the Area of Potential Effect (APE) and, if such properties are present, determine whether significant impacts

are likely to occur. If there are potentially adverse impacts, the USACE shall consult with the SHPO, and Federally recognized tribes as necessary, to address mitigation and/or avoidance measures. Even if no historic properties (i.e., places eligible for listing in the NRHP) are present or affected, the USACE is still required to notify the SHPO before proceeding. If it is determined that historic properties are present, the USACE and SHPO are required to assess and resolve any adverse effects of the undertaking.

For a description of the historic and cultural resources at the Turkey Point site, see Section 2.7. In 2009, FPL conducted an archaeological and architectural resources survey of the direct- and indirect-effects APEs on the Units 6 and 7 project site (FPL 2011-TN95). FPL concluded that there are no NRHP-eligible archaeological sites, above-ground resources, or traditional cultural properties located within the onsite direct-effects APE and the indirect-effects APE. As a result of cultural resources studies conducted for the Turkey Point Units 6 and 7 project area, FPL concluded that no known cultural resources exist within the onsite direct or indirect APEs. The Florida SHPO concurred with FPL's informal determination of "no historic properties affected" (FPL 2014-TN4058, Appendix 2.5A). During the site visit in June 2010 (NRC 2010-TN1457), the review team reviewed the documentation used by FPL to prepare the cultural resources section of the ER. The NRC staff did not identify any important cultural resources that would be affected directly or indirectly by construction and preconstruction of proposed Turkey Point Units 6 and 7.

For transmission lines and other offsite facilities, FPL has provided desktop cultural resources investigations, including a search of the Florida Master Site file (Janus Research 2009) (FPL 2011-TN95). The archaeological sites and historic structures within the direct and indirect-effects APEs for the transmission line corridors are listed in Section 2.7. The desktop investigation concluded that no known resources were found in the APE for the non-transmission lines offsite facilities, including water pipelines from the MDWASD SDWWTP and various access roads and bridges. However, resources do occur within the transmission line corridors. The USACE will use this information during the ongoing consultation process for the transmission lines.

In work plans describing future studies for both the Units 6 and 7 project area (FPL 2009-TN1514; FPL 2011-TN95) and the offsite facilities (FPL 2009-TN1515; FPL 2011-TN95), such as the transmission lines, FPL has agreed that it would develop plans for addressing unanticipated discoveries (FPL 2014-TN4058). FPL reiterated this commitment in a letter to the USACE dated March 31, 2016 (FPL 2016-TN4581). These plans would include, at a minimum, a worker training program and procedures for informing managers and workers to stop work if cultural materials or human remains are inadvertently discovered during operations or maintenance activities and to notify staff within the appropriate organization (FPL 2014-TN4058). Details of the unanticipated discoveries plans will be developed in consultation with the USACE and Florida SHPO the Tribes and if a DA permit is issued it would likely be a condition of the permit. The USACE will continue to consult with the Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida on the development of the work plan. Included in the plan will be protocols for work stoppage for any ground-disturbing activity that could affect a historic property that is potentially eligible or, eligible for listing in the NRHP, or contains human remains, and notification procedures for the USACE, Florida SHPO, and appropriate Tribes. The special conditions that the USACE typically uses for permitting actions dictate that

all work and ground-disturbing activities shall halt within a 100 m radius of any unanticipated discovery of cultural resources or human remains. Work shall not commence without written notice from the USACE, and the SHPO.

For the purposes of the review team's NEPA analysis, the review team concludes that the impacts from operation would be SMALL. This conclusion is based on (1) no known significant cultural resources within the Units 6 and 7 onsite APEs, (2) the review team's cultural resource analysis, (3) FPL's commitment to develop procedures that would be in place if ground-disturbing operations or maintenance activities reveal historic or cultural resources, (4) consultation with the Florida SHPO that concluded with a finding of no historic properties affected for the Units 6 and 7 onsite area (FDHR 2010-TN1455; FPL 2014-TN4058, Appendix 2.5A) and ongoing consultation efforts for transmission lines and offsite locations, and (5) the assessment that the operation and maintenance of transmission lines would not contribute additional visual impacts beyond those generated during construction. Mitigative actions may be warranted if an unanticipated discovery is made during any ground-disturbing activities associated with the project; these actions would be determined by the USACE, SHPO, and the Miami-Dade County Office of Historic and Archaeological Resources. FPL would have cultural resource management procedures in place prior to construction and operation (FPL 2014-TN4058).

5.7 Meteorological and Air-Quality Impacts

The primary impacts of operating proposed Units 6 and 7 at the Turkey Point site on local meteorological conditions and air quality would be associated with emissions from the routine operation of auxiliary equipment and cooling systems and from emissions from worker's vehicles. The potential impacts on air quality are addressed in Section 5.7.1, and the potential impacts of operating the cooling system are addressed in Section 5.7.2.

5.7.1 Air-Quality Impacts

Section 2.9 describes the meteorological characteristics and air quality at the Turkey Point site. Sources of air emissions include stationary combustion sources (diesel generators and auxiliary boilers), cooling towers, and mobile sources (worker vehicles, onsite heavy equipment and support vehicles, and delivery of materials and disposal of wastes). Proposed Units 6 and 7 at the Turkey Point site would have two standby diesel generators for each unit, two ancillary diesel generators, and a single diesel-fired fire pump as described in the site ER (FPL 2014-TN4058, Chapter 3.5). These generators and fire pump would each be operated about 8 hours per month. In addition, various general-purpose diesel engines (all rated less than 450 kW) would be used continuously in equipment such as cranes and compressors.

5.7.1.1 Criteria Pollutants

The principal emissions associated with the new units at the Turkey Point site are emissions of particulate matter that have an aerodynamic diameter of 10 microns or less (PM_{10}) from the cooling towers. Table 5-7 lists the expected annual emissions from all sources used in operating proposed Units 6 and 7. These emissions include particulate matter, sulfur oxides (SO_x), carbon monoxide (CO), hydrocarbons in the form of VOCs, and nitrogen oxides (NO_x).

New or modified sources of air pollution are considered to be a major source and need to undergo a new source review before construction and obtain a Title V operating permit from the FDEP if emissions exceed threshold amounts. Stationary equipment such as diesel generators and auxiliary boilers would be required to comply with the requirements of the "National Emission Standards for Hazardous Air Pollutants" given in 40 CFR Part 63 (TN1403). These regulations specify emission limits and, for nonemergency diesel engines, performance tests, limitations on fuel sulfur content, and operating limitations. In addition, depending on when the engines are built and installed, there may be additional requirements under the "Standards of Performance for Stationary Compression Ignition Internal Combustion Engines" (40 CFR 60, Subpart IIII [TN1020]). These Federal requirements would be administered by the State of Florida and included in the Title V operating permit. Given the small size and infrequent operation of combustion equipment, their impact on offsite air quality is expected to be minimal.

Table 5-7. Anticipated Atmospheric Emissions Associated with Operation of Proposed Units 6 and 7

	Four 4,100 kW Diesel Generators (lb/yr)[a,b]	Four 36 kW Ancillary Diesel Generators (lb/yr)[a,b]	Two 243 kW Diesel Fire Pump Engines (lb/yr)[a,b]	General-Purpose Engines (lb/yr)[a,b]	Maximum Mechanical Drift from All Six Cooling Towers (lb/yr)[c]
PM_{10}	2,000	19	56	2,520	42,400
$PM_{2.5}$	1,700	19	56	2,520	220
Sulfur oxides	23	0.25	0.69	12	---
Carbon monoxide	42,000	370	370	7,700	---
Hydrocarbons	5,000	44	140	2,900	---
Nitrogen oxides	34,000	300	950	35,700	---

(a) Assumes ultra-low sulfur diesel (15 ppm S) and operates 8 hours per month.
(b) Based on Manufacturer Certification and 40 CFR Part 60 (TN1020), Subpart III, for diesel generators and fire pump except for particulate matter with an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$) based on the EPA's *Compilation of Air Pollutant Emission Factors* (AP-42). For the general-purpose engines, see AP-42 Chapter 3.3, Gasoline and Industrial Engines, Table 3.3-1 (EPA 2011-TN1088).
(c) Maximum escape of dissolved salts that could be emitted from cooling-tower outflow as drift based on peak in PM_{10}, which occurs at 4000 ppm TDS (Reisman and Frisbie 2002-TN1022).

Source: FPL 2009-TN1023

The Turkey Point site is in Miami-Dade County, which is in attainment for all criteria pollutants defined in the National Ambient Air Quality Standards (NAAQSs) (FPL 2014-TN4058). Because the generating system and fire pumps would be used infrequently (i.e., typically a few hours per month) and the general diesel engine emissions and the cooling towers would be operated in accordance with relevant State and Federal air permit regulations, the review team concludes that the combined air-quality impact of pollutants from these sources would be minor.

Other emissions generated as a result of the operation of proposed Units 6 and 7 would come from workforce commuting. A total of 806 personnel are needed to support operations of the two units. Emissions associated with the workforce commute have been estimated (see Section 4.7). The operational workforce is much smaller than the combined preconstruction and construction workforce of up to 3,950 workers that were concluded to have a minor impact; therefore, the impact from transportation of operational workers on air quality would be minimal.

5.7.1.2 Greenhouse Gases

Finally, the operation of a nuclear power plant involves the emission of some GHGs, primarily CO_2. The review team has estimated that the total GHG footprint for actual plant operations of Units 6 and 7 for 40 years is on the order of 634,000 MT of CO_2 equivalent (the sum of about 181,000 MT per unit from plant operation and about 136,000 MT per unit from operations workforce transportation) of CO_2 equivalent (an emission rate of about 15,850 MT CO_2e annually, averaged over the period of operation). This is about 0.005 percent of the 290 million MT CO_2e total GHG emissions for the State of Florida in 2007 (FDEP 2010-TN2997). This also equates to about 0.0002 percent of the total United States annual CO_2 emissions rate of 6.7 billion MT CO_2e (EPA 2013-TN2815). The value of 634,000 MT CO_2e includes the emissions from two nuclear power plants operating (362,000 MT CO_2e) and the associated emissions from the operations workforce (272,000 MT CO_2e). These estimates are based on GHG footprint estimates in Appendix J of this EIS.

The EPA promulgated the Prevention of Significant Deterioration (PSD) requirements and the Title V GHG Tailoring Rule on June 3, 2010 (75 FR 31514) (TN1404). As of January 2, 2011, operating permits issued to major sources of GHGs under the PSD or Title V Federal permit programs must contain provisions requiring the use of Best Available Control Technology to limit the emissions of GHGs if those sources would be subject to PSD or Title V permitting requirements because of their non-GHG pollutant emission potentials and their estimated GHG emissions are at least 75,000 T/yr of CO_2e. Based on the review team's estimate of 15,850 MT CO_2e emitted annually from operation of two new units at the Turkey Point site, the power plant could be exempted from GHG emission limits in a PSD permit or a Title V permit (EPA 2014-TN4116).

Based on this assessment of the plant operations' GHG footprint in comparison to the Florida and United States annual GHG emissions, the review team concludes that the atmospheric impacts of GHGs from plant operations would not be noticeable and additional mitigation measures would not be warranted.

5.7.2 Cooling-System Impacts

As described in Section 3.2.2.2, the operation of the cooling system for proposed Units 6 and 7 would remove waste heat generated as a byproduct of each unit's electrical power generation to the environment. Proposed Units 6 and 7 would each be equipped with a CWS that includes three mechanical draft cooling towers that provide cooling during normal operations. In addition, a single mechanical draft cooling tower would be used to remove heat from the service-water system for each unit, but the proposed system is much smaller than the CWS and the analysis therefore focuses on the CWS. The cooling-tower emissions would be required to adhere to the New Source Performance Standards (40 CFR 60.40Da [TN1020]) and demonstrate compliance with ambient air-quality standards by acquiring a PSD permit before the cooling towers could be operated.

Potential atmospheric impacts from cooling-system operation include fogging and subsequent icing downwind of the mechanical cooling towers, and potential impacts from plume blight (formation of a visible plume) and drift emissions from the cooling towers.

FPL used EPA's CALPUFF (EPA 2007-TN1474) modeling system in conjunction with the *cooling-tower* emissions processor (CTEMISS) to estimate the fogging impacts from the operation of the cooling towers. The CALPUFF model is the FDEP's preferred model for assessing fogging and plume blight from cooling towers. Inputs to the model included important physical and mechanical performance characteristics of the mechanical cooling towers (e.g., location, base heat rejection rate, dry heat input, stack height, stack diameter, exit velocity, temperature, and building dimension data). This information was used in conjunction with 5 years of meteorological data (2001–2005) from the Miami International Airport to determine plume visibility. FPL used the Miami International Airport data for this analysis because the data covered a longer period of record (5 versus 3 years for the onsite data) and were shown to be regionally representative of the Turkey Point site as described in Section 2.3 of the Final Safety Analysis Report (FPL 2015-TN4502).

Results from the CALPUFF (EPA 2007-TN1474) modeling analysis (Version 5.8) showed that the most frequent visible plumes would occur in the winter months (719 hours) and the least frequent during the summer months (230 hours). The median summer length of the plume was 200 m and the median winter length of the plume was slightly longer—250 m. The median height of the plume across all four seasons ranged from 175 to 200 m. During daylight hours the plume would only be visible an average of 584 hr/yr or 7 percent of the daylight hours. The plumes are predicted to have lengths exceeding 10,000 m on average 93 hr/yr. However, of these hours only 7 would be during daylight hours.

Fogging from mechanical draft cooling towers occurs when the visible plume intersects with the ground. CALPUFF modeling shows that plume-induced fogging does not occur during the summer and autumn months. Offsite areas on the eastern and southeastern perimeter of the Turkey Point site experience induced fogging during the winter season for an average of 7 days, but only for a few hours. During the spring season an average of 1 day experiences plume-induced fogging. No cases of icing were found in the simulations. On the basis of this analysis, the NRC staff concludes that the impacts of Turkey Point Units 6 and 7 on fogging would be minimal and not warrant mitigation. The staff further concludes that because the temperatures in the area are almost always above freezing the impacts on icing would also be minimal and not warrant mitigation.

The AERMOD (07026) modeling system was used to evaluate the amount and location of cooling-tower salt-drift deposition (EPA 2009-TN1501). The AERMOD air-dispersion model uses the state-of-the-science algorithms for simulating plume behavior in all types of terrain. While not specifically developed for cooling towers it does have the state-of-the-science recognized deposition algorithms that have been tested and documented in a number of studies and would be applicable for salt deposition from the operation of cooling towers. FPL proposes to control particulate matter with high-efficiency mist eliminators designed for a droplet drift rate of 0.0005 percent of the circulating-water flow rate of the cooling towers. Although use of the reclaimed wastewater is the primary water source, FPL modeled the cooling-tower drifts assuming the use of saltwater to demonstrate the maximum possible salt deposition. For saltwater, the expected TDS concentration is approximately 34,000 ppm, which represents the average TDS concentration of water in Biscayne Bay near the Turkey Point site. At 1.5 cycles of concentration the expected average TDS concentration is 50,000 ppm. The particle diameter size and mass fraction distribution used in the modeling were based on test data for the

distributions of water droplet size for a drift eliminator that achieved a tested drift rate of 0.0003 percent (Reisman and Frisbie 2002-TN1022). Because FPL is proposing to use a 0.0005 percent drift rate, it is reasonable to expect that a 0.0003 percent drift rate would produce smaller droplets and therefore be conservative for predicting the fraction of PM_{10} from the total cooling-tower particulate matter emissions.

To more accurately represent the physical model of the CWS cooling-tower emissions, the modeling approach considered the cooling-tower emission as saltwater droplets. The emission rate of saltwater droplets at 50,000 ppm TDS concentration is 69.6 g/s from each cooling tower. The density of the saltwater droplets is 1.05 g/cm^3. The emission rates, particulate size distribution, and density were all used as input to the model and the final deposition was determined by multiplying the saltwater droplet deposition amount by 0.05 to reflect the 50,000 ppm salt concentration in the cooling-water vapor.

The Turkey Point salt-deposition analysis indicated that the annual salt-deposition rate from cooling-tower drift using saltwater from the RCWs as a primary cooling-water source could result in depositions as high as 105 kg/ha/mo near the makeup-water reservoir, decreasing to 1 to 70 kg/ha/mo in the cooling canals; salt-deposition rates greater than 10 kg/ha/mo generally would be confined to the Turkey Point site except for areas adjacent to the southeastern portion of the site.

On the basis of the analysis presented in the ER and the review team's independent evaluation of that analysis, the review team concludes that atmospheric impacts of Turkey Point Units 6 and 7 cooling towers would be minimal.

5.7.3 Transmission Line Impacts

The NRC addresses the impacts of existing transmission lines on air quality in NUREG–1437, Revision 1 (NRC 2013-TN2654). Small amounts of ozone and smaller amounts of nitrogen oxides are produced by transmission lines. The production of these gases was found to be insignificant for 745 kV transmission lines (the largest lines in operation) and for a prototype 1,200 kV transmission line. In addition, it was determined that potential mitigation measures, such as burying transmission lines, would be very costly and would not be warranted.

The components needed to complete an interface between proposed Units 6 and 7 and Turkey Point Units 1 and 2, and ties to the regional power grid, would be well within the range of transmission lines evaluated in NUREG–1437, Revision 1 (NRC 2013-TN2654). The largest line planned for the site is 500 kV. Therefore, the review team concludes that the air-quality impacts from transmission lines would not be noticeable and mitigation would not be warranted.

5.7.4 Summary of Meteorological and Air-Quality Impacts

The review team evaluated the potential impacts on air quality associated with criteria pollutants and GHG emissions from operating proposed Turkey Point Units 6 and 7. The review team also evaluated the potential impacts of cooling-system emissions and transmission lines. In each case, the review team determined that the impacts would be minimal. On this basis, the review team concludes that the impacts of operating proposed Units 6 and 7 on air quality from

emissions of criteria pollutants, GHG emissions, cooling-system emissions, and transmission line impacts would be SMALL and warrant no further mitigation.

5.8 Nonradiological Health Impacts

This section addresses the nonradiological human health impacts on the public from operating the proposed new nuclear Units 6 and 7 at the Turkey Point site. Nonradiological public health and worker impacts are considered from operation of the cooling system, noise generated by operations, EMFs, and transporting materials and personnel to and from the site. Nonradiological health impacts from the same sources are also evaluated for workers during the operation of proposed Units 6 and 7. Section 2.10 provides background information about the affected environment and nonradiological health at and within the vicinity of the Turkey Point site. Health impacts from radiological sources during operations are discussed in Section 5.9.

5.8.1 Etiological and Chemical Agents

This section first describes the operational components of the proposed Units 6 and 7 that could have an impact on public health due to etiological (disease-causing) and chemical agents. Next, it describes the potential exposure pathways and risks (impacts) for each of these components.

5.8.1.1 Operational Components

Operation of proposed Units 6 and 7 would result in the use of reclaimed wastewater received from the Miami-Dade SDWWTP as the primary source of water for the cooling system. According to FPL's response to NRC RAI L-2011-158 (FPL 2011-TN55), the reclaimed wastewater proposed for use at Turkey Point site would have already undergone secondary treatment, as defined in Fla. Admin. Code 600.420(1), and high-level disinfection as defined in Fla. Admin. Code 62-600.440(5) (TN1268).

The Fla. Admin. Code regulations specify three alternative sets of requirements for allowing the use of reclaimed wastewater in open cooling towers, e.g., Fla. Admin. Code 62-610.668(2) (b), (c), or (d) (TN1269). The SDWWTP is complying with option (b), which includes high-level disinfection and secondary treatment, as well as "All requirements of Part III of Chapter 62-610…." Part III (titled "Slow-Rate Land Application Systems; Public Access Areas, Residential Irrigation, and Edible Crops") also includes reliability and operator staffing, monitoring, operating protocol, and other requirements. According to Fla. Admin. Code 62-610.460 (TN1269), in Part III the reclaimed wastewater shall have no more than 5.0 mg/L of suspended solids before the disinfectant is applied, and, as specified in Fla. Admin. Code 62-600.440(5) (TN1268), the high-level disinfection will result in reclaimed wastewater in which fecal coliform values (per 100 mL of sample) are below detectable limits. The SDWWTP also has recently added enhanced treatment of the final treated effluent to the treatment plan (FPL 2012-TN1270). This enhanced treatment includes additional sand filtration and additional disinfection. These treatments are expected to eliminate or minimize etiological agents from the SDWWTP makeup-water source, and might have some effect on chemical agents. FPL has stated (FPL 2011-TN55) that its RWTF would provide additional treatment beyond the requirements of Part III of Fla. Admin. Code 62-610 (TN1269).

When reclaimed wastewater cannot supply the quantity and/or quality of water needed for the CWS, a second source for makeup water would be available from the RCWs that would withdraw saltwater from under Biscayne Bay. Because most of the etiological agents of concern are primarily found in freshwater, as described in Section 2.10, etiological agents likely would not be present in the makeup water from the RCWs. Two possible exceptions are *Vibrio* spp., which are thermophilic bacteria commonly found in coastal marine waters such as those at the Turkey Point site, and a toxin-producing dinoflagellate such as *Karenia brevis*, which can cause red tide when present in high concentrations.

Blowdown water from the cooling towers and other plant discharge effluents would be collected in a sump and injected to the Boulder Zone, a cavernous, high-permeability geologic horizon within the Lower Floridan aquifer system. The Boulder Zone contains water similar to seawater in salinity. As described in EIS Section 2.3.1.2, a greater than 1000 ft thick sequence of mostly low-permeability limestone and dolomite overlies the Boulder Zone and separates it from the overlying Upper Floridan aquifer, which is a potential source of drinking water. Details from the drilling and testing of the EW-1 exploratory well and a discussion of upward migration of wastewater that has occurred at other Florida wastewater injection sites is presented in Section 2.3.1.2. The potential for upward migration of injectate from the planned UIC wells is presented in Section 5.2.1.3. The Boulder Zone UIC wells would be permitted by FDEP and would be required to implement institutional controls and monitoring programs to detect upward migration of injected wastewater.

5.8.1.2 Potential Impacts

In general, Fla. Admin. Code 62-610, under which exposure of reclaimed wastewater to the public is controlled, is designed to "assure that all waters of the State shall be free from components of wastewater discharges which, alone or in combination with other substances, are acutely toxic; are present in concentrations which are carcinogenic, mutagenic, or teratogenic to humans, animals, or aquatic species; or otherwise pose a serious threat to the public health, safety, and welfare" (Fla. Admin. Code 62-610.100(5) [TN1269]). The review team concludes that compliance with Florida requirements for the treatment and use of reclaimed wastewater by FPL for Units 6 and 7 would be protective of public health. Furthermore, FPL has stated they would comply with Florida requirements for reclaimed wastewater (FPL 2014-TN4058).

The review team identified several possible pathways for human exposure to etiological and chemical agents attributable to the operation of proposed Units 6 and 7 at the Turkey Point site. The potential sources and/or pathways of exposure include the onsite RWTF, makeup-water reservoir, open channel flume, cooling-tower drift (i.e., deposition of particulates from aerosolized cooling water), blowdown sump, UIC well site, migration of the injected water in the subsurface, and sanitary-waste and solid-waste management. The review team recognizes that human health risks might be increased because of the use of improperly treated or handled reclaimed wastewater, both before and especially after it is heated during reactor cooling. Thermal discharges have the potential to increase the growth of thermophilic microorganisms (including those that can cause diseases, i.e., etiological agents). The types of organisms of concern in the reclaimed water include enteric pathogens (such as *Salmonella* spp. and *Pseudomonas aeruginosa*), thermophilic fungi, bacteria (such as *Legionella* spp.), and free-

living amoeba (such as *Naegleria fowleri* and *Acanthamoeba* spp.), and noroviruses. Any of these microorganisms could result in potentially serious human health effects, particularly at high exposure levels (NRC 2013-TN2654). Section 2.10.1.2 discusses etiological agents in more detail and present incidence data of waterborne diseases in Florida. However, extensive treatment of the reclaimed water before use, the harsh environment of the cooling-water system, the very low drift rates from the cooling towers, the disposal of blowdown through deep-well injection, and the isolation of the site from the public would likely eliminate any public health risk from thermophilic microorganisms associated with the operation of Units 6 and 7.

The review team also evaluated the potential for human health risk from the category of compounds and chemicals referred to as "contaminants of emerging concern" (CECs) or alternatively "microconstituents," "emerging substances of concern," or "emerging pollutants of concern" (EPOCs). CECs is the term used by the EPA and the NRC review team to identify these compounds and chemicals. The potential impacts from exposure to CECs are addressed below for public health and in Section 5.8.5 for worker health.

As mentioned above, the RWTF treatment would exceed the requirements of Part III of Fla. Admin. Code 62-610 (TN1269) (FPL 2011-TN55). In addition, "…the conceptual RWTF treatment system incorporates de-chlorination, nutrient removal, hardness removal (if necessary), pH adjustment, filtration and disinfection processes (FPL 2012-TN1270)." These additional treatments are expected to eliminate or sufficiently minimize etiological and chemical agents from this makeup-water source such that public health would be protected. Furthermore, regarding etiological and chemical agents from cooling-tower drift, the majority of any potential human exposure is onsite, as indicated by the salt-deposition rates shown in Figure 5-3. Therefore, the review team concludes that because public access to the site is limited, and there are no residences in the vicinity of the site where inhalation from operation of the proposed units would be likely to occur, only potential worker exposure is a potential concern for human health (Section 5.8.5).

Regarding UIC wells and the potential for contamination of the Upper Floridan aquifer, which is a source of drinking water, the low-permeability layer separating the Upper and Lower Floridan aquifers is expected to prevent transport of any etiological agents that might be present in the injected wastes from migrating into drinking water supplies (see Section 2.8). Furthermore, an investigation of the geology within a 25 mi radius of the site revealed no features or lineaments associated with faulting within the plant property and determined that a continuous horizontal stratigraphy is present with no faults or folds related to tectonic deformation. Thus, the review team concludes that cooling-tower blowdown would not be discharged to waters that have the potential for any contact by members of the public. Also, as noted in Section 5.2, monitoring is planned for the groundwater to identify any changes in water quality related to deep-well injection.

5.8.2 Noise

In NUREG–1437 (NRC 2013-TN2654), the NRC discusses the environmental impacts of noise from operations at existing nuclear power plants. Common sources of noise from plant operation include cooling towers, transformers, turbines, and the operation of pumps along with intermittent contributions from loud speakers and auxiliary equipment such as diesel generators.

In addition, there may be corona discharge noise—the electrical breakdown of air into charged particles—associated with high-voltage transmission lines. The common sources and impacts of noise are addressed in this section.

As described in Section 2.10.2, the impact of noise upon humans is difficult to determine because of the varying responses of humans to the same or similar noise patterns. For the Turkey Point site, both an ambient noise survey and an operations noise prediction analysis were conducted. The ambient noise survey is described in Section 2.10.2. The noise prediction analysis for the operation of proposed Units 6 and 7 is fully described in Section 6.7 of the SCA and is the focus of this section. These predictions were developed using the CadnaA computer model, a computerized software program for calculation, presentation, assessment, and prediction of environmental noise, and results are described in the following section (FPL 2010-TN272).

The noise impacts of proposed Units 6 and 7 were evaluated using the equipment associated with normal operation of the facility. The noise level generated by each cooling tower would be on the order of 88 dBA at 3 ft from the towers, 73 dBA at 200 ft from the towers, and 65 dBA at 400 ft from the towers, which is within the Units 6 and 7 plant area. Therefore, levels of noise at the site boundary from Units 6 and 7 are expected to be lower than 65 dBA, and even lower at the nearest permanent, residence approximately 3.9 mi away. To confirm this, the day-night average sound levels (L_{dn}) were examined. The L_{dn} is a single dBA value calculated from hourly noise level equivalent (L_{eq}) over a 24-hour period, with the addition of 10 dBA to nighttime sound levels to account for the greater sensitivity of most people to nighttime noise. The nearest likely future resident, located just outside the nearest northern boundary 1.6 mi away, as shown in Figure 2-41 (the S5 noise monitoring location), would experience average noise levels during operation of about 45.7 dBA during the daytime and 48.7 dBA during the nighttime, which would be close to the measured background noise levels of 44.1 dBA during the daytime and 47.9 dBA during the nighttime. The L_{dn} at this location during operation thus would be about 55.9 dBA, while the background L_{dn} would about 55.1 dBA, which indicates that the operation of Units 6 and 7 would have minimal impact at this location.

Furthermore, according to NUREG–1437 (NRC 2013-TN2654), noise levels below 60 to 65 dBA are considered to be of small significance. More recently, the impacts of noise were considered in the *Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities* (NUREG–0586, Supplement 1) (NRC 2002-TN665). The criterion for assessing the level of significance was not expressed in terms of sound levels, but was based on the effect of noise on human activities and on threatened and endangered species. The criterion in NUREG–0586, Supplement 1, is stated as follows:

> The noise impacts... are considered detectable if sound levels are sufficiently high to disrupt normal human activities on a regular basis. The noise impacts... are considered destabilizing if sound levels are sufficiently high that the affected area is essentially unsuitable for normal human activities, or if the behavior or breeding of a threatened and endangered species is affected.

Regarding the corona discharge noise associated with high-voltage transmission lines, the occurrences are infrequent and weather-related, when the public is likely to be indoors. Corona noise is composed of both broadband noise, characterized as a crackling noise, and pure tones,

characterized as a humming noise. Corona noise, which is greater with increased voltage, is also affected by the weather. During dry weather, the noise level is low and often indistinguishable off the transmission line corridor from background noise. In wet conditions, water drops collecting on conductors can cause louder corona discharges. However, background noise (e.g., falling rain, traffic, or blowing leaves) can easily mask this noise. For 500 kV transmission lines, corona noise, when present, is typically below ambient outdoor levels. During rain showers, the corona noise likely would not be readily distinguishable from background noise. Residents also are more likely to be indoors at such times. During very moist but not rainy conditions, such as heavy fog, the resulting small increase in the background noise levels would not be expected to result in annoyance to adjacent residents. Periodic maintenance activities, particularly vegetation management, would produce noise from mowing, bush-hogging, and tree and limb trimming and grinding.

Based on the relatively low levels of noise associated with the operation of proposed Units 6 and 7 and the significant attenuation of that noise, the review team concludes that potential noise impacts associated with the operation of the new units on the public would be minor and would not require mitigation.

5.8.3 Acute Effects of Electromagnetic Fields

In its ER (FPL 2014-TN4058), FPL states that the proposed transmission system for Units 6 and 7 would consist of one onsite 230 kV line, three offsite 230 kV lines, and two offsite 500 kV lines. Electric shock related to transmissions lines is an acute effect that results from either direct access to energized conductors or induced charges in metallic structures. Such acute effects are controlled and minimized by conformance with National Electrical Safety Code (NESC) (IEEE 2007-TN1087; 10 CFR 51, Subpart B, Appendix A [TN250]). NESC describes how to establish minimum vertical clearances to the ground for electric lines having voltages exceeding 98 kV. The clearance must limit the induced current as a result of electrostatic effects to 5 mA if the largest anticipated truck, vehicle, or equipment were short-circuited to ground (IEEE 2007-TN1087). By way of comparison, the short-circuit setting of ground-fault circuit interrupters (used in residential wiring of special breakers for outside circuits or those with outlets in kitchens and bathrooms) is 4 to 6 mA.

FPL states in its ER that the proposed transmission lines would be built in compliance with the NESC (FPL 2014-TN4058). In addition, all transmission lines constructed by FPL would conform to standards established by American National Standards Institute, NESC, and other applicable codes and standards that are generally accepted by the industry, except as modified by Florida statutes. Also, during construction of the transmission lines, FPL would ground existing fences and gates that cross or parallel the right-of-way to mitigate shock hazards.

The transmission lines would also be designed to comply with FDEP regulations limiting maximum electrical and magnetic field strength (Fla. Admin. Code 62-814-TN644):

- The maximum electric field at the edge of the transmission line corridor and at the new substation property boundary shall not exceed 2 kV/m.
- The maximum electric field on the transmission line corridor shall not exceed 10 kV/m.

- The maximum magnetic field at the edge of the transmission line right-of-way and at the new substation property boundary shall not exceed 200 milliGauss (mG).

FPL notes that during the license renewal process for Units 3 and 4 at Turkey Point site, the existing eight 230 kV circuits that extend from Turkey Point site to the Davis and Florida City substations were analyzed (FPL 2014-TN4058). The maximum induced current for these circuits was determined to be 4.3 mA, which is below the allowable 5 mA. This compliance demonstrates the capability of FPL to meet the 5 mA limit for the 500 kV lines also, such as through tower design (e.g., increased height) as described in SCA Section W9.2 (FPL 2010-TN272). The proposed transmission lines for Units 6 and 7 would display similar induced current results because the proposed lines would be built in compliance with the NESC limit.

Based on the regulations related to the design and installation of new transmission lines, and the fact that transmission lines constructed and upgraded to serve proposed Units 6 and 7 would meet NESC standards in effect at the time of installation, the review team concludes that the potential impact on the public from acute effects of EMFs would be minor and further mitigation would not be warranted.

5.8.4 Chronic Effects of Electromagnetic Fields

Operating power transmission lines in the United States produce EMFs of nonionizing radiation at 60 Hz, which is considered to be an ELF-EMF. Research on the potential for chronic effects of EMF from energized transmission lines was reviewed and addressed by the NRC in NUREG–1437 (NRC 1996-TN288). At that time, research results were not conclusive. The National Institute of Environmental Health Sciences (NIEHS) directs related research through the U.S. Department of Energy. An NIEHS report (NIEHS 1999-TN78; HPA 2006-TN1273) contains the following conclusion:

> The NIEHS concludes that ELF-EMF exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard. In our opinion, this finding is insufficient to warrant aggressive regulatory concern. However, because virtually everyone in the United States uses electricity and therefore is routinely exposed to ELF-EMF, passive regulatory action is warranted such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. The NIEHS does not believe that other cancers or non-cancer health outcomes provide sufficient evidence of a risk to currently warrant concern.

The review team reviewed available scientific literature on the chronic effects of ELF-EMF on human health published since the NIEHS report and found that several other organizations reached the same conclusions (HPA 2006-TN1273; WHO 2007-TN1272). Additional work under the auspices of the World Health Organization (WHO) updated the assessments of a number of scientific groups reflecting the potential for transmission line EMF to cause adverse health effects in humans. In the report by WHO, the authors summarized the potential for ELF-EMF to cause disease such as cancers in children and adults, depression, suicide, reproductive dysfunction, developmental disorders, immunological modifications, and neurological disease. The results of the review by WHO found that the extent of scientific evidence linking these diseases to EMF exposure is not conclusive (WHO 2007-TN1272).

The review team reviewed available scientific literature on chronic effects of EMF on human health and found that the scientific evidence regarding the chronic effects of ELF-EMF on human health does not conclusively link ELF-EMF to adverse health impacts.

5.8.5 Occupational Health

As discussed in Section 2.10, human health risks for personnel engaged in activities such as maintenance, testing, and plant modifications for proposed Units 6 and 7 are expected to be dominated by occupational accidents (e.g., falls, electric shock, and burns) or occupational illnesses due to noise exposure, exposure to toxic or oxygen-replacing gases, and other hazards. Data shown in that section indicate that the average incidence rate for the Turkey Point Units 3 and 4 workforce for 2004 through 2008 was 0.4 cases per 100 workers. Using this rate for Units 6 and 7, the annual estimate for injuries and illnesses at Units 6 and 7 is 3.1, which is well under the numbers that would be expected at an electric power-generation facility based on national and State incident rates, i.e., 23 and 22, respectively. Also, note that as was the case for construction injury estimates in Section 4.8, these are gross estimates that do not take into account injury risks that workers would face if they were employed somewhere other than at the Turkey Point site. The net effect of Turkey Point operation on total occupational injuries in Miami-Dade County could be considerably lower, or even negative, if alternative employment is associated with higher risks.

Possible key pathways of concern for worker exposure to etiological agents are via the onsite RWTF, makeup-water reservoir, open channel flume, cooling-tower drift, blowdown sump, underground injection well site, and sanitary-waste and solid-waste management. These locations would be located within the Turkey Point site, which would preclude access by members of the public. Furthermore, site personnel access would be strictly controlled by administrative controls and security patrols. Personnel protective measures (i.e., personal protective equipment, personnel monitoring) related to work activities requiring personnel contact with reservoir and flume systems would be controlled by the facility's worker protection plan, as described below. In addition, the planned disinfection for the cooling water is expected to eliminate or minimize health risks to workers (DOL 2012-TN1274; HDR 2009-TN1073). In its ER, FPL addresses management of occupational injury and fatality risks through safety and health programs, and personnel to promote safe work practices and respond to occupational injuries and illnesses (FPL 2014-TN4058). Procedures have been developed and implemented for the existing units that would be applied to the proposed new units that have the objective of providing personnel who work at Turkey Point site with an effective means of preventing accidents due to unsafe conditions and unsafe acts. These safe work practices address a number of occupational health issues (e.g., hearing protection, confined space entry, personal protective equipment, heat stress, electrical safety, the safe use of ladders, microbial hazards, chemical handling, storage, and use, and other industrial hazards). These procedures ensure that FPL adheres to NRC and OSHA safety standards (29 CFR 1910) (TN654), practices, and procedures. Furthermore, health impacts on workers from nonradiological emissions during operations at the proposed Units 6 and 7 would be monitored and controlled in accordance with the applicable OSHA regulations. Appropriate State and local statutes and procedures, including those for new nuclear unit operations (State of Florida 2014-TN3637), would also be considered when assessing and controlling occupational hazards and health risks at the Turkey Point site.

Similar to the discussion in Section 5.8.1.2 regarding public health, even with regulatory and voluntary controls in place to protect worker health, technical or other failures could occur, or rules and guidelines could be deemed to be out of date at some point (e.g., because of newer information about health effects). In addition, several public comments have addressed concern for worker health risks from reclaimed wastewater in cooling-tower drift (Appendix D). NUREG–1555 (NRC 2000-TN614) also requires that the human health impacts associated with a plant's cooling system be evaluated. Furthermore, as indicated by the salt-deposition graphs in ER Figure 5.3-1 (FPL 2014-TN4058), the majority of any potential exposure to etiological and chemical agents from cooling-tower drift would be onsite. Therefore, additional analysis of cooling-tower drift was conducted by the review team, as described below.

Regarding etiological agents, as discussed above in Section 5.8.1.2 for public health, FPL has stated that its RWTF would exceed the requirements of Part III of Fla. Admin. Code 62-610 (TN1269), and, according to its response to RAI L 2012-225 (FPL 2012-TN1270), "…the conceptual RWTF treatment system incorporates de-chlorination, nutrient removal, hardness removal (if necessary), pH adjustment, filtration and disinfection processes." These additional treatments are expected to eliminate etiological agents as a concern for worker health.

Regarding chemical agents from the use of reclaimed water, a screening-level confirmatory analysis was conducted on selected agents in cooling-water drift from cooling towers. Sections 5.2.1.3 and 5.7.2 describe air modeling conducted by NRC staff to estimate drift impacts on surface water and air quality, respectively. Similar modeling was used here to estimate the air concentrations of chemicals in the centerline of the drift plume as it leaves the cooling towers. Specifically, the AERMOD model (EPA 2003-TN1310) was run using a 5-year period to predict the particle phase concentrations in the air emissions. The maximum annual average concentration for a 1 g/s (or 1 x 10^6 ug/s) chemical emission rate was estimated as 0.05 ug/m^3. This relationship then was used to scale the maximum concentration of selected chemicals. This concentration was assumed to be the concentration in the blowdown effluent as it is injected underground. A cooling-water emission rate of 1,824 L/s was used, based on Table 3.3-1 (Stream Number 42) of the ER (FPL 2014-TN4058). Thus, for example, if the concentration of a chemical in the cooling water is 1 ug/L, then its maximum annual average concentration in the air would be 1 ug/L × 1824 L/s × (0.05 ug/m^3 per 1 × 10^6 ug/s), or 9.1 × 10^{05} ug/m^3 (or 9.1 × 10^{-08} mg/m^3). The estimated air concentrations were then compared to health-based benchmarks (HBBs) for air using a "hazard index" approach whereby the exposure concentration is divided by the HBB. A hazard index greater than 1 using screening-level assumptions indicates additional analysis is needed.

The modeling results for this analysis are shown in Table 5-8. Chemicals were selected based on their relatively high toxicity, the availability of HBB data, and to represent a range of chemical types, i.e., 1,4-dichlorobenzene (typical disinfection byproduct) to represent halogenated semivolatile organic compounds, ethinyl estradiol to represent endocrine disruptor compounds, and hexavalent chromium to represent metals. As seen in the table, all hazard indices are two or more orders of magnitude less than one.

Highly conservative, screening-level assumptions were used for this analysis. These assumptions include the close proximity of workers (i.e., on the top ledge of the tower in the plume centerline instead of typical actual locations, which are at some distance from the towers

for the majority of the time) and high chemical concentrations (i.e., the maximum concentrations from the blowdown water instead of more probable lower concentrations due to averaging and removal at FPL's RWTF, biodegradation, photolysis, hydrolysis, and/or volatilization). Additional analysis would only result in lower hazard indices, and thus no additional analysis is needed. The impact from chemical exposure to workers from drift appears to be minimal.

Table 5-8. Screening-Level Analysis of Inhalation of Selected Chemicals in Drift from Reclaimed Water Used for Cooling

Chemical	Water Conc. (µg/L)[(a)]	Air Conc. (mg/m^3)	HBB (mg/m^3)	HBB Source[(b)]	Hazard Index
1,4-Dichlorobenzene	5.7	5.2×10^{-7}	4.5×10^{2}	OSHA PEL	1.2×10^{-9}
1,4-Dichlorobenzene	5.7	5.2×10^{-7}	8×10^{-1}	EPA RfC	6.5×10^{-7}
Ethinyl estradiol	5.8×10^{-2}	5.3×10^{-9}	1×-10^{5}	Caldwell et al. 2010	5.3×10^{-4}
Hexavalent chromium	6.5×10^{1}	5.9×10^{-6}	5×-10^{3}	OSHA PEL	1.2×10^{-3}
Hexavalent chromium	6.5×10^{1}	5.9×10^{-6}	1×10^{-4}	EPA RfC (particulates)	5.9×10^{-2}

(a) Maximum concentration from the blowdown effluent as it is injected underground. While some dilution is expected to occur prior to injection, additional planned treatment of the reclaimed wastewater prior to use also is expected. Therefore, the actual concentration of these constituents in drift would be lower.
(b) OSHA PEL = Occupational Safety and Health Administration permissible exposure limit
EPA RfC = Environmental Protection Agency reference concentration
Caldwell et al. 2010-TN1276

Based on the requirements of Part III of Fla. Admin. Code 62-610 (TN1269) that the reclaimed wastewater supplied by SDWWTP to Units 6 and 7 would be suitable for "…Public Access Areas, Residential Irrigation, and Edible Crops", as well as the additional disinfection and other treatment and mitigation measures identified by FPL in its ER (FPL 2014-TN4058), the strict adherence to NRC and OSHA safety standards, practices, and procedures, and the review team's independent evaluation, the review team concludes that occupational health impacts on Turkey Point onsite personnel would be minimal, and no mitigation would be warranted.

5.8.6 Impacts of Transporting Operations Personnel to and from the Turkey Point Site

This EIS assesses the impact of transporting workers to and from the Turkey Point site from the perspective of three areas of impact: the socioeconomic impacts, the air-quality impacts of fugitive dust and particulate matter emitted by vehicle traffic, and the potential health impacts related to additional traffic-related accidents. Human health impacts are addressed in this section, while the socioeconomic impacts are addressed in Section 5.4.1.3, and air-quality impacts are addressed in Section 5.7.2.

The general approach used to calculate the nonradiological impacts of fuel and waste shipments is the same as that used to calculate the impacts of transporting operations and outage personnel to and from the proposed Turkey Point Units 6 and 7 plant area and alternative sites (see Section 4.8.3). However, preliminary estimates are the only data available to estimate these impacts. The impacts evaluated in this section for two proposed nuclear generating units at the Turkey Point site are appropriate for characterizing the alternative sites discussed in Section 9.3. Alternative sites evaluated in this EIS include the existing Turkey Point site (proposed new units), and alternative sites at Martin, Glades, Okeechobee, and St. Lucie. There is no meaningful differentiation among the proposed and the alternative sites regarding the

nonradiological environmental impacts from transporting operations and outage personnel to the Turkey Point site and alternative sites, so these impacts are not discussed further in Chapter 9.

The review team calculated nonradiological impacts from transporting operations workers based on the following considerations:

- In its ER, FPL stated that 403 workers would be needed for operation of each proposed unit, or a total of 806 workers to operate both proposed Units 6 and 7 (FPL 2014-TN4058). Up to an additional 1,000 temporary workers are anticipated to be needed for refueling outages (FPL 2014-TN4058). The review team determined impacts considering that outages for the two units would not occur simultaneously.
- The average commuting distance for operations and outage workers was conservatively assumed by the review team to be 20 mi one way. This assumption is based on the U.S. Department of Transportation (DOT) data that estimates the typical home to work commute for U.S. residents is approximately 16 mi one way (DOT 2003-TN297).
- To develop representative commuter traffic impacts, data from the DOT provide a Florida-specific fatality rate for all traffic for the years from 2004 to 2008 (DOT 2008-TN411). The average fatality rate for the period from 2004 to 2008 in Florida was used as the basis for estimating Florida-specific injury and accident rates. Adjustment factors were developed using national traffic accident statistics in the DOT publication National Transportation Statistics 2010 (DOT 2010-TN408). The adjustment factors are the ratio of the national injury rate to the national fatality rate and the ratio of the national accident rate to the national fatality rate. These adjustment factors were multiplied by the Florida-specific fatality rate to approximate the injury and accident rates for commuters in the State of Florida.

The estimated impacts of transporting operations and outage workers to and from the proposed Turkey Point site and alternative sites are listed in Table 5-9. The total annual traffic fatalities during operations, including both operations and outage personnel, represent about a 0.3 percent increase above the average 316 traffic fatalities per year that occurred in Miami-Dade County, Florida, from 2004 to 2008 (DOT 2008-TN412). The impacts of transporting operations workers to and from the alternative sites were about a 0.03 percent increase for the Martin site (DOT 2008-TN413), a 1.2 percent increase for the Glades site (DOT 2008-TN414), a 0.7 percent increase for the Okeechobee site (DOT 2008-TN415), and a 0.2 percent increase for the St. Lucie site (DOT 2008-TN416). These percentages represent small increases relative to the current traffic fatality risks in the areas surrounding the proposed Turkey Point site and alternative sites.

Table 5-9. Nonradiological Estimated Impacts of Transporting Operations Workers to and from the Turkey Point Site and Alternative Sites

	Accidents Per Year Per Unit	Injuries Per Year Per Unit	Fatalities Per Year Per Unit
Permanent Workers	9.4×10^{0}	4.3×10^{0}	6.4×10^{-2}
Outage Workers	4.2×10^{0}	1.9×10^{0}	2.9×10^{-2}

Based on the information provided by FPL, the review team's independent evaluation, and considering that this increase would be small relative to the current traffic fatalities (that is, before the proposed units are constructed) in the affected counties, the review team concludes that the nonradiological impacts of transporting construction materials and personnel to the proposed Turkey Point site and alternative sites would be minimal, and no mitigation would be warranted.

5.8.7 Summary of Nonradiological Health Impacts

For operation using reclaimed water the review team concludes that the extensive water treatment of the reclaimed water before reuse required by the State of Florida (Part III of Fla. Admin. Code 62-610 (TN1269)), the harsh environment of the cooling-water system, the very low drift rates from the cooling towers, the likely deposition of most of the cooling-tower drift onsite, the disposal of blowdown through deep-well injection and the isolation of the site from the public would likely eliminate any public health risk from thermophilic microorganisms or CECs associated with the operation of Units 6 and 7. The review team also evaluated the potential for public health risk from periodic operation of the RCWs. Concern about the proliferation of harmful thermophilic microorganisms at industrial facilities such as the Turkey Point IWF is typically focused on the station receiving waters for facilities using once through cooling and freshwater. Turkey Point Units 6 and 7 would not use freshwater, would use closed-cycle cooling. The withdrawal of saltwater from under Biscayne Bay eliminates the risk of most thermophilic organisms that do not inhabit saltwater environments. Additionally, because of the periodic nature of the operation of the RCW system, the lack of surface receiving waters due to the deep-well disposal of blowdown, the use of closed-cycle cooling, the filtration effect of withdrawing groundwater, the harsh environment in the cooling-water system, and the isolation of the site from the public, the review team finds that the risk of stimulating population levels of harmful thermophilic microorganism, due to the operation of Units 6 and 7, is highly unlikely. Therefore, the review team determined that the likelihood of impacts from etiological agents on human health from operation using reclaimed water or water from the RCW system would be minimal and mitigation would not be warranted.

The review team evaluated health impacts on the public and workers from the proposed cooling system, noise generated by plant operations, acute and chronic impacts of EMFs, and transporting operations and outage workers to and from the proposed Units 6 and 7. Health risks to workers are expected to be dominated by occupational injuries at rates below the average U.S. industrial rates. Health impacts on the public and workers from etiological agents, noise generated by plant operations, and acute impacts of EMF would be minimal. The review team reviewed available scientific literature on chronic effects of EMF on human health and found that the scientific evidence regarding the chronic effects of ELF-EMF on human health does not conclusively link ELF-EMF to adverse health impacts. Based on the information provided by FPL, the applicant's compliance with all applicable Federal, State, and local regulations mentioned in the above sections, and the review team's own independent evaluation, the review team concludes that the potential impacts on nonradiological health resulting from the operation of the proposed two additional units at the Turkey Point site would be SMALL, and mitigation would not be warranted.

5.9 Radiological Impacts of Normal Operations

This section addresses the radiological impacts of normal operations of the proposed Turkey Point Units 6 and 7, including the estimated radiation dose to a member of the public and to the non-human biota inhabiting the area around the Turkey Point site. Estimated doses to workers at the proposed units are also discussed. Radiological impacts were determined using the Westinghouse AP1000 pressurized water reactor design with expected direct radiation and liquid and gaseous radiological effluent rates in the evaluation. Revision 19 of the AP1000 reactor design (Westinghouse 2011-TN261) is a certified design as set forth in 10 CFR Part 52, Appendix D. Revision 6 of FPL's ER (FPL 2014-TN4058) references Revision 19 of the Westinghouse AP1000 Design Control Document (DCD); therefore, the COL application and evaluation of radiological impacts of normal operations presented here are based on Revision 19 of the Westinghouse AP1000 DCD (Westinghouse 2011-TN261).

5.9.1 Exposure Pathways

The public and non-human biota would receive radiation dose from a nuclear power station via the liquid effluent, gaseous effluent, and direct radiation pathways. FPL estimated the potential exposures to the public and biota by evaluating exposure pathways typical of those surrounding the proposed Turkey Point Units 6 and 7. In ER Section 5.4.1, FPL considered pathways that could cause the highest calculated radiological dose based on the use of the environment around the site (FPL 2014-TN4058). The relative importance of a pathway is based on the type and amount of radioactivity released, the environmental transport mechanism, and the consumption or usage factors of the recipient. For example, factors such as the location of homes in the area, consumption of meat from the area, and consumption of vegetables grown in area gardens were considered.

For the liquid effluent release pathway, FPL proposes to use deep-well injection of liquid effluents to isolate this radiation stream from the public and non-human biota. However, FPL has assessed the possible radiation pathways of the liquid effluents once they are injected into the well.

As discussed in the Appendix 12AA of the Final Safety Analysis Report (FSAR) (FPL 2015-TN4502), the design of proposed Turkey Point Units 6 and 7 includes a number of features to prevent and mitigate leakage from system components such as pipes and tanks that may contain radioactive material. Also, in Appendix 12AA (FPL 2015-TN4502), FPL committed to use the guidance of NEI 08-08A, "Generic FSAR Template Guidance for Life-Cycle Minimization of Contamination," (NEI 2009-TN1277) to the extent practicable in the development of operating programs and procedures. However, the potential still exists for leaks of radioactive material, such as tritium, into the ground, similar to those that have been reported at currently operating power plants. Based on the discussion above, the NRC staff expects that the impacts from such potential leakage for proposed Turkey Point Units 6 and 7 would be minimal.

For the gaseous effluent release pathway, FPL considered the following exposure pathways in evaluating the dose to the maximally exposed individual (MEI): immersion in the radioactive plume, direct radiation exposure from deposited radioactivity, inhalation, ingestion of garden fruit and vegetables, and ingestion of meat animals.

For population doses from the gaseous effluents, FPL used the same exposure pathways as those used for the individual dose assessment, with the addition of a pathway for the ingestion of cow milk. It is assumed that all agricultural products grown within 50 mi of the proposed Turkey Point Units 6 and 7 are consumed by the population within 50 mi of the new units at the Turkey Point site (see Figure 5-4).

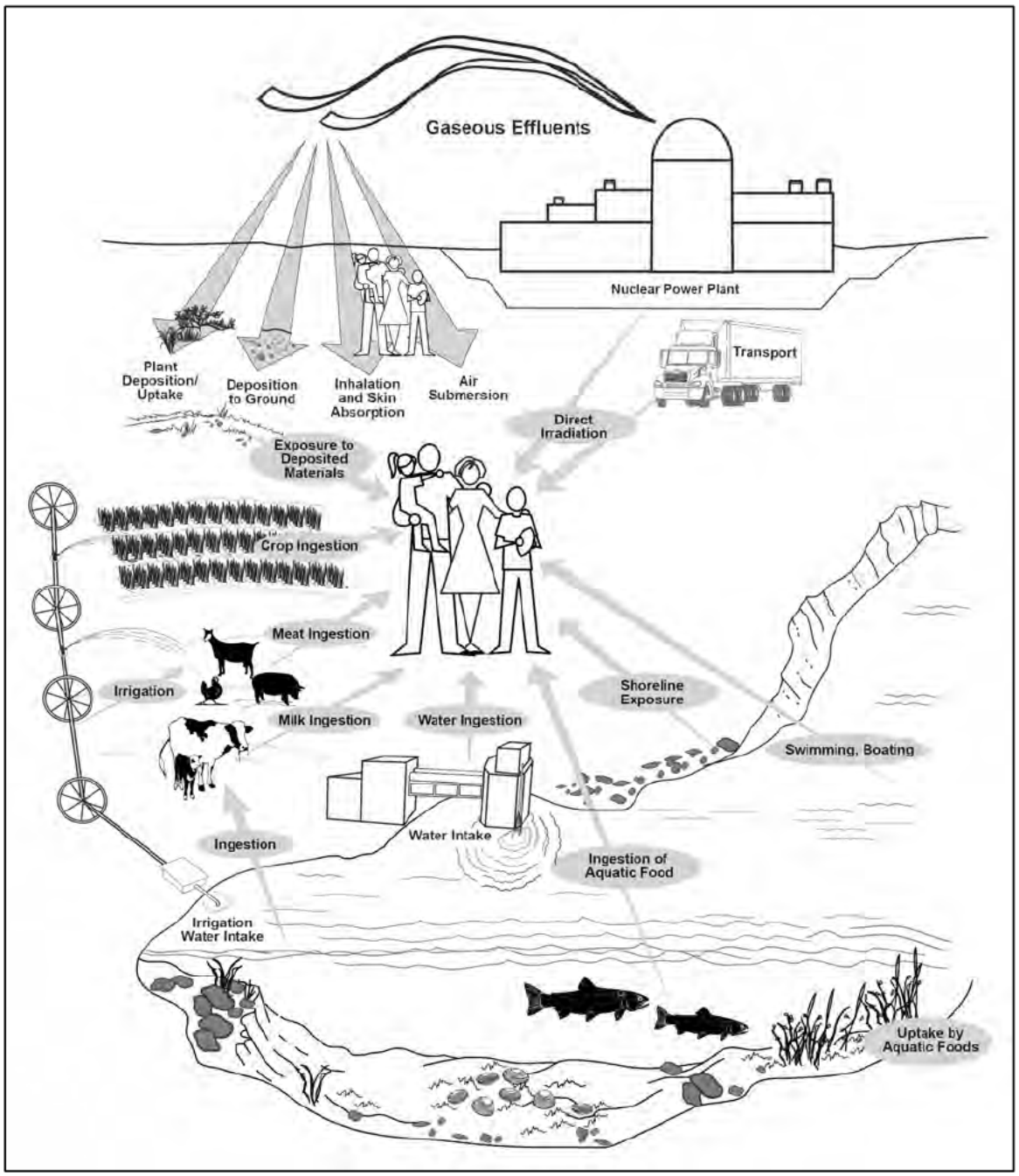


Figure 5-4. Exposure Pathways to Humans (adapted from Soldat et al. 1974-TN710)

In ER Section 5.4.1 (FPL 2014-TN4058), FPL stated that the contained sources of radiation at proposed Units 6 and 7, including the refueling water storage tank, would be shielded such that

the direct dose rate at the Turkey Point site boundary would be negligible. This is also stated in Section 12.4.2.1 of the AP1000 DCD (Westinghouse 2011-TN261). The containment and other plant buildings would be shielded and direct radiation from them would be negligible. The AP1000 design also provides for the storage of refueling water inside the containment building instead of in an outside storage tank. This planned storage eliminates refueling water as a source of significant direct radiation to offsite receptors.

Exposure pathways considered in evaluating dose to the biota are shown in Figure 5-4 and Figure 5-5 and include the following:

- ingestion of aquatic foods;
- ingestion of water;
- external exposure from water immersion or surface effect;
- inhalation of airborne radionuclides;
- external exposure to immersion in gaseous effluent plumes; and
- surface exposure from deposition of iodine and particulates from gaseous effluents (NRC 1977-TN90).

The NRC staff reviewed the exposure pathways for the public and biota identified by FPL and found them to be appropriate, based on a documentation review, a tour of the environs, and interviews with FPL staff and contractors during the site visit in June 2010.

5.9.2 Radiation Doses to Members of the Public

In ER Section 5.4, FPL discusses the calculated dose to the MEI and the population living within a 50 mi radius of the Turkey Point site from the direct radiation, liquid, and gaseous effluent release pathways (FPL 2014-TN4058). FPL stated that it conservatively estimated the direct radiation exposure to the MEI from sources of radiation at the proposed Turkey Point Units 6 and 7 would occur at the Turkey Point site boundary and that most of the dose would be a result of the external pathways.

5.9.2.1 Liquid Effluent Pathway

Treated liquid radioactive waste from operations at proposed Turkey Point Units 6 and 7 would be discharged to the plant sump prior to ultimate release to the Boulder Zone via the UIC wells (see Figure 5-6). As discussed in Sections 2.3.1.2, 3.3.1.6, and 5.2.1.3 of this EIS, the highly saline Boulder Zone of the Lower Floridan aquifer is used for deep-well injection of treated municipal wastewater and reverse osmosis concentrates in Miami-Dade County. Injection occurs below the middle confining layer at depths of approximately 2,700 ft or more, approximately 900 ft below the base of the lowest USDW. The Boulder Zone is currently not a source of potable water and there is no viable pathway for the injection well releases to reach potable water. Hence, there is no liquid effluent pathway dose that results from normal plant operations.

As discussed in Section 5.2.1.3, hydrologic alterations affecting the Boulder Zone of the Lower Floridan aquifer would result from the injection of up to 85 Mgd of blowdown water and other liquid waste streams from the proposed units via a deep-well injection system. However, although a normal operation exposure pathway is not expected, because of the unique nature of

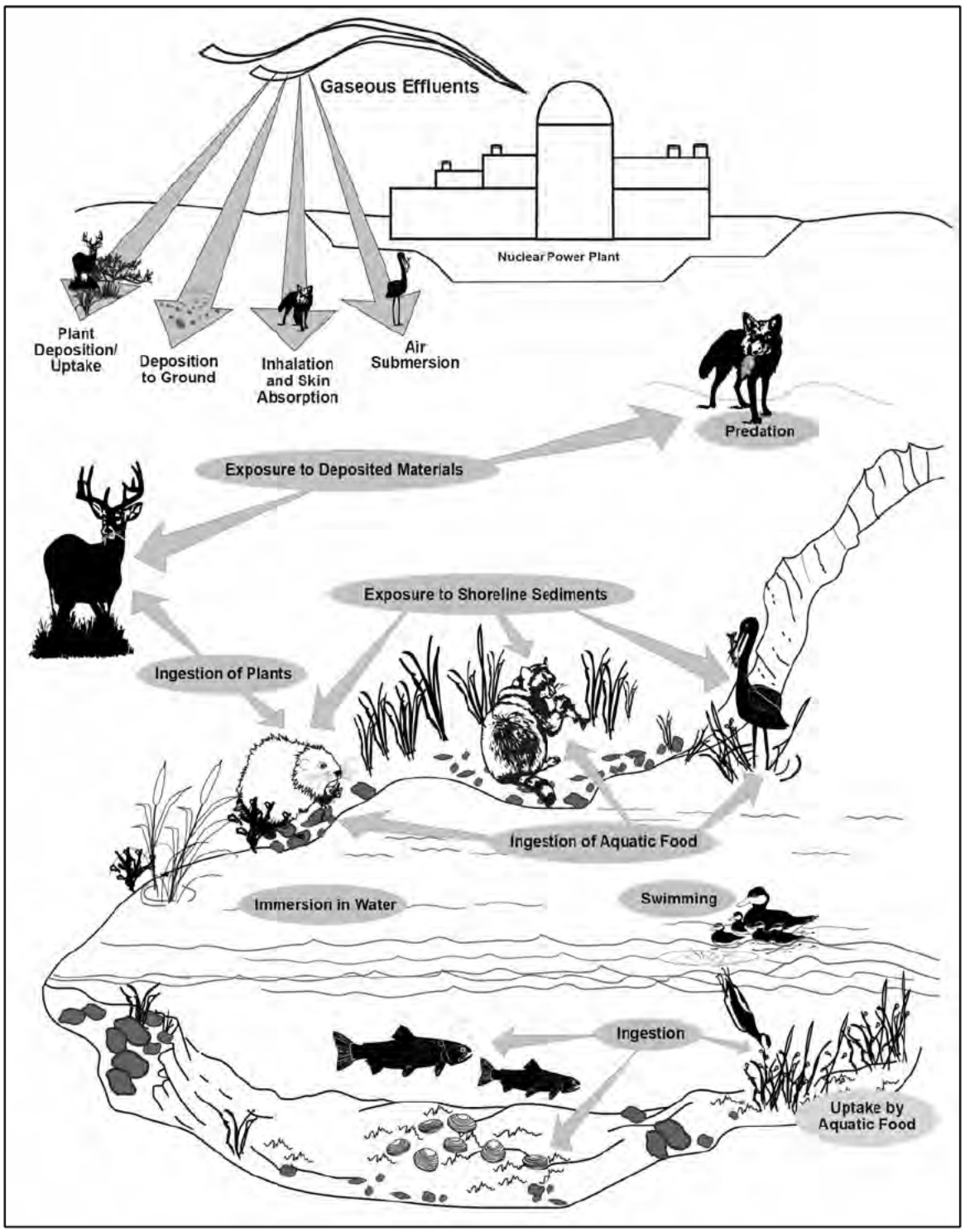


Figure 5-5. Exposure Pathway to Biota Other than Humans (Soldat et al. 1974-TN710)

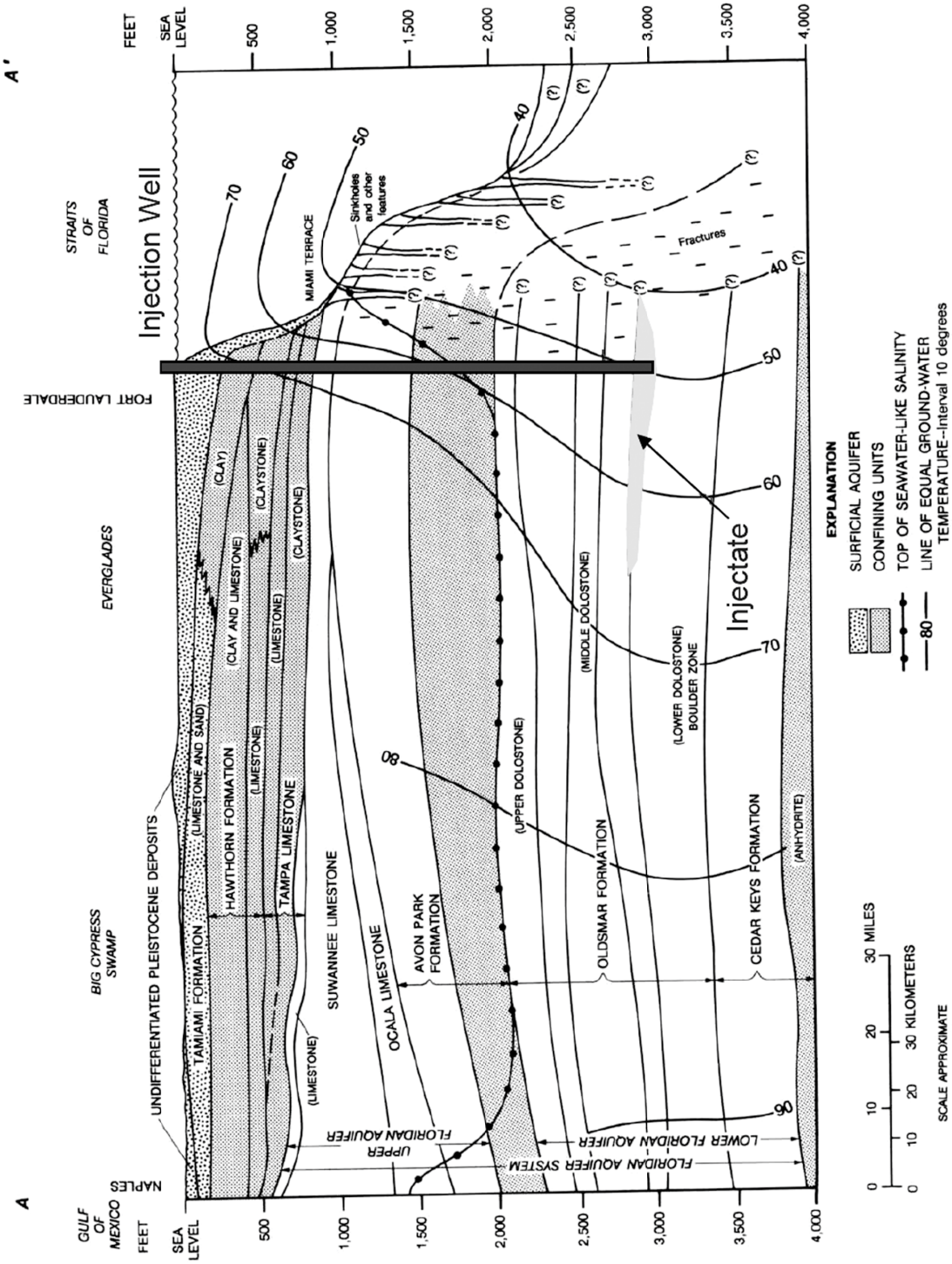


Figure 5-6. Typical Injection Well for Turkey Point Units 6 and 7 (Adapted from Taylor 2009-TN2256; Meyer 1989-TN2255; NRC 2009-TN2257)

the radioactive effluent discharge and in response to NRC RAIs (NRC 2013-TN3937), FPL evaluated three potential dose scenarios in FSAR Section 11.2.3.5 (FPL 2015-TN4502) and ER Section 5.4.1.1 (FPL 2014-TN4058) based on potential groundwater flow pathways of the injected radioactive liquid effluent that could result in inadvertent radioactive exposure to the general public.

In its model, FPL assumed that in model year 1, Unit 6 is the only unit operating and using deep-well injection into the Boulder Zone, and in model year 2, Unit 7 is operating and using deep-well injection. It was assumed that each unit injected for 60 years non-stop (i.e., 40-year initial license and a 20-year license renewal, with no decrease in injection rate due to outages). Thus, from model year 2 through model year 60, both units are operating and using deep-well injection. In model year 61 only Unit 7 is operating and using deep-well injection (i.e., Unit 6 has ceased operation). In model year 62 to model year 100, both units have ceased operations. The analysis goes out to model year 100 to determine how the injection plume decays and dissipates over the 38 years after both units cease deep-well injection.

In order to have a postulated pathway to the surface, the scenarios were based on a freshwater well already existing or being drilled into the Upper Floridan aquifer directly above a conduit in the confining layer above the Boulder Zone (i.e., an opening that extended through the more than 900 ft thick low-permeability rocks over the Boulder Zone). These scenarios also assumed that whatever the radioactive concentration was in the Boulder Zone at the bottom of the conduit was also at the wellhead with no loss in concentration due to travel time or dilution.

One scenario is at the Ocean Reef Club community (this community located approximately 7.7 mi south-southeast of the deep-well injection analysis center point). This scenario was selected because it is the only public use of freshwater from the Upper Floridan aquifer. The other two scenarios are located at the closest private parcel to Turkey Point 6 and 7 (this parcel is located approximately 2.2 mi north-northwest of the deep-well injection analysis center point). Here it is assumed that a freshwater well is drilled into the Upper Floridan aquifer (no such well exists at this time). The NRC staff has reviewed the proposed pathway scenarios for the radioactive liquid effluent injectate and found them to be acceptable.

A discussion of the postulated doses from these scenarios is provided in Section 5.9.3.3.

5.9.2.2 Gaseous Effluent Pathway

FPL calculated the gaseous pathway doses to the MEI using the GASPAR II computer program (Strenge et al. 1987-TN83) at the following locations: nearest site boundary, nearest meat animal, nearest residence, and nearest vegetable garden. The GASPAR II computer program was also used to calculate annual population doses. The following activities were considered in the dose calculations: (1) direct radiation from submersion in the gaseous effluent cloud and exposure to particulates deposited on the ground; (2) inhalation of gases and particulates; (3) ingestion of meat from animals eating grass affected by gases and particulates deposited on the ground; and (4) ingestion of foods (e.g., vegetables) affected by gases and particulates deposited on the ground. The gaseous effluent releases used in the estimate of dose to the MEI and population are found in Table 11.3-3 of the AP1000 DCD (Westinghouse 2011-TN261) and Table G-3 of Appendix G. Other parameters used as inputs to the GASPAR II program,

including population data, atmospheric dispersion factors, ground deposition factors, receptor locations, and consumption factors, are found in Tables 5.4-5 and 5.4-6 of the ER (FPL 2014-TN4058).

As previously discussed, there is no liquid effluent pathway from normal operations, thus the doses derived from the gaseous effluent pathway are the only doses that affect members of the public and non-human biota. Therefore, the doses to and impacts of the gaseous effluents on the public and non-human biota are discussed in Sections 5.9.3 and 5.9.5, respectively.

The NRC staff recognizes the GASPAR II computer program as an appropriate tool for calculating dose to the MEI and population from gaseous effluent releases. The NRC staff reviewed the input parameters and values used by FPL (2014-TN4058) for appropriateness, including references made to the Westinghouse AP1000 DCD (Westinghouse 2011-TN261). The NRC staff concluded that the assumed input parameters and values used by FPL were appropriate. The NRC staff performed an independent evaluation of the gaseous pathway doses and obtained similar results for the MEI (see Appendix G for details).

5.9.3 Impacts on Members of the Public

This section describes the NRC staff's evaluation of the estimated impacts from radiological releases and direct radiation from proposed Turkey Point Units 6 and 7. The evaluation addresses dose from operations to the MEI located at the Turkey Point site and the population dose (collective dose to the population within 50 mi) around the site.

5.9.3.1 Maximally Exposed Individual

In ER Section 5.4 (FPL 2014-TN4058), FPL stated that total body and organ dose estimates to the MEI from gaseous effluents for each new unit would be within the design objectives of 10 CFR Part 50 (TN249), Appendix I. As previously stated, there is no dose due to liquid effluents during normal operations. The MEI doses were determined by considering the maximally exposed adult, teenager, child, and infant at the locations shown here in Table 5-10. The receptor locations listed in the table are those at which the maximum atmospheric dispersion and deposition factors occur for each exposure pathway.

Table 5-10. Gaseous Effluent Exposure Pathway Receptor Locations

Nearest Receptor	Direction	Distance (mi)
Site Boundary (Turkey Point Site Property Boundary)	SSE	0.35
Residence	N	2.7
Vegetable Garden	NW	4.8
Meat Animal (Meat Cow Pasture[(a)])	N	2.7
Non-human Biota	SSE	0.25

(a) There are no milk animals within 5 mi of proposed Turkey Point Units 6 and 7.

Source: FPL 2014-TN4058, Table 5.4-6

The total body and organ doses to the MEI are provided in Table 5-11. FPL summed the contributions from viable pathways to obtain a total dose for each organ and age group. Although Table 5-10 shows that the vegetable garden is farther away than the residence and the meat animal, FPL added the garden doses to the doses from the other two pathways. Furthermore, FPL conservatively assumed that an individual resides at the Turkey Point site boundary, although the nearest actual residence is farther away, as indicated in Table 5-10. In effect, doses were calculated at two locations: the Turkey Point site boundary and a combined residence/garden/meat animal location.

Table 5-11. Annual Individual Doses to the MEI from Gaseous Effluents for One Unit

Pathway	Location	Age Group	Total Body Dose (mrem/yr)	Max Organ Dose (mrem/yr)	Skin Dose (mrem/yr)	Thyroid Dose (mrem/yr)
Plume	Residence	All	6.7×10^{-3}	7.4×10^{-3}(lung)	4.6×10^{-2}	6.7×10^{-3}
Ground	Residence	All	6.56×10^{-3}	6.6×10^{-3}(lung)	7.7×10^{-3}	6.6×10^{-3}
Inhalation	Residence	Adult	1.2×10^{-3}	1.45×10^{-3} (lung)	0.0	9.6×10^{-3}
		Teen	1.2×10^{-3}	1.6×10^{-3} (lung)	0.0	1.2×10^{-2}
		Child	1.0×10^{-3}	1.4×10^{-3} (lung)	0.0	1.4×10^{-2}
		Infant	5.9×10^{-2}	8.7×10^{-4} (lung)	0.0	1.2×10^{-2}
Vegetable	Vegetable	Adult	6.4×10^{-3}	3.3×10^{-2} (bone)	0.0	8.6×10^{-2}
	Garden	Teen	9.2×10^{-3}	5.0×10^{-2} (bone)	0.0	1.1×10^{-1}
		Child	2.0×10^{-2}	1.14×10^{-1} (bone)	0.0	2.1×10^{-1}
Meat	Residence	Adult	2.64×10^{-3}	1.14×10^{-2} (bone)	0.0	9.4×10^{-3}
		Teen	2.1×10^{-3}	9.54×10^{-3} (bone)	0.0	7.0×10^{-3}
		Child	3.8×10^{-3}	1.8×10^{-2} (bone)	0.0	1.1×10^{-2}
Total MEI Dose[(a)]		Adult	2.3×10^{-2}	5.8×10^{-2} (bone)	5.3×10^{-2}	1.2×10^{-1}
		Teen	2.6×10^{-2}	7.3×10^{-2} (bone)	5.3×10^{-2}	1.4×10^{-1}
		Child	3.8×10^{-2}	1.45×10^{-1} (bone)	5.3×10^{-2}	2.44×10^{-1}
		Infant	1.4×10^{-2}	1.34×10^{-2} (bone)	5.3×10^{-2}	2.5×10^{-2}

(a) Total MEI dose is a sum of the residence, vegetable, and meat pathways.
There are no milk cows/goats within 5 mi of the Turkey Point site.
Assumes the MEI's food comes from nearest meat and vegetable sources to the Turkey Point site.

Source: FPL 2014-TN4058, Table 5.4-7

Table 5-12 presents the doses at the exclusion area boundary from gaseous effluents and would be within the design objectives of 10 CFR Part 50 (TN249), Appendix I of 10 mrad/yr air dose from gamma radiation, 20 mrad/yr air dose from beta radiation, 5 mrem/yr to the total body, and 15 mrem/yr to the skin. In addition, dose to the thyroid from gaseous effluents would be within the 15 mrem/yr Appendix I dose design objective. The NRC staff completed an independent evaluation of compliance with Appendix I dose design objectives and found similar results. While liquid effluents are not part of the exposure pathway for releases for the reasons previously mentioned, the combined gaseous and liquid effluents from the Turkey Point Units 6 and 7 would be below the Appendix I dose design objectives.

Table 5-12. Comparisons of the Dose Estimates from Liquid and Gaseous Effluents to 10 CFR Part 50 (TN249), Appendix I Design Objective at the Turkey Point Site Boundary

Radionuclide Releases/Dose (from site boundary)	FPL Dose Estimates[a]	Appendix I Design Objectives
Gaseous Effluents		
Beta air dose	18 mrad	20 mrad
Gamma air dose	4.2 mrad	10 mrad
External total body dose	3.6 mrem	5 mrem
Skin dose	14 mrem	15 mrem
Liquid Effluents		
Total body dose from all pathways	0 rem[b]	3 mrem
Critical organ dose from all pathways	0 rem[b]	10 mrem

(a) This is the dose for a single unit (i.e., either Unit 6 or Unit 7).
(b) There are no exposure pathways for liquid effluents to reach a population under normal operating conditions, as previously discussed and in Section G.2. However, under the pathway scenarios assessed by FPL, Appendix I criteria were met and is considered bounding.

Source: FPL 2014-TN4058, Table 5.4-8

FPL compared the combined doses estimates from direct radiation and gaseous and liquid effluents from the two new units as well as the two existing units to the regulatory limits of 40 CFR Part 190 (TN739). FPL states the dose limits for members of the public in 40 CFR Part 190 (TN739) are more restrictive than those in 10 CFR 20.1301(a)(1) (TN283). To FPL, the demonstration of compliance with the dose limits of 40 CFR Part 190 (TN739) is also a demonstration of compliance with the 0.1 rem total effective dose equivalent (TEDE) limit of 10 CFR 20.1301(a)(1) (TN283). As stated earlier, exposure at the site boundary from direct radiation sources at the new units would be negligible and would not contribute significantly to the MEI dose. Table 5-13 compares FPL's calculated doses from the existing two operating units and the two proposed units to the dose standards from 40 CFR Part 190; i.e., 25 mrem/yr to the total body, 75 mrem/yr to the thyroid, and 25 mrem/yr to any other organ. The NRC staff completed an independent evaluation of compliance with 40 CFR Part 190 standards and found similar results. The assessment shows that the 40 CFR Part 190 (TN739) standards would be met.

Table 5-13. Cumulative Turkey Point Site Dose to the MEI from Units 6 and 7 Combined with Units 3 and 4

Type of Dose (mrem/yr)	FPL Units 3 and 4[a]	FPL Units 6 and 7 Liquid Dose[b]	FPL Units 6 and 7 Gaseous Dose[c]	Combined Maximum Individual Dose	40 CFR Part 190 Dose Standards
Total Body	0.0029	0	7.8	7.8	25
Thyroid	0.0059	0	15.0	15.0	75
Other Organ	0.0059	0	8.4	8.4	25

Source: FPL 2014-TN4058, Tables 5.4-8 and 5.4-9

(a) Bounding values from 5 years of effluent reports; theoretical values (thyroid, bone, and skin dose assumed to be the same).
(b) Under normal operating conditions expected to be zero.
(c) Values from table representing dose from both AP1000 units.

5.9.3.2 Population Dose

In ER Table 5.4-10 (FPL 2014-TN4058), FPL estimated the collective total body dose within a 50 mi radius of the Turkey Point site to be 8.0 person-rem/yr from both proposed Turkey Point Units 6 and 7. The estimated collective dose to the same population from natural background radiation is estimated to be 2.5×10^6 person-rem/yr. The dose from natural background radiation was calculated by multiplying the 50 mi population estimate for the year 2080 of 7.5 million people given in ER Table 2.5-1 (FPL 2014-TN4058) by the annual background dose rate of 311 mrem/yr (NCRP 2009-TN420).

Collective population doses from gaseous effluent pathway were estimated by FPL using the GASPAR II computer code. The NRC staff performed an independent evaluation of population doses and obtained similar results (see Appendix G).

Radiation protection experts assume that any amount of radiation may pose some risk of causing cancer or a severe hereditary effect, and that the risk is higher for higher radiation exposures. Therefore, a linear, no-threshold dose response relationship is used to describe the relationship between radiation dose and detriments such as cancer induction. A report by the National Research Council (2006), the Biological Effects of Ionizing Radiation (BEIR) VII report (National Research Council 2006-TN296), uses the linear, no-threshold model as a basis for estimating the risks from low doses. This approach is accepted by the NRC as a conservative method for estimating health risks from radiation exposure, recognizing that the model may overestimate those risks. Based on this method, the NRC staff estimated the risk to the public from radiation exposure using the nominal probability coefficient for total detriment. This coefficient has the value of 570 fatal cancers, non-fatal cancers, and severe hereditary effects per 1,000,000 person-rem (10,000 person-Sv), equal to 0.00057 effects per person-rem. The coefficient it is taken from Publication 103 of the International Commission on Radiological Protection (ICRP 2007-TN422).

Both the National Council on Radiation Protection and Measurements (NCRP) and ICRP suggest that when the collective effective dose is smaller than the reciprocal of the relevant risk detriment (in other words, less than 1/0.00057, which is less than 1,754 person-rem), the risk assessment should note that the most likely number of excess health effects is zero (NCRP 1995-TN728; ICRP 2007-TN422). As noted above, the estimated collective whole body dose to the population living within 50 mi of the Turkey Point Units 6 and 7 is 8.0 person-rem/yr, which is less than the value of 1,754 person-rem/yr that ICRP and NCRP suggest would most likely result in zero excess health effects (NCRP 1995-TN728; ICRP 2007-TN422).

In addition, at the request of the U.S. Congress, the National Cancer Institute (NCI) conducted a study and published *Cancer in Populations Living Near Nuclear Facilities* in 1990 (Jablon et al. 1990-TN1257). The NCI report included an evaluation of health statistics around all nuclear power plants, as well as several other nuclear fuel cycle facilities, in operation in the United States in 1981 and found “no evidence that an excess occurrence of cancer has resulted from living near nuclear facilities” (Jablon et al. 1990-TN1257).

5.9.3.3 Deep-Well Injection Scenarios – Postulated Doses

As previously discussed in Section 5.9.2.1, although there is no normal exposure pathway for the deep-well injected effluent to reach the public, FPL postulated three public exposure scenarios that could theoretically result in having treated liquid radioactive effluent mixed into the Boulder Zone reach the Upper Floridan aquifer, a potential pathway for public exposure. One of these scenarios is at the Ocean Reef Club (located approximately 7.7 mi south-southeast of the deep-well injection analysis center point) and two scenarios are at a private parcel of land (located approximately 2.2 mi north-northwest of the deep-well injection analysis center point).

With respect to the Ocean Reef Club scenario (where a well into the Upper Floridan aquifer already exists), FPL's groundwater analysis determined that no effluent radionuclides will migrate to this location over 100-year period. Therefore, FPL estimated that members of the public in the Ocean Reef Club community would not receive a postulated dose from deep-well the injected liquid effluent.

With respect to the dose receptors for the two scenarios at the private parcel of land, one was a child and the other was a well driller.

- The first scenario assumed a child (i.e., the most conservative member of the public dose receptor) ingested water from the well and ingested food irrigated by water from the well for an entire year.
- The second scenario assumed a driller, while drilling the well, is standing in a puddle of water discharged by the well during the drilling process, and thus is exposed by inhalation (i.e., from the puddle evaporation "cloud"); deposition (i.e., vapor from the "cloud" condensing on the driller); and immersion (i.e., from being surrounded by the "cloud"). The exposure duration was for 12 hours per day for 45 days. In addition, it was assumed that the driller also ingested water from the well and ingested food irrigated by water from the well for an entire year.

FPL's groundwater analysis determined that at the private land parcel location, the following maximum radionuclide concentrations occur in the following years after the start (i.e., model year 1) of deep-well injection:

- tritium (H-3) 3.1E+04 pCi/L 25 years
- cesium-134 (Cs-134) 7.7E-03 pCi/L 15 years
- cesium-137 (Cs-137) 7.6E-01 pCi/L 42 years
- strontium-90 (Sr-90) 5.6E-04 pCi/L 41 years.

Only these four effluent radionuclides were analyzed in the groundwater analysis because FPL determined that when using the LADTAP II computer program (Strenge et al. 1986-TN82), these radionuclides contributed over 99 percent of the dose. For additional conservatism, while the maximum concentration for each radionuclide happen at different times, FPL assumed for the dose analysis that the maximum concentrations occur concurrently.

With respect to postulated dose due to ingestion, LADTAP II was used for both the child and the driller. For the postulated driller dose due to the "cloud," FPL used the guidance provided by the EPA in EPA-402-R-93-081 (Eckerman and Ryman 1993-TN3955) and EPA 550-B-99-099 (EPA 2009-TN3954).

As determined by FPL in ER Tables 5.4-2 and 5.4-3, the largest postulated dose is received by the driller at 2.8 mrem whole body and maximum organ dose of 3.9 mrem to the liver per unit (FPL 2014-TN4058). Thus the postulated scenario doses received from the Turkey Point Units 6 and 7 liquid effluents would be below the Appendix I dose design objectives of 3 mrem whole body and 10 mrem organ dose.

The NRC staff performed an independent confirmatory evaluation of these hypothetical liquid pathways and concluded that FPL's analysis was appropriate. Results of the NRC staff's independent review are found in Appendix G.

5.9.3.4 Summary of Radiological Impacts on Members of the Public

The NRC staff evaluated the potential health impacts from routine gaseous radiological effluent releases from proposed Turkey Point Units 6 and 7. Based on information provided by FPL, and the NRC's own independent evaluation, the NRC staff concluded there would be no observable health impacts on the public from normal operation of the proposed units, any health impact would be SMALL, and additional mitigation would not be warranted.

5.9.4 Occupational Doses to Workers

For proposed Turkey Point Units 6 and 7, as discussed in Section 12.4.1.7 of the AP1000 DCD (Westinghouse 2011-TN261), the estimated annual occupational dose, including outage activities, is less than 63.2 person-rem per unit. By comparison, the annual collective dose per operating pressurized water reactor in the United States was 51 person-rem in 2014 (NRC 2016-TN4761). The dose to Unit 7 construction workers during the operation of Unit 6 and the existing units is addressed in EIS Section 4.9.

The licensee of a new plant would need to maintain individual doses to workers within 5 rem annually as specified in 10 CFR 20.1201 (TN283) and incorporate provisions to maintain doses as low as is reasonably achievable (ALARA). FPL has described the health physics program in Section 12.5 of its FSAR for Turkey Point Units 6 and 7 and the radiation protection features in FSAR Section 12.3 (FPL 2015-TN4502). Based on these descriptions, FPL would ensure that occupational exposures are maintained ALARA. In addition, the Turkey Point Units 6 and 7 FSAR (FPL 2015-TN4502) discusses plans to establish worker training, monitoring, and radiation safety programs based on NEI 07-03A, "Generic FSAR Template Guidance for Radiation Protection Program," (NEI 2009-TN1279) to the extent practicable.

The NRC staff concludes that the health impacts from occupational radiation exposure would be SMALL based on individual worker doses being maintained within 10 CFR 20.1201 (TN283) limits and collective occupational doses being typical of doses found in current operating light-water reactors. Additional mitigation would not be warranted because the operating plant would be required to maintain doses ALARA.

5.9.5 Impacts on Non-Human Biota

FPL estimated doses to non-human biota in the environs for the Turkey Point site, in many cases using surrogate species. Surrogate species used in the ER are well-defined and provide an acceptable method for evaluating doses to non-human biota (Soldat et al. 1974-TN710). Surrogate species analysis was performed for terrestrial species (e.g., muskrats, raccoons, herons, and ducks [FPL 2014-TN4058]). Exposure pathways considered in evaluating dose to the non-human biota are discussed in Section 5.9.1. The NRC staff's evaluation is presented in Appendix G.

5.9.5.1 Liquid Effluent Pathway

As discussed in Section 5.9.2.1, there is no liquid effluent pathway for exposure of non-human biota due to deep-well injection. Therefore, this pathway is not considered for estimating doses to fish, invertebrates, algae, and all terrestrial species.

5.9.5.2 Gaseous Effluent Pathway

Gaseous effluents would contribute to the total body dose of the terrestrial surrogate species (i.e., muskrat, raccoon, heron, and duck). The exposure pathways include inhalation of airborne radionuclides, external exposure because of immersion in gaseous effluent plumes, and surface exposure from deposition of iodine and particulates from gaseous effluents. The dose calculated to the MEI from gaseous effluent releases in Section 5.9.3 would also be applicable to terrestrial surrogate species with two modifications. One modification defined in ER Section 5.4.4 (FPL 2014-TN4058) was increasing the ground-deposition factors by a factor of two because terrestrial animals would be closer to the ground than a member of the public. The second modification was to use the biota location delineated in Table 5-14. The total body dose estimates to the surrogate species from the gaseous pathway for one unit are shown in Table 5-15. In addition, Appendix G presents the NRC staff's estimate of the dose to the American crocodile of 174.7 mrad/yr.

Table 5-14. FPL Estimate of Non-Human Biota Doses for Proposed Turkey Point Units 6 and 7 for a Single Unit

Biota	Total Body Biota Dose (mrad/yr)[(a)]
Saltwater Fish	0.0
Invertebrate	0.0
Algae	0.0
Muskrat	26.0
Raccoon	26.0
Heron	26.0
Duck	26.0

(a) Radiological doses to non-human biota are expressed in units of absorbed dose (rad).

Source: FPL 2014-TN4058, Section 5.4.4

Table 5-15. Comparison of the FPL Estimate of Biota Doses from the Proposed Turkey Point Units 6 and 7 to the IAEA/NRCP Guidelines for Biota Protection

Biota	Estimate of Dose to Biota[(a)] (mrad/d)	IAEA/NCRP Guidelines for Protection of Biota Populations (mrad/d)
Saltwater Fish	0.00	1,000
Invertebrate	0.00	1,000
Algae	0.00	1000
Muskrat	0.14	100
Raccoon	0.14	100
Heron	0.14	100
Duck	0.14	100

(a) Dose is for both units based on the single unit total dose from Table 5-14 converted to mrad/d.

Source: FPL 2014-TN4058, Section 5.4.4

5.9.5.3 Summary of Impacts on Biota Other Than Humans

The International Atomic Energy Agency (IAEA 1992-TN712) and the National Council on Radiation Protection and Measurements (NCRP 1991-TN729) reported that a chronic dose rate of no greater than 10 mGy/d (1,000 mrad/d) to the MEI in a population of aquatic organisms would ensure protection of the population. The IAEA (IAEA 1992-TN712) also concluded that chronic dose rates of 1 mGy/d (100 mrad/d) or less do not appear to cause observable changes in terrestrial animal populations.

Table 5-15 compares the estimated total body dose rates to surrogate non-human biota species produced by releases from proposed Turkey Point Units 6 and 7 for both units, to the IAEA/NCRP biota dose guidelines (IAEA 1992-TN712; NCRP 1991-TN729). From the FPL estimate (FPL 2014-TN4058), the gaseous pathway dose is about 0.14 mrad/d. In Appendix G, the NRC staff's estimate of the dose to the American crocodile is 0.96 mrad/d. Thus, the doses to non-human biota are far below the 100 mrad/d IAEA guideline (IAEA 1992-TN712) for terrestrial biota and the 1,000 mrad/d guideline for aquatic biota. Based on the NRC staff's independent evaluation, the NRC staff concludes that the radiological impact on biota from the routine operation of the proposed Turkey Point Units 6 and 7 would be SMALL, and additional mitigation would not be warranted.

5.9.6 Radiological Monitoring

FPL has conducted a radiological environmental monitoring program (REMP) around the Turkey Point site since 1969 (AEC 1972-TN999).

On April 3, 2012, the NRC published in the *Federal Register* (77 FR 20059) (TN1001) a final Environmental Assessment and Finding of No Significant Impact and on June 15, 2012 the final approval of the licensing amendments for the approximately 15 percent extended power uprates of Turkey Point Units 3 and 4 (NRC 2012-TN1438). A result of the extended power uprates for Turkey Point Units 3 and 4 was a supplemental REMP sampling program.

In addition to the REMP and the Offsite Dose Calculation Manual (ODCM) description in the Annual Radiological Effluent Release Report, ODCM Appendix 5A discusses a supplemental REMP sampling program that is agreed upon by the State of Florida Department of Health and

Rehabilitative Services and FPL. This supplemental sampling program is not required by regulation, but is performed to provide a broader database for the REMP (FPL 2011-TN119). The sampling under this supplemental program provides additional data, including data from sampling in the discharge canal. A discussion of the cooling-canal monitoring program is provided in EIS Section 2.11.

Currently, radiological releases are summarized in the annual reports titled *Turkey Point, Units 3 and 4, Annual Radioactive Effluent Release Report* and *Turkey Point, Units 3 and 4, Annual Radiological Environmental Operating Report*. The limits for all radiological releases are specified in the Turkey Point ODCM, and these limits are designed to meet Federal standards and requirements. The REMP includes monitoring of the aquatic environment (fish, invertebrates, and shoreline sediment), atmospheric environment (airborne radioiodine, gross beta, and gamma), and terrestrial environment (vegetation) and direct radiation. The NRC staff reviewed these annual reports for calendar years 2002 through 2015 (the references for these reports can be found in Section 2.11). These reports show that doses to individuals around the Turkey Point site were a small fraction of the limits specified in Federal environmental radiation standards, 10 CFR Part 20 (TN283), 10 CFR Part 50, Appendix I (TN249), and 40 CFR Part 190 (TN739).

As discussed in the ODCM, groundwater is sampled for tritium (FPL 2011-TN119). However, no drinking water pathway exists from groundwater at the Turkey Point site (FPL 2009-TN100). In addition, as stated in FSAR Section 2.4.12.2.1.3 (FPL 2015-TN4502), as part of the injection permit, FPL would also install a dual-zone monitoring well. The UIC wells would be regulated by and fully comply with the requirements of Fla. Admin. Code Chapter 62-528 (TN556) and applicable FDEP rules (FDEP 2012-TN1280).

5.10 Nonradioactive Waste Impacts

This section describes the environmental impacts that could result from the generation, handling, and disposal of nonradioactive waste and mixed waste during operation of proposed Turkey Point Units 6 and 7. As discussed in Section 3.4.4, the types of nonradioactive waste that would be generated, handled, and disposed of during operations include municipal solid waste, industrial solid wastes, stormwater runoff, sanitary waste, liquid effluents containing chemicals or biocides, industrial liquid wastes, and combustion emissions. In addition, small quantities of hazardous waste and mixed waste (waste that has both hazardous and radioactive characteristics) may be generated during plant operations. The assessment of potential impacts resulting from these types of wastes is presented in the following sections.

5.10.1 Impacts on Land

The expected nonradioactive waste streams destined for land-based treatment or disposal during operation include water-treatment sludge, laboratory wastes, trash, sanitary waste, and hazardous waste.

Any uncontaminated sediment or excavated soils would be stockpiled onsite in designated areas with appropriate engineering controls to limit surface-water runoff. Nonhazardous solid waste generated during operations would be segregated and recycled to the extent practicable,

and the balance would be disposed of at offsite, licensed commercial waste-disposal facilities. Spent filters from water and wastewater treatment would be disposed in accordance with applicable industrial solid-waste regulations. FPL estimates that during operations, Units 6 and 7 would generate an average of 1,000 T of nonradioactive, nonhazardous solid waste annually. (FPL 2014-TN4058).

Approximately 1,300 gallons of residual sludge from the sanitary wastewater-treatment plant would be sent to a licensed offsite disposal facility. The FPL RWTF will produce an estimated 435 T/d of sludge, which will be disposed of in licensed landfills (FPL 2014-TN4058).

FPL estimates that proposed Units 6 and 7, combined, would generate about 4,800 lb of nonradioactive hazardous waste annually. All hazardous wastes would be collected and temporarily stored onsite, and then transported offsite by a licensed and permitted Resource Conservation and Recovery Act of 1976, as amended (RCRA) (42 U.S.C. § 6901 et seq.) (TN1281) waste hauler, and treated or disposed of offsite at a RCRA-permitted facility (FPL 2014-TN4058).

Mixed waste contains both low-level radioactive waste and hazardous waste. The generation, storage, treatment, or disposal of mixed waste is regulated by Atomic Energy Act of 1954 (42 U.S.C. § 2011 et seq.) (TN663), the Solid Waste Disposal Act of 1965 (42 U.S.C. § 82 et seq.) (TN1032), as amended by RCRA in 1976, and the Hazardous and Solid Waste Amendments (42 U.S.C. § 6921 et seq.) (TN1033) (which amended RCRA in 1984). The mixed waste from proposed Turkey Point Units 6 and 7 would be handled and managed in accordance with the applicable Federal, State, and local requirements. The packaged waste would be stored in the auxiliary and radwaste buildings until being shipped offsite to a licensed disposal facility (FPL 2014-TN4058).

Because no wastes would be landfilled onsite and all wastes destined for land-based treatment or disposal would be transported offsite by licensed contractors to existing, licensed, disposal facilities operating in compliance with all applicable Federal, State, and local requirements, the review team expects that impacts on land from nonradioactive and mixed wastes generated during operation of the Turkey Point Units 6 and 7 would be minimal, and no further mitigation would be warranted.

5.10.2 Impacts on Water

The nonradioactive liquid waste streams during operation would include cooling-tower blowdown, demineralized water system effluent, filter backwash wastewater, water-treatment wastes, discharge from floor and equipment drains, fire-protection water, stormwater runoff, and effluents from the sanitary waste-treatment effluent (FPL 2014-TN4058).

All nonradioactive, liquid discharges during operations would need to comply with the applicable provisions of the site's NPDES stormwater operations permit for industrial activities issued under Fla. Admin. Code 62-621 (TN709). FPL would direct stormwater during operations to the IWF under a requested modification of the site's Industrial Wastewater Permit No. FL0001562 (FPL 2014-TN4058). Fire-protection water from testing would also be routed to the IWF through the stormwater system (FPL 2010-TN272).

All other nonradioactive liquid waste streams would be discharged onsite in the UIC wells, with the exception of oil collected from oil/water separators. Collected oil would be transported offsite by a licensed waste contractor. Waste oil from Turkey Point Units 3 and 4 is currently recycled for heat reclamation and similar practices are planned for the waste oil from Units 6 and 7 (FPL 2014-TN4058). Effluent streams that would be directed to the UIC wells include water rejected from the demineralized water system, service-water system blowdown, CWS blowdown; water from equipment, floor, and wash drains; water from oil/water separators; treated sanitary wastewater; component cooling-system water; small volumes of liquid radwaste effluent; and potentially a small portion of the water from the FPL RWTF (FPL 2010-TN272).

FPL also plans to construct and operate a fleet vehicle maintenance facility, which would generate waste oil, waste coolant, and potentially solvent from the solvent wash tank. The maintenance facility would be served by a local septic tank. Discharges would be regulated in compliance with Pollution Control Facility Permit No. IW5-006229-2012-2012, as it is renewed and updated (FPL 2014-TN4058).

Because all nonradioactive liquid wastes, except those noted above, would be combined into a single, permitted, and monitored discharge stream, the review team concludes that impacts on water from nonradioactive liquid wastes generated during operation of proposed Turkey Point Units 6 and 7 would be minimal, and no further mitigation would be warranted.

5.10.3 Impacts on Air

The nonradioactive gaseous waste streams during operation would include emissions from the combustion of fossil fuels, volatile emissions from those fuels, and other VOCs from the use of materials such as paints, oils, and solvents.

Gaseous emissions would be produced by the combustion of diesel fuel during monthly testing of the 10 diesel engines that would power fire pumps and standby generators. Each of these diesel engines would have an associated fuel tank that would release small quantities of VOCs. Additional VOCs would be released from the use of paints, oils, solvents, and other standard building and maintenance materials.

Any emissions from the fleet vehicle maintenance facility would be offset by a reduction in emissions from offsite service stations, at which the FPL vehicle fleet would need maintenance in the absence of an onsite maintenance facility.

Estimates of the GHG production, primarily CO_2, from the operation of a 1,000 MW(e) nuclear power plant for 40 years, equal 320,000 MT of CO_2 equivalent, or about 640,000 MT for proposed Units 6 and 7 combined, exclusive of the uranium fuel cycle. Of this total, approximately 380,000 MT pertain to periodic testing of diesel engines for the auxiliary power and fire-protection water systems and most of the remaining 260,000 MT arise from worker transportation. The estimated annual production of 16,000 MT is small compared to the estimated CO_2 equivalent production of 14,000,000 MT from a coal-fired power plant and 5,900,000 MT from a natural-gas-fired power plant of comparable size (FPL 2014-TN4058).

Nonradioactive gaseous emissions from operations (including GHG emissions) would be limited in magnitude. FPL would install equipment with appropriate emission controls and comply with all applicable Federal, State, and local requirements. Because nonradioactive gaseous emissions are limited in magnitude and FPL would implement emission control measures and comply with all applicable Federal, State, and local requirements, the review team concludes that impacts on air from nonradioactive gaseous wastes generated during operation of proposed Turkey Point Units 6 and 7 would be minimal, and no further mitigation would be warranted.

5.10.4 Summary of Nonradiological Waste Impacts

Solid, liquid, gaseous, hazardous, and mixed wastes generated during operation of the proposed Turkey Point Units 6 and 7 would be handled according to County, State, and Federal regulations. County and State permits for handling and disposal of solid waste would be obtained and implemented. Compliance with the permits for releases of cooling water and other liquid effluents would ensure compliance with the Federal Water Pollution Control Act (Clean Water Act) (33 U.S.C. § 1251 et seq.) (TN662) and Florida water-quality standards. Air emissions from the facility would be minimal and would not reduce the local air quality. All transportation, storage, and disposal of regulated hazardous and mixed wastes would be in accordance with applicable Federal, State, and local requirements.

Based on (1) the information provided by FPL; (2) the planned practices for recycling, minimizing, managing, and disposing of wastes; (3) the requirements to obtain regulatory approvals for waste disposal and discharges; and (4) the review team's independent evaluation, which determined impacts to land, water and air would be minimal, the review team concludes that the potential impacts from nonradioactive and mixed waste resulting from the operation of the proposed Turkey Point Units 6 and 7 would be SMALL, and mitigation would not be warranted.

5.11 Environmental Impacts of Postulated Accidents

The NRC staff considered the radiological consequences for the environment of potential accidents at the proposed Turkey Point Units 6 and 7. FPL based its COL application on the proposed installation of AP1000 reactors for Units 6 and 7. Revision 19 of the AP1000 reactor design (Westinghouse 2011-TN261) is a certified design as set forth in 10 CFR Part 52 (TN251), Appendix D. The FPL application (FPL 2013-TN2885) references Revision 19 of the AP1000 DCD.

The term "accident," as used in this section, refers to any off-normal event not addressed in Section 5.9 that results in release of radioactive materials into the environment. The focus of this review is on events that could lead to releases substantially greater than permissible limits for normal operations. Normal release limits are specified in 10 CFR Part 20 (TN283), Appendix B, Table 2.

Many safety features combine to reduce the risk associated with accidents at nuclear power plants. Safety features in the design, construction, and operation of the plants, are intended to prevent the release of radioactive materials from nuclear power plants. The design objectives and the measures for keeping levels of radioactive materials in effluents to unrestricted areas ALARA are specified in 10 CFR Part 50 (TN249), Appendix I. Additional measures are

designed to mitigate the consequences of failures. These include the NRC's reactor site criteria in 10 CFR Part 100 (TN282), which require that the site has certain characteristics that reduce the risk to the public and the potential impacts of an accident. Licensees must have emergency preparedness plans and protective action measures for the site and environs, as set forth in 10 CFR 50.47 (TN249), 10 CFR Part 50 (TN249), Appendix E, and NUREG–0654/FEMA-REP-1 (NRC 1980-TN512). All of these safety features, measures, and plans make up the defense-in-depth philosophy to protect the health and safety of the public and the environment.

On March 11, 2011, and for an extended period thereafter, several nuclear power plants in Japan experienced the loss of important equipment necessary to maintain reactor cooling after the combined effects of severe natural phenomena (i.e., an earthquake followed by a tsunami it caused). In response to these events, the Commission established a task force (NTTF) to review the current regulatory framework in place in the United States and to make recommendations for improvements. The task force reported the results of its review (NRC 2011-TN684) and presented its recommendations to the Commission on July 12 and July 19, 2011, respectively. As part of the short-term review, the task force concluded that while improvements are expected to result from the lessons learned, the continued operation of nuclear power plants and licensing activities for new plants did not pose an imminent risk to public health and safety. A number of areas were recommended to the Commission for long-term consideration. Collectively, these recommendations are intended to clarify and strengthen the regulatory framework for protection against severe natural phenomena, mitigation of the effects of such events, coping with emergencies, and improving the effectiveness of NRC programs. By nature of the passive design and inherent 72-hour coping capability for core, containment, and spent fuel pool cooling with no operator action required, the AP1000 design has many of the design features and attributes necessary to address the task force recommendations (NRC 2011-TN684).

On March 12, 2012, the Commission issued three Orders and a Request for Information (RFI) to holders of U.S. commercial nuclear reactor licenses and construction permits to enhance safety at U.S. reactors based on specific lessons learned from the event at Japan's Fukushima Dai-ichi Nuclear Power Plant as identified in the task force report.

The first Order (EA-12-049) and third Order (EA-12-051) apply to every U.S. commercial nuclear power plant, including recently licensed new reactors (77 FR 16091 [TN2476]; 77 FR 16082 [TN1424]). The first Order requires a three-phase approach for mitigating beyond-design basis external events. Licensees are required to use installed equipment and resources to maintain or restore cooling of the core, containment, and spent fuel during the initial phase. (For the AP1000 design, this is the first 72 hours.) During the transition phase (the next 4 days), licensees are required to provide portable, onsite equipment and consumables sufficient to maintain or restore these functions until they can be accomplished with resources brought from offsite. During the final phase (after 7 days), licensees are required to obtain sufficient offsite resources to sustain those functions indefinitely (77 FR 16091) (TN2476). The second Order requires reliable hardened vent systems at boiling water reactor facilities with "Mark I" and "Mark II" containment structures (77 FR 16098) (TN2477). The third Order requires reliable spent fuel pool level instrumentation (77 FR 16082) (TN1424). The RFI addressed five topics: (1) seismic reevaluations, (2) flooding reevaluations, (3) seismic hazard walkdowns, (4) flooding hazard walkdowns, and (5) a request for licensees to assess their current communications system and

equipment under conditions of onsite and offsite damage and prolonged station blackout, and perform a staffing study to determine the number and qualifications of staff required to fill all necessary positions in response to a multi-unit event (NRC 2012-TN3236; 77 FR 16082 [TN1424]; 77 FR 16091 [TN2476]; NRC 2012-TN3237). The RFI asked reactor licensees to reevaluate seismic and flooding hazards using methods to determine if their plants' design should be changed.

The NRC staff issued RAIs to FPL requesting information to address the requirements of the first and third Orders, and information sought under the first and fifth RFI topics (NRC 2012-TN3239). FPL addressed the first and third Orders along with the fifth RFI by proposing license conditions to be implemented prior to initial fuel loading (FPL 2014-TN4058; FPL 2014-TN4103). The AP1000 containment design differs from those identified in the second Order; therefore, the actions addressed in this Order are not applicable to the Turkey Point Units 6 and 7. The NRC's evaluation of FPL's responses will be addressed in the NRC's final safety evaluation report (FSER) and any changes to the COL application that are deemed necessary will be incorporated into the applicant's FSAR (FPL 2015-TN4502).

The severe accident evaluation presented later in this section draws from the analyses developed in the NRC staff's safety review, which includes consideration of severe accidents initiated by external events and those that involve fission product releases. The staff evaluation discusses the environmental impacts of severe accidents in terms of risk, which considers both the likelihood of a severe accident and its consequences. For reasons discussed below, the staff has determined that the Fukushima accident and the NRC's implementation of the task force recommendations do not change the staff's conclusions about the environmental impacts of design basis accidents or severe accidents. These conclusions are based on the Turkey Point Units 6 and 7 COL FSAR, Revision 7 (FPL 2015-TN4502), which was submitted to the NRC by a letter dated October 14, 2015 (FPL 2015-TN4586). FPL has indicated that changes are made to the site grading and footprint of the plant area, which are integral parts of the design basis flood for the proposed Turkey Point Units 6 and 7 (FPL 2015-TN4502).

Each new reactor application evaluates the natural phenomena that are pertinent to the site for the proposed reactor design by applying present-day regulatory guidance and methodologies. This includes a determination of the characteristics of the flood and seismic hazards. With respect to flooding, FPL documented the flood hazard in the FSAR consistent with present-day guidance and methodologies. The final flood hazard analysis was submitted by FPL as part of Revision 7 of the FSAR (FPL 2015-TN4502). As set forth in Section 2.4, Hydrologic Engineering, of the Advanced Safety Evaluation (NRC 2016-TN4775), the NRC staff finds that the applicant appropriately considered flood-causing phenomena and their combinations that are relevant for Turkey Point Units 6 and 7. The Advanced Safety Evaluation Section 2.4 provides the detailed results of the NRC staff's safety review for flooding.

With respect to the consideration of severe accidents initiated by seismic events, FPL developed its response to the staff's seismic hazard RAI stemming from the first RFI topic (FPL 2013-TN3241) and modified the Turkey Point Units 6 and 7 COL FSAR, Revision 7 (FPL 2015-TN4502) to reflect the information provided in the RAI response. The RAI requested that FPL evaluate the impact of the latest information affecting seismic hazard analysis (SHA) for the eastern United States. In response to the staff's RAI, FPL reevaluated its SHA. The NRC staff reviewed and evaluated the applicant's response, which was incorporated in Section 2.5 of

Revision 7 of the FSAR (FPL 2015-TN4502), and determined that the applicant's analyses of vibratory ground motion adequately characterized the Turkey Point Site. The detailed results of the NRC staff's seismic safety review is provided in Section 2.5, Geology, Seismology, and Geotechnical Engineering, of the Advanced Safety Evaluation (NRC 2016-TN4775).

In addition to the above considerations for seismic and flooding hazards, the safety features of the AP1000 design support the conclusion that the Fukushima accident does not warrant a change in the assessment of environmental risks from severe accidents considered in the Turkey Point Units 6 and 7 EIS analysis. In particular, the potential design-related vulnerabilities raised by the event at Fukushima, such as the impact of the extended loss of alternating-current electric power on core cooling systems, would not materially affect the analysis of severe accidents for Turkey Point Units 6 and 7 because the AP1000 has been designed to prevent and mitigate severe accidents given a loss of all alternating-current electrical power sources. As previously noted in the task force report on loss of alternating-current electrical power, the AP1000 passive safety systems would remove the decay heat from the reactor core and spent fuel. They will maintain adequate core cooling for a period of 72 hours without further operator action, unlike the facilities at the Fukushima site. This core cooling by the passive safety systems can be sustained for an extended period beyond 72 hours during which the only operator actions are to refill the tank that is the source of water for the passive safety systems and distribute the water when needed.

Additional details are provided in the staff's Safety Evaluation Report for the AP1000 design certification. The NRC staff's design-certification review (76 FR 82079) (TN248) regarding the safety of the AP1000 design concluded that the design has a very high capacity to withstand beyond-design basis events.

In summary, none of the information the staff has identified about the Fukushima accident or the steps taken by the NRC to date to implement the task force recommendations suggests that the seismic and flooding hazards or the available mitigation capability assumed in the Turkey Point Units 6 and 7 EIS analysis of severe accidents would be affected. For these reasons, the NRC's analysis of the environmental impacts of design basis and severe accidents presented herein remains valid.

This section discusses (1) the types of radioactive materials, (2) the paths to the environment, (3) the relationship between radiation dose and health effects, and (4) the environmental impacts of reactor accidents, both design basis accidents (DBAs) and severe accidents. The environmental impacts of accidents during transportation of spent fuel are discussed in Chapter 6.

The potential for dispersion of radioactive materials in the environment depends on the mechanical forces that physically transport the materials and on the physical and chemical forms of the material. Radioactive material exists in a variety of physical and chemical forms. Most of the material in the fuel is in the form of nonvolatile solids. However, a significant amount of material is in the form of volatile solids or gases. The gaseous radioactive materials include the chemically inert noble gases (e.g., krypton and xenon), which have a high potential for release. Radioactive forms of iodine, which are created in substantial quantities in the fuel by fission, are volatile. Other radioactive materials formed during the operation of a nuclear

power plant have lower volatilities and therefore lower tendencies to escape from the fuel than the noble gases and iodines.

Radiation dose to individuals is determined by their proximity to radioactive material; the amount of radioactive material inhaled, ingested, or absorbed through the skin; the duration of their exposure; and the extent to which they are shielded from the radiation. Pathways that lead to radiation exposure include (1) external radiation from radioactive material in the air, on the ground, and in the water; (2) inhalation of radioactive material; and (3) ingestion of food or water containing material initially deposited on the ground and in water.

Radiation protection experts assume that any amount of radiation may pose some risk of causing cancer or a severe hereditary effect and that the risk is higher for higher radiation exposures. Therefore, a linear, no-threshold dose response relationship is used to describe the relationship between radiation dose and detriments such as cancer induction. A report by the National Research Council (2006-TN296), the BEIR VII report, uses the linear, no-threshold dose response model as a basis for estimating the risks from low doses. This approach is accepted by the NRC as a conservative method for estimating health risks from radiation exposure, recognizing that the model may overestimate those risks.

Physiological effects are clinically detectable if individuals receive radiation exposure resulting in a dose greater than about 25 rad over a short period of time (hours). Doses of about 250 to 500 rad received over a relatively short period (hours to a few days) can be expected to cause some fatalities.

5.11.1 Design Basis Accidents

FPL evaluated the potential consequences of postulated accidents to demonstrate that an AP1000 could be constructed and operated at the Turkey Point site without undue risk to the health and safety of the public (FPL 2014-TN4058). FPL used a set of DBAs that are representative for the AP1000 design for the Turkey Point site and site-specific meteorological data. The set of accidents covers events that range from relatively high probability of occurrence with relatively low consequences to relatively low probability of occurrence with high consequences.

The DBA review focuses on the certified AP1000 reactors at the Turkey Point site. The bases for analyses of postulated accidents for this design are well established because they have been considered part of the NRC's reactor design-certification process for the AP1000 design. Potential consequences of DBAs are evaluated by the following procedures outlined in regulatory guides and standard review plans. The potential consequences of accidental releases depend on the specific radionuclides released, the amount of each radionuclide released, and the meteorological conditions. The source terms for the AP1000 for evaluating potential accidents are based on guidance in Regulatory Guide 1.183, *Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors* (NRC 2000-TN517).

For environmental reviews, consequences are evaluated assuming realistic meteorological conditions. Meteorological conditions are represented in these consequence analyses by an

atmospheric dispersion factor (χ/Q), which has units of seconds per cubic meter (s/m^3). Acceptable methods of calculating the χ/Q for DBAs from meteorological data are set forth in Regulatory Guide 1.145 (NRC 1983-TN279).

Table 5-16 lists χ/Q values the NRC staff considers pertinent to the environmental review of DBAs for the Turkey Point site. Smaller χ/Q values are associated with lower concentration or greater dilution capability. The first column lists the time periods and boundaries for which χ/Q and dose estimates are needed. For the exclusion area boundary (EAB), the postulated DBA dose and its χ/Q are calculated for a short term (i.e., 2 hours). For the low-population zone (LPZ), they are calculated for the course of the accident (i.e., 30 days composed of four time periods). The second column in Table 5-16 lists corresponding χ/Q values for Turkey Point site (FPL 2014-TN4058); these values were calculated using 3 years of meteorological data (2002, 2005, and 2006) for the Turkey Point site and assuming that the ground-level releases point was located on a line enclosing all potential release points (between the two proposed reactors). Although PAVAN code calculations were performed twice with the building wake credited and not credited, the reported results do not take any credit for building wake for EAB receptors within the building wake influence zone to ensure conservative results and are based on 50 percent χ/Q values as documented in FPL's ER (FPL 2014-TN4058).

Table 5-16. Atmospheric Dispersion Factors for Turkey Point Site DBA Calculations

Time Period and Boundary	χ/Q (s/m^3)
0 to 2 hr, exclusion area boundary	1.89×10^{-4}
0 to 8 hr, low-population zone	5.29×10^{-6}
8 to 24 hr, low-population zone	4.02×10^{-6}
1 to 4 d, low-population zone	2.21×10^{-6}
4 to 30 d, low-population zone	9.39×10^{-7}

Source: FPL 2014-TN4058,Table 7.1-11

Table 5-17 lists the set of DBAs considered by FPL and presents estimates of the environmental consequences of each accident in terms of TEDE. TEDE is estimated by the sum of the committed effective dose equivalent from inhalation and the deep dose equivalent from external exposure. Dose conversion factors from Federal Guidance Report 11 (Eckerman et al. 1988-TN68) were used to calculate the committed effective dose equivalent. Similarly, dose conversion factors from Federal Guidance Report 12 (Eckerman and Ryman 1993-TN3955) were used to calculate the deep dose equivalent.

The NRC staff reviewed FPL's selection of DBAs by comparing the accidents listed in the application with the DBAs considered in the AP1000 DCD. The DBAs in FPL's ER (FPL 2014-TN4058) are the same as those considered in Revision 19 of the AP1000 DCD (Westinghouse 2011-TN261). The NRC staff concludes the set of DBAs in FPL's ER is appropriate.

The review criteria used in the NRC staff's safety review of DBA doses are included in Table 5-17 to illustrate the magnitude of the calculated environmental consequences (TEDE doses). In all cases, the calculated TEDE values are considerably smaller than those used as safety review criteria.

Table 5-17. Design Basis Accident Doses for an AP1000 Reactor for Proposed Turkey Point Units 6 and 7

Accident	Standard Review Plan Section[b]	TEDE in rem[a]		
		EAB[c]	LPZ[d]	Review Criterion
Main Steam Line Break	15.1.5			
Preexisting iodine spike		0.19	0.0088	25
Accident-initiated iodine spike		0.22	0.024	2.5
Steam Generator Tube Rupture	15.6.3			
Preexisting iodine spike		0.52	0.016	25
Accident-initiated iodine spike		0.22	0.01	2.5
Loss-of-Coolant Accident	15.6.5	9.1	0.56	25
Rod Ejection	15.4.8	0.67	0.06	6.3
Reactor Coolant Pump Rotor Seizure (locked rotor)	15.3.3			
No feedwater		0.19	0.0043	2.5
Feedwater available		0.15	0.0091	2.5
Failure of Small Lines Carrying Primary Coolant Outside Containment	15.6.2	0.41	0.011	2.5
Fuel Handling	15.7.4	1.0	0.026	6.3

(a) To convert rem to Sieverts, divide by 100.
(b) NUREG–0800 (NRC 2007-TN613).
(c) EAB = exclusion area boundary.
(d) LPZ = low-population zone.
(e) 10 CFR 52.79(a)(1) (TN251) and 10 CFR 100.21 (TN282) criteria.
(f) Standard Review Plan criterion.
The more restrictive limits shown are applicable to safety analysis report doses.

Source: FPL 2014-TN4058, Table 7.1-12

The NRC staff reviewed the DBA analysis in FPL's ER, which is based on analyses performed for design certification of Revision 19 of the AP1000 reactor design with adjustments for Turkey Point site-specific characteristics. The NRC staff also performed an independent confirmatory DBA analysis with consideration of both Revision 17 and Revision 19 of the AP1000 DCD (Westinghouse 2008-TN496; Westinghouse 2011-TN261). The results of the FPL and NRC staff analyses indicate that the environmental risks associated with DBAs from an AP1000 reactor built at the Turkey Point site would be small. On this basis, the staff concludes that the environmental consequences of DBAs at the Turkey Point site would be SMALL for an AP1000 reactor.

5.11.2 Severe Accidents

In its ER (FPL 2014-TN4058), FPL considers the potential consequences of severe accidents for an AP1000 reactor at the Turkey Point site. Three pathways are considered: (1) the atmospheric pathway, in which radioactive material is released to the air; (2) the surface-water pathway, in which airborne radioactive material falls out on open bodies of water; and (3) the groundwater pathway, in which groundwater is contaminated by a basemat (floor) melt-through with subsequent contamination of surface water by the groundwater.

FPL's consequence assessment is based on the probabilistic risk assessment (PRA) for Revision 15 of the of the AP1000 design (Westinghouse 2005-TN3242), which is certified in 10 CFR Part 52 (TN251), Appendix D. Westinghouse subsequently upgraded and updated the PRA model; however, Westinghouse reviewed the AP1000 probabilistic risk assessment for Revision 15 and concluded that the PRA remains valid for proposed revisions to the DCD (Westinghouse 2009-TN3243). The NRC staff evaluated the current PRA model and its results,

using guidance in *Probabilistic Risk Assessment Information to Support Design Certification and Combined License Applications* (DC/COL-ISG-3) (NRC 2008-TN671), and concluded that the Revision 15 results remain conservative and are an acceptable basis for evaluating severe accidents and strategies for mitigating them. FPL is required by regulation to upgrade and update the PRA prior to fuel loading. At that time, the NRC staff expects the PRA to be site-specific and that it would no longer use the bounding assumptions of the design-specific PRA.

FPL in its ER evaluation of the potential environmental consequences for the atmospheric and surface-water pathways (FPL 2014-TN4058) incorporates the results of the MELCOR Accident Consequence Code System (MACCS) computer code Version 1.13.1 (Chanin and Young 1998-TN66) run using AP1000 reactor source-term information and Turkey Point site-specific meteorological, population, and land-use data. FPL provided the NRC staff with copies of the input and output files for the MACCS computer runs (FPL 2014-TN3660). The NRC staff reviewed the files, ran confirmatory calculations, and determined that FPL's results are reasonable.

The MACCS computer code was developed to evaluate the potential offsite consequences of severe accidents for the sites covered by NUREG–1150 (NRC 1990-TN525). The MACCS code evaluates the consequences of atmospheric releases of radioactive material after a severe accident. The pathways modeled include exposure to the passing plume, exposure to radioactive material deposited on the ground and skin, inhalation of material in the passing plume and re-suspended from the ground, and ingestion of radioactively contaminated food and surface water.

Three types of severe accident consequences were assessed in the MACCS analysis: (1) human health, (2) economic costs, and (3) land area affected by contamination. Human health effects are expressed in terms of the number of cancers that might be expected if a severe accident were to occur. These effects are directly related to the cumulative radiation dose received by the general population. MACCS estimates both early fatalities and latent cancer fatalities. Early fatalities are related to high doses or dose rates and can be expected to occur within a year of exposure (Jow et al. 1990-TN526). Latent cancer fatalities are related to exposure of a large number of people to low doses and dose rates and can be expected to occur after a latent period of several (2 to 15) years. Population health-risk estimates are based on the population distribution within a 50 mi radius of the site. Economic costs of a severe accident include the costs associated with short-term relocation of people; decontamination of property and equipment; interdiction of food supplies, land, and equipment use; and condemnation of property. The affected land area is a measure of the areal extent of the residual radioactive contamination after a severe accident. Farmland decontamination is an estimate of the area that has an average whole body dose rate for the 4-year period after the release that would be greater than 0.5 rem/yr if not reduced by decontamination and that would have a calculated dose rate after decontamination of less than 0.5 rem/yr. Decontaminated farmland is not necessarily suitable for farming.

Risk is the product of the frequency and the consequences of an accident. For example, the probability of a severe accident without loss of containment for an AP1000 reactor at the Turkey Point site is estimated to be 2.2×10^{-7} per reactor-year (Ryr), and the cumulative population dose associated with a severe accident without loss of containment at the Turkey Point site is

calculated to be 18,182 person-rem. The population dose risk for this class of accidents is the product of 2.2×10^{-7}/Ryr and 18,182 person-rem, or 0.004 person-rem/Ryr.

The risks presented in the tables that follow are risks per year of reactor operation. FPL has submitted an application to construct and operate two AP1000 reactors at the Turkey Point site. The consequences of a severe accident would be the same regardless of whether one or two reactors were built at the site. If two reactors were built, the risks would apply to each reactor, and the total risk for the site would be approximately double the risk for a single reactor. The following sections discuss the estimated risks associated with each pathway.

5.11.2.1 Air Pathway

The MACCS code directly estimates consequences associated with releases to the air pathway. FPL used the MACCS code to estimate consequences to the population in 2080 based on meteorological data for 2002, 2005, and 2006. The 2002 meteorological data were used for most of the subsequent analyses because the data resulted in the largest consequence of the 3 years analyzed. The analysis assumed that 95 percent of the population was evacuated after the declaration of general emergency. The use of 95 percent of the population evacuated is conservative when it is compared to the general practice of using 99.5 percent for the fraction of the population assumed to be evacuated after the declaration of general emergency. An evacuation speed of 1 mph was assumed. The 1 mph evacuation speed was selected conservatively based on a study (KLD 2012-TN3244) conducted to estimate the evacuation time using expected traffic patterns during a general emergency.

The core damage frequencies (CDFs) given in Table 5-18 are for internally initiated accident sequences while the plant is at power. Internally initiated accident sequences include sequences that are initiated by human error, equipment failures, loss of offsite power, etc. Estimates of the CDFs for externally initiated events and during shutdown are discussed later in Section 5.11.2.4.

The risks calculated from the results of the MACCS runs are also presented in Table 5-18. This table shows that the probability-weighted consequences (i.e., risk) of severe accidents for an AP1000 reactor located at Turkey Point site are small for all categories of risk considered. For perspective, Table 5-19 and Table 5-20 compare the health risks from severe accidents for an AP1000 reactor at the Turkey Point site with the risks for current-generation reactors at various sites and with the health risks for AP1000 reactors at the North Anna, Clinton, Grand Gulf, and Vogtle early site permit sites.

In Table 5-19, the health risks estimated for an AP1000 reactor at the Turkey Point site are compared with health-risk estimates for the five reactors considered in NUREG–1150 (NRC 1990-TN525). Although risks associated with both internally and externally initiated events were considered for the Peach Bottom and Surry reactors in NUREG–1150 (NRC 1990-TN525), only internally initiated events are presented in Table 5-20. Table 5-20 also compares the health risks of an AP1000 reactor at the Turkey Point site with the health risks of an AP1000 reactor at four early site permit sites: North Anna (NRC 2006-TN7), Clinton (NRC 2006-TN672), Grand Gulf (NRC 2006-TN674), and Vogtle (NRC 2008-TN673).

Table 5-18. Mean Environmental Risks from AP1000 Reactor Severe Accidents at the Turkey Point Site

Release Category Description (Accident Class)		Core Damage Frequency (per Ryr)	Environmental Risk					
			Population Dose[a] (person-rem/Ryr)	Fatalities (per Ryr)		Cost[d] ($/Ryr)	Land Requiring Decontamination[e] (ac/Ryr)	Population Dose from Water Ingestion[a,f] (person-rem/Ryr)
				Early[b]	Latent[c]			
IC	Intact containment	2.2×10^{-7}	4.0×10^{-3}	0.0	2.4×10^{-6}	0.78	1.6×10^{-7}	1.6×10^{-5}
BP	Containment bypass	1.1×10^{-8}	2.0×10^{-1}	3.0×10^{-7}	1.4×10^{-4}	497	2.8×10^{-4}	9.2×10^{-3}
CI	Containment isolation failure	1.3×10^{-9}	8.3×10^{-3}	1.3×10^{-9}	5.4×10^{-6}	18	1.3×10^{-5}	1.7×10^{-4}
CFE	Early containment failure	7.5×10^{-9}	5.0×10^{-2}	2.5×10^{-8}	3.4×10^{-5}	116	7.9×10^{-5}	1.3×10^{-3}
CFI	Intermediate containment failure	1.9×10^{-9}	1.5×10^{-3}	5.0×10^{-11}	9.9×10^{-7}	4.2	3.5×10^{-6}	1.6×10^{-4}
CFL	Late containment failure	3.5×10^{-13}	4.3×10^{-6}	0.0	2.7×10^{-9}	0.014	9.0×10^{-9}	3.3×10^{-9}
	Total	2.4×10^{-7}	2.7×10^{-1}	3.2×10^{-7}	1.8×10^{-4}	636	3.8×10^{-4}	1.1×10^{-2}

(a) To convert to person-Sv, divide by 100.
(b) Early fatalities are fatalities related to high doses or dose rates that generally can be expected to occur within a year of the exposure (Jow et al. 1990-TN526).
(c) Latent cancer fatalities are fatalities related to low doses or dose rates that could occur after a latent period of several (2 to 15) years.
(d) Cost risk includes costs associated with short-term relocation of people, decontamination, interdiction, and condemnation. It does not include costs associated with health effects (Jow et al. 1990-TN526).
(e) Land risk is farmland requiring decontamination prior to resumption of agricultural usage.
(f) The meteorology data of 2005 yielded the largest population dose from water ingestion that are noted in this column.

Source: FPL 2014-TN4058, Table 7.2-1

Table 5-19. Comparison of Environmental Risks for an AP1000 Reactor at the Turkey Point Site with Risks for Current-Generation Reactors at Five Sites Evaluated in NUREG−1150 and the AP1000 at Four Early Site Permit Sites[a]

	Core Damage Frequency (per Ryr)	50 mi Population Dose Risk (person-rem/Ryr)[b]	Fatalities per Ryr		Average Individual Fatality Risk per Ryr	
			Early	Latent	Early	Latent Cancer
Grand Gulf[c]	4.0×10^{-6}	$5 \times 10^{+1}$	8×10^{-9}	9×10^{-4}	3×10^{-11}	3×10^{-10}
Peach Bottom[c]	4.5×10^{-6}	$7 \times 10^{+2}$	2×10^{-8}	5×10^{-3}	5×10^{-11}	4×10^{-10}
Sequoyah[c]	5.7×10^{-5}	$1 \times 10^{+3}$	3×10^{-5}	1×10^{-2}	1×10^{-8}	1×10^{-8}
Surry[c]	4.0×10^{-5}	$5 \times 10^{+2}$	2×10^{-6}	5×10^{-3}	2×10^{-8}	2×10^{-9}
Zion[c]	3.4×10^{-4}	$5 \times 10^{+3}$	4×10^{-5}	2×10^{-2}	9×10^{-9}	1×10^{-8}
AP1000[d] Reactor at the Turkey Point Site	2.4×10^{-7}	2.7×10^{-1}	3.2×10^{-7}	1.8×10^{-4}	2.0×10^{-10}	2.6×10^{-12}
AP1000[e] Reactor at North Anna	2.4×10^{-7}	8.3×10^{-2}	1.2×10^{-10}	4.0×10^{-5}	2.6×10^{-13}	4.9×10^{-11}
AP1000[f] Reactor at Clinton	2.4×10^{-7}	2.2×10^{-2}	1.4×10^{-8}	1.2×10^{-6}	6.4×10^{-13}	5.5×10^{-11}
AP1000 Reactor at Vogtle[g]	2.4×10^{-7}	2.8×10^{-2}	1.9×10^{-10}	1.9×10^{-5}	1.6×10^{-12}	1.1×10^{-11}
AP1000[h] Reactor at Grand Gulf	2.4×10^{-7}	1.4×10^{-2}	1.0×10^{-12}	6.9×10^{-6}	1.0×10^{-14}	2×10^{-11}

(a) NRC 1990-TN525.
(b) To convert to person-Sv, divide by 100.
(c) Risks were calculated using the MACCS code and presented in NUREG–1150 (NRC 1990-TN525).
(d) Calculated with MACCS code using Turkey Point site-specific input, Turkey Point Units 6 and 7 COL Application, Part 3 – Environmental Report (FPL 2014-TN4058, Table 7.2-1).
(e) NUREG–1811 (NRC 2006-TN7).
(f) NUREG–1815 (NRC 2006-TN672).
(g) NUREG–1872 (NRC 2008-TN673).
(h) NUREG–1817 (NRC 2006-TN674).

Table 5-20. Comparison of Environmental Risks from Severe Accidents Initiated by Internal Events for an AP1000 Reactor at the Turkey Point Site with Risks Initiated by Internal Events for Current Plants Undergoing Operating License Renewal Review and Environmental Risks of the AP1000 Reactor at Other Sites

	Core Damage Frequency (per yr)	80 km (50 mi) Population Dose Risk (person-rem/Ryr)[a]
Current Reactor Maximum[b]	2.6×10^{-4}	$9.5 \times 10^{+1}$
Current Reactor Mean[b]	2.7×10^{-5}	$2.0 \times 10^{+1}$
Current Reactor Median[b]	1.6×10^{-5}	$1.4 \times 10^{+1}$
Current Reactor Minimum[b]	1.9×10^{-6}	5.5×10^{-1}
AP1000[c] Reactor at the Turkey Point Site	2.4×10^{-7}	2.7×10^{-1}
AP1000[d] Reactor at North Anna	2.4×10^{-7}	8.3×10^{-2}
AP1000[e] Reactor at Clinton	2.4×10^{-7}	2.2×10^{-2}
AP1000[f] Reactor at Grand Gulf	2.4×10^{-7}	1.4×10^{-2}
AP1000[g] Reactor at Vogtle	2.4×10^{-7}	2.8×10^{-2}

(a) To convert to person-Sv, divide by 100.
(b) Based on MACCS calculations for over 70 current plants at over 40 sites.
(c) Calculated with MACCS code using Turkey Point site-specific input, Turkey Point Units 6 and 7 COL Application, Part 3 – Environmental Report (FPL 2014-TN4058, Table 7.2-1).
(d) NUREG–1811 (NRC 2006-TN7).
(e) NUREG–1815 (NRC 2006-TN672).
(f) NUREG–1817 (NRC 2006-TN674).
(g) NUREG–1872 (NRC 2008-TN673).

The last two columns of Table 5-19 provide average individual fatality risk estimates. To put these estimates into context for the environmental analysis, the staff compares these estimates to the safety goals. The Commission has set safety goals for average individual early fatality and latent cancer fatality risks from reactor accidents in the Safety Goal Policy Statement (51 FR 30028) (TN594). These goals are presented here solely to provide a point of reference for the environmental analysis and do not serve the purpose of a safety analysis. The Safety Goal Policy Statement expressed the Commission's policy regarding the acceptance level of radiological risk from a nuclear power plant operation as follows:

- Individual members of the public should be provided a level of protection from the consequences of nuclear power plant operation such that individuals bear no significant additional risk to life and health.
- Societal risks to life and health from nuclear power plant operation should be comparable to or less than the risks of generating electricity by viable competing technologies and should not be a significant addition to other societal risks.

The following quantitative health objectives are used in determining achievement of the safety goals:

- The risk to an average individual in the vicinity of a nuclear power plant of prompt fatalities that might result from reactor accidents should not exceed one-tenth of 1 percent (0.1 percent) of the sum of prompt fatality risks resulting from other accidents to which members of the U.S. population are generally exposed.

- The risk to the population in the area near a nuclear power plant of cancer fatalities that might result from nuclear power plant operation should not exceed one-tenth of 1 percent (0.1 percent) of the sum of cancer fatality risks resulting from all other causes.

These quantitative health objectives are translated into two numerical objectives as follows:

- The individual risk of a prompt fatality from all "other accidents to which members of the U.S. population are generally exposed," is about 4.0×10^{-4}/yr, including a 1.3×10^{-4}/yr risk associated with transportation accidents (NSC 2010-TN3240). One-tenth of 1 percent of these figures implies that the individual risk of prompt fatality from a reactor accident should be less than 4×10^{-7}/Ryr.
- "The sum of cancer fatality risks resulting from all other causes" for an individual is taken to be the cancer fatality rate in the United States, which is about 1 in 500 or 2×10^{-3}/yr (Reed 2007-TN523). One-tenth of 1 percent of this implies that the risk of cancer to the population in the area near a nuclear power plant because of its operation should be limited to 2×10^{6}/Ryr.
- MACCS computer code calculates average individual early and latent cancer fatality risks. The average individual early fatality risk is calculated using the population distribution within 1 mi of the plant boundary. The average individual latent cancer fatality risk is calculated using the population distribution within 10 mi of the plant. For the plants considered in NUREG–1150 (NRC 1990-TN525), these risks were well below the Commission's safety goals. Risks calculated by FPL for the AP1000 reactor design at the Turkey Point site are lower than the risks associated with the current-generation reactors considered in NUREG–1150 (NRC 1990-TN525) and are well below the Commission's safety goals.

The NRC staff compared the CDF and population dose risk estimate for an AP1000 reactor at the Turkey Point site with statistics summarizing the results of contemporary severe accident analyses performed for over 70 reactors at over 40 sites. The results of these analyses are included in the final site-specific Supplements 1 through 51 to the *Generic Environmental Impact Statement (GEIS) for License Renewal* (NUREG–1437) (NRC 2013-TN2654), and in the ERs included with license renewal applications for those plants for which supplements have not been published. All of the analyses were completed after publication of NUREG–1150 (NRC 1990-TN525), and the analyses for most of the reactors used MACCS, which was released in 1997. Table 5-20 shows that the CDFs estimated for the AP1000 reactor are significantly lower than the CDFs of current-generation reactors. Similarly, the population doses estimated for an AP1000 reactor at the Turkey Point site are well below the mean and median values for current-generation reactors undergoing license renewal.

Finally, the population dose risk from a severe accident for an AP1000 reactor at the Turkey Point site (0.27 person-rem/Ryr) may be compared to the dose risk for normal operation of a single AP1000 reactor at the Turkey Point site (4.0 person-rem/Ryr; see Section 5.9.3.2). The risk associated with a severe accident is about 15 times lower than the risk associated with normal operations. Comparatively, the population dose risk associated with a severe accident is small.

5.11.2.2 Surface-Water Pathways

Surface-water pathways are an extension of the air pathway. These pathways cover the effects of radioactive material deposited on open bodies of water and include ingestion of water and aquatic foods as well as water submersion and activities occurring near the water. Of these surface-water pathways, the ingestion of contaminated water was evaluated by MACCS code (Chanin and Young 1998-TN66). The risks associated with this surface-water pathway calculated for the Turkey Point site are included in the last columns of Table 5-18. The water-ingestion dose risk of 1.1×10^{-2} person-rem/Ryr is small compared to the total population dose risk of 0.27 person-rem/Ryr (FPL 2014-TN4058).

Although surface-water pathways beyond water ingestion are not considered in the MACCS code, they have been examined in the GEIS for license renewal in the context of renewal of licenses for current-generation reactors. Environmental consequences of potential surface-water pathways related to immersion, which involves swimming, fishing, boating, and performing activities near the shoreline, are not modeled by MACCS. FPL relied on generic analyses in the GEIS (NRC 2013-TN2654) for the immersion pathway. The GEIS (NRC 2013-TN2654) reiterates conclusions set forth in the *Final Environmental Statement Related to the Operation of Enrico Fermi Atomic Power Plant, Unit No. 2* (NUREG–0769) (NRC 1981-TN675) that indicate doses from shoreline activities and swimming are smaller than either water-ingestion doses or aquatic food ingestion doses.

For sites near large waterbodies, the NRC evaluated doses from the aquatic food pathway (fishing) for the current nuclear fleet discharging to various bodies of water in the GEIS (NRC 2013-TN2654). The NRC evaluation concluded that with interdiction, the risk associated with the aquatic food pathway is SMALL relative to the atmospheric pathway for most sites and essentially the same as the atmospheric pathway for the few sites with large annual aquatic food harvests. The new plant atmospheric pathway doses are lower than those of the current U.S. nuclear fleet; therefore, the doses from surface-water sources are consistently lower for the new plant as well.

FPL used the National Marine Fisheries Service database to determine the amount of commercial fish harvested for Hope Creek, Calvert Cliffs, and Turkey Point sites for the year 2010 (FPL 2010-TN1365). The amount of fish commercially harvested on the Florida east coast was 27,459,579 lb compared to 47,333,206 lb for the Chesapeake Bay area. FPL estimated that the expected uninterdicted aquatic food exposure pathway dose risk for the Turkey Points site would be lower than the uninterdicted aquatic food exposure pathway dose at the Calvert Cliff site. The NRC staff therefore agrees that the use of the Calvert Cliff site as a surrogate for the aquatic food exposure pathway is a reasonable assumption.

The NRC staff expects the actual dose rate to be a factor of 2 to 10 times smaller due to interdiction of contaminated food (NRC 2013-TN2654). The NRC staff also expects, because the AP1000 atmospheric exposure pathway doses are lower than those of the existing licensed power reactors, it is reasonable to conclude that the doses from surface-water sources would be considerably lower than those reported above for the surface-water exposure pathway. On this basis, the NRC staff believes that the overall surface-water pathway risk remains small when compared to the total population dose risk from all sources.

5.11.2.3 Groundwater Pathway

The groundwater pathway involves a reactor core melt, reactor vessel failure, and penetration of the floor (basemat) below the reactor vessel. Ultimately, core debris could reach the groundwater where soluble radionuclides are transported with the groundwater. In the GEIS (NRC 2013-TN2654), the NRC staff assumes a 1×10^{-4}/Ryr probability of occurrence of a severe accident with a basemat melt-through leading to potential groundwater contamination, and concludes that groundwater contribution to risk is generally a small fraction of the risk attributable to the atmospheric pathway. The FPL ER (FPL 2014-TN4058) summarizes the discussion in NUREG–1437 (NRC 2013-TN2654) and reaches the same conclusion.

The NRC staff has reevaluated its assumption of a 1×10^{-4}/Ryr probability of a basemat melt-through. The NRC staff believes that the 1×10^{-4} probability is too large for new plants. Design elements have been included in the AP1000 reactor design to minimize the potential for reactor core debris to reach groundwater. These elements include external reactor vessel cooling and ex-vessel core debris cooling. Further, the probability of core melt with a basemat melt-through should be no larger than the total CDF estimate for the reactor. Table 5-18 gives a total CDF estimate of 2.4×10^{-7}/Ryr for the AP1000 reactor. NUREG–1150 (NRC 1990-TN525) indicates that the conditional probability of a basemat melt-through ranges from 0.05 to 0.25 for current-generation reactors. If the CDFs for AP1000 severe accidents in which containment remains intact are subtracted from the total AP1000 CDF to get the CDF for severe accidents in which basemat melt-through is a possibility, the CDF is on the order of 2×10^{-8}/Ryr. On this basis, the NRC staff believes that a basemat melt-through probability of 2×10^{-8}/Ryr is reasonable and still conservative. The groundwater pathway is also more tortuous and affords more time for implementing protective actions than the air pathway and, therefore, results in a lower risk to the public. As a result, the NRC staff concludes that the risks associated with releases to groundwater are sufficiently small that they would not have a significant effect on the overall plant risk.

5.11.2.4 Externally Initiated Events

The analyses described above are specifically for internally initiated events. FPL's ER Revision 6 (FPL 2014-TN4058) also addresses potential consequences from externally initiated events consistent with the Turkey Point Units 6 and 7 COL FSAR, Revision 7 (FPL 2015-TN4502). FPL's approach is to qualitatively estimate the total event core damage frequency (internal and external events), which is approximately double the internal event core damage frequency. Application of such an external events multiplier would approximately double the resulting dose-risk or cost-risk. The review team considered these consequences, which are similar to the consequences of internal severe accidents, in evaluating the risks of external severe accidents in light of their probabilities, as set forth below, and as a contributor to the SAMDA evaluation. The AP1000 reactor vendor and the NRC have addressed three externally initiated events during initial design certification of the AP1000 reactor: (1) seismic, (2) internal fire, and (3) internal flooding events. The results of these analyses are described in Section 19.1.5 of the FSER for Revision 15 of the AP1000 DCD (NRC 2004-TN3253). While amending the certified design, the seismic hazard was reevaluated and the seismic margin analysis was revised. The results are described in Revision 19 of the AP1000 DCD (Westinghouse 2011-TN261). The NRC staff's evaluation is documented in Section 19.1.5 of Supplement 2 to the AP1000 FSER

(NRC 2011-TN2479). In addition, high winds, external flooding, transportation-related events, and potential hazards from nearby industrial facilities were assessed. The NRC staff's evaluation is documented in Sections 19.1.5.4 through 19.1.5.7 of the same supplement.

With respect to seismic events, the AP1000 reactor vendor performed a PRA-based seismic margin analysis. This analysis indicated that there is a high confidence (95 percent) that safety systems and components would survive a seismic event with a peak ground acceleration of 0.5 g. The safe-shutdown earthquake for the AP1000 reactor design is 0.3 g. Consequently, the NRC staff concluded in the FSER that the AP1000 reactor design is acceptable (NRC 2004-TN3253). After re-evaluating the seismic hazard for the amended design and for a spectrum of site characteristics ranging from soft soil to hard rock and updating the PRA-based seismic margin analysis, the applicant reported the same results for the amended design. Consequently, the NRC staff concluded that the amended design is acceptable (NRC 2011-TN2479). FPL reported the same results for the amended design. The NRC staff reviewed and evaluated FPL's results to ensure they meet all applicable regulatory requirements (NRC 2016-TN4805). The NRC staff considers it unlikely for the site-specific evaluation to differ from the AP1000 conclusions.

With respect to other external events, the applicant found that the risks are negligible. For high winds, the annual CDF was determined not to exceed 1×10^{-8} per year, and a more detailed analysis was not required. Similarly, the design basis flood elevation (24.8 ft) is below the design plant grade (26.0 ft), and no further evaluation of accidents resulting from external floods is required.

With respect to internal fires, the AP1000 reactor vendor estimated the fire-induced CDF to be about 5.6×10^{-8}/yr during power operation and about 8×10^{-8}/yr during shutdown, and considers these estimates to be conservative. While the NRC staff believes that such a conclusion is not possible without a detailed PRA, the NRC staff, in its safety review, concluded that the AP1000 reactor design is capable of withstanding severe accident challenges from internal fires in a manner superior to most, if not all, operating plant designs (NRC 2011-TN2479). The applicant reaches similar conclusions for the other external hazards, as summarized in Chapter 19 of the Turkey Point Units 6 and 7 COL FSAR, Revision 7 (FPL 2015-TN4502).

With respect to internal flooding, the AP1000 reactor vendor did not perform a detailed PRA to assess the risk from internal flooding. Instead, the vendor performed an internal flooding PRA commensurate with the level of detail available and, where detailed information was not available, made conservative assumptions to bound the flooding analysis. In its safety review, the NRC staff found that this analysis was adequate to identify potential vulnerabilities and to lend insight into the design that could be used to support design-certification requirements. Quantification of potential scenarios with the plant at power resulted in a total CDF from internal floods of about 1×10^{-9}/yr. The CDF from internal floods when the plant is shutdown is estimated to be about 3.2×10^{-9}/yr. The vendor considers these estimates to be conservative. While the NRC staff believes that such a conclusion is not possible without a detailed PRA, the NRC staff, in its safety review, concluded that the AP1000 reactor design is capable of withstanding severe accident challenges from internal floods in a manner superior to operating plants and is consistent with the conclusions from the vendor's internal flood risk analysis (NRC 2011-TN2479).

With respect to high winds, the AP1000 reactor vendor considered extratropical cyclones, hurricanes up to Category 5 on the Saffir-Simpson scale, and tornadoes up to EF5 on the enhanced Fujita scale. The total contribution of high winds to CDF was reported to be 1.38×10^{-8}/yr by the AP1000 reactor vendor (Westinghouse 2011-TN261), assuming that only safety systems are available. The more detailed analysis in the Turkey Point Units 6 and 7 COL FSAR, Revision 7 (FPL 2015-TN4502) also estimated CDF probability from high wind on the order of 1.0×10^{-8}/yr. The NRC staff reviewed and evaluated FPL's results to ensure they meet all applicable regulatory requirements (NRC 2016-TN4805). The NRC staff considers it unlikely for the site-specific evaluation to differ from the AP1000 conclusions.

With respect to external flooding, the AP1000 reactor vendor considered all sources of flooding that could occur at any site and concluded that, as long as floodwaters did not rise to the level of the plant grade, there would be no contribution to CDF. More detail evaluation of external flooding at Turkey Point site also confirmed that the flood level at probable maximum precipitation will be below the plant grade. As noted in the Turkey Point Units 6 and 7 COL FSAR, Revision 7 (FPL 2015-TN4502),

> …flood levels at Turkey Point Units 6 & 7 during severe storms, such as the PMP [probable maximum precipitation] event, would be controlled by storm tides in the Biscayne Bay because Turkey Point Units 6 & 7 are located on the Biscayne Bay shoreline and there are no major streams or rivers nearby. As a result, a detailed modeling analysis to determine the flood levels from PMF [probable maximum flood] on streams and rivers was not performed for Turkey Point Units 6 & 7.

The NRC staff reviewed and evaluated FPL's results to ensure they meet all applicable regulatory requirements (NRC 2016-TN4775). The NRC staff considers it unlikely for the site-specific evaluation to differ from the AP1000 conclusions with respect to external flooding.

With respect to all other hazards related to transportation and nearby industrial activities, the risks from accidents are addressed by the AP1000 reactor vendor in a generic but bounding manner. These accidents have also been addressed as a part of Chapter 19 and Chapter 2 of the Turkey Point Units 6 and 7 COL FSAR, Revision 7 (FPL 2015-TN4502), and FPL found them to be highly unlikely or to have an insignificant contribution to CDF; therefore, they were screened out. The NRC staff reviewed FPL's results to ensure they meet all applicable regulatory requirements (NRC 2016-TN4775, NRC 2016-TN4805).

The NRC staff considers it unlikely for the site-specific evaluation for these other hazards to differ from the AP1000 conclusions.

5.11.2.5 Summary of Severe Accident Impacts

The FPL application refers to Revision 19 of the AP1000 reactor certified design (10 CFR Part 52) [TN251], Appendix D). The consequence assessment is based on the PRA for Revision 15 of the AP1000 design (Westinghouse 2005-TN3242). Westinghouse subsequently upgraded and updated the PRA; however, Westinghouse reviewed the AP1000 PRA report submitted with Revision 15 of the DCD and concluded that the reported results and insights remain valid for proposed revisions of the DCD (Westinghouse 2010-TN3251). The NRC staff evaluated the current PRA model and its results, using guidance in *Probabilistic Risk Assessment Information to Support Design Certification and Combined License Applications* (DC/COL-ISG-3)

(NRC 2008-TN671), and concluded that the Revision 15 results remain conservative and are an acceptable basis for evaluating severe accidents and strategies for mitigating them. FPL is required by regulation to upgrade and update the PRA prior to fuel loading. At that time, the NRC staff expects the PRA to be site-specific and that it will no longer use the bounding assumptions of the design-specific PRA. The NRC staff considers it unlikely that the PRA would change sufficiently to cause the NRC staff to materially change its conclusions related to severe accident risks.

The NRC staff reviewed the risk analyses in the ER (FPL 2014-TN4058) and conducted a confirmatory analysis of the probability-weighted consequences of severe accidents for proposed Turkey Point Units 6 and 7 using the MACCS code. The results of both the FPL analysis and the NRC staff analysis indicate that the environmental risks associated with severe accidents if an AP1000 reactor were to be located at the Turkey Point site would be small compared to risks associated with operation of the current-generation reactors at the Turkey Point site (e.g., Units 3 and 4) and other sites. These risks are below the NRC safety goals. On these bases, the NRC staff concludes that the environmental impact of the probability-weighted consequences of severe accidents at the Turkey Point site would be SMALL for the proposed AP1000 reactors.

5.11.3 Severe Accident Mitigation Alternatives

The purpose of the evaluation of severe accident mitigation alternatives (SAMAs) is to determine whether there are severe accident mitigation design alternatives (SAMDAs), procedural modifications, or training activities that can be justified to further reduce the risks of severe accidents (NRC 2000-TN614). FPL based its COL application on the AP1000 reactor design (see 10 CFR Part 52 [TN251], Appendix D – Design Certification Rule for the AP1000 Design), which incorporates many features intended to reduce CDFs and the risks associated with severe accidents. The effectiveness of the AP1000 reactor design features is evident in Table 5-19 and Table 5-20, which compare CDFs and severe accident risks for the AP1000 reactor with CDFs and risks for current-generation reactors. The CDFs and risks have generally been reduced considerably when compared to the existing current-generation reactors.

Consistent with the direction from the Commission to consider the SAMDAs at the time of initial certification, the AP1000 reactor vendor (Westinghouse 2005-TN3242) and the NRC staff (NRC 2004-TN3253; NRC 2005-TN3252) considered a number of design alternatives for an AP1000 reactor at a generic site. The conclusion of the NRC staff's review was as follows:

> … none of the potential design modifications evaluated are justified on the basis of benefit-cost considerations. The NRC further concludes that it is unlikely that any other design changes would be justified in the future on the basis of person-rem exposure because the estimated CDFs are very low on an absolute scale.

Westinghouse reviewed the AP1000 PRA for Revision 15 and concluded that the PRA remains valid for the revision of the DCD (Westinghouse 2010-TN3251); this conclusion is unchanged for subsequent revisions through Revision 19 (Westinghouse 2011-TN261). Furthermore, the NRC staff evaluated the current PRA, using guidance in *Probabilistic Risk Assessment Information to Support Design Certification and Combined License Applications*

(DC/COL-ISG-3) (NRC 2008-TN671), and concluded that the PRA submitted with Revision 15 is a conservative and acceptable basis for evaluating severe accidents and strategies for mitigating them. Therefore, the NRC staff considers the PRA for DCD Revision 15 to be an adequate basis for a SAMDA analysis for an application referencing DCD Revision 19. Consequently, the NRC staff incorporates by reference the environmental assessment accompanying the design-certification rulemaking for Appendix D to 10 CFR Part 52 (TN251) (NRC 2006-TN7; NRC 2006-TN672; NRC 2006-TN674).

Section 5.11.2 presents the environmental risks from various classes of severe accidents for the Turkey Point site. Site-specific information appears in SAMDA evaluations as population dose risk (person-rem/Ryr) and offsite economic costs ($/Ryr). The staff considers these two elements to be the appropriate metrics to use to determine whether the site characteristics are bounded by the site parameters because they are calculated from the site-specific meteorology, population distribution, and land-use data. Appendix 1B of the AP1000 DCD (Westinghouse 2011-TN261) lists the population dose risk (person-rem/Ryr) used in the DCD generic SAMDA review. While it does not list the offsite economic costs, it does include a maximum attainable benefit that considers offsite economic costs, onsite exposure costs, onsite cleanup costs, and replacement power costs, in addition to the cost associated with the offsite population dose risk. To perform a like-kind comparison, the NRC staff used the maximum attainable benefit-cost for Turkey Point site. The DCD probability-weighted, mean population dose risks from Table 1B-1 in Appendix 1B and the base-case maximum attainable benefit listed in Table 1B-4 are the metrics used by the NRC staff to determine whether the Turkey Point site characteristics are within the site parameters specified in Appendix 1B of the AP1000 DCD (Westinghouse 2011-TN261).

Table 5-21 presents a comparison of Turkey Point site-specific values (FPL 2014-TN4058) with the generic values from Appendix 1B of the AP1000 DCD (Westinghouse 2008-TN496). Table 5-21 shows that the population dose risk for the Turkey Point site is approximately 6 times larger than the DCD Appendix 1B value, while the maximum attainable benefit for the Turkey Point site is approximately 2 to 3 times greater than the DCD Appendix 1B value. The population dose risk and the maximum attainable benefit are higher than the value reported in DCD Appendix 1B because of the large population of the surrounding areas of Turkey Point site. The NRC staff confirmed these assertions by examining the population and the property value estimates from the latest census data of 2010 and the results of case runs made by using the latest version of SECPOP 2010 software (NRC 2003 (NUREG/CR-6525); Bixler et al. 2003-TN3636). The NRC staff also examined the sensitivity of the maximum attainable benefit at the Turkey Point site to a higher plant capacity factor in replacement power costs and higher property values surrounding the Turkey Point site.

The generic AP1000 SAMDA analysis is presented in Appendix 1B of the DCD (Westinghouse 2011-TN261). Design alternatives considered by Westinghouse and their estimated implementation costs are presented in Table 5-22 (Westinghouse 2011-TN261, Table 1B-5). In the base-case analysis, the benefit-cost methodology of NUREG/BR-0184 (NRC 1997-TN676) is used to calculate the maximum attainable benefit. The analysis assumes that the implementation of the design alternative completely eliminates all potential for core damage. For the AP1000, the maximum attainable benefit was valued at $21,000 (Westinghouse 2011-TN261, Appendix 1B, Section 1B.1.8). Only one design alternative in

Table 5-22—the self-actuating containment isolation valves—has a cost ($33,000) comparable to the maximum attainable benefit. To evaluate the benefit of this SAMDA, the design change was assumed to eliminate the Containment Isolation severe accident release category, which is only a small contributor to the total CDF. Therefore, this design alternative provides almost no benefit in reducing the AP1000 CDF.

Table 5-21. Comparison of the Turkey Point Site SAMDA Characteristics with Parameters Specified in Appendix 1B of the AP1000 DCD

	Population Dose Risk, Person-rem/Ryr	Maximum Attainable Benefit
DCD Appendix 1B (internal events)	4.3×10^{-2}	$21,000
Turkey Point site (internal events)	2.7×10^{-1}	$55,513
Turkey Point site risk as fraction of DCD risk (%)	628	264

Source: FPL 2014-TN4058, Table 7.2-2

Table 5-22. Alternatives Considered for the SAMDA in the AP1000 DCD

No.	Design Alternative	Cost ($)
1	Upgrade chemical, volume, and control system for small loss-of-coolant accident	1,500,000
2	Containment filtered vent	5,000,000
3	Self-actuating containment isolation valves	33,000
4	Safety grade passive containment spray	3,900,000
6	Steam generator shell-side heat removal	1,300,000
7	Steam generator relief flow to in-containment refueling water storage tank (IRWST)	620,000
8	Increased steam generator pressure capability	8,200,000
9	Secondary containment ventilation with filtration	2,200,000
10	Diverse IRWST injection valves	570,000
12	Ex-vessel core catcher	1,660,000
13	High-pressure containment design	50,000,000
14	More reliable diverse actuation system	470,000

Source: Westinghouse 2011-TN261, Table 1B-5.

For SAMDA analysis, the base-case CDF, dose risk, and cost risk for internal events were escalated to account for external events, both at power and at shutdown, by using the ratio of the total annual CDF to the annual CDF from internal events $(5.0 \times 10^{-7})/(2.40 \times 10^{-7})$. The monetized value for reducing the base-case CDF to zero for an AP1000 reactor at the Turkey Point site was estimated. The basic assumptions used in monetizing the accident risk were consistent with those delineated in NUREG/BR-0184 (NRC 1997-TN676), such as $2,000 per person-rem for internal and external dose estimated by MACCS code, 60-year plant life, and the 1993 economic discount rates.

The FPL ER (FPL 2014-TN4058) updates the SAMDA analysis conducted for AP1000 design certification using the results of the Turkey Point site-specific consequence analysis (MACCS) discussed in Section 7.2 of the ER and Section 5.11.2 of this EIS. The results of the FPL analysis indicate that the maximum potential benefit if the total risk for the AP1000 at Turkey Point site could be reduced to zero has a value of about $55,513. Similar to the finding in the AP1000 DCD SAMDA analysis, only the self-actuating containment isolation valves design

alternative (Table 5-22) has a value comparable to the maximum attainable benefit for the Turkey Point site. To evaluate the maximum benefit of implementing this SAMDA, it was assumed that the Containment Isolation severe accident release category would be eliminated and its contribution would be added to the Intact Containment release category. The frequency contribution of failure of Containment Isolation severe accident release category is small, as shown in Table 5-14. Therefore, the benefit associated with the implementation of this SAMDA is only $994 (FPL 2014-TN4058). Table 5-22 identifies the cost associated with various design alternatives considered for SAMDA in the AP1000 DCD.

In a Commission ruling in the Indian Point license renewal proceeding, the Commission required sensitivity analyses regarding two MACCS decontamination input parameter values in the context of the severe accident mitigation alternative (SAMA) evaluation. *See Entergy Nuclear Operations, Inc.*, (Indian Point Nuclear Generating Units 2 and 3), CLI-16-07, 83 NRC ___ (May 4, 2016) (NRC 2016-TN4631). In view of the Commission decision in CLI-16-07, the staff determined that a sensitivity study would be appropriate for the Turkey Point Units 6 and 7 COL SAMDA assessments. The two MACCS input parameters are decontamination cost of non-farmland (CNDFRM) and decontamination duration (TIMDEC). The staff performed this sensitivity study as described in Appendix G, Section G.4. The sensitivity study accounts for higher input parameter values as described in Appendix G, and the results demonstrate that the original staff conclusion that no SAMDA is cost-beneficial set forth in the draft EIS remains valid.

FPL is required by regulation to update the PRA prior to fuel loading. The NRC staff expects the site-specific PRA to be more realistic than the generic (design-specific) PRA, which uses bounding assumptions. The NRC staff considers it unlikely that the PRA would change sufficiently to cause the NRC staff to conclude that any SAMDA considered in the design-certification process would become cost-beneficial.

The SAMDA issue is a subset of the SAMA review. FPL has not yet addressed the other attributes of the SAMA review (i.e., procedural modifications and training activities). However, FPL has stated that risk insights would be considered in the development of plant procedures and training (FPL 2014-TN4058). Because the maximum attainable benefit is relatively low, a SAMA based on procedures or training for an AP1000 reactor at the Turkey Point site would almost have to eliminate risk entirely to become cost-beneficial. Based on its evaluation, the NRC staff concludes that it is unlikely that any of the SAMAs based on procedures or training would reduce the CDF or risk sufficiently. Therefore, the staff further concludes it is unlikely that these SAMAs would be cost-effective. The NRC staff considers it to be unlikely for the site-specific PRA results to change sufficiently to cause any of the SAMDAs that are considered in the design-certification process to become cost-beneficial. In addition, based on statements by FPL in the ER (FPL 2014-TN4058), the staff expects that FPL will consider risk insights in the development of procedures and training. However, this expectation is not crucial to the staff's conclusions because the staff already concluded procedural and training SAMAs would be unlikely to be cost-effective. Therefore, the NRC staff concludes that SAMAs have been appropriately considered.

5.11.4 Summary of Postulated Accident Impacts

The NRC staff evaluated the environmental impacts from DBAs and severe accidents for an AP1000 at the Turkey Point site. Based on the information provided by FPL and NRC's own independent review, the NRC staff concludes that the potential environmental impacts (risks) from a postulated accident from the operation of the proposed Turkey Point Units 6 and 7 would be SMALL, and no further mitigation would be warranted.

5.12 Measures and Controls to Limit Adverse Impacts during Operation

In its evaluation of environmental impacts during operation of proposed Turkey Point Units 6 and 7, the review team relied on FPL's compliance with the following measures and controls that would limit adverse environmental impacts:

- compliance with applicable Federal, State, and local laws, ordinances, and regulations intended to prevent or minimize adverse environmental impacts;
- compliance with applicable requirements of permits or licenses required for operation of the new units (e.g., NPDES permit);
- compliance with existing Turkey Point Units 1–5 processes and/or procedures applicable to proposed Units 6 and 7 environmental compliance activities for the Turkey Point site;
- compliance with FDEP final Conditions of Certification; and
- implementation of BMPs.

The review team considered these measures and controls in its evaluation of the impacts of plant operation. Table 5-23, which is the staff's adaptation from sections of FPL's ER Table 5.10-1 (FPL 2014-TN4058), lists a summary of measures and controls to limit adverse impacts during operation proposed by FPL.

Table 5-23. Summary of Proposed Measures and Controls to Limit Adverse Impacts during Operation

Impact Category	Specific Measures and Control
Land-Use Impacts	
The Site and Vicinity	FPL did not propose any additional measures or controls.
Transmission Line Corridors and Offsite Areas	**Environmental impacts of T-Lines:** **Terrestrial** – Maintenance procedures have previously been established. Consultations would be held with appropriate Federal, State, and local agencies about mitigation actions for the known populations of multiple threatened and endangered species, as needed. **Aquatic** – Environmental Best Management Practices (BMPs) would be used to reduce soil erosion and sedimentation. Corridor vegetation-management and line-maintenance programs and procedures have been established to minimize impacts. The same procedures establish strict guidelines for use of herbicides application according to Federal, State, and local regulations. In addition, environmental BMPs would be used to reduce soil erosion and sedimentation vegetation management in forested wetlands would be in full compliance with Florida Statute 403.814 General Permits.

Table 5-23. (contd)

Impact Category	Specific Measures and Control
Water-Related Impacts	
Water-Use Impacts	A monitoring well system would be installed near the location of the RCW caissons that would be used to monitor the groundwater elevation and quality during operation of the radial collector wells.
Water-Quality Impacts	The use of environmental BMPs along with a spill prevention plan would prevent or minimize the potential impacts of sediment transport or releases to the environment. Monitoring wells could be installed and used to monitor the groundwater level and water quality inshore of the radial collector well locations. Environmental BMPs and a spill prevention plan would be used to minimize and prevent impacts. Any minor spills of diesel fuel, hydraulic fluid, lubricants, or other pollutants would be cleaned up quickly to prevent them from moving into the groundwater. Mitigation for water quality would not be warranted beyond the FDEP final Conditions of Certification.
Ecological Impacts	
Terrestrial Ecosystems	Light pollution during facility operation could affect wildlife residing on or migrating through the Turkey Point site. Possible mitigation measures include minimizing upward lighting, reduced lighting from 11 p.m. to sunrise, providing light only where needed. Vegetation control for transmission line maintenance would follow a site-specific maintenance program that accounts for local conditions and resources. Herbicide use would be in accordance with manufacturer specifications and carried out by licensed applicators. Stormwater from the newly developed facilities could affect local resources. Mitigation includes use of retention basins and oil-water separation and riprap aprons. Cooling-tower noise could affect local wildlife. Splash guards and stacks on mechanical fans would reduce and divert noise. Uncertainty exists regarding the potential for increased vehicle collision mortality to sensitive species. Roads developed during construction would be returned to previous condition. Unavoidable wetland impacts would be mitigated in compliance with Federal and State permitting processes. FPL has drafted a mitigation plan that would compensate for the loss or impairment of wetland functions affected by operation of the Turkey Point site and the associated offsite facilities. FPL has committed to developing a final wetland mitigation plan that would provide at least as many Uniform Mitigation Assessment Methodology functional lift units as the actual Turkey Point site project losses incurred. A Condition of Certification by the Florida Department of Environmental Protection would require protocol surveys for listed species (excluding plants) that may occur on the Turkey Point site and associated offsite facilities prior to land “clearing and construction.” If listed species are detected and operational impacts cannot be avoided, appropriate mitigation may be

Table 5-23. (contd)

Impact Category	Specific Measures and Control
	required on a case-by-case basis as determined through consultation with the Florida Fish and Wildlife Conservation Commission.
	Uncertainty exists regarding potential wood stork mortality and loss of foraging from transmission line operation. FPL would fund a Mitigation Effectiveness Study to determine mortality from collision with transmission lines and loss of foraging habitat within core foraging areas.
Aquatic Ecosystems	Environmental BMPs would be used to reduce to minimize impacts on onsite and offsite aquatic resources, including listed species and the Mangrove Rivulus, a State and Federal Species of Special Concern. Transmission line corridor vegetation-management and line-maintenance programs and procedures would also be employed by FPL to minimize impacts. These procedures would include adherence to strict guidelines established by Federal, State, and local resource agencies regarding the use of herbicides.
Socioeconomic Impacts	
Physical Impacts	FPL would improve roads and control speed limits to minimize noise impacts.
	FPL would comply with the State of Florida PSD permit limits and regulations for operating air emission sources.
Social and Economic Impacts	FPL would communicate with local and regional governmental and nongovernmental organizations to disseminate project information and enable organizations to plan accordingly for changes in land-use patterns, housing markets, water and wastewater demand and public school enrollment.
Environmental Justice Impacts	No mitigating measures or controls are considered to be required.
Historic and Cultural Resources Impacts	FPL would develop an unanticipated discovery plan for the treatment of cultural resources inadvertently discovered during operation activities, such as maintenance.
Air-Quality Impacts	Obtain air permits, operate systems within permit limits, and monitor emissions as required.
Radiological Impacts of Normal Operation	
Radiation Doses to Members of the Public	The radiological monitoring program requires that radiological releases be monitored. If conditions warrant, the pertinent operating/control procedures would be enacted.
Occupational Doses	The radiological monitoring program requires that radiological releases be monitored. If conditions warrant, the pertinent operating/control procedures would be enacted. Transportation impact – For workers whose job functions have the risk of large exposures, the radiological protection programs are configured to limit and manage those doses.
Radiation Doses to Biota Other than Humans	The radiological monitoring program requires that radiological releases be monitored. If conditions warrant, the pertinent operating/control procedures would be enacted.

Table 5-23. (contd)

Impact Category	Specific Measures and Control
Nonradioactive Waste Impacts	
Nonradioactive Waste System Impacts	Proposed practices for recycling, minimizing, managing, and disposing of wastes and the requirement to obtain regulatory approvals for waste disposal and discharges would help minimize impacts from waste generation.
Mixed-Waste Impacts	Mixed waste would be handled and managed in accordance with the applicable Federal, State, and local requirements. The packaged waste would be stored in the auxiliary and radwaste buildings until being shipped offsite to a licensed disposal facility.
Impacts of Postulated Accidents	
Design Basis Accidents	The calculated dose consequences of design basis accidents for an AP1000 were found to be within regulatory limits.
Severe Accidents	The calculated probability-weighted consequences of severe accidents for the AP1000 at the Turkey Point site were found to be lower than the probability-weighted consequences for current operating reactors and the Commission's reactor safety goals.
Nonradiological Health Impacts	• Monitor and maintain reclaimed water (i.e., tertiary) treatment facility to minimize levels of microbial and chemical agents in the cooling tower and condenser. • Comply with OSHA standards for Turkey Point operational workers. • Monitor the release of nonradiological waste emissions and effluents.

5.13 Summary of Operational Impacts

The review team's evaluation of the environmental impacts of operations of proposed Turkey Point Units 6 and 7 is summarized in Table 5-24. Impact levels are denoted in the table as SMALL, MODERATE, or LARGE as a measure of their expected adverse impacts. Socioeconomic categories for which the impacts are likely to be beneficial are noted as such in the Impact Level column.

Table 5-24. Summary of Operational Impacts for the Proposed Turkey Point Units 6 and 7

Category	Comments	Impact Level
Land-Use Impacts	Operational activities would be compatible with other land uses on the Turkey Point site. Operation and maintenance of transmission lines in urban areas and near National Parks could pose land-use compatibility issues.	MODERATE
Water-Related Impacts		
Water Use – Surface Water	Operational activities would have negligible impacts on surface-water availability.	SMALL

Table 5-24. (contd)

Category	Comments	Impact Level
Water Use – Groundwater	Operational activities would have negligible impacts on groundwater availability because the primary source of cooling water would be reclaimed wastewater. The backup water supply (radial collector wells) would be used infrequently (60 d/yr or less) so the impact of the backup water-supply system on groundwater availability would also be SMALL.	SMALL
Water Quality – Surface Water	Operational activities would have negligible impacts on surface-water quality.	SMALL
Water Quality – Groundwater	Operational activities would have negligible impacts on groundwater quality.	SMALL
Ecological Impacts		
Terrestrial Ecosystems	Operational activities have the potential of increased vehicle collision mortality to the Florida panther, vegetation-control effects on listed plants, and transmission-system impacts on wood storks and Everglade snail kites.	MODERATE
Aquatic Ecosystems	During permitted radial collector well operation (60 d/yr or less), there would be no noticeable change in salinity above or below normal background variation. The use of reclaimed water from Miami-Dade County to operate the cooling system would not result in noticeable impacts on onsite and offsite aquatic resources.	SMALL
Socioeconomic Impacts		
Physical	Physical impacts of operations on workers and the local public, buildings, and aesthetics near the Turkey Point site would be SMALL.	SMALL
Demography	Demographic impacts of operation in Miami-Dade County would be SMALL.	SMALL
Economic Impacts on Community	The economic impacts of operating Turkey Point Units 6 and 7 would be SMALL and beneficial in Miami-Dade County as well as in Homestead and Florida City.	SMALL and Beneficial
Infrastructure and Community Services	The operational impacts on the regional infrastructure and community services would be SMALL with the exception of impacts on traffic, which would be MODERATE.	SMALL to MODERATE

Table 5-24. (contd)

Category	Comments	Impact Level
Environmental Justice Impacts	No environmental pathways or health and other preconditions of the minority and low-income populations were found that would lead to disproportionately high and adverse impacts.	NONE[(a)]
Historic and Cultural Resources Impacts	Based on (1) no known significant cultural resources within the Areas of Potential Effect, (2) the review team's cultural resource analysis and consultation, (3) FPL's commitment to develop procedures that would be in place if ground-disturbing or maintenance activities discover historic or cultural resources, and (4) the NRC's and FPL's consultation with the Florida SHPO that concluded a finding of "no historic properties affected" (FDHR 2010-TN1455; FPL 2014-TN4058), the review team concludes that the impacts from operation would be SMALL.	SMALL
Meteorological and Air-Quality Impacts	The impacts of operating proposed Units 6 and 7 on air quality from emissions of criteria pollutants, CO_2 emissions, and cooling-system emissions would be SMALL and warrant no further mitigation.	SMALL
Nonradiological Health Impacts	Risks from etiological and chemical agents would be minimal. Noise impacts would be minimal, complying with all Federal, State, and County regulations. Occupational safety and health impacts would be limited by compliance with OSHA standards. Acute effects of electromagnetic fields would be avoided by compliance with National Electrical Safety Code standards. Transportation impacts would be minimal.	SMALL
Radiological Health Impacts		
Members of Public	Doses to members of the public would be below NRC and U.S. Environmental Protection Agency standards and there would be no observable health impacts (10 CFR Part 20 [TN283], Appendix I to 10 CFR Part 50 [TN249], 40 CFR Part 190 [TN739]).	SMALL
Plant Workers	Occupational doses to plant workers would be below NRC standards and a program to maintain doses as low as reasonably achievable would be implemented.	SMALL
Biota Other than Humans	Doses to biota other than humans would be well below National Council on Radiation Protection and Measurements and International Atomic Energy Agency guidelines.	SMALL

Table 5-24. (contd)

Category	Comments	Impact Level
Nonradioactive Waste Impacts	Proposed practices for recycling, minimizing, managing, and disposing of wastes and the requirement to obtain regulatory approvals for waste disposal and discharges would help minimize impacts from waste generation at Turkey Point Units 6 and 7.	SMALL
Impacts of Postulated Accidents		
Design Basis Accidents	Impacts of design basis accidents would be well below regulatory limits.	SMALL
Severe Accidents	Probability-weighted consequences of severe accidents would be lower than the probability-weighted consequences for currently operating reactors.	SMALL

(a) A determination of “NONE” for Environmental Justice analyses does not mean there are no adverse impacts on minority or low-income populations from the proposed project. Instead, an indication of “NONE” means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

6.0 FUEL CYCLE, TRANSPORTATION, AND DECOMMISSIONING

This chapter addresses the environmental impacts from (1) the uranium fuel cycle and solid waste management, (2) the transportation of radioactive material, and (3) the decommissioning of proposed Turkey Point Nuclear Power Plant (Turkey Point) Units 6 and 7 in Miami-Dade County, Florida.

In its evaluation of uranium fuel-cycle impacts from proposed Units 6 and 7 at the Turkey Point site, Florida Power & Light Company (FPL) used the AP1000 pressurized water reactor design. The capacity factor reported by FPL for the AP1000 reactor design is 93 percent (FPL 2014-TN4058). The results reported here apply to the impacts from two Westinghouse Electric Company, LLC (Westinghouse) AP1000 pressurized water reactor units.

6.1 Fuel-Cycle Impacts and Solid Waste Management

This section discusses the environmental impacts from the uranium fuel cycle and solid waste management for the AP1000 reactor design. The environmental impacts of this design are evaluated against specific criteria for light water reactor (LWR) designs at Title 10 of the *Code of Federal Regulations* (CFR) 51.51 (TN250).

The regulations in 10 CFR 51.51(a) (TN250) state that

> Under § 51.50, every environmental report prepared for the construction permit stage or early site permit stage or combined license stage of a light-water-cooled nuclear power reactor, and submitted on or after September 4, 1979, shall take Table S–3, Table of Uranium Fuel Cycle Environmental Data, as the basis for evaluating the contribution of the environmental effects of uranium mining and milling, the production of uranium hexafluoride, isotopic enrichment, fuel fabrication, reprocessing of irradiated fuel, transportation of radioactive materials and management of low-level wastes and high-level wastes related to uranium fuel cycle activities to the environmental costs of licensing the nuclear power reactor. Table S–3 shall be included in the environmental report and may be supplemented by a discussion of the environmental significance of the data set forth in the table as weighed in the analysis for the proposed facility.

The AP1000 reactors proposed for the Turkey Point site are LWRs that would use uranium dioxide fuel; therefore, Table S–3 (10 CFR Part 51) (TN250) can be used to assess environmental impacts of the uranium fuel cycle. The values provided in Table S–3, which are reproduced in Table 6-1, are normalized for a reference 1,000 MW(e) LWR at an 80 percent capacity factor.

The gross electrical power output for each of the two AP1000 reactors proposed for the Turkey Point site is 1,115 MW(e) (FPL 2014-TN4058), and the capacity factor is 93 percent.

Specific categories of environmental considerations are included in Table S–3 (see Table 6-1). These categories relate to land use, water consumption and thermal effluents, radioactive

releases, burial of transuranic and high-level wastes and low-level wastes (LLWs), and radiation doses from transportation and occupational exposures. In developing Table S–3, the U.S. Nuclear Regulatory Commission (NRC) staff considered two fuel-cycle options that differed in the treatment of spent fuel removed from a reactor. The "no-recycle" option treats all spent fuel as waste to be stored at a Federal waste repository, whereas, the "uranium-only recycle" option involves reprocessing spent fuel to recover unused uranium and return it for use in new fuel. Neither cycle involves the recovery of plutonium. The contributions in Table S–3 resulting from reprocessing, waste management, and transportation of wastes are maximized for both of the two fuel cycles (uranium-only and no-recycle); that is, the identified environmental impacts are based on the cycle that results in the greater impact. The uranium fuel cycle is defined as the total of the operations and processes associated with provision, use, and ultimate disposition of fuel for nuclear power reactors.

Table 6-1. Table S–3 from 10 CFR 51.51(b) (TN250), Table of Uranium Fuel-Cycle Environmental Data[a]

Environmental Considerations	Total	Maximum Effect per Annual Fuel Requirement or Reference Reactor Year of Model 1,000 MW(e) LWR
Natural Resource Use		
Land (ac):		
Temporarily committed[b]	100	
Undisturbed area	79	
Disturbed area	22	Equivalent to a 110 MW(e) coal-fired power plant.
Permanently committed	13	
Overburden moved (millions of metric tons [MT])	2.8	Equivalent to a 95 MW(e) coal-fired power plant.
Water (millions of gallons):		
Discharged to air	160	= 2 percent of model 1,000 MW(e) LWR with cooling tower.
Discharged to waterbodies	11,090	
Discharged to ground	127	
Total	11,377	<4 percent of model 1,000 MW(e) with once-through cooling.
Fossil fuel:		
Electrical energy (thousands of MWh)	323	<5 percent of model 1,000 MW(e) LWR output.
Equivalent coal (thousands of MT)	118	Equivalent to the consumption of a 45 MW(e) coal-fired power plant.
Natural gas (millions of standard cubic feet)	135	<0.4 percent of model 1,000 MW(e) energy output.
Effluents – Chemical (MT)		
Gases (including entrainment):[c]		
SO_x	4,400	
NO_x[d]	1,190	Equivalent to emissions from a 45 MW(e) coal-fired plant for a year.
Hydrocarbons	14	
CO	29.6	
Particulates	1,154	

Table 6-1. (contd)

Environmental Considerations	Total	Maximum Effect per Annual Fuel Requirement or Reference Reactor Year of Model 1,000 MW(e) LWR
Other gases:		
F	0.67	Principally from uranium hexafluoride (UF_6) production, enrichment, and reprocessing. Concentration within range of State standards—below level that has effects on human health.
HCl	0.014	
Liquids:		
SO_4^-	9.9	From enrichment, fuel fabrication, and reprocessing steps. Components that constitute a potential for adverse environmental effect are present in dilute concentrations and receive additional dilution by receiving bodies of water to levels below permissible standards. The constituents that require dilution and the flow of dilution water are NH_3 – 600 cfs, NO_3 – 20 cfs, Fluoride – 70 cfs.
NO_3^-	25.8	
Fluoride	12.9	
Ca^{++}	5.4	
Cl−	8.5	
Na+	12.1	
NH_3	10.0	
Fe	0.4	
Tailings solutions (thousands of MT)	240	From mills only – no significant effluents to environment.
Solids	91,000	Principally from mills – no significant effluents to environment.
Effluents – Radiological (curies)		
Gases (including entrainment):		
Rn-222		Presently under reconsideration by the Commission.
Ra-226	0.02	
Th-230	0.02	
Uranium	0.034	
Tritium (thousands)	18.1	
C-14	24	
Kr-85 (thousands)	400	
Ru-106	0.14	Principally from fuel reprocessing plants.
I-129	1.3	
I-131	0.83	
Tc-99		Presently under consideration by the Commission.
Fission products and transuranic elements	0.203	
Liquids:		
Uranium and daughters	2.1	Principally from milling, included tailings liquor and returned to ground – no effluents; therefore, no effect on environment.
Ra-226	0.0034	From UF_6 production.
Th-230	0.0015	
Th-234	0.01	From fuel fabrication plants – concentration 10 percent of 10 CFR Part 20 (TN283) for total processing 26 annual fuel requirements for model LWR.
Fission and activation products	5.9×10^{-6}	
Solids (buried onsite):		
Other than high-level waste (shallow)	11,300	9,100 Ci comes from low-level reactor wastes and 1,500 Ci comes from reactor decontamination and decommissioning – buried at land burial facilities. 600 Ci comes from mills – included in tailings returned to ground. Approximately 60 Ci comes from conversion and spent fuel storage. No significant effluent to the environment.
Transuranic and high-level waste (deep)	1.1×10^7	Buried at Federal repository.

Table 6-1. (contd)

Environmental Considerations	Total	Maximum Effect per Annual Fuel Requirement or Reference Reactor Year of Model 1,000 MW(e) LWR
Effluents – thermal (billions of British thermal units)	4,063	<5 percent of model 1,000 MW(e) LWR.
Transportation (person-rem):		
Exposure of workers and general public.	2.5	
Occupational exposure (person-rem).....	22.6	From reprocessing and waste management.

(a) In some cases where no entry appears, it is clear from the background documents the matter was addressed and that, in effect, the table should be read as if a specific zero entry had been made. However, other areas are not addressed at all in the table. Table S–3 does not include health effects from the effluents described in the table, estimates of releases of radon-222 from the uranium fuel cycle, or estimates of technetium-99 released from waste-management or reprocessing activities. These issues may be the subject of litigation in the individual licensing proceedings.
Data supporting this table are given in the *Environmental Survey of the Uranium Fuel Cycle*, WASH-1248 (AEC 1974-TN23); the *Environmental Survey of the Reprocessing and Waste Management Portion of the LWR Fuel Cycle*, NUREG–0116 (Supp.1 to WASH-1248) (NRC 1976-TN292); the *Public Comments and Task Force Responses Regarding the Environmental Survey of the Reprocessing and Waste Management Portions of the LWR Fuel Cycle*, NUREG–0216 (Supp. 2 to WASH-1248) (NRC 1977-TN1255); and in the record of the final rulemaking pertaining to Uranium Fuel Cycle Impacts from Spent Fuel Reprocessing and Radioactive Waste Management, Docket RM-50-3. The contributions from reprocessing, waste management, and transportation of wastes are maximized for either of the two fuel cycles (uranium-only and no-recycle). The contribution from transportation excludes transportation of cold fuel to a reactor and of irradiated fuel and radioactive wastes from a reactor, which are considered in Table S–4 of Sec. 51.20(g). The contributions from the other steps of the fuel cycle are given in columns A-E of Table S–3A of WASH-1248 (AEC 1974-TN23).
(b) The contributions to temporarily committed land from reprocessing are not prorated over 30 years because the complete temporary impact accrues regardless of whether the plant services 1 reactor for 1 year or 57 reactors for 30 years.
(c) Estimated effluents based upon combustion of equivalent coal for power generation.
(d) 1.2 percent from natural-gas use and process.

In 1978, the Nuclear Non-Proliferation Act of 1978 (22 U.S.C. § 3201 et seq.) (TN737) was enacted. This law significantly affected the disposition of spent nuclear fuel by indefinitely deferring the commercial reprocessing and recycling of spent fuel produced in the U.S. commercial nuclear power program. Even though the ban on the reprocessing of spent fuel was lifted in October 1981, economic circumstances changed, reserves of uranium ore increased, and the stagnation of the nuclear power industry in the United States provided little incentive for industry to resume reprocessing. In 2005, the Energy Policy Act of 2005 (42 U.S.C. § 15801 et seq.) (TN738) was enacted. It authorized the U.S. Department of Energy (DOE) to conduct an advanced fuel-recycling technology research and development program to evaluate proliferation-resistant fuel-recycling and transmutation technologies that minimize environmental or public health and safety impacts. Consequently, while Federal policy does not prohibit reprocessing, additional government and commercial efforts would be necessary before commercial reprocessing and recycling of spent fuel produced in U.S. commercial nuclear power plants could commence.

The no-recycle option is presented schematically in Figure 6-1. Natural uranium is mined in either open-pit or underground mines or by an in situ leach solution mining process. In situ leach mining, presently the primary form of mining in the United States, involves injecting a lixiviant solution into the uranium ore body to dissolve uranium and then pumping the solution to the surface for further processing. The ore or in situ leach solution is transferred to mills where it is processed to produce “yellowcake” (U_3O_8). A conversion facility prepares the U_3O_8 by

converting it to uranium hexafluoride (UF_6), which is then processed by an enrichment facility to increase the percentage of the more fissile isotope uranium-235 and decrease the percentage of the non-fissile isotope uranium-238. At a fuel fabrication facility, the enriched uranium, which is approximately 5 percent uranium-235, is then converted to uranium dioxide (UO_2). The UO_2 is pelletized, sintered, and inserted into tubes to form fuel assemblies, which ultimately will be placed in a reactor to produce power. When the content of the uranium-235 reaches a point at which the nuclear reaction has become inefficient with respect to neutron economy, the fuel assemblies are withdrawn from the reactor as spent fuel. After being stored onsite for sufficient time to allow short-lived fission product decay to occur and to reduce the heat generation rate, the fuel assemblies would be transferred to a waste repository for internment. Disposal of spent fuel elements in a repository constitutes the final step in the no-recycle option.

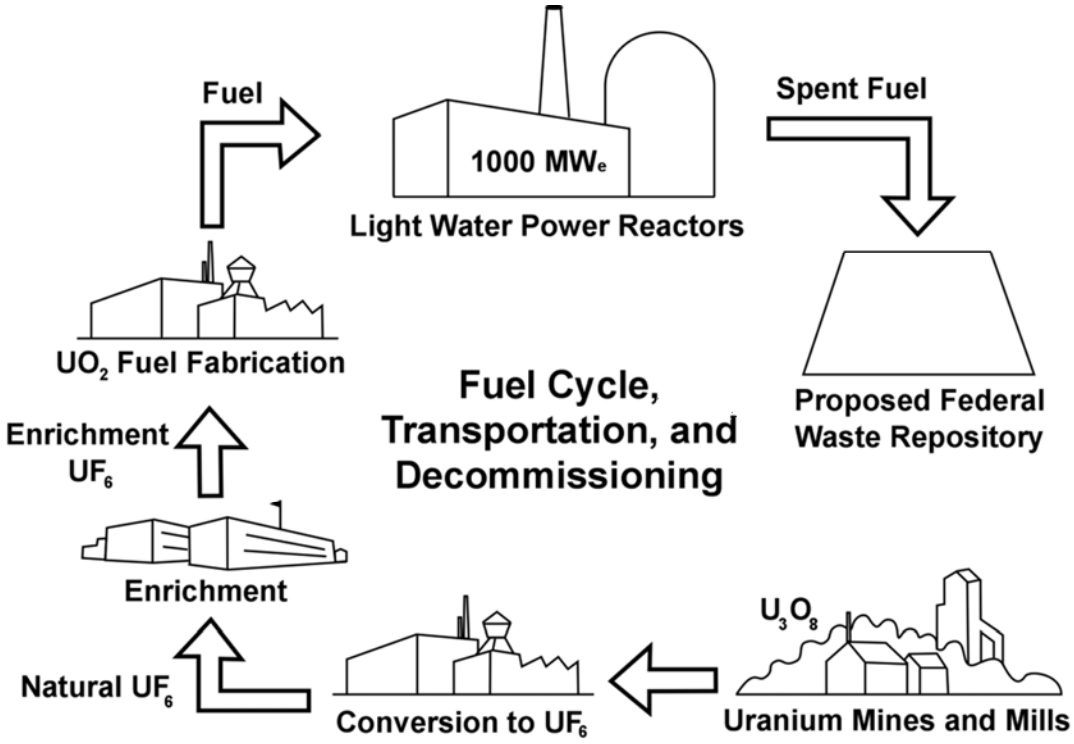


Figure 6-1. The Uranium Fuel Cycle: No-Recycle Option (Derived from NRC 1999-TN289)

The following assessment of the environmental impacts of the fuel cycle related to the operation of the proposed project is based on the values given in Table S–3 (see Table 6-1) and the NRC staff's analysis of the radiological impact from radon-222 and technetium-99. In NUREG–1437, *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS) (NRC 1996-TN288; NRC 1999-TN289; NRC 2013-TN2654),(1) the NRC staff provides a detailed analysis of the environmental impacts from the uranium fuel cycle. Although NUREG–1437 is specific to the impacts related to license renewal, the information is relevant to this review

(1) NUREG–1437 was originally issued in 1996 (NRC 1996-TN288). Addendum 1 to NUREG–1437 was issued in 1999 (NRC 1999-TN289). NUREG–1437, Revision 1 (NRC 2013-TN2654), was issued in June 2013. The version of NUREG–1437 cited, whether 1996 or 2013, is the one in which the technical information is discussed. In some cases, the technical information is discussed in both documents. For those instances, NUREG–1437, Revision 1, is cited.

because the advanced LWR design considered here uses the same type of fuel; the staff's analyses in NUREG–1437 are summarized and provided here.

The fuel-cycle impacts in Table S–3 are based on a reference 1,000 MW(e) LWR operating at an annual capacity factor of 80 percent for a net electric output of 800 MW(e). In the following review and evaluation of the environmental impacts of the fuel cycle, the NRC staff considered the gross electrical power output of 1,115 MW(e) for each AP1000 reactor and the capacity factor of 93 percent, which together yield a net electrical power output of 1,037 MW(e) per reactor, or a total of 2,074 MW(e) for the two proposed units at the Turkey Point site (FPL 2014-TN4058). This total output is about 2.6 times (i.e., 2,074 MW(e) divided by 800 MW(e) yields 2.6) the impact values provided in Table S–3 (see Table 6-1). Throughout this chapter, this will be referred to as the 1,000 MW(e) LWR-scaled model.

Recent changes in the uranium fuel cycle may have some bearing on environmental impacts; however, as discussed below, the NRC staff is confident that contemporary fuel-cycle impacts are less than those identified in Table S–3. This is true in light of the recent uranium fuel-cycle trends in the United States identified below:

- The increased use of in situ leach uranium mining, which does not produce mine tailings and would lower the release of radon gas. A detailed discussion of this subject is provided in Section 6.1.5 below.
- The transition of U.S. uranium enrichment technology from gaseous diffusion to gas centrifugation. The centrifuge process uses only a small fraction of the electrical energy per separation unit compared to gaseous diffusion (U.S. gaseous-diffusion plants relied on electricity derived mainly from the burning of coal).
- Current LWRs that use nuclear fuel more efficiently through higher fuel burnup. Therefore, less uranium fuel per year of reactor operation is required than in the past to generate the same amount of electricity.
- Discharge of fewer spent fuel assemblies per reactor year; hence, the waste storage/ repository impact is lessened.

The values in Table S–3 were calculated from industry averages for the performance of each type of facility or operation within the fuel cycle. Recognizing that this approach meant that there would be a range of reasonable values for each estimate, the NRC staff used an approach of choosing the assumptions or factors to be applied so that the calculated values would not be underestimated. This approach was intended to ensure that the actual environmental impacts would be less than the quantities shown in Table S–3 for all LWR nuclear power plants within the widest range of operating conditions. Many subtle fuel-cycle parameters and interactions were recognized by the NRC staff as being less precise than the estimates and were not considered or were considered but had no effect on the Table S–3 calculations. For example, to determine the quantity of fuel required for a year's operation of a nuclear power plant in Table S–3, the NRC staff defined the model reactor as a 1,000 MW(e) LWR operating at 80 percent capacity with a 12-month fuel-reloading cycle and an average fuel burnup of 33,000 MWd/MTU. This is a "reference reactor year" (NRC 2013-TN2654). If approved, the combined construction permit and operating licenses (combined licenses or COLs) for the two proposed units at the Turkey Point site would allow 40 years of operation. The sum of the initial fuel loading plus all of the reloads for the lifetime of the reactor can be divided by a 60-year

lifetime (40-year initial license term and 20-year license renewal term) to obtain the average annual fuel requirements for both boiling water reactors and pressurized water reactors. This approach was followed in the original GEIS for license renewal (NRC 1996-TN288) and carried forward into Revision 1 (NRC 2013-TN2654). The higher annual fuel requirement for a boiling water reactor, 35 MT of uranium, was chosen in the GEIS, Revision 1, as the basis for the reference reactor year (NRC 2013-TN2654). If the lifetime was limited to the 40-year initial license term, the average annual fuel requirement would be increased by only 2 percent. A number of fuel-management improvements have been adopted by nuclear power plant operators to achieve higher performance and to reduce fuel and separative work (enrichment) requirements. Since the mid-1970s when Table S–3 was promulgated (AEC 1974-TN23; NRC 1976-TN292), these improvements have reduced the annual fuel requirement, which means the Table S–3 assumptions remain bounding as applied to the proposed two units.

Another change supporting the bounding nature of the Table S–3 assumptions with respect to the impacts of the new capacity at the Turkey Point site is the elimination of U.S. restrictions on the importation of foreign uranium. Until recently, the economic conditions of the uranium market favored use of foreign uranium at the expense of the domestic uranium industry. In the 1980s, the economic conditions of the uranium market resulted in the closing of most U.S. uranium mines and mills, substantially reducing the environmental impacts in the United States from uranium-mining activities. More recently, there is renewed interest in uranium recovery in the United States. Between 2007 and 2014, the NRC received 10 license applications for uranium recovery facilities (NRC 2014-TN4054). All but two of these applications were for facilities using the in situ recovery process, which does not produce mill tailings that would have released radon to the environment. Factoring in changes to the fuel cycle suggests that the environmental impacts of mining and mill tailings could drop to levels less than those given in Table S–3; therefore, Table S–3 estimates remain bounding as applied to the proposed new units.

In summary, these reasons highlight why Table S–3 is likely to overestimate impacts from the proposed Turkey Point Units 6 and 7, and therefore remains adequate for use in the bounding approach used in this analysis. Section 4.12.1.1 of NUREG–1437, Revision 1 (NRC 2013-TN2654), and Section 6.2.3 of NUREG–1437 (NRC 1996-TN288) discuss in greater detail the sensitivity to changes in the uranium fuel cycle since issuance of Table S–3 on the environmental impacts.

6.1.1 Land Use

The total annual land requirement for the fuel cycle supporting the 1,000 MW(e) LWR-scaled model would be about 294 ac. Of this land requirement, approximately 34 ac would be permanently committed land, and 260 ac would be temporarily committed. A “temporary” land commitment is a commitment for the life of the specific fuel-cycle plant (e.g., a mill, enrichment plant, or succeeding plants). After completion of decommissioning, such land can be released for unrestricted use. “Permanent” commitments represent land that may not be released for use after plant shutdown and decommissioning because decommissioning activities do not result in removal of sufficient radioactive material to meet the limits in 10 CFR Part 20 (TN283), Subpart E, for release of that area for unrestricted use. Of the 260 ac of temporarily committed land, 205 ac are undisturbed and 55 ac are disturbed. In comparison, a coal-fired power plant producing the same megawatt-electric output as the LWR-scaled model and using strip-mined

coal would disturb approximately 520 ac/yr of land for fuel alone. The NRC staff concludes that the impacts on land use to support the 1,000 MW(e) LWR-scaled model would be SMALL.

6.1.2 Water Use

The principal water use for the fuel cycle supporting a 1,000 MW(e) LWR-scaled model would be that required to remove waste heat from the power stations supplying electrical energy to the enrichment step of this cycle. Scaling from Table S–3, of the total annual water use of 29,580 million gal, about 28,830 million gal are required for the removal of waste heat if the power stations use once-through cooling. Also scaling from Table S–3, other water uses involve the discharge to air (e.g., evaporation losses in process cooling) of about 416 million gal/yr and discharge to the ground (e.g., mine drainage) of about 330 million gal/yr.

Annual thermal discharges from power plants supporting the uranium fuel cycle are about 4 percent of those from operation of the supported LWR. If the thermal power plants supporting the fuel cycle use once-through cooling, the fuel-cycle consumptive water use is primarily from process cooling and equals about 2 percent of the cooling-tower evaporative losses during LWR operation, assuming that the LWR uses cooling towers. If all the power plants supplying electrical energy to the uranium fuel cycle use cooling towers, the consumptive water use increases to about 6 percent of that of the LWR using cooling towers. Under this condition, thermal effluents would be negligible. The NRC staff concludes that the impacts on water use for these combinations of thermal loadings and water consumption would be SMALL.

6.1.3 Fossil-Fuel Impacts

As indicated in Appendix J of this environmental impact statement (EIS), the largest source of greenhouse gas (GHG) emissions associated with nuclear power is from the fuel cycle, not operation of the plant. The largest source of GHGs in the fuel cycle is production of electric energy and process heat required during various phases of the fuel-cycle process, such as enrichment. The electric energy is often produced by the combustion of fossil fuel at conventional power plants.

Table S–3 in 10 CFR 51.51 (TN250) presents data for evaluating the environmental effects of a reference 1,000 MW(e) light water-cooled nuclear power reactor resulting from the uranium fuel cycle. Table S–3 does not provide an estimate of GHG emissions associated with the uranium fuel cycle, but does state that 323,000 MWh is the assumed annual electric energy use associated with the uranium fuel cycle for the reference 1,000 MW(e) nuclear power plant and this 323,000 MWh of annual electric energy is assumed to be generated by a 45 MW(e) coal-fired power plant burning 118,000 MT of coal. Table S–3 also assumes approximately 135,000,000 standard cubic feet (scf) of natural gas is also required per year to generate process heat for certain portions of the uranium fuel cycle.

In Appendix J of this EIS, the NRC used these fossil fuel use assumptions presented in Table S–3 to estimate that the GHG footprint of the fuel cycle to support a reference 1,000 MW(e) LWR with an 80 percent capacity factor for a 40-year operational period is on the order of 10,100,000 MT of carbon dioxide (CO_2) equivalent. Scaling this footprint to the power level and capacity factor of the two proposed AP1000 reactor units using the scaling factor of

2.6 discussed earlier, the review team estimates the GHG footprint for 40 years of fuel-cycle emissions to be approximately 26,000,000 MT of CO_2 equivalent (CO_2e). This rate of GHG production equals 657,000 MT of CO_2e per year, less than 0.2 percent of Florida's annual CO_2 emission rate (FDEP 2010-TN2997).

The largest use of electricity in the fuel cycle comes from the enrichment process. The development of Table S–3 assumed that the gaseous-diffusion process is used to enrich uranium. The gaseous-diffusion technology is no longer used for uranium enrichment. The last gaseous-diffusion enrichment facility in the United States ceased operations recently (USEC 2013-TN2765). Current enrichment facilities use gas-centrifuge technologies, and recent applications for new uranium enrichment facilities are based on gas-centrifuge and laser-separation technologies. The same amount of enrichment from gas centrifuge and laser separation uses less electricity and therefore results in lower amounts of air emissions such as CO_2 than gaseous-diffusion enrichment. In addition, U.S. electric utilities have begun to switch from coal to cheaper, cleaner-burning natural gas (DOE/EIA 1995-TN2996); therefore, the Table S–3 assumption that a 45 MW(e) coal-fired plant is used to generate the 323,000 MWh of annual electric energy for the uranium fuel cycle also results in conservative air emission estimates. Therefore, the NRC staff concludes that the values for electricity use and air emissions in Table S–3 continue to be appropriately bounding values.

On this basis, the NRC staff concludes that the fossil-fuel impacts, including GHG emissions, from the direct and indirect consumption of electric energy for fuel-cycle operations would be SMALL.

6.1.4 Chemical Effluents

The quantities of gaseous and particulate chemical effluents produced in fuel-cycle processes are given in Table S–3 (see Table 6-1) for the reference 1,000 MW(e) LWR and, according to WASH-1248 (AEC 1974-TN23), result from the generation of electricity for fuel-cycle operations. The principal effluents are sulfur oxides, nitrogen oxides, and particulates. Table 6-1 states that the fuel cycle for the reference 1,000 MW(e) LWR requires 323,000 MWh of electricity. Therefore, the fuel cycle for the 1,000 MW(e) LWR-scaled model would require 840,000 MWh of electricity, or 0.02 percent of the 4.1 billion MWh of electricity generated in the United States in 2012 (DOE/EIA 2013-TN2540). Therefore, the gaseous and particulate chemical effluents from fuel-cycle processes to support the operation of the 1,000 MW(e) LWR-scaled model would add about 0.02 percent to the national gaseous and particulate chemical effluents from electricity generation.

Liquid chemical effluents produced in fuel-cycle processes are related to fuel enrichment and fabrication, and may be released to receiving waters. These effluents usually are present in dilute concentrations so only small amounts of dilution water are required to reach concentration levels that are within established standards. Table S–3 (see Table 6-1) specifies the amount of dilution water required for specific constituents. In addition, all liquid discharges into the navigable waters of the United States from facilities associated with fuel-cycle operations would be subject to requirements and limitations set by appropriate Federal, State, Tribal, and local agencies.

Tailings solutions and solids are generated during the milling process, but as Table S–3 indicates, effluents are not released in quantities sufficient to have a significant impact on the environment.

Based on the above analysis, the NRC staff concludes that the impacts of these gaseous, particulate, and liquid chemical effluents would be SMALL.

6.1.5 Radiological Effluents

Radioactive effluents estimated to be released to the environment from waste-management activities and certain other phases of the fuel-cycle process are listed in Table S–3 (see Table 6-1). Using these effluents in NUREG–1437, Revision 1 (NRC 2013-TN2654), the NRC staff calculated the 100-year environmental dose commitment to the U.S. population from the fuel cycle for 1 year of operation of the reference 1,000 MW(e) LWR using the radioactive effluents in Table 6-1. The total overall whole body gaseous dose commitment and whole body liquid dose commitment from the fuel cycle (excluding reactor releases and dose commitments because of exposure to radon-222 and technetium-99) were calculated to be approximately 400 person-rem and 200 person-rem, respectively. Scaling these dose commitments by a factor of about 2.6 for the 1,000 MW(e) LWR-scaled model would result in whole body dose commitment estimates of 1,040 person-rem for gaseous releases and 520 person-rem for liquid releases. For both pathways, the estimated 100-year environmental dose commitment to the U.S. population would be approximately 1,600 person-rem for the 1,000 MW(e) LWR-scaled model.

Currently, radiological impacts associated with radon-222 and technetium-99 releases are not addressed in Table S–3. Principal radon releases occur during mining and milling operations and as emissions from mill tailings, whereas principal technetium-99 releases occur from gaseous-diffusion enrichment facilities. FPL provided an assessment of radon-222 and technetium-99 in its Environmental Report (ER) (FPL 2014-TN4058). FPL's evaluation relied on the information discussed in NUREG–1437 (NRC 2013-TN2654).

In Section 6.2 of the 1996 version of NUREG–1437 (NRC 1996-TN288), the NRC staff estimated the radon-222 releases from mining and milling operations and from mill tailings for each year of operations of the reference 1,000 MW(e) LWR. The estimated release of radon-222 for the reference reactor year for the 1,000 MW(e) LWR-scaled model, or for the total electric power rating for the site for a year, is approximately 13,500 Ci. Of this total, about 78 percent would be from mining, 15 percent from milling operations, and 7 percent from inactive tailings before stabilization. For radon releases from stabilized tailings, the NRC staff assumed that the LWR-scaled model would result in an emission of 2.6 Ci per site year (i.e., about 2.6 times the NUREG–1437 (NRC 1996-TN288) estimate for the reference reactor year). The major risks from radon-222 are from exposure to the bone and the lung, although a small risk from exposure to the whole body exists. The organ-specific dose weighting factors from 10 CFR Part 20 (TN283) Subpart C were applied to the bone and lung doses to estimate the 100-year dose commitment from radon-222 to the whole body. The estimated 100-year environmental dose commitment from radon from mining, milling, and tailings before stabilization for each site year (assuming the 1,000 MW(e) LWR-scaled model) would be approximately 2,400 person-rem to the whole body. From stabilized tailings piles, the estimated 100-year environmental dose commitment would be approximately 47 person-rem to the whole body. Additional insights regarding Federal policy/resource perspectives concerning institutional control comparisons with routine radon-222 exposure and risk and long-term releases from stabilized tailing piles are discussed in NUREG–1437 (NRC 1996-TN288).

Also, as discussed in NUREG–1437, Revision 1 (NRC 2013-TN2654), the NRC staff considered the potential doses associated with the releases of technetium-99. The estimated releases of technetium-99 for the reference reactor year for the 1,000 MW(e) LWR-scaled model are 0.018 Ci from chemical processing of recycled UF_6 before it enters the isotope-enrichment cascade and 0.013 Ci into the groundwater from a repository. The major risks from technetium-99 are from exposure of the gastrointestinal tract and kidney, although there is a small risk from exposure to the whole body. Applying the organ-specific dose weighting factors from 10 CFR Part 20 (TN283) Subpart C to the gastrointestinal tract and kidney doses, the total-body 100-year dose commitment from technetium-99 to the whole body was estimated to be 260 person-rem for the 1,000 MW(e) LWR-scaled model.

Radiation protection experts assume that any amount of radiation may pose some risk of causing cancer or a severe hereditary effect, and that the risk is higher for higher radiation exposures. Therefore, a linear, no-threshold dose-response relationship assumption is used to describe the relationship between radiation dose and detriments such as cancer induction. A 2006 report by the National Research Council (National Research Council 2006-TN296), the Biological Effects of Ionizing Radiation (BEIR) VII report, uses the linear, no-threshold model as a basis for estimating the risks from low doses. This approach is accepted by the NRC as a conservative method for estimating health risks from radiation exposure, recognizing that the model may overestimate those risks. Based on this method, the staff estimated the risk to the public from radiation exposure using the nominal probability coefficient for total detriment. This nominal probability coefficient has the value of 570 fatal cancers, non-fatal cancers, and severe hereditary effects per 1,000,000 person-rem (10,000 person-Sv), equal to 0.00057 effects per person-rem. The coefficient is taken from International Commission on Radiological Protection (ICRP) Publication 103 (ICRP 2007-TN422).

The nominal probability coefficient was multiplied by the sum of the estimated whole body population doses from gaseous effluents, liquid effluents, radon-222, and technetium-99 discussed above (approximately 4,300 person-rem/yr) to calculate that the U.S. population would incur a total of approximately 2.4 fatal cancers, non-fatal cancers, and severe hereditary effects annually.

Both the Council on Radiation Protection and Measurements (NCRP) and ICRP suggest that when the collective effective dose is smaller than the reciprocal of the relevant risk detriment (i.e., less than 1/0.00057, which is less than 1,754 person-rem), the risk assessment should note that the most likely number of excess health effects is zero (NCRP 1995-TN728; NCRP 2009-TN420; ICRP 2007-TN422). The estimated collective whole body dose value of 4,300 person-rem/yr to the U.S. population is not significantly larger than the 1,754 person-rem value that the ICRP and NCRP suggest would most likely result in zero excess health effects (NCRP 1995-TN728; NCRP 2009-TN420; ICRP 2007-TN422). Thus, it is not expected that the 2.4 expected health effects would be observable.

Radon-222 releases from tailings are indistinguishable from background radiation levels at a few miles from the tailings pile (at less than 0.6 mi in some cases) (NRC 1996-TN288). The public dose limit in the U.S. Environmental Protection Agency's (EPA's) regulation, 40 CFR 190.10 (TN739), is 25 mrem/yr to the whole body from the entire fuel cycle, but most NRC licensees have airborne effluents resulting in doses of less than 1 mrem/yr (61 FR 65120) (TN294).

In addition, at the request of the U.S. Congress, the National Cancer Institute conducted a study and published *Cancer in Populations Living Near Nuclear Facilities* in 1990 (Jablon et al. 1990-TN1257). This report included an evaluation of health statistics around all nuclear power plants, as well as several other nuclear fuel-cycle facilities in operation in the United States in 1981. The report found "… no evidence that an excess occurrence of cancer has resulted from living near nuclear facilities" (Jablon et al. 1990-TN1257). The contribution to the annual average dose received by an individual from fuel-cycle–related radiation and other sources as reported by the NCRP (2009-TN420) is listed in Table 6-2. The nuclear fuel-cycle contribution to an individual's annual average radiation dose is extremely small (about 0.1 mrem/yr) compared to the annual average background radiation dose (approximately 311 mrem/yr).

Table 6-2. Comparison of Annual Average Dose Received by an Individual from All Sources

Source		Dose (mrem/yr)[(a)]	Percent of Total
Ubiquitous background	Radon and thoron	228	37
	Space	33	5
	Terrestrial	21	3
	Internal (body)	29	5
	Total background sources	**311**	**50**
Medical	Computed tomography	147	24
	Medical x-ray	76	12
	Nuclear medicine	77	12
	Total medical sources	**300**	**48**
Consumer	Construction materials, smoking, air travel, mining, agriculture, fossil-fuel combustion	13	2
Other	Occupational	0.5[(b)]	0.1
	Uranium fuel cycle	0.05[(c)]	0.01
	Total	**624**	**100**

(a) NCRP Report 160 table expressed doses in mSv/yr (1 mSv/yr equals 100 mrem/yr).
(b) Occupational dose is regulated separately from public dose and is provided here for informational purposes.
(c) Calculated using 153 person-Sv/yr from Table 6.1 of NCRP 160 and a 2006 U.S. population of 300 million.

Source: Report 160, *Ionizing Radiation Exposure of the Population of the United States* (NCRP 2009-TN420)

Based on the analyses presented above, the NRC staff concludes that the environmental impacts of radioactive effluents from the fuel cycle, including gaseous and liquid releases, are SMALL.

6.1.6 Radiological Wastes

The quantities of buried radioactive waste material (low-level, high-level, and transuranic wastes) generated by the reference 1,000 MW(e) LWR are specified in Table S–3 (Table 6-1). For LLW disposal at land burial facilities, the Commission notes in Table S–3 that there would be no significant radioactive releases to the environment.

The Barnwell LLW disposal facility in Barnwell, South Carolina, no longer accepts Class B and C wastes from sources in states outside of the Atlantic Compact, and therefore, FPL would not be able to dispose of these wastes at the Barnwell facility. FPL currently has a contract with Studsvik, Inc. for processing, storage, and disposal of Class B and C LLW from Turkey Point Units 3 and 4 (77 FR 20059) (TN1001) and they expect to establish a similar contract with a third party to process, store, and dispose of LLW produced by Units 6 and 7 as a result of operations (FPL 2014-TN4058). If FPL has not entered into an agreement with an NRC-

licensed facility that would accept LLW from proposed Turkey Point Units 6 and 7, FPL would implement measures to reduce the generation of Class B and C wastes (FPL 2014-TN4058). If needed, FPL also would construct additional storage facilities onsite and has indicated (FPL 2014-TN4058) that such facilities would be designed and operated to meet the guidance standards in Appendix 11.4-A of the *Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition* (NUREG–0800) (NRC 2007-TN613). Because FPL would have to choose one or a combination of these three options, the NRC staff considered the environmental impacts of each of these three options.

Table S–3 addresses the environmental impacts if FPL enters into an agreement with an NRC-licensed facility for disposal of LLW, and Table S–4 addresses the environmental impacts from transportation of LLW as discussed in Section 6.2. The use of third-party contractors was not explicitly addressed in Tables S–3 and S–4; however, such third-party contractors are already licensed by the NRC and currently operate in the United States. Experience from the operation of these facilities shows that the additional environmental impacts are not significant compared to the impacts described in Tables S–3 and S–4.

The measures to reduce the generation of Class B and C wastes described by FPL, such as reducing the service run length of resin beds, could increase the volume of LLW, but would not increase the total curies of radioactive material in the waste. The volume of waste would still be bounded by or very similar to the estimates in Table S–3, and the environmental impacts would not be significantly different (FPL 2014-TN4058).

In most circumstances, the NRC's regulations (10 CFR 50.59) (TN249) allow licensees operating nuclear power plants to construct and operate additional onsite LLW storage facilities without seeking approval from the NRC. Licensees are required to evaluate the safety and environmental impacts before constructing the facility and make those evaluations available to NRC inspectors. A number of nuclear power plant licensees have constructed and operate such facilities in the United States. Typically, these additional facilities are constructed near the power block inside the security fence on land that has already been disturbed during initial plant construction. Therefore, the impacts on environmental resources (e.g., land use and aquatic and terrestrial biota) would be very small. All of the NRC (10 CFR Part 20) (TN283) and EPA (40 CFR Part 190) (TN739) dose limitations would apply both for public and occupational radiation exposure. The radiological environmental monitoring programs around nuclear power plants that operate such facilities show that the increase in radiation dose at the site boundary is not significant; the radiation doses continue to be less than 25 mrem/yr, the dose limit of 40 CFR Part 190 (TN739). In addition, NUREG–1437 assessed the impacts of LLW storage onsite at currently operating nuclear power plants and concluded that the radiation doses to offsite individuals from interim LLW storage are insignificant (NRC 1996-TN288). The types and amounts of LLW generated by the proposed reactors at the Turkey Point site would be very similar to those generated by currently operating nuclear power plants, and the construction and operation of these interim LLW storage facilities would be very similar to the construction and operation of the currently operating facilities. Therefore, the impacts of constructing and operating additional onsite LLW storage facilities would be small.

Current national policy, as found, for example, in the Nuclear Waste Policy Act (42 U.S.C. § 10101 et seq.) (TN740), mandates that high-level and transuranic wastes are to be buried in deep geologic repositories. No release to the environment is expected to be associated with

deep geologic disposal, because it has been assumed that all of the gaseous and volatile radionuclides contained in the spent fuel are released to the atmosphere before the disposal of the waste. In NUREG–0116 (NRC 1976-TN292), which provides background and context for the Table S–3 values established by the Commission, the NRC staff indicates that these high-level and transuranic wastes would be buried and would not be released to the environment.

As part of the Table S–3 rulemaking, the staff evaluated, along with more conservative assumptions, the zero-release assumption associated with waste burial in a repository, and reached an overall generic determination that fuel-cycle impacts would not be significant. In 1983, the Supreme Court affirmed the NRC's position that the zero-release assumption was reasonable in the context of the Table S–3 rulemaking to address generically the impacts of the uranium fuel cycle in individual reactor licensing proceedings (Baltimore Gas and Electric Co. v. Natural Resources Defense Council, Inc. 1983-TN1054).

Environmental impacts from onsite spent fuel storage have been studied extensively and are well understood. In the context of operating license renewal, the staff provides descriptions of the storage of spent fuel during the licensed lifetime of reactors operations. Specifically, NUREG-1437, "Generic Environmental Impact Statement for License Renewal," supports a conclusion that the impacts of building and operating an ISFSI on the site would be minor (NRC 2013-TN2654). Radiological impacts are well within regulatory limits; thus, radiological impacts of onsite storage during operations meet the standard for a conclusion of small impact. Nonradiological environmental impacts have been shown to be not significant (NRC 1989-TN3714); thus, they are classified as small. However, the U.S. Army Corps of Engineers may require additional mitigation measures for any disturbance to wetland resources. The overall conclusion for onsite storage of spent fuel during the licensed lifetime of reactor operations is that the environmental impacts will be small (NRC 2013-TN2654).

On August 26, 2014, the Commission issued a revised rule at 10 CFR 51.23 (TN250) and associated *Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel: Final Report, Volumes 1 and 2* (NUREG–2157) (NRC 2014-TN4117). The revised rule adopts the generic impact determinations made in NUREG–2157 and codifies the NRC's generic determinations regarding the environmental impacts of continued storage of spent nuclear fuel beyond a reactor's operating license (i.e., those impacts that could occur as a result of the storage of spent nuclear fuel at at-reactor or away-from-reactor sites after a reactor's licensed life for operation and until a permanent repository becomes available).

In CLI-14-08, the Commission held that the revised 10 CFR 51.23 (TN250) and associated NUREG–2157 cure the deficiencies identified by the court in New York v. NRC, 681 F.3d 471 (D.C. Cir. 2012) and stated that the rule satisfies the NRC's NEPA obligations with respect to continued storage for actions such as the Turkey Point Units 6 and 7 COL application. As directed by 10 CFR 51.23(b), the impacts assessed in NUREG–2157 are deemed incorporated into this EIS.

The staff's evaluation of the potential environmental impacts of continued storage of spent fuel presented in NUREG–2157 identifies an impact level, or a range of impacts, for each resource area for a range of site conditions and timeframes. The timeframes analyzed in NUREG–2157 include the short-term timeframe (60 years beyond the licensed life of a reactor), the long-term

timeframe (an additional 100 years after the short-term timeframe), and an indefinite timeframe (see Section 1.8.2 of NUREG–2157).

The analysis in Section 4.20 of NUREG–2157 concludes that the potential impacts of spent fuel storage at the reactor site in both a spent fuel pool and in an at-reactor independent spent fuel storage installation would be SMALL during the short-term timeframe. However, for the longer timeframes for at-reactor storage, and for all timeframes for away-from-reactor storage, Sections 4.20 and 5.20 of NUREG–2157 have determined a range of potential impacts in some resource areas. These ranges reflect uncertainties that are inherent in analyzing environmental impacts on some resource areas over long timeframes. Those uncertainties exist, however, regardless of whether the impacts are analyzed generically or site-specifically.

Appendix B of NUREG–2157 provides an assessment of the technical feasibility of a deep geologic repository and continued safe storage of spent fuel. That assessment concluded that a deep geologic repository is technically feasible and that a reasonable timeframe for its development is approximately 25 to 35 years. The assessment in NUREG–2157 noted that DOE's goal is to have sited, constructed, and commenced operations of a repository by 2048. If the current proposed action is approved and no renewals are granted in the future, the short-term period will end 60 years after the end of the licensed period. The licensed period plus the short-term timeframe is more than twice as long as the time estimated to develop a deep geologic repository.

The most likely impacts of the continued storage of spent fuel are those considered for at-reactor storage in the short-term timeframe. In the unlikely event that fuel remains on site into the long-term and indefinite timeframes, the ranges in NUREG–2157 reflect factors that lead to uncertainties regarding the potential impacts over these very long periods of time. Based on the analysis and impact determination in NUREG–2157, and taking into account the impacts that the NRC can predict with certainty, which are SMALL; the uncertainty reflected by the ranges in the long-term and indefinite timeframes, and the relative likelihood of the timeframes, the staff finds that the impacts for at-reactor storage for Turkey Point Units 6 and 7 are likely to be minor.

Spent fuel could also be moved to an away-from-reactor storage facility. However, there is uncertainty about whether an away-from-reactor storage facility would be constructed, uncertainty about where it might be located, and uncertainty about the impacts in the short-term and the longer timeframes. As a result, these impacts provide limited insights to the decision-maker in the overall picture of the environmental impacts from the proposed action and do not change the staff's overall conclusion regarding the environmental impacts of radiological wastes from the fuel cycle (which includes the impacts associated with spent fuel storage).

The NRC staff concludes, based on Table S–3 and the above conclusions regarding storage and disposal of LLW and spent fuel, that the environmental impacts from radioactive waste storage and disposal associated with the operation of Turkey Point Units 6 and 7 would be SMALL.

6.1.7 Occupational Dose

The annual occupational dose attributable to all phases of the fuel cycle for the 1,000 MW(e) LWR-scaled model is about 1,560 person-rem. This dose is based on a 600 person-rem

occupational dose estimate attributable to all phases of the fuel cycle for the reference 1,000 MW(e) LWR (NRC 2013-TN2654). The environmental impact from this occupational dose is considered SMALL because the dose to any individual worker would be maintained within the limits of 10 CFR Part 20 (TN283) Subpart C, which is 5 rem/yr.

6.1.8 Transportation

The transportation dose to workers and the public related to the uranium fuel cycle totals about 2.5 person-rem annually for the reference 1,000 MW(e) LWR, according to Table S–3 (Table 6-1). This corresponds to a dose of 6.5 person-rem per year for the 1,000 MW(e) LWR-scaled model. For purposes of comparison, the estimated collective dose from natural background radiation to the current population within 50 mi of the Turkey Point site is about 907,000 person-rem/yr (FPL 2014-TN4058). Based on this comparison, the NRC staff concludes that environmental impacts of transportation would be SMALL.

6.1.9 Conclusions for Fuel Cycle and Solid Waste Management

The NRC staff evaluated the environmental impacts of the uranium fuel cycle, as given in Table S–3 (10 CFR 51.51) (TN250) (see Table 6-1), considered the effects of radon-222 and technetium-99, and appropriately scaled the impacts for the 1,000 MW(e) LWR-scaled model. The NRC staff also evaluated the environmental impacts of GHG emissions from the uranium fuel cycle and appropriately scaled the impacts for the 1,000 MW(e) LWR-scaled model. The NRC staff also evaluated the environmental impacts of storage of LLW and spent fuel. Based on these evaluations, the NRC staff concludes that the impacts of the uranium fuel cycle would be SMALL.

6.2 Transportation Impacts

This section addresses both the radiological and nonradiological environmental impacts from normal operating and accident conditions resulting from (1) shipment of unirradiated fuel to the Turkey Point site and the alternative sites, (2) shipment of irradiated (spent) fuel to a monitored retrievable storage facility or a permanent repository, and (3) shipment of low-level radioactive waste and mixed waste to offsite disposal facilities. For the purposes of these analyses, the NRC staff considered the proposed Yucca Mountain site in Nevada as a surrogate destination for a permanent repository. The impacts evaluated in this section for two new nuclear generating units at the Turkey Point site are appropriate for characterizing the alternative sites discussed in Section 9.3 of this EIS. Alternative sites evaluated in this EIS include the existing Turkey Point site (proposed), and the Martin, Glades, Okeechobee, and St. Lucie sites. As discussed in this section, there is no meaningful differentiation among the proposed and alternative sites regarding the radiological and nonradiological environmental impacts from normal operating and accident conditions and are not discussed further in Chapter 9.

The NRC performed generic analyses of the environmental effects of the transportation of fuel and waste to and from LWRs in the *Environmental Survey of Transportation of Radioactive Materials to and from Nuclear Power Plants*, WASH-1238 (AEC 1972-TN22) and in a supplement to WASH-1238, NUREG–75/038 (NRC 1975-TN216). Based on these analyses, the environmental impacts of transportation of fuel and waste to and from LWRs were found to

be SMALL. These documents provided the basis for Table S–4 in 10 CFR 51.52 (TN250) that summarizes the environmental impacts of transportation of fuel and waste to and from one LWR with a generating capacity of 3,000 to 5,000 MW(t) (1,000 to 1,500 MW(e)). Impacts are provided for normal conditions of transport and accidents in transport for a reference 1,100 MW(e) LWR. Dose to transportation workers during normal transportation operations was estimated to result in a collective dose of 4 person-rem per reference reactor year. The combined dose to the public along the route and dose to onlookers were estimated to result in a collective dose of 3 person-rem per reference reactor year.

Normal transportation dose estimates have been re-examined several times since publication of WASH-1238, basically to determine the adequacy of NRC's transportation regulations (i.e., 10 CFR Part 71 [TN301]). In 1977, the NRC published NUREG–0170, which concluded that average radiation doses to the public from normal transportation of radioactive materials is a small fraction of natural background radiation. In 2000, the NRC published NUREG/CR–6672 (Sprung et al. 2000), which indicated the normal transportation doses were lower than those calculated in NUREG–0170. Recently, in early 2014, the NRC published NUREG–2125 (NRC 2014-TN3231). This document concluded that the collective doses from normal transportation were higher than those calculated in NUREG–0170 (NRC 1977-TN417) and NUREG/CR–6672 (Sprung et al. 2000-TN222), but were still a small fraction of natural background dose. Therefore, use of the normal transportation dose models employed in NUREG–2125 (NRC 2014-TN3231) may result in somewhat higher normal transportation dose estimates that those shown in this EIS, but they will still be a small fraction of natural background radiation doses.

Environmental risks of radiological effects during accident conditions, as stated in Table S–4, are small. Nonradiological impacts from postulated accidents were estimated as one fatal injury in 100 reactor years and one non-fatal injury in 10 reference reactor years.

Transportation accident risks have been re-examined several times since WASH-1238 to determine the adequacy of NRC's transportation regulations. NUREG–0170 used refined computer models to estimate the risk of transportation accidents. The modeling results indicated that the risks were much smaller than the nonradiological risks of accidents involving large trucks or freight trains. Based on the results, the NRC determined that the risks were sufficiently small to allow continued transport of radioactive materials by all modes. In 1987, the NRC published the Modal Study (NUREG/CR-4829) (Fischer et al. 1987-TN4105), which provided further refinements to the computer models used to estimate radiological risks from transportation accidents. The Modal Study's refined modeling techniques resulted in smaller risk estimates than those presented in NUREG–0170 (NRC 1977-TN417). In 2000, further refined risk models were developed and published in NUREG/CR–6672 (Sprung et al. 2000-TN222). The modeling enhancements developed for NUREG/CR–6672 resulted in smaller accident risk estimates than those presented in NUREG–0170 and the Modal Study. Finally, NUREG–2125 (NRC 2014-TN3231) was recently published by the NRC. The resulting accident risk estimates were smaller than those presented in NUREG–0170, the Modal Study, and NUREG/CR–6672. Therefore, if the accident risk models provided in NUREG–2125 were to be used in this EIS, even smaller accident risks would be estimated.

In accordance with 10 CFR 51.52(a) (TN250), a full description and detailed analysis of transportation impacts is not required when licensing an LWR (i.e., impacts are assumed to be bounded by Table S–4) if the reactor meets the following conditions:

- The reactor has a core thermal power level not exceeding 3,800 MW(t).
- Fuel is in the form of sintered uranium oxide pellets having a uranium-235 enrichment not exceeding 4 percent by weight; and the pellets are encapsulated in zircaloy-clad fuel rods.
- The average level of irradiation of the fuel from the reactor does not exceed 33,000 MWd/MTU, and no irradiated fuel assembly is shipped until at least 90 days after it is discharged from the reactor.
- With the exception of irradiated fuel, all radioactive waste shipped from the reactor is packaged and in solid form.
- Unirradiated fuel is shipped to the reactor by truck; irradiated (spent) fuel is shipped from the reactor by truck, rail, or barge; and radioactive waste other than irradiated fuel is shipped from the reactor by truck or rail.

The environmental impacts of transporting fuel and radioactive wastes to and from LWR nuclear power facilities were resolved generically in 10 CFR 51.52 (TN250), provided that the specific conditions in the rule (see above) are met; if not, a full description and detailed analysis are required for initial licensing. The NRC may consider requests for licensed plants to operate at conditions above those in the facility's licensing basis; for example, at higher burnup levels (greater than 33,000 MWd/MTU), enrichment levels (greater than 4 percent uranium-235), or thermal power levels (greater than 3,800 MW(t)). Departures from the conditions itemized in 10 CFR 51.52(a) (TN250) are to be supported by a full description and detailed analysis of the environmental effects, as specified in 10 CFR 51.52(b) (TN250). Departures found to be acceptable for licensed facilities cannot serve as the basis for initial licensing for new reactors.

In its application, FPL requested COLs for two additional reactors at its Turkey Point site in Miami-Dade County, Florida. The reactor design proposed by FPL—the AP1000—has a design thermal power rating of 3,400 MW(t) and a net electrical output of approximately 1,000 MW(e). The thermal power rating does not exceed the 3,800 MW(t) condition specified in 10 CFR 51.52(a) (TN250). The AP1000 reactor is expected to operate with a 93 percent capacity factor (FPL 2014-TN4058), resulting in a net electrical output (annualized) of about 930 MW(e). Fuel for the plants would be enriched up to about 4.54 weight percent uranium-235 for core reloads, which exceeds the 10 CFR 51.52(a) (TN250) condition. In addition, the average irradiation level of about 50,533 MWd/MTU (FPL 2014-TN4058) is also greater than the 10 CFR 51.52(a) (TN250) condition. Because the enrichment and irradiation levels exceed the 10 CFR 51.52(a) (TN250) conditions, a full description and detailed analysis of transportation impacts is required.

In its ER (FPL 2014-TN4058), FPL provided a full description and detailed analyses of transportation impacts. In these analyses, the radiological impacts of transporting fuel and waste to and from the Turkey Point site and alternative sites were calculated using the RADTRAN 5.6 computer code (Weiner et al. 2008-TN302). RADTRAN 5.6, which was used in this EIS, is the most commonly used transportation impact analysis software used in the nuclear

industry. An update to the RADTRAN computer code, RADTRAN 6, is currently available (Weiner et al. 2013-TN3390). Preliminary comparisons of RADTRAN 5.6 and RADTRAN 6 outputs for identical cases indicated that RADTRAN 6 would produce identical incident-free impacts and slightly lower accident impacts than RADTRAN 5.6. In addition, the RADTRAN 5.6 computer code was used by FPL in its application. As a result, for consistency with the FPL application, the RADTRAN 5.6 computer code was used in the NRC's confirmatory analysis.

Based on comments about previous nuclear power plant EISs, an explicit analysis of the nonradiological impacts of transporting workers and construction materials to and from the Turkey Point site and alternative sites is included in this EIS. Nonradiological impacts of transporting construction workers and materials and operations workers are addressed in Sections 4.8.3 and 5.8.6, respectively. Publicly available information about traffic accidents, injury, and fatality rates was used to estimate nonradiological impacts. In addition, the radiological impacts on maximally exposed individuals (MEIs) are evaluated.

6.2.1 Transportation of Unirradiated Fuel

The NRC staff performed an independent evaluation of the environmental impacts of transporting unirradiated (i.e., fresh) fuel to the Turkey Point site and the alternative sites. Radiological impacts of normal operating conditions and transportation accidents as well as nonradiological impacts are discussed in this section. Radiological impacts on populations and MEIs are presented. The specific location of the fuel fabrication plant for Turkey Point unirradiated fuel is not known at this time. Therefore, the NRC staff's independent and confirmatory analyses assume "representative" routes between the fuel fabrication facility and the Turkey Point site and alternative sites. This means that there are no substantive differences between the impacts calculated, for the purposes of Chapter 9, for the Turkey Point site and the four alternative sites. The site-specific differences are minor because the radiation doses from unirradiated fuel transport are small. In addition, the differences in shipping distances from the proposed and alternative sites to a fuel fabrication facility are less than 320 km (200 mi), which is less than 10 percent of the representative shipping distance assumed by the NRC staff. Therefore, because transportation impacts are approximately proportional to shipping distance, the differences in impacts among the alternative sites will be less than 10 percent.

6.2.1.1 Normal Conditions

Normal conditions, sometimes referred to as "incident-free" transportation, are transportation activities during which shipments reach their destination without releasing any radioactive material to the environment. Impacts from these shipments would be from the low levels of radiation that penetrate the unirradiated fuel shipping containers. Radiation exposures at some level would occur to the following individuals: (1) persons residing along the transportation corridors between the fuel fabrication facility and the Turkey Point site; (2) persons in vehicles traveling on the same route as an unirradiated fuel shipment; (3) persons at vehicle stops for refueling, rest, and vehicle inspections; and (4) transportation crew workers.

Truck Shipments

Table 6-3 provides an estimate of the number of truck shipments of unirradiated fuel for the AP1000 reactor compared to those of the reference 1,100 MW(e) reactor specified in

WASH-1238 (AEC 1972-TN22) operating at 80 percent capacity (880 MW(e)), herein the reference LWR. In the ER, the applicant estimated the initial core would be loaded with 157 AP1000 unirradiated fuel assemblies and an additional 43 assemblies per year for refueling. Shipping cask capacities were assumed to be 7 fuel assemblies per shipment for the initial core and 9 assemblies per shipment for core reloads. This results in a total of about 209 shipments over the assumed 40-year life of the reactor (i.e., initial core plus 39 years of core reloads). After normalization to the annual electrical capacity of the reference LWR, the NRC staff found that the number of truck shipments of unirradiated fuel to the proposed Turkey Point site is less than the number of truck shipments of unirradiated fuel estimated for the reference LWR in WASH-1238 (AEC 1972-TN22).

Table 6-3. Number of Truck Shipments of Unirradiated Fuel for the Reference LWR and the AP1000 Reactor

Reactor Type	Number of Shipments per Reactor	Unit Electric Generation, MW(e)[b]	Capacity Factor[b]	Normalized, Shipments per 1,100 MW(e)[c]
	Total[a]			
Reference LWR (WASH-1238)	252	1,100	0.8	252
Turkey Point and Alternative Sites AP1000 reactor	209	1,000	0.93	199

(a) Total shipments of unirradiated fuel over a 40-year plant lifetime (i.e., initial core load plus 39 years of average annual reload quantities).
(b) Unit capacities and capacity factors were taken from WASH-1238 (AEC 1972-TN22) for the reference LWR and the ER (FPL 2014-TN4058) for the AP1000 reactor.
(c) Normalized to net electric output for WASH-1238 (AEC 1972-TN22) reference LWR (i.e., 1,100 MW(e) plant at 80 percent or net electrical output of 880 MW(e)).

Shipping Mode and Weight Limits

In 10 CFR 51.52 (TN250) a condition is identified that states all unirradiated fuel will be shipped to the reactor by truck. FPL specifies that unirradiated fuel would be shipped to the proposed reactor site by truck. Section 10 CFR 51.52 (TN250), Table S–4, includes a condition that the truck shipments not exceed 73,000 lb as governed by Federal or State gross vehicle weight restrictions. FPL states in its ER that the unirradiated fuel shipments would comply with applicable weight restrictions (FPL 2014-TN4058).

Radiological Doses to Transport Workers and the Public

Section 10 CFR 51.52 (TN250), Table S–4, includes conditions related to radiological dose to transport workers and members of the public along transport routes. These doses are a function of many variables, including the radiation dose rate emitted from the unirradiated fuel shipments, the number of exposed individuals and their locations relative to the shipment, the time in transit (including travel and stop times), and the number of shipments to which the individuals are exposed. For this EIS, the radiological dose impacts of the transportation of unirradiated fuel were calculated by the NRC staff for the worker and the public using the RADTRAN 5.6 computer code (Weiner et al. 2008-TN302).

One of the key assumptions in WASH-1238 (AEC 1972-TN22) for unirradiated fuel shipments for the reference LWR is that the radiation dose rate at 3.3 ft from the transport vehicle would be

approximately 0.1 mrem/hr. This assumption also was used in the NRC staff's confirmatory analysis of the AP1000 unirradiated fuel shipments and is lower than the maximum dose rate allowed by Federal regulations (i.e., 10 mrem/hr at 2 m from the side of a transport vehicle; see 10 CFR 71.47) (TN301). This assumption is reasonable because the AP1000 fuel materials would be low-dose−rate uranium radionuclides and would be packaged similarly to the practice described in WASH-1238 (AEC 1972-TN22) (i.e., inside a metal container that provides little radiation shielding). The numbers of shipments per year were obtained by dividing the normalized shipments in Table 6-3 by 40 years of reactor operation. Other key input parameters (listed in metric units) used in the radiation dose analysis for unirradiated fuel are shown in Table 6-4.

Table 6-4. RADTRAN 5.6 Input Parameters for Unirradiated Fuel Shipments

Parameter	RADTRAN 5.6 Input Value	Source
Shipping distance, km	3,200	AEC 1972-TN22[(a)]
Travel fraction – rural	0.90	NRC 1977-TN417
Travel fraction – suburban	0.05	
Travel fraction – urban	0.05	
Population density – rural, persons/km^2	10	DOE 2002-TN418
Population density – suburban, persons/km^2	349	
Population density – urban, persons/km^2	2,260	
Vehicle speed – km/hr	88.49	Conservative in-transit speed of 55 mph assumed; predominantly interstate highways used.
Traffic count – rural, vehicles/hr	530	DOE 2002-TN418
Traffic count – suburban, vehicles/hr	760	
Traffic count – urban, vehicles/hr	2,400	
Dose rate at 1 m from vehicle, mrem/hr	0.1	AEC 1972-TN22
Shipment length, m	9.1	Approximate length of two AP1000 fuel assemblies placed end to end (INEEL 2003-TN71)
Number of truck crew	2	AEC 1972-TN22, NRC 1977-TN417, and DOE 2002-TN418
Stop time, hr/trip	4	Based on one 30-minute stop per 4-hour driving time (Johnson and Michelhaugh 2003-TN1234)
Population density at stops, persons/km^2	See Table 6-8 for truck stop parameters	

(a) AEC 1972-TN22 provides a range of shipping distances between 40 km (25 mi) and 4,800 km (3,000 mi) for unirradiated fuel shipments. A 3,200 km (2,000 mi) "representative" shipping distance was assumed here.

The RADTRAN 5.6 results for this "generic" unirradiated fuel shipment are as follows:

- worker dose: 1.71×10^{-3} person-rem/shipment
- general public dose (onlookers/persons at stops and sharing the highway): 3.62×10^{-3} person-rem/shipment

- general public dose (along route/persons living near a highway or truck stop): 5.12×10^{-5} person-rem/shipment.

These values were combined with the average annual shipments of unirradiated fuel for the AP1000 reactor to calculate annual doses to the public and workers. Table 6-5 presents the annual radiological impacts on workers, public onlookers (i.e., persons at stops and on the road), and members of the public along the route (i.e., residents within 0.5 mi of the highway) for transporting unirradiated fuel to the Turkey Point site. The cumulative annual dose estimates in Table 6-5 were normalized to 1,100 MW(e) (880 MW(e) net electrical output). The NRC staff performed an independent review and determined that all dose estimates are bounded by the Table S–4 conditions of 4 person-rem/yr to transportation workers, 3 person-rem/yr to onlookers, and 3 person-rem/yr to members of the public along the route.

Table 6-5. Radiological Impacts under Normal Conditions of Transporting Unirradiated Fuel to the Turkey Point Site or the Alternative Sites

Plant Type	Normalized Average Annual Shipments	Cumulative Annual Dose, person-rem/yr per 1,100 MW(e)[(a)] (880 MW(e) net)		
		Workers	Public Onlookers	Public Along Route
Reference LWR (WASH-1238) (AEC 1972-TN22)	6.3	0.011	0.023	0.00032
Turkey Point and Alternative Sites AP1000 reactor	5.0	0.009	0.018	0.00025
10 CFR 51.52 (TN250), Table S–4 Condition	<1 per day	4	3	3

(a) Multiply person-rem/yr times 0.01 to obtain doses in person-Sv/yr.

Radiation protection experts assume that any amount of radiation may pose some risk of causing cancer or a severe hereditary effect and that the risk is higher for higher radiation exposures. Therefore, a linear, no-threshold dose-response relationship is used to describe the relationship between radiation dose and detriments to health such as cancer induction. A report by the National Research Council (2006-TN296), the BEIR VII report, uses the linear, no-threshold dose-response model as a basis for estimating the risks from low doses. This approach is accepted by the NRC as a conservative method for estimating health risks from radiation exposure, recognizing that the model may overestimate those risks. Based on this method, the NRC staff estimated the risk to the public from radiation exposure using the nominal probability coefficient for total detriment. This coefficient has the value of 570 fatal cancers, non-fatal cancers, and severe hereditary effects per 1,000,000 person-rem (10,000 person-Sv), which is equal to 0.00057 effects per person-rem. The coefficient is taken from ICRP Publication 103 (ICRP 2007-TN422).

Both the NCRP and ICRP suggest that, when the collective effective dose is smaller than the reciprocal of the relevant risk detriment (in other words, less than 1/0.00057, which is less than 1,754 person-rem), the risk assessment should note that the most likely number of excess health effects is zero (NCRP 1995-TN728; ICRP 2007-TN422). The NRC staff estimated that the largest annual collective dose estimate for transporting unirradiated fuel to the Turkey Point

site and the alternative sites was 0.018 person-rem, which is less than the 1,754 person-rem value that ICRP and NCRP suggest would most likely result in zero excess health effects.

To place these impacts in perspective, the average U.S. resident receives about 311 mrem/yr effective dose equivalent from natural background radiation (i.e., exposures from cosmic radiation, naturally occurring radioactive materials such as radon, and global fallout from testing of nuclear explosive devices) (NCRP 2009-TN420). Using this average effective dose, the collective population dose from natural background radiation to the population along this representative route would be approximately 2.2×10^5 person-rem. Therefore, the radiation doses from transporting unirradiated fuel to the Turkey Point site and alternative sites are minimal compared to the collective population dose to the same population from exposure to natural sources of radiation.

Maximally Exposed Individuals under Normal Transport Conditions

The NRC staff performed a scenario-based analysis to develop estimates of incident-free radiation doses to MEIs for fuel and waste shipments to and from the Turkey Point site and alternative sites. The following discussion applies to unirradiated fuel shipments to, and spent fuel and radioactive waste shipments from, any of the alternative sites. The NRC staff's analysis is based on data in DOE's *Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE 2002-TN1236) and incorporates data about exposure times, dose rates, and the number of times an individual may be exposed to an offsite shipment. Adjustments were made where necessary to reflect the normalized fuel and waste shipments addressed in this EIS. For the analyses of MEIs, the NRC staff assumed that the dose rate emitted from the shipping containers would be 10 mrem/hr at a distance 2 m (6.6 ft) from the side of the transport vehicle. This assumption is conservative in that the assumed dose rate is the maximum dose rate allowed by U.S. Department of Transportation (DOT) regulations (10 CFR Part 71) (TN301). Most unirradiated fuel and radioactive waste shipments would have much lower dose rates than the regulations allow (AEC 1972-TN22; DOE 2002-TN418). An MEI is a person who may receive the highest radiation dose from a shipment to and/or from the Turkey Point site and the alternative sites. The analysis is described below.

Truck Crew Member

Truck crew members would receive the highest radiation doses during incident-free transport because of their proximity to the loaded shipping container for an extended period. The analysis assumed that crew member doses are limited to 2 rem/yr, which is the administrative control level presented in DOE-STD-1098-2008, *DOE Standard, Radiological Control*, Chapter 2, Article 211 (DOE 2009-TN1426). The NRC staff anticipates this limit will apply to spent nuclear fuel shipments to a disposal facility, because DOE would take title to the spent fuel at the reactor site. Because the capacities of spent fuel shipping casks are limited by their substantial radiation shielding and accident resistance requirements, there would be more shipments of spent nuclear fuel from the Turkey Point site (or the alternative sites) than there would be shipments of unirradiated fuel to, and radioactive waste other than spent fuel from, these sites. Spent fuel shipments also have significantly higher radiation dose rates than unirradiated fuel and radioactive waste (DOE 2002-TN418). As a result, crew doses from

unirradiated fuel and radioactive waste shipments would be lower than the doses from spent nuclear fuel shipments. The DOE administrative limit (i.e., 2 rem/yr; see DOE 2009-TN1426) is less than the NRC limit for occupational exposures (i.e., 5 rem/yr; see 10 CFR Part 20 [TN283]).

The DOT does not regulate annual occupational exposures but recommends limits to air crew members that are a 5-year effective dose of 2 rem/yr with no more than 5 rem in a single year (DOT 2003-TN419). As a result, a 2 rem/yr MEI dose to truck crews is a reasonable estimate to apply to shipments of fuel and waste from the Turkey Point site.

Inspector

Radioactive shipments are inspected by Federal or State vehicle inspectors, for example, at State ports of entry. DOE (2002-TN1236) assumed that inspectors would be exposed for 1 hour at a distance of 1 m (3.3 ft) from the shipping containers. Also, DOE conservatively assumed that the external dose rate at 2 m (6.6 ft) is the maximum allowed by regulations (i.e., 10 mrem/hr), the dose rate at 1 m (3.3 ft) is about 14 mrem/hr (Weiner et al. 2008-TN302). Therefore, the dose per shipment is about 14 mrem. This is independent of the location of the reactor site. Based on this conservative external dose rate and the assumption that the same person inspects all shipments of fuel and waste to and from the Turkey Point site and the alternative sites, the annual doses to vehicle inspectors were calculated by the NRC staff to be about 1 rem/yr, based on a combined total of 72 shipments of unirradiated fuel, spent fuel, and radioactive waste per year. This value is less than the DOE administrative control level of 2 rem/yr (DOE 2009-TN1426) on individual doses and is also less than the 5 rem/yr NRC occupational dose limit.

Resident

The analysis assumed that a resident lives adjacent to a highway where a shipment would pass and would be exposed to all shipments along a particular route. Exposures to residents on a per-shipment basis were obtained from the NRC staff's RADTRAN 5.6 output files. These dose estimates are based on a stationary individual located 100 ft from the shipments as the shipments are traveling past at 15 mph. The potential radiation dose to the maximally exposed resident is about 0.04 mrem/yr for shipments of fuel and waste to and from the Turkey Point site and the alternative sites.

Individual Stuck in Traffic

This scenario addresses potential traffic interruptions that could lead to a person being exposed to a loaded shipment for 1 hour at a distance of 4 ft. The NRC staff's analysis assumed this exposure scenario would occur only one time to any individual, and the dose rate was at the regulatory limit of 10 mrem/hr at 2 m (6.6 ft) from the shipment, so the dose rate would be higher at the assumed exposure distance of 4 ft. These are the same assumptions applied by DOE (2002-TN1236). The dose to the MEI was calculated to be 16 mrem.

Person at a Truck Service Station

This scenario estimates the annual doses to an employee at a service station where all truck shipments to and from the Turkey Point site and alternative sites are assumed to stop. The

NRC staff's analysis assumed this person would be exposed for 1 year. The NRC staff also applied a per exposure time of 49 minutes at a distance of 52 ft from the loaded shipping container based on the observations discussed by Griego et al. (1996-TN69). This results in a dose of about 0.34 mrem/shipment and an annual dose of about 24 mrem/yr for the Turkey Point site and alternative sites, assuming that a single individual services all unirradiated fuel, spent fuel, and radioactive waste shipments to and from the Turkey Point site and alternative sites.

6.2.1.2 Radiological Impacts of Transportation Accidents

Accident risks are a combination of accident frequency and consequence. Because of improvements in highway safety and security and an overall reduction in traffic accident, injury, and fatality rates since WASH-1238 was published, accident frequencies for transportation of unirradiated fuel to the Turkey Point site and the alternative sites are expected to be lower than those used in the analysis in WASH-1238 (AEC 1972-TN22), which forms the basis for Table S–4 of 10 CFR 51.52 (TN250). There is no significant difference in consequences of transportation accidents severe enough to result in a release of unirradiated fuel particles to the environment between the AP1000 reactor and current-generation LWRs because the fuel form, cladding, and packaging are similar to those analyzed in WASH-1238. Consequently, consistent with the conclusions of WASH-1238 (AEC 1972-TN22), the impacts of accidents during transport of unirradiated fuel for the AP1000 reactor at the Turkey Point site and alternative sites are expected to be less than those listed in Table S–4 for current-generation LWRs.

6.2.1.3 Nonradiological Impacts of Transportation Accidents

Nonradiological impacts are the human health impacts projected to result from traffic accidents involving shipments of unirradiated fuel to the Turkey Point site and the alternative sites; that is, the analysis does not consider radiological or hazardous characteristics of the cargo.

Nonradiological impacts include the projected number of traffic accidents, injuries, and fatalities that could result from shipments of unirradiated fuel to the site and return shipments of empty containers from the site.

Nonradiological impacts are calculated using accident, injury, and fatality rates from published sources. The rates (i.e., impacts per vehicle-km traveled) are then multiplied by estimated travel distances for workers and materials. The general formula for calculating nonradiological impacts is:

$$\text{Impacts} = (\text{unit rate}) \times (\text{round-trip shipping distance}) \times (\text{annual number of shipments})$$

In this formula, impacts are presented in units of the number of accidents, number of injuries, and number of fatalities per year. Corresponding unit rates (i.e., impacts per vehicle-km traveled) are used in the calculations.

Accident, injury, and fatality rates were taken from Table 4 in ANL/ESD/TM-150, *State-Level Accident Rates for Surface Freight Transportation: A Reexamination* (Saricks and Tompkins 1999-TN81). Nationwide median rates were used for shipments of unirradiated fuel

to the site. The data are representative of traffic accident, injury, and fatality rates for heavy truck shipments similar to those to be used to transport unirradiated fuel to the Turkey Point site and the alternative sites. In addition, the DOT Federal Motor Carrier Safety Administration evaluated the data underlying the Saricks and Tompkins (1999-TN81) rates, which were taken from the Motor Carrier Management Information System, and determined that the rates were under-reported. Therefore, the accident, injury, and fatality rates in Saricks and Tompkins (1999-TN81) were adjusted using factors derived from data provided by the University of Michigan Transportation Research Institute (UMTRI) (Blower and Matteson 2003-TN410). The UMTRI data indicate that accident rates for 1994 to 1996, the same data used in the report (ANL/ESD/TM-150) by Saricks and Tompkins (1999-TN81), were under-reported by about 39 percent. Injury and fatality rates were under-reported by 16 and 36 percent, respectively. As a result, the accident, injury, and fatality rates were increased by factors of 1.64, 1.20, and 1.57, respectively, to account for the under-reporting.

The nonradiological accident impacts for transporting unirradiated fuel to (and empty shipping containers from) the Turkey Point site and the alternative sites are shown in Table 6-6. The nonradiological impacts associated with the WASH-1238 (AEC 1972-TN22) reference LWR also are shown for comparison purposes. Note that there are only small differences between the impacts calculated for an AP1000 reactor at the Turkey Point site and the alternative sites and the reference LWR in WASH-1238 (AEC 1972-TN22) due entirely to the estimated annual number of shipments. Overall, the impacts are minimal, and there are no substantive differences among the alternative sites.

Table 6-6. Nonradiological Impacts of Transporting Unirradiated Fuel to the Turkey Point Site and the Alternative Sites Normalized to Reference LWR

Plant Type	Annual Shipments Normalized to Reference LWR	One-Way Shipping Distance, km	Round-Trip Distance, km/yr	Annual Impacts		
				Accidents per Year	Injuries per Year	Fatalities per Year
Reference LWR (WASH-1238) (AEC 1972-TN22)	6.3	3,200	4.0×10^{4}	1.9×10^{-2}	9.3×10^{-3}	5.8×10^{-4}
AP1000 Reactors at Turkey Point and the Alternative Sites	5.0	3,200	3.2×10^{4}	1.5×10^{-2}	7.4×10^{-3}	4.6×10^{-4}

6.2.2 Transportation of Spent Fuel

The NRC staff performed an independent analysis of the environmental impacts of transporting spent fuel from the proposed Turkey Point site and the alternative sites to a spent fuel disposal repository. For the purposes of these analyses, the NRC staff considered the proposed Yucca Mountain site in Nevada as a surrogate destination. Currently, the NRC has not made a decision on the proposed geologic repository at Yucca Mountain. However, the NRC staff considers that an estimate of the impacts of the transportation of spent fuel to a possible repository in Nevada to be a reasonable bounding estimate of the transportation impacts on a storage or disposal facility because of the distances involved and the representativeness of the distribution of members of the public in urban, suburban, and rural areas (i.e., population distributions) along the shipping routes. Radiological and nonradiological environmental

impacts of normal operating conditions and transportation accidents, as well as nonradiological impacts, are discussed in this section. Note: on March 3, 2010, DOE (2010-TN1239) submitted a motion to the Atomic Safety and Licensing Board to withdraw with prejudice its application for a permanent geologic repository at Yucca Mountain, Nevada. Regardless of the outcome of this motion, the NRC staff concludes that transportation impacts are roughly proportional to the distance from the reactor site to the repository site, in this case Florida to Nevada.

This NRC staff's analysis is based on shipment of spent fuel by legal-weight trucks in shipping casks with characteristics similar to casks currently available (i.e., massive, heavily shielded, cylindrical metal pressure vessels). Because of the large size and weight of spent fuel shipping casks, each shipment is assumed to consist of a single shipping cask loaded on a modified trailer. These assumptions are consistent with those made in the evaluation of the environmental impacts of transportation of spent fuel in Addendum 1 to NUREG–1437 (NRC 1999-TN289). These assumptions are conservative because the alternative transportation methods involve rail transportation or heavy-haul trucks, which would reduce the overall number of spent fuel shipments (NRC 1999-TN289), thus reducing impacts. Also, the use of current shipping cask designs for this analysis results in conservative impact estimates because the current designs are based on transporting short-cooled spent fuel (i.e., spent fuel approximately 120 days out of reactor). Future shipping casks would be designed to transport longer-cooled fuel (i.e., more than 5 years out of reactor) and would require much less shielding to meet external dose limitations. Therefore, future shipping casks are expected to have larger cargo capacities, thus reducing the numbers of shipments and associated impacts.

Radiological impacts of transportation of spent fuel were calculated by the NRC staff using the RADTRAN 5.6 computer code (Weiner et al. 2008-TN302). Routing and population data used in RADTRAN 5.6 for truck shipments were obtained from the TRAGIS routing code (Johnson and Michelhaugh 2003-TN1234). The population data in the TRAGIS code are based on the 2000 Census. Nonradiological impacts were calculated using published traffic accident, injury, and fatality data (Saricks and Tompkins 1999-TN81) in addition to route information from TRAGIS (Johnson and Michelhaugh 2003-TN1234). Traffic accident rates input to RADTRAN 5.6 and nonradiological impact calculations were adjusted to account for under-reporting, as discussed in Sections 4.8.3 and 6.2.1.3.

6.2.2.1 Normal Conditions

Normal conditions, sometimes referred to as "incident-free" conditions, are transportation activities in which shipments reach their destination without an accident occurring. Impacts from these shipments would be from the low levels of radiation that penetrate the heavily shielded spent fuel shipping cask. Radiation exposures would occur to the following populations: (1) persons residing along the transportation corridors between the Turkey Point site and the alternative sites and the proposed repository location; (2) persons in vehicles traveling the same route as a spent fuel shipment; (3) persons at stops for refueling, rest, and vehicle inspections; and (4) transportation crew workers (drivers). For the purposes of this analysis, it was assumed that the destination for the spent fuel shipments is the proposed Yucca Mountain disposal facility in Nevada. This assumption is conservative because it tends to maximize the shipping distance from the Turkey Point site and the alternative sites.

Shipping casks have not been designed for the spent fuel from advanced reactor designs such as the AP1000 reactor. Information in *Early Site Permit Environmental Report Sections and Supporting Documentation* (INEEL 2003-TN71) indicated that advanced LWR fuel designs would not be significantly different from existing LWR designs; therefore, current shipping cask designs were used for the analysis of AP1000 spent fuel shipments. The NRC staff assumed that the capacity of a truck shipment of AP1000 spent fuel was 0.5 MTU/shipment, the same capacity as that used in WASH-1238 (AEC 1972-TN22). In its ER (FPL 2014-TN4058), FPL assumed a shipping cask capacity of 0.5 MTU/shipment.

Input to RADTRAN 5.6 includes the total shipping distance between the origin and destination sites and the population distributions along the routes. This information was obtained by running the TRAGIS computer code (Johnson and Michelhaugh 2003-TN1234) for representative highway routes from the proposed Turkey Point site and the alternative sites to the proposed Yucca Mountain disposal facility. The resulting information regarding route characteristics is shown in Table 6-7. Note that, for truck shipments, all the spent fuel is assumed to be shipped to the proposed Yucca Mountain disposal facility over designated controlled-quantity highway routes. In addition, TRAGIS data were used in RADTRAN 5.6 on a state-by-state basis. This approach increases precision and could allow the results to be presented for each state along the route between the Turkey Point site and the alternative sites and the proposed geologic repository at Yucca Mountain, if desired.

Table 6-7. Transportation Route Information for Shipments from the Turkey Point Site and the Alternative Sites to the Proposed Geologic Repository at Yucca Mountain, Nevada[(a)]

Advanced Reactor Site	One-Way Shipping Distance, km				Population Density, persons/km^2			Stop Time Per Trip, hr
	Total	Rural	Suburban	Urban	Rural	Suburban	Urban	
Turkey Point Site	4,977	3,777	988	212	9.8	367.1	2,422	5
Martin Alternative Site	4,775	3,761	890	124	9.8	342.2	2,304	5
Glades Alternative Site	4,795	3,775	903	116	9.9	333.6	2,324	5
Okeechobee Alternative Site	4,788	3,788	876	124	9.6	344.8	2,304	5
St. Lucie Alternative Site	4,739	3,728	884	127	9.7	346.6	2,308	5

(a) This table presents aggregated route characteristics provided by TRAGIS (Johnson and Michelhaugh 2003-TN1234), including estimated distances from the alternative sites to the nearest TRAGIS highway node. Input to the RADTRAN 5.6 computer code was disaggregated to a state-by-state level.

Radiation doses are a function of many parameters, including vehicle speed, traffic count, dose rate, packaging dimensions, number of individuals in the truck crew, stop time, and population density at stops. A list of the values for these and other parameters and the sources of the information is provided in Table 6-8.

Table 6-8. RADTRAN 5.6 Normal (Incident-Free) Exposure Parameters

Parameter	RADTRAN 5.6 Input Value	Source
Vehicle speed, km/hr	88.49	Based on average speed in rural areas given in DOE's *A Resource Handbook on DOE Transportation Risk Assessment* (DOE 2002-TN418). Conservative in-transit speed of 55 mph assumed; predominantly interstate highways used.
Traffic count – rural, vehicles/hr	State-specific	Weiner et al. 2008-TN302
Traffic count – suburban, vehicles/hr		
Traffic count – urban, vehicles/hr		
Vehicle occupancy, persons/vehicle	1.5	DOE 2002-TN418
Dose rate at 1 m from vehicle, mrem/hr	14	DOE 2002-TN418; DOE 2002-TN1236) – approximate dose rate at 1 m that is equivalent to maximum dose rate allowed by Federal regulations (i.e., 10 mrem/hr at 2 m from the side of a transport vehicle.
Packaging dimensions, m	Length – 5.2 Diameter – 1.0	DOE 2002-TN418
Number of truck crew	2	AEC 1972-TN22; NRC 1977-TN417; DOE 2002-TN418; DOE 2002-TN1236
Stop time, hr/trip	Route-specific	See Table 6-5
Population density at stops, persons/km^2	30,000	Sprung et al. 2000-TN222. Equivalent to nine persons within 10 m of vehicle. See Figure 6-2.
Min/max radii of annular area around vehicle at stops, m	1 to 10	Sprung et al. 2000-TN222
Shielding factor applied to annular area surrounding vehicle at stops, dimensionless	1 (no shielding)	Sprung et al. 2000-TN222
Population density surrounding truck stops, persons/km^2	340	Sprung et al. 2000-TN222
Min/max radius of annular area surrounding truck stop, m	10 to 800	Sprung et al. 2000-TN222
Shielding factor applied to annular area surrounding truck stop, dimensionless	0.2	Sprung et al. 2000-TN222

For the purposes of this analysis, the transportation crew for spent fuel shipments delivered by truck is assumed to consist of two drivers. Escort vehicles and drivers were considered, but they were not included because their distance from the shipping cask would reduce the dose rates to levels well below the dose rates experienced by the drivers and would be negligible. Stop times for refueling and rest were assumed to occur at the rate of 30 minutes per 4 hours of driving time. TRAGIS outputs were used to estimate the number of stops. Doses to the public at truck stops have been significant contributors to the doses calculated in previous RADTRAN 5.6 analyses. For this analysis, doses to the public at refueling and rest stops ("stop doses") are the sum of the doses to individuals located in two annular rings centered at the stopped vehicle,

as illustrated in Figure 6-2. The inner ring represents persons who may be at the truck stop at the same time as a spent fuel shipment and extends 1 to 10 m from the edge of the vehicle. The outer ring represents persons who reside near a truck stop and extends from 10 to 800 m from the vehicle. This scheme is similar to that used in NUREG/CR–6672 (Sprung et al. 2000-TN222). Population densities and shielding factors were also taken from NUREG/CR–6672 (Sprung et al. 2000-TN222), which were based on the observations of Griego et al. (1996-TN69).

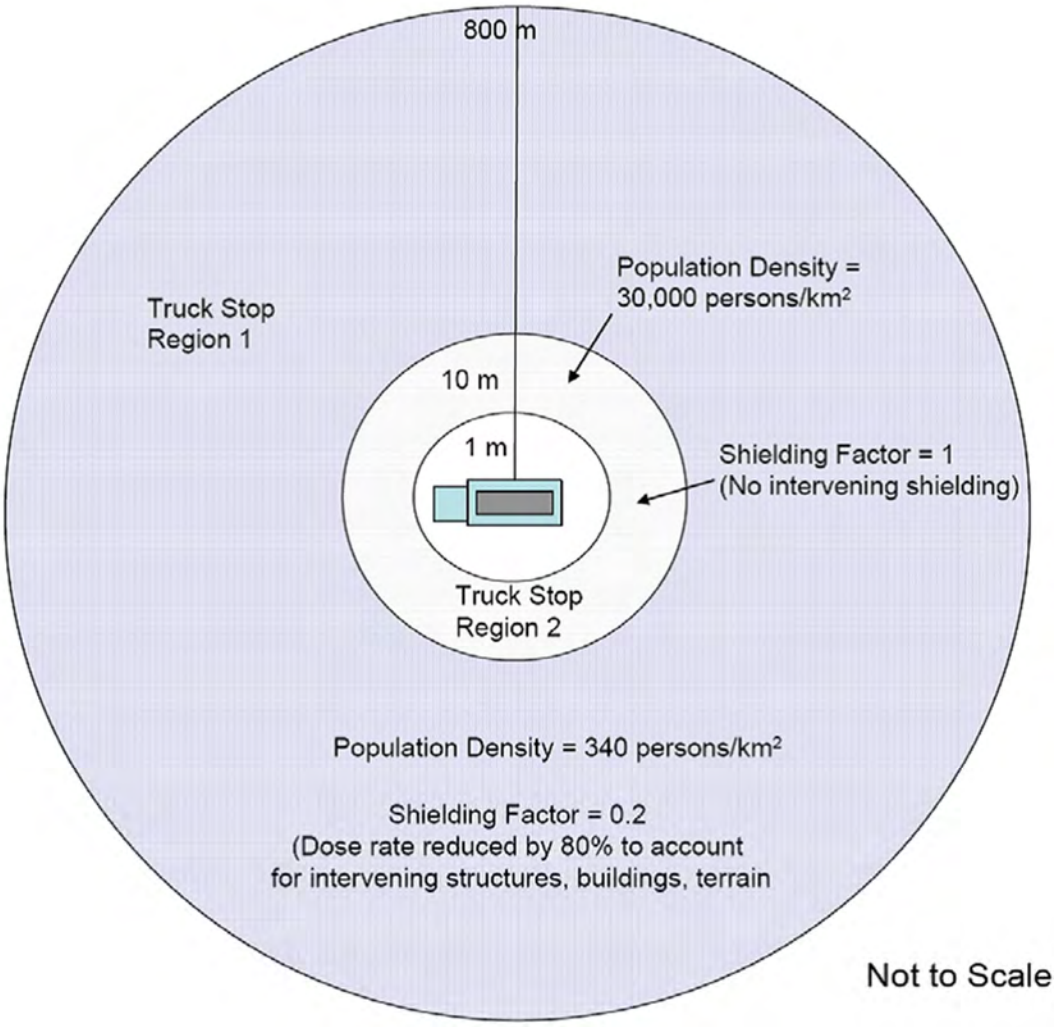


Figure 6-2. Illustration of Truck Stop Model

The results of these normal (incident-free) exposure calculations are shown in Table 6-9 for the proposed Turkey Point site and the alternative sites. Population dose estimates are given for workers (i.e., truck crew members), onlookers (doses to persons at stops and on highways exposed to the spent fuel shipment), and persons along the route (persons living near the highway).

Table 6-9. Normal (Incident-Free) Radiation Doses to Transport Workers and the Public from Shipping Spent Fuel from the Turkey Point Site and the Alternative Sites to the Proposed High-Level Waste Repository at Yucca Mountain

	Worker (Crew), person-rem/yr[(a)]	Along Route, person-rem/yr[(a)]	Onlookers, person-rem/yr[(a)]
Reference LWR (WASH-1238) (AEC 1972-TN22)	1.4×10^{1}	8.2×10^{-1}	2.5×10^{1}
AP1000 Reactor at Turkey Point Site	9.9×10^{0}	5.9×10^{-1}	1.8×10^{1}
Martin Alternative Site	9.5×10^{0}	5.1×10^{-1}	1.8×10^{1}
Glades Alternative Site	9.5×10^{0}	5.2×10^{-1}	1.8×10^{1}
Okeechobee Alternative Site	9.5×10^{0}	5.2×10^{-1}	1.8×10^{1}
St. Lucie Alternative Site	9.4×10^{0}	5.1×10^{-1}	1.8×10^{1}
Table S–4 Condition	4×10^{0}	3×10^{0}	3×10^{0}

(a) To convert person-rem to person-Sv, divide by 100.

Shipping schedules for spent fuel generated by the proposed new unit have not been determined. The NRC staff determined that assuming the annual number of spent fuel shipments to be equivalent to the annual refueling requirements was reasonable for calculating annual doses. Population doses were normalized to the reference LWR in WASH-1238 (880 net MW[e]) (AEC 1972-TN22). This corresponds to an 1,100 MW(e) LWR operating at 80 percent capacity.

The differences in transportation impacts among the four alternative sites evaluated are not significant. In general, impacts at the Turkey Point site are slightly higher than those at the alternative sites, primarily because of the longer shipping distance to Yucca Mountain. However, the differences among sites are relatively minor and are less than the uncertainty in the analytical results.

The bounding cumulative doses to the exposed population given in Table S–4 are

- 4 person-rem/reactor year to transport workers
- 3 person-rem/reactor year to the general public (onlookers), and members of the public along the route.

The calculated population doses to the crew and onlookers for the reference LWR and the Turkey Point site and the alternative site shipments exceed Table S–4 values. A key reason for the higher population doses relative to Table S–4 is the longer shipping distances assumed for this COL analysis (i.e., to a proposed repository in Nevada) than the distances used in WASH-1238 (AEC 1972-TN22). WASH-1238 assumed that each spent fuel shipment would travel a “typical” distance of 1,000 mi, whereas the shipping distances used in this assessment were between 2,900 and 3,100 mi. If the shorter distance were used to calculate the impacts for Turkey Point spent fuel shipments, the doses could be reduced by about 60 to 70 percent. Other important differences are the stop model described above and the additional precision that results from incorporating state-specific route characteristics and vehicle densities on highways (vehicles per hour).

Where necessary, the NRC staff made conservative assumptions to calculate impacts associated with the transportation of spent fuel. Some of the key conservative assumptions are as follows:

- Use of the regulatory maximum dose rate (10 mrem/hr at 2 m) in the RADTRAN 5.6 calculations. The shipping casks assumed in the EIS prepared by DOE in support of the application for a geologic repository at the proposed Yucca Mountain repository (DOE 2002-TN1236) would transport spent fuel that has cooled for a minimum of 5 years (see 10 CFR Part 961 [TN300], Subpart B). Most spent fuel would have cooled for much longer than 5 years before it is shipped to a possible geologic repository. Based on this assumption, shipments from the Turkey Point site and alternative sites are also expected to be cooled for longer than 5 years. Consequently, the estimated population doses in Table 6-9 would be further reduced if more realistic dose rate projections and shipping cask capacities are used.
- Use of the shipping cask capacity used in WASH-1238. The WASH-1238 analyses that form the basis for Table S–4 assumed that spent fuel would be shipped at least 90 days after discharge from a current LWR. The spent fuel shipping casks described in WASH-1238 were designed to transport 90-day−cooled fuel, so their shielding and containment designs must accommodate this highly radioactive cargo. Shipping cask capacities assumed in WASH-1238 were approximately 0.5 MTU per truck cask. In the Yucca Mountain Supplemental EIS (DOE 2008-TN1237), DOE assumed a 10-year cooling period for spent fuel to be shipped to the repository. This allowed DOE to increase the assumed shipping cask capacity to about 1.8 MTU per truck shipment of un-canistered spent fuel. The NRC staff believes this is a reasonable projection for future spent fuel truck shipping cask capacities. If this assumption were to be used in this EIS, the number of shipments of spent fuel would be reduced by about one-third with a similar reduction in radiological incident-free impacts.
- Use of 30 minutes as the average time at a truck stop in the calculations. Many stops made for actual spent fuel shipments are of short duration (i.e., 10 minutes) for brief visual inspections of the cargo (e.g., checking the cask tie-downs). These stops typically occur in minimally populated areas, such as an overpass or freeway ramp in an unpopulated area. Furthermore, empirical data provided by Griego et al. (1996-TN69) indicate that a 30-minute duration is toward the high end of the stop time distribution. Average stop times observed by Griego et al. (1996-TN69) are on the order of 18 minutes. More realistic stop times would further reduce the population doses in Table 6-9.

A sensitivity study was performed by the NRC staff to demonstrate the effects of using more realistic dose rates and stop times on the incident-free population dose calculations. For this sensitivity study, the dose rate was reduced to 5 mrem/hr, the approximate 50 percent confidence interval of the dose rate distribution estimated by Sprung et al. (2000-TN222) for future spent fuel shipments. The stop time was reduced to 18 minutes per stop. All other RADTRAN 5.6 input values were unchanged. The result is that the annual crew doses were reduced to 3.5 person-rem/yr or about 36 percent of the annual dose shown in Table 6-9. The annual onlooker doses were reduced to 4.9 person-rem/yr (27 percent) and the annual doses to persons along the route were reduced to 0.22 person-rem/yr (37 percent).

In its ER (FPL 2014-TN4058), FPL described the results of a RADTRAN 5.6 analysis of the impacts of incident-free transport of spent fuel to Yucca Mountain. Although the overall approaches are the same (e.g., use of TRAGIS and RADTRAN 5.6), there are some differences in the modeling details. The NRC staff concluded that the results produced by FPL are similar to those calculated by the NRC staff in this EIS.

Using the linear no-threshold dose-response relationship discussed in Section 6.2.1.1, the annual public dose impacts for transporting spent fuel from the Turkey Point site or the alternative sites to Yucca Mountain are about 19 person-rem, which is less than the 1,754 person-rem value that ICRP (2007-TN422) and NCRP (1995-TN728) suggest would most likely result in no excess health effects. This dose is very small compared to the estimated 4.5×10^5 person-rem that the same population along the route from the proposed Turkey Point site to Yucca Mountain would incur annually from exposure to natural sources of radiation. Note that the estimated population dose along the Turkey Point-to-Yucca-Mountain route from natural background radiation is different than the natural background dose calculated by the NRC staff for unirradiated fuel shipments in Section 6.2.1.1 of this EIS because the route characteristics are different. A representative route was used in Section 6.2.1.1 for unirradiated fuel shipments and actual highway routes were used in this section for spent fuel shipments.

Dose estimates to the MEI from transport of unirradiated fuel, spent fuel, and waste under normal conditions are presented in Section 6.2.1.1.

6.2.2.2 Radiological Impacts of Transportation Accidents

As discussed previously, the NRC staff used the RADTRAN 5.6 computer code to estimate impacts of transportation accidents involving spent fuel shipments. RADTRAN 5.6 considers a spectrum of postulated transportation accidents, ranging from those with high frequencies and low consequences (e.g., “fender benders”) to those with low frequencies and high consequences (i.e., accidents in which the shipping container is exposed to severe mechanical and thermal conditions).

Radionuclide inventories are important parameters in the calculation of accident risks. The NRC staff used the radionuclide inventories from the FPL ER (FPL 2014-TN4058). These spent fuel inventories are presented in Table 6-10. The list of radionuclides in the table includes all of the radionuclides that were included in the analysis conducted by Sprung et al. (2000-TN222). The analysis also included the inventory of crud—radioactive material deposited on the external surfaces of LWR spent fuel rods. Crud is deposited from corrosion products generated elsewhere in the reactor cooling system. Because the AP1000 is a new reactor design and has no operating experience, there is uncertainty about the quantities and characteristics of crud that will be deposited on AP1000 spent fuel. This uncertainty will be reduced over time as operating experience with AP1000 reactors increases. For this EIS, Turkey Point AP1000 spent fuel transportation accident impacts were calculated by the NRC staff assuming the cobalt-60 inventory in the form of crud is 4.1 Ci/MTU and the antimony-125 inventory in the form of crud is 0.11 Ci/MTU, based on information provided by Westinghouse.

Table 6-10. Radionuclide Inventories Used in Transportation Accident Risk Calculations for an AP1000 Reactor(a)

Radionuclide	Ci/MTU	Physical-Chemical Group
Am-241	727	Particulate
Am-242m	13	Particulate
Am-243	33	Particulate
Ce-144	8,870	Particulate
Cm-242	28	Particulate
Cm-243	31	Particulate
Cm-244	7,750	Particulate
Cm-245	1.2	Particulate
Co-60[(b)]	4.1	Crud
Cs-134	48,000	Cesium
Cs-137	93,000	Cesium
Eu-154	9,130	Particulate
Eu-155	4,620	Particulate
Kr-85[(c)]	8,900	Gas
Pm-147	17,600	Particulate
Pu-238	6,070	Particulate
Pu-239	255	Particulate
Pu-240	543	Particulate
Pu-241	69,600	Particulate
Pu-242	1.8	Particulate
Ru-106	15,500	Ruthenium
Sb-125[(b)]	0.11	Crud
Sr-90	61,900	Particulate
Y-90	61,900	Particulate

(a) The source of the spent fuel inventories is FPL (2014-TN4058), Table 7.4-3, except as noted in footnote (b).
(b) Cobalt-60 and antimony-125 are the primary radioactive constituents in fuel assembly crud, or radioactive material deposited on the external surfaces of fuel assemblies.
(c) The Kr-85 source term was taken from INEEL (2003) and was included to ensure that potential releases of gaseous radionuclides were considered in the transportation accident risk analysis.

Robust shipping casks are used to transport spent fuel because of the radiation shielding and accident resistance required by 10 CFR Part 71 (TN301). Spent fuel shipping casks must be certified as Type B packaging systems, meaning they must withstand a series of severe postulated accident conditions with essentially no loss of containment or shielding capability. These casks also are designed with fissile material controls to ensure the spent fuel remains subcritical under both normal and accident conditions. According to Sprung et al. (2000-TN222), the probability of encountering accident conditions that would lead to shipping cask failure is less than 0.01 percent (i.e., more than 99.99 percent of all accidents would result in no release of radioactive material from the shipping cask). The NRC staff assumed that shipping casks approved for transportation of spent fuel from an AP1000 reactor would provide equivalent mechanical and thermal protection of the spent fuel cargo.

Accident frequencies are calculated in RADTRAN 5.6 using user-specified accident rates and conditional shipping cask failure probabilities. State-specific accident rates were taken from

Saricks and Tompkins (1999-TN81) and used in the RADTRAN 5.6 calculations. The state-specific accident rates were then adjusted to account for under-reporting, as described in Section 6.2.1.3. Conditional shipping cask failure probabilities (i.e., the probability of cask failure as a function of the mechanical and thermal conditions applied in an accident) were taken from Sprung et al. (2000-TN222).

The RADTRAN 5.6 accident risk calculations were performed using the radionuclide inventories given in Table 6-10. The resulting risk estimates then were multiplied by assumed annual spent fuel shipments to derive estimates of the annual accident risks associated with spent fuel shipments from the Turkey Point site and the alternative sites to the proposed repository at Yucca Mountain in Nevada. As was done for routine exposures, the NRC staff assumed that the numbers of shipments of spent fuel per year are equivalent to the annual discharge quantities.

For this assessment, release fractions for current-generation LWR fuel designs (Sprung et al. 2000-TN222) were used to approximate the impacts from the AP1000 spent fuel shipments. This assumes that the fuel materials and containment systems (i.e., cladding and fuel coatings) behave similarly to current LWR fuel under applied mechanical and thermal conditions.

The NRC staff used RADTRAN 5.6 to calculate the population dose from the released radioactive material from four of five possible exposure pathways.(1)

The four pathways used in the NRC calculations are listed below:

1. External dose from exposure to the passing cloud of radioactive material (cloudshine).
2. External dose from the radionuclides deposited on the ground by the passing plume (groundshine). The NRC staff's analysis included the radiation exposure from this pathway even though the area surrounding a potential accidental release would be evacuated and decontaminated, thus preventing long-term exposures from this pathway.
3. Internal dose from inhalation of airborne radioactive contaminants (inhalation).
4. Internal dose from resuspension of radioactive materials that were deposited on the ground (resuspension). The NRC staff's analysis included the radiation exposures from this pathway even though evacuation and decontamination of the area surrounding a potential accidental release would prevent long-term exposures.

Table 6-11 presents the environmental consequences of transportation accidents when shipping spent fuel from the Turkey Point site and the alternative sites to the proposed Yucca Mountain repository. The shipping distances and population distribution information for the routes were the same as those used for the normal “incident-free” conditions (see Section 6.2.2.1). The results are normalized to the WASH-1238 (AEC 1972-TN22) reference reactor (i.e., 880 MW(e) net electrical generation, 1,100 MW(e) reactor operating at 80 percent capacity) to provide a common basis for comparison to the impacts listed in Table S–4. Although there are slight differences in impacts among the alternative sites, none of the alternative sites would be clearly favored over the Turkey Point site.

(1) Internal dose from ingestion of contaminated food was not considered because the staff assumed evacuation and subsequent interdiction of foodstuffs following a postulated transportation accident.

Table 6-11. Annual Spent Fuel Transportation Accident Impacts for an AP1000 Reactor at the Turkey Point Site and the Alternative Sites, Normalized to Reference 1,100 MW(e) LWR Net Electrical Generation

	Normalized Population Impacts, Person-rem/Reference Reactor Year[(a)]
Reference LWR (WASH-1238)	7.2×10^{-5}
AP1000 Reactor at Turkey Point Site	5.2×10^{-5}
Martin Alternative Site	4.5×10^{-5}
Glades Alternative Site	4.5×10^{-5}
Okeechobee Alternative Site	4.5×10^{-5}
St. Lucie Alternative Site	4.6×10^{-5}

(a) To convert person-rem to person-Sv, divide by 100.

Using the linear no-threshold dose-response relationship discussed in Section 6.2.1.1, the annual collective public dose estimates for transporting spent fuel from the Turkey Point site and the alternative sites to Yucca Mountain are on the order of 1×10^{-4} person-rem, which is less than the 1,754 person-rem value that ICRP (2007-TN422) and NCRP (1995-TN728) suggest would most likely result in zero excess health effects. This risk is very small compared to the estimated 4.5×10^{5} person-rem/yr that the same population would incur annually along the route from the proposed Turkey Point site to Yucca Mountain from exposure to natural sources of radiation.

6.2.2.3 Nonradiological Impact of Spent Fuel Shipments

The general approach used to calculate nonradiological impacts of spent fuel shipments is the same as that used for unirradiated fuel shipments. The main difference is that the spent fuel shipping route characteristics are better defined so the State-level accident statistics in Saricks and Tompkins (1999-TN81) may be used. State-by-state shipping distances were obtained from the TRAGIS output file and combined with the annual number of shipments and accident, injury, and fatality rates by State from Saricks and Tompkins (1999-TN81) to calculate nonradiological impacts. In addition, the accident, injury, and fatality rates from Saricks and Tompkins (1999-TN81) were adjusted to account for under-reporting (see Section 6.2.1.3). The results are shown in Table 6-12. Overall, the impacts are minimal, and there are no substantive differences among the alternative sites.

Table 6-12. Nonradiological Impacts of Transporting Spent Fuel from the Turkey Point Site and the Alternative Sites to Yucca Mountain, Normalized to Reference LWR

Site	One-Way Shipping Distance, km	Nonradiological Impacts, per Year		
		Accidents/yr	Injuries/yr	Fatalities/yr
Turkey Point (proposed site)	3,093	1.5×10^{-1}	9.8×10^{-2}	6.8×10^{-3}
Martin Alternative Site	2,967	1.5×10^{-1}	9.7×10^{-2}	6.6×10^{-3}
Glades Alternative Site	2,980	1.5×10^{-1}	9.7×10^{-2}	6.6×10^{-3}
Okeechobee Alternative Site	2,975	1.5×10^{-1}	9.7×10^{-2}	6.6×10^{-3}
St. Lucie Alternative Site	2,944	1.5×10^{-1}	9.7×10^{-2}	6.5×10^{-3}

Note: The number of shipments of spent fuel assumed in the calculations is 60 shipments/yr after normalizing to the reference LWR.

6.2.3 Transportation of Radioactive Waste

This section discusses the environmental effects of transporting radioactive waste other than spent fuel from the Turkey Point site and the alternative sites. The environmental conditions listed in 10 CFR 51.52 (TN250) that apply to shipments of radioactive waste are listed below:

- Radioactive waste (except spent fuel) would be packaged and in solid form.
- Radioactive waste (except spent fuel) would be shipped from the reactor by truck or rail.
- The weight limitation of 73,000 lb per truck and 100 tons per cask per railcar would be met.
- Traffic density would be less than one truck shipment per day or three railcars per month.

Radioactive waste other than spent fuel from the Turkey Point AP1000 reactors is expected to be capable of being shipped in compliance with Federal and/or State weight restrictions. Table 6-13 presents estimates of annual waste volumes and annual waste shipment numbers for an AP1000 reactor normalized to the reference 1,100 MW(e) LWR defined in WASH-1238 (AEC 1972-TN22). The expected annual shipped waste volumes for the AP1000 reactor are estimated at 1,964 ft^3/yr (Westinghouse 2011-TN261), and the annual number of waste shipments was estimated at 23 shipments per year after normalization to the reference LWR in WASH-1238 (AEC 1972-TN22). The annual waste volume and annual number of shipments are less than those for the 1,100 MW(e) reference reactor that was the basis for Table S–4. The annual shipment estimates could also be reduced if more efficient packaging is used to transport waste from the Turkey Point site than is assumed in WASH-1238 (AEC 1972-TN22). The NRC staff reviewed the radioactive waste generation and shipment data in the ER (FPL 2014-TN4058) and concluded that the information is consistent with current LWR operating experience.

Table 6-13. Summary of Radioactive Waste Shipments from the Turkey Point Site and Alternative Sites

Reactor Type	Waste Generation Information	Annual Waste Volume, m^3/yr per Unit	Electrical Output, MW(e) per Unit	Normalized Rate, m^3/1,100 MW(e) Unit (880 MW(e) Net)[(a)]	Shipments/ 1,100 MW(e) (880 MW(e) Net) Electrical Output[(b)]
Reference LWR (WASH-1238)	3,800 ft^3/yr per unit	108	1,100	108	46
Turkey Point AP1000 (ER volume)	1,964 ft^3/yr per unit[(c)]	56	1,000	53	23

Conversions: 1 m^3 = 35.31 ft^3. Drum volume = 210 L (0.21 m^3).

(a) Capacity factors used to normalize the waste generation rates to an equivalent electrical generation output are 80 percent for the reference LWR (AEC 1972-TN22) and 93 percent for the Turkey Point AP1000 reactor (FPL 2014-TN4058). Waste generation for the AP1000 reactor is normalized to 880 MW(e) net electrical output (1,100 MW(e) unit with an 80 percent capacity factor).

(b) The number of shipments per 1,100 MW(e) was calculated by dividing the normalized rate by the assumed shipment capacity used in WASH-1238 (AEC 1972-TN22) (2.34 m^3/shipment).

(c) This value was taken from the *AP1000 Design Control Document* (Westinghouse 2011-TN261).

The sum of the daily shipments of unirradiated fuel, spent fuel, and radioactive waste for an AP1000 reactor located at the Turkey Point site and the alternative sites is less than the one-truck-shipment-per-day condition given in 10 CFR 51.52 (TN250), Table S–4.

Dose estimates to the MEI from transport of unirradiated fuel, spent fuel, and waste under normal conditions are presented in Section 6.2.1.1.

Nonradiological impacts of radioactive waste shipments were calculated using the same general approach as unirradiated and spent fuel shipments. For this EIS, the shipping distance was assumed to be 500 mi one way (AEC 1972-TN22). Because the actual destination is uncertain, national median accident, injury, and fatality rates were used in the calculations (Saricks and Tompkins 1999-TN81). These rates were adjusted to account for under-reporting, as described in Section 6.2.1.3. The results are presented in Table 6-14. As shown, the calculated nonradiological impacts for transportation of radioactive waste other than spent fuel from the Turkey Point site and alternative sites to waste disposal facilities are less than the impacts calculated for the reference LWR in WASH-1238 (AEC 1972-TN22).

Table 6-14. Nonradiological Impacts of Radioactive Waste Shipments from the Turkey Point Site

	Normalized Shipments per Year	One-Way Distance, Km	Accidents per Year	Injuries per Year	Fatalities per Year
Reference LWR (WASH-1238) (AEC 1972-TN22)	46	800	3.4×10^{-2}	1.7×10^{-2}	1.1×10^{-3}
Turkey Point AP1000 Reactor	23	800	1.7×10^{-2}	8.5×10^{-3}	5.3×10^{-4}

6.2.4 Conclusions for Transportation

The NRC staff conducted independent confirmatory analyses of potential impacts under normal operating and accident conditions of transportation of fuel and wastes to and from AP1000 reactors to be located at the proposed Turkey Point site and the alternative sites. To make comparisons to Table S–4, the environmental impacts were adjusted (i.e., normalized) to the environmental impacts associated with the reference LWR in WASH-1238 (AEC 1972-TN22) by multiplying the AP1000 impact estimates by the ratio of the total electric output for the reference reactor to the electric output of the proposed reactor.

Because of the conservative approaches and data used to calculate impacts, the NRC staff does not expect the actual environmental effects to exceed those calculated in this EIS. Thus, the NRC staff concludes that the environmental impacts of transportation of fuel and radioactive wastes to and from the Turkey Point site and the alternative sites site would be SMALL, and would be consistent with the environmental impacts associated with transportation of fuel and radioactive wastes to and from current-generation reactors presented in Table S–4 of 10 CFR 51.52 (TN250).

The NRC staff concludes that transportation impacts are approximately proportional to the distance from the reactor site to the repository site, in this case from South Florida to Nevada. The distance from the Turkey Point site or any of the alternate sites to any new planned repository in the contiguous United States would be no more than double the distance from the Turkey Point site or alternative sites to Yucca Mountain. Doubling the environmental impact estimates from the transportation of spent reactor fuel, as presented in this section, would provide a reasonable bounding estimate of the impacts for NEPA purposes (42 U.S.C. § 4321 et

seq.) (TN661). The NRC staff concludes that the environmental impacts of these doubled estimates would not be significant and, therefore, would still be SMALL.

6.3 Decommissioning Impacts

At the end of the operating life of a nuclear power reactor, NRC regulations require that the facility be decommissioned. The NRC defines decommissioning as the safe removal of a facility from service and the reduction of residual radioactivity to a level permitting termination of the NRC license. The regulations governing decommissioning of power reactors are found in 10 CFR 50.75 and 10 CFR 50.82 (TN249). The radiological criteria for termination of the NRC license are in 10 CFR Part 20 (TN283), Subpart E. Minimization of contamination and generation of radioactive waste requirements for facility design and procedures for operation are addressed in 10 CFR 20.1406 (TN283).

An applicant for a COL is required to certify that sufficient funds will be available to provide for radiological decommissioning at the end of power operations. As part of its COL application for the proposed Units 6 and 7 on the Turkey Point site, FPL included a Decommissioning Funding Assurance Report (FPL 2014-TN4103). FPL would establish an external sinking funds account to accumulate funds for decommissioning.

Environmental impacts from the activities associated with the decommissioning of any reactor before or at the end of an initial or renewed license are evaluated in the *Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities: Supplement I, Regarding the Decommissioning of Nuclear Power Reactors* (GEIS-DECOM), NUREG–0586 Supplement 1 (NRC 2002-TN665). Environmental impacts of the DECON, SAFSTOR, and ENTOMB decommissioning methods are evaluated in the GEIS-DECOM. A COL applicant is not required to identify a decommissioning method at the time of the COL application. The NRC staff's evaluation of the environmental impacts of decommissioning presented in the GEIS-DECOM identifies a range of impacts for each environmental issue for a range of different reactor designs. The NRC staff concludes that the construction methods that would be used for the AP1000 reactor are not sufficiently different from the construction methods used for the current plants to significantly affect the impacts evaluated in the GEIS-DECOM. Therefore, the NRC staff concludes that the impacts discussed in the GEIS-DECOM remain bounding for reactors deployed after 2002, including the AP1000.

The GEIS-DECOM does not specifically address the GHG footprint of decommissioning activities. However, it does list the decommissioning activities and states that the decommissioning workforce would be expected to be smaller than the operational workforce and that the decontamination and demolition activities could take up to 10 years to complete. Finally, it discusses SAFSTOR, in which decontamination and dismantlement are delayed for a number of years. Given this information, the NRC staff estimated the GHG footprint of decommissioning to be of the order of 7.0×10^4 MT (i.e., 2.7×10^4 MT for the reference 1,000 MW(e) LWR multiplied by the scaling factor of 2.6) for two units without SAFSTOR. This footprint is about one-third decommissioning workforce transportation and two-thirds equipment usage. The details of the NRC staff's estimate are presented in Appendix J for a single unit. A 40-year SAFSTOR period would increase the GHG footprint of decommissioning by about

40 percent. These GHG footprints are roughly three orders of magnitude less than the GHG footprint presented in Section 6.1.3 for the uranium fuel cycle.

Therefore, the staff relies upon the bases established in the GEIS-DECOM and concludes the following:

1. Doses to the public would be well below applicable regulatory standards regardless of which decommissioning method considered in GEIS-DECOM is used.
2. Occupational doses would be well below applicable regulatory standards during the license term.
3. The quantities of Class C or greater than Class C wastes generated would be comparable or less than the amounts of solid waste generated by reactors licensed before 2002.
4. The air-quality impacts of decommissioning are expected to be negligible at the end of the operating term.
5. Measures are readily available to avoid potential significant water-quality impacts from erosion or spills. The liquid radioactive waste system design includes features to limit release of radioactive material to the environment, such as pipe chases and tank collection basins. These features would minimize the amount of radioactive material in spills and leakage that would have to be addressed at decommissioning.
6. The ecological impacts of decommissioning are expected to be negligible.
7. The socioeconomic impacts would be short-term and could be offset by decreases in population and economic diversification.

For the proposed new units at Turkey Point, the impacts from decommissioning are expected to be within the bounds described in the GEIS-DECOM for both the Turkey Point site and the alternative sites. On the basis of the GEIS-DECOM and the evaluation of air-quality impacts from GHG emissions above, the NRC staff concludes that, as long as the regulatory requirements for decommissioning activities to limit the impacts of decommissioning are met, the decommissioning activities would result in a SMALL impact.

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11. ABSTRACT (200 words or less)

This environmental impact statement (EIS) has been prepared in response to an application submitted to the U.S. Nuclear Regulatory Commission (NRC) by Florida Power and Light Company (FPL) for two combined construction permits and operating licenses) combined licenses or COLs). The proposed actions related to the FPL application are (1) NRC issuance of COLs for two new power reactor units (Units 6 & 7) at the Turkey Point Nuclear Power Plant site in Miami-Dade County, Florida, and (2) U.S. Army Corps of Engineers (USACE) decision to issue, deny, or issue with modifications a Department of the Army (DA) permit to perform certain dredge and fill activities in waters of the United States and to construct structures in navigable waters of the United States related to the project.

This EIS documents the review team's analysis, which considers and weighs the environmental impacts of constructing and operating two new nuclear units at the Turkey Point site and at alternative sites, including measures potentially available for reducing or avoiding adverse impacts.

After considering the environmental aspects of the proposed action before the NRC, the NRC staff's recommendation to the Commission is that the COLs be issued as proposed. This recommendation is based on (1) the application, including the Environmental Report (ER), submitted by FPL; (2) consultation with Federal, State, Tribal, and local agencies; (3) the review team's independent review; (4) the consideration of public comments received on the environmental review; and (5) the assessments summarized in this EIS, including the potential mitigation measures identified in the ER and this EIS.

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Office of New Reactors
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Lead Agency: U.S. Nuclear Regulatory Commission
Cooperating Agency: U.S. Army Corps of Engineers, Jacksonville District
Contact: Alicia Williamson, Environmental Project Manager
Environmental Projects Branch
Division of New Reactor Licensing
Office of New Reactors
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
Telephone: 301-415-1878
e-mail: Alicia.Williamson@nrc.gov

ABSTRACT

This environmental impact statement (EIS) has been prepared in response to an application submitted to the U.S. Nuclear Regulatory Commission (NRC) by Florida Power & Light Company (FPL) for two combined construction permits and operating licenses (combined licenses or COLs). The proposed actions related to the FPL application are (1) NRC issuance of COLs for two new power reactor units (Units 6 and 7) at the Turkey Point Nuclear Power Plant site in Miami-Dade County, Florida, and (2) U.S. Army Corps of Engineers (USACE) decision to issue, deny, or issue with modifications a Department of the Army (DA) permit to perform certain dredge and fill activities in waters of the United States and to construct structures in navigable waters of the United States related to the project. The NRC, its contractors, and USACE make up the review team. The National Park Service (NPS) is also a cooperating agency on this EIS but does not now have a request to take any specific regulatory action before it. Due to this unique set of circumstances, impact determinations made in this EIS should only be attributed to the review team. This EIS documents the review team's analysis, which considers and weighs the environmental impacts of constructing and operating two new nuclear units at the Turkey Point site and at alternative sites, including measures potentially available for reducing or avoiding adverse impacts.

The EIS includes an evaluation of the impacts of construction and operation of Turkey Point Units 6 and 7 on waters of the United States pursuant to Section 404 of the Clean Water Act and on navigable waters of the United States pursuant to Section 10 of the Rivers and Harbors Act of 1899. The USACE will base its evaluation of FPL's DA permit application, on the requirements of USACE regulations, the Clean Water Act Section 404(b)(1) Guidelines, and the USACE public interest review process.

After considering the environmental aspects of the proposed action before the NRC, the NRC staff's recommendation to the Commission is that the COLs be issued as proposed. This recommendation is based on (1) the application, including the Environmental Report (ER), submitted by FPL; (2) consultation with Federal, State, Tribal, and local agencies; (3) the review

team's independent review; (4) the consideration of public comments received on the environmental review; and (5) the assessments summarized in this EIS, including the potential mitigation measures identified in the ER and this EIS.

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EXECUTIVE SUMMARY

This environmental impact statement (EIS) presents the results of a U.S. Nuclear Regulatory Commission (NRC) environmental review of an application for a combined construction permit and operating license (combined license or COL) for two new nuclear reactor units at a proposed Turkey Point site in Miami-Dade County, Florida. The U.S. Army Corps of Engineers (USACE) participated in the preparation of the EIS as a cooperating agency and as a member of the review team, which consisted of the NRC staff, its contractor staff, and the USACE staff. The National Park Service (NPS) participated in the environmental review as a cooperating agency by providing special expertise for the areas in and around the adjacent national parks (Biscayne and Everglades National Parks). The NPS does not have a request to take any specific regulatory actions related to the proposed COLs before it. Due to this unique set of circumstances, all impact determinations made in this EIS should not be attributed to NPS, but only to the NRC and USACE (also referred to as the review team). The NPS's participation in connection with this EIS does not imply NPS concurrence.

Background

On June 30, 2009, the Florida Power & Light Company (FPL) submitted an application to the NRC for a combined construction permit and operating license (combined license or COL) for Turkey Point Units 6 and 7.

Upon acceptance of FPL's application, the NRC review team began the environmental review process by publishing a Notice of Intent to prepare an EIS and conduct scoping in the *Federal Register* on June 15, 2010. As part of this environmental review, the review team did the following:

- conducted public scoping meetings on July 15, 2010 in Homestead, Florida
- conducted a site visit of the proposed Units 6 and 7 plant area on the Turkey Point site in June 2010
- conducted visits to alternative sites in July 2010
- reviewed FPL's Environmental Report (ER)
- consulted with Tribal Nations and other agencies such as the U.S. Fish and Wildlife Service (FWS), Advisory Council on Historic Preservation, Florida Fish and Wildlife Conservation Commission, National Marine Fisheries Service, Miami-Dade Office of Historic and Archaeological Resources, and Florida Division of Historical Resources
- conducted the review following guidance set forth in NUREG-1555:
  - "Standard Review Plans for Environmental Reviews for Nuclear Power Plants
  - Supplement 1: Operating License Renewal"
- considered public comments received during the 60-day scoping process from June 15, 2010 to August 16, 2010

- conducted public meetings on the draft EIS on April 22, 2015, in Miami, Florida, and on April 23, 2015, in Homestead, Florida
- considered public comments received during the comment periods for the draft EIS, which extended from March 5 to May 22 and from May 28 to July 17, 2016.

Proposed Action

FPL initiated the proposed Federal action by submitting an application for Turkey Point Units 6 and 7 to the NRC. The NRC's Federal action is issuance of COLs for two Westinghouse AP1000 reactors at the Turkey Point site near Homestead, Florida.

The USACE is a cooperating agency in preparation of this EIS. The USACE's Federal action is its decision of whether to issue, deny, or issue with modifications a Department of Army (DA) permit pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899 to authorize certain construction activities potentially affecting waters of the United States.(1)

Purpose and Need for Action

The purpose of the proposed NRC action, issuance of the COL, is to provide for additional baseload electric generating capacity for use in the FPL service territory.

The USACE determines both a basic and an overall project purpose pursuant to the Clean Water Act Section 404(b)(1) Guidelines, 33 CFR § 230.10. The basic purpose is to meet the public's need for electric energy. The overall purpose is to meet the public's need for reliable increased electrical baseload generating capacity in FPL's service territory.

Affected Environment

The Turkey Point site is located in southeast Miami-Dade County, Florida, near Homestead (Figure ES-1). Turkey Point Units 6 and 7 would be located on the same site as the existing Turkey Point site, which has five other power plants, including two nuclear power reactors. Turkey Point would be located 25 mi south of Miami and 4.5 and 8 mi east of Homestead and Florida City, respectively. The primary source of cooling water would be reclaimed wastewater and the alternative source would be saltwater supplied from radial collector wells beneath Biscayne Bay. The ultimate heat sink for Turkey Point Units 6 and 7 would be the atmosphere, using three mechanical draft cooling towers per reactor.

(1) Waters of the United States" is used to include both "waters of the United States" as defined by 33 CFR Part 328 (TN1683) defining the extent of USACE geographic jurisdiction pursuant to Section 404 of the Clean Water Act and "navigable waters of the United States" as defined by 33 CFR Part 329 (TN4770) defining the extent of USACE geographic jurisdiction pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403) (TN4768).

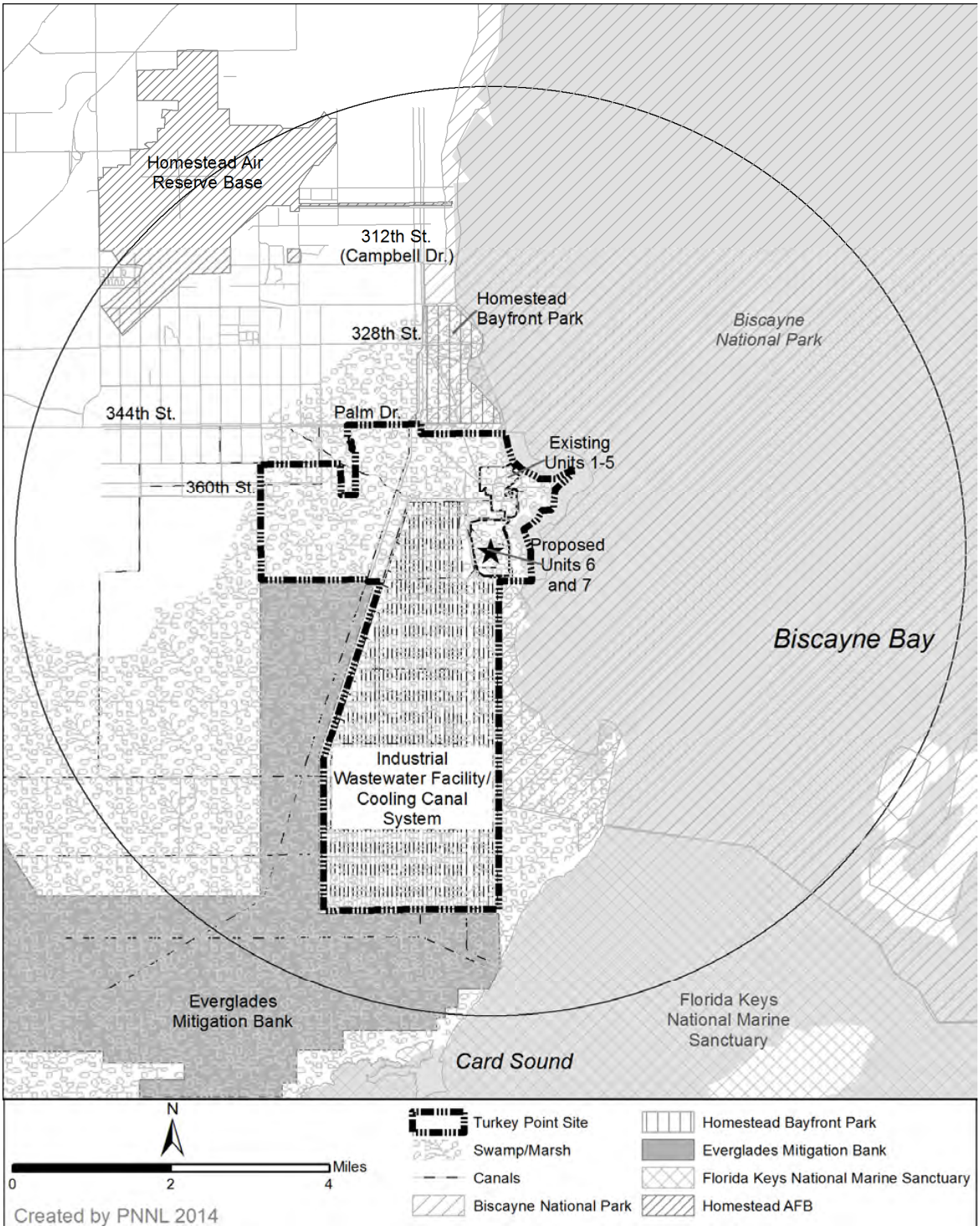

Figure ES-1. The Turkey Point Site and Affected Environment

Evaluation of Environmental Impacts

SMALL: Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.

MODERATE: Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.

LARGE: Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

This EIS evaluates the potential environmental impacts of the construction and operation of the two new nuclear plants proposed for the Turkey Point site related to the following resource areas:

- land use
- air quality
- aquatic ecology
- terrestrial ecology
- surface and groundwater
- waste (radiological and nonradiological)
- human health (radiological and nonradiological)
- socioeconomics
- environmental justice
- cultural resources
- fuel cycle, decommissioning, and transportation

The impacts are designated as SMALL, MODERATE, or LARGE. The incremental impacts related to the construction and operations activities requiring NRC authorization are described and characterized, as are the cumulative impacts resulting from the proposed action when the effects are added to, or interact with, other past, present, and reasonably foreseeable future effects on the same resources. A summary of the construction and operation impacts are outlined in Table ES-1. Table ES-2 summarizes the review team's assessment of cumulative impacts. The review team's detailed analysis which supports the impact assessment of the proposed new units can be found in Chapters 4, 5, and 7, respectively.

Table ES-1. Environmental Impact Levels of the Proposed Turkey Point Units 6 and 7

Resource Category	Preconstruction and Construction	Operation
Land Use	MODERATE (NRC authorized construction impact level is SMALL)	MODERATE
Water-Related		
Water Use – Surface Water	SMALL	SMALL
Water Use – Groundwater Use	SMALL	SMALL
Water Quality – Surface Water	SMALL	SMALL
Water Quality – Groundwater	SMALL	SMALL
Ecology		
Terrestrial Ecosystems	MODERATE (NRC authorized construction impact level is SMALL)	MODERATE
Aquatic Ecosystems	SMALL to MODERATE	SMALL
Socioeconomic		
Physical Impacts	SMALL (adverse) to MODERATE (beneficial)	SMALL (adverse) to MODERATE (beneficial)
Demography	SMALL	SMALL
Economic Impacts on the Community	SMALL	SMALL and beneficial
Infrastructure and Community Services	SMALL to MODERATE	SMALL to MODERATE
Environmental Justice	NONE[(a)]	NONE[(a)]
Historic and Cultural Resources	MODERATE (NRC authorized construction impact level is SMALL)	SMALL
Air Quality	SMALL	SMALL
Nonradiological Health	SMALL	SMALL
Nonradiological Waste	SMALL	SMALL
Radiological Health	SMALL	SMALL
Postulated Accidents	n/a	SMALL
Fuel Cycle, Transportation, and Decommissioning	n/a	SMALL

(a) A determination of "NONE" for Environmental Justice analyses does not mean there are no adverse impacts to minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

Table ES-2. Cumulative Impacts on Environmental Resources, Including the Impacts of Proposed Turkey Point Units 6 and 7

Resource Category	Impact Level
Land Use	MODERATE
Water-Related	
Water Use – Surface Water	SMALL
Water Use – Groundwater Use	SMALL
Water Quality – Surface Water	MODERATE
Water Quality – Groundwater	SMALL
Ecology	
Terrestrial Ecosystems	MODERATE to LARGE
Aquatic Ecosystems	MODERATE
Socioeconomic	
Physical Impacts	SMALL adverse to MODERATE beneficial
Demography	SMALL
Economic Impacts on the Community	SMALL and beneficial
Infrastructure and Community Services	SMALL to MODERATE
Environmental Justice	NONE[(a)]
Historic and Cultural Resources	MODERATE
Air Quality	SMALL to MODERATE for criteria pollutants and MODERATE for GHGs
Nonradiological Health	SMALL
Nonradiological Waste	SMALL
Radiological Health	SMALL
Postulated Accidents	SMALL
Fuel Cycle, Transportation, and Decommissioning	SMALL

(a) A determination of "NONE" for Environmental Justice analyses does not mean there are no adverse impacts to minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

Alternatives

The review team considered the environmental impacts associated with alternatives to issuing a COL for the two new nuclear units proposed by FPL for the Turkey Point site. These alternatives included a no-action alternative (i.e., not issuing the COL) and alternative energy sources, siting locations, and system designs.

The no-action alternative would result in the COL not being granted or the USACE not issuing its permit. Upon such a denial, construction and operation of new units at the Turkey Point site would not occur and the predicted environmental impacts would not take place. If no other facility would be built or strategy implemented to take its place, the benefits of the additional electrical capacity and electricity generation to be provided would also not occur and the need for baseload power would not be met.

Based on the NRC staff's review of energy alternatives, the NRC staff concluded that, from an environmental perspective, none of the viable alternatives is environmentally preferable to building a new baseload nuclear power generation plant at the Turkey Point site. The NRC staff eliminated several energy sources (e.g., wind, solar, geothermal, and biomass) from full

consideration because they are not currently capable of meeting the need of this project. None of the viable baseload alternatives (natural gas, coal, or a combination of alternatives) was environmentally preferable to the proposed Turkey Point units.

After comparing the cumulative effects of a new nuclear power plant at the proposed site against those at the alternative sites, the NRC staff concluded that none of the alternative sites would be environmentally preferable to the proposed site for building and operating a new nuclear power plant (Table ES-3). The four alternatives sites selected were as follows (Figure ES-2):

- Glades
- Martin
- Okeechobee 2
- St. Lucie.

Table ES-3. Comparison of Cumulative Impacts at the Turkey Point and Alternative Sites

Resource Category	Turkey Point Site[a]	Glades[b]	Martin[b]	Okeechobee 2[b]	St. Lucie[b]
Land Use	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
Water-Related					
Surface-water use	SMALL	MODERATE	MODERATE	MODERATE	SMALL
Groundwater use	SMALL	SMALL	SMALL	SMALL	SMALL
Surface-water quality	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
Groundwater quality	SMALL	SMALL	SMALL	SMALL	SMALL
Ecology					
Terrestrial and wetland ecosystems	MODERATE to LARGE	MODERATE	MODERATE	MODERATE	MODERATE
Aquatic ecosystems	MODERATE	MODERATE	MODERATE	MODERATE	SMALL to MODERATE
Socioeconomics					
Physical impacts	SMALL adverse except for MODERATE beneficial impacts on road quality	MODERATE adverse to SMALL beneficial impacts on road quality	MODERATE adverse to MODERATE beneficial impacts on road quality	MODERATE adverse to SMALL beneficial impacts on road quality	LARGE adverse to MODERATE beneficial impacts on road quality
Demography	SMALL	SMALL	SMALL	SMALL	SMALL, except for LARGE residential displacement impacts
Economic impacts on the community	SMALL and beneficial	SMALL and beneficial, except for LARGE and beneficial property tax revenues for Glades County and School District	SMALL and beneficial, except for MODERATE and beneficial property tax revenues for Martin County and School District	SMALL and beneficial, except for LARGE and beneficial property tax revenues for Okeechobee County and School District	SMALL and beneficial

Table ES-3. (contd)

Resource Category	Turkey Point Site[a]	Glades[b]	Martin[b]	Okeechobee 2[b]	St. Lucie[b]
Infrastructure and community services	SMALL except for MODERATE adverse impacts on traffic	SMALL except for MODERATE adverse impacts on traffic	SMALL except for MODERATE adverse impacts on traffic	SMALL except for MODERATE adverse impacts on traffic	SMALL except for MODERATE adverse impacts on traffic
Environmental Justice	None[c]	None[c]	None[c]	None[c]	None[c]
Historic and Cultural Resources	MODERATE	MODERATE	SMALL	MODERATE	SMALL
Air Quality					
Criteria pollutants	SMALL to MODERATE	SMALL	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE
Greenhouse gas emissions	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
Nonradiological Health	SMALL	SMALL	SMALL	SMALL	SMALL
Radiological Health	SMALL	SMALL	SMALL	SMALL	SMALL
Postulated Accidents	SMALL	SMALL	SMALL	SMALL	SMALL

(a) Cumulative impact determinations taken from EIS Table 7-3.
(b) Cumulative impact determinations taken from EIS Table 9-28.
(c) A determination of "NONE" for Environmental Justice analyses does not mean there are no adverse impacts on minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

Table ES-3 provides a summary of the cumulative impacts for the proposed and alternative sites. The NRC staff concluded that all of the sites were generally comparable, and it would be difficult to state that one site is preferable to another from an environmental perspective. In such a case, the proposed site prevails because none of the alternatives is environmentally preferable to the proposed site.

Table ES-4 provides a summary of the EIS-derived impacts for a new nuclear power plant in comparison with the energy alternatives. The NRC staff concluded that none of the viable energy alternatives is preferable to construction of a new baseload nuclear power-generating plant located within FPL's region of interest.

The NRC staff considered various alternative systems designs, including seven alternative heat-dissipation systems and multiple alternative intake, discharge, and water-supply systems. The review team identified no alternatives that were environmentally preferable to the proposed Turkey Point Units 6 and 7 systems design.

Figure ES-2. Location of Sites Considered as Alternatives to the Turkey Point Site

Table ES-4. Summary of Environmental Impacts[a] of Construction and Operation of New Nuclear, Coal-Fired, and Natural-Gas–Fired Generating Units and a Combination of Alternatives

Impact Category	Nuclear	Coal[b]	Natural Gas[b]	Combination of Alternatives[b]
Land Use	MODERATE	MODERATE	MODERATE	MODERATE
Air Quality	SMALL	MODERATE	SMALL to MODERATE	SMALL to MODERATE
Water Use and Quality	SMALL	SMALL	SMALL	SMALL
Ecology	MODERATE	MODERATE	MODERATE	MODERATE
Waste Management	SMALL	MODERATE	SMALL	SMALL
Socioeconomics	MODERATE Beneficial to MODERATE Adverse	MODERATE Beneficial to MODERATE Adverse	MODERATE Beneficial to SMALL Adverse	MODERATE Beneficial to MODERATE Adverse
Human Health	SMALL	SMALL	SMALL	SMALL
Historic and Cultural Resources	MODERATE	MODERATE	MODERATE	MODERATE
Environmental Justice	NONE[b]	NONE[b]	NONE[b]	NONE[b]

(a) Impact levels for all alternatives are for construction and operation but do not reflect cumulative impacts. Thus, the nuclear impacts identified here may differ from those used to compare the proposed site to the alternative sites, which reflect cumulative impacts.
(b) Impacts taken from EIS Table 9-4. These conclusions for energy alternatives should be compared to NRC-authorized activities reflected in Chapters 4, 5, and Sections 6.1, and 6.2.
(c) A determination of "NONE" for Environmental Justice analyses does not mean there are no adverse impacts to minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

Benefits and Costs

The NRC staff compiled and compared the pertinent analytical conclusions reached in the EIS. It gathered all of the expected impacts from building and operating proposed Turkey Point Units 6 and 7 and aggregated them into two final categories: (1) expected environmental costs and (2) expected benefits to be derived from approval of the proposed action. Although the analysis in Section 10.6 is conceptually similar to a purely economic benefit-cost analysis, which determines the net present dollar value of a given project, the purpose of the section is to identify potential societal benefits of the proposed activities and compare them to the potential internal (i.e., private) and external (i.e., societal) costs of the proposed activities. In general, the purpose is to inform the COL process by gathering and reviewing information that demonstrates the likelihood that the benefits of the proposed activities outweigh the aggregate costs.

On the basis of the assessments in this EIS, the building and operation of proposed Turkey Point Units 6 and 7, with mitigation measures identified by the review team, would accrue benefits that most likely would outweigh the economic, environmental, and social costs. For the NRC-proposed action (i.e., NRC-authorized construction and operation), the accrued benefits would also outweigh the costs of preconstruction, construction, and operation of proposed Turkey Point Units 6 and 7.

Public Involvement

A 60-day scoping period was held from June 15, 2010, to August 16, 2010. On July 15, 2010, the NRC held two public scoping meetings in Homestead, Florida. The review team received many oral comments during the public meetings and 32 e-mails and 10 letters throughout the rest of the scoping period on numerous topics including energy alternatives, terrestrial ecology, ground and surface water, and socioeconomics. The review team's response to the in-scope public comments can be found in Appendix D. The Scoping Summary Report (Agencywide Documents Access and Management System (ADAMS) Accession No. ML103130609) contains all of the comments, even those considered out-of-scope (e.g., security, safety issues).

During the initial 75-day comment period on the draft EIS, which began on March 6, 2015, the review team held public meetings in Miami, Florida, on April 22, 2015, and in Homestead, Florida, on April 23, 2015. During the course of the comment period, the NRC received requests from members of the public, a Tribal government, and Federal agencies to extend the comment period. In response to these requests, the NRC reopened the comment period on the draft EIS on May 28, 2015, until July 17, 2015, allowing additional time for public comments. In total, approximately 68 people provided oral comments at the public meetings held in April, and the NRC received approximately 11,300 pieces of correspondence during the original and reopened comment period.

Recommendation

The NRC's recommendation to the Commission related to the environmental aspects of the proposed action is that the COL should be issued.

This recommendation is based on the following:

- the application, including the ER, submitted by FPL
- consultation with Federal, State, Tribes, and local agencies
- site audits and alternative sites audits
- consideration of public comments received during the environmental review
- the review team's independent review and assessment summarized in this EIS.

The NRC's determination is independent of the USACE's determination of whether to issue, deny, or issue with modifications the DA permit application for the Turkey Point Units 6 and 7. The USACE will conclude its Clean Water Act Section 404(b)(1) Guidelines and public interest analyses in its Record of Decision.

ABBREVIATIONS/ACRONYMS

AADT	annual average daily traffic
ac	acre(s)
ACC	averted cleanup and decontamination costs
ac-ft	acre (foot) feet
ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
AD	Anno Domini
ADAMS	Agencywide Documents Access and Management System
AERMOD	American Meteorological Society/U.S. Environmental Protection Agency (AMS/EPA) Regulatory Model
AICUZ	Air Installation Compatible Use Zone
ALARA	as low as reasonably achievable
a.m.	ante meridian
AO	Administrative Order
AP-42	EPA's Compilation of Air Pollutant Emission Factors document
APE	Area of Potential Effect
APPZ	Avon Park Permeable (or Producing) Zone
AQCR	Air Quality Control Region
ARNI	Aquatic Resources of National Importance
ARRA	American Recovery and Reinvestment Act of 2009
ASE	advanced safety evaluation
ASR	aquifer storage and recovery (system)
ATC	Atlantic Coastal Ridge
BA	Biological Assessment
BACT	Best Available Control Technologies
BBCW	Biscayne Bay Coastal Wetlands
BC	Before Christ
BEBR	University of Florida's Bureau of Economic and Business Research
BEA	U.S. Bureau of Economic Analysis
BEIR VII	Biological Effects of Ionizing Radiation VII
bgs	below ground surface
BISC	Biscayne Bay
BLS	U.S. Bureau of Labor Statistics
BMP	Best Management Practice
Btu	British thermal unit
°C	degree(s) Celsius
μCi	microcurie(s)

μCi/mL	microcuries per milliliter
CA	Consent Agreement
CAA	Clean Air Act
CAIR	Clean Air Interstate Rule
CCD	Colony Collapse Disorder
CCR	coal combustion residuals
CCS	cooling-canal system (also known as IWF)
CDF	core damage frequency
CDMP	Comprehensive Development Master Plan
CDNFRM	cost for decontamination of non-farmland
CEC	chemical/contaminant of emerging concern
CEQ	Council on Environmental Quality
CERP	Comprehensive Everglades Restoration Program (also Project, Plan)
CFR	*Code of Federal Regulations*
cfs	cubic foot/feet per second
cm	centimeter(s)
cm^2	square centimeter(s)
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COL	combined construction permit and operating license
CPI	Consumer Price Index
CPUE	catch per unit effort
CSAPR	Cross-State Air Pollution Rule
CTEMISS	cooling-tower emissions processor
CWA	Clean Water Act (aka Federal Water Pollution Control Act)
CWS	circulating-water system
CZMP	Coastal Zone Management Plan
d	day(s)
D	Directional Distribution Factor
DA	Department of the Army
dB	decibel(s)
dBA	decibel(s) on the A-weighted scale
DBA	design basis accident
DCD	Design Control Document
DEET	*N*,*N*-Diethyl-*meta*-toluamide
DEIS	draft environmental impact statement
DERM	Miami-Dade County Department of Environmental Resources Management
DHS	Department of Homeland Security

DNL	day-night average sound level
DOE	U.S. Department of Energy
DOI	U.S. Department of Interior
DOT	U.S. Department of Transportation
DPS	distinct population segment
DSM	demand-side management
DZMW	dual-zone monitoring well
EAB	exclusion area boundary
EAI	Ecological Associates, Inc.
EC10	effective concentration required to induce a 10% effect
EC50	effective concentration required to induce a 50% effect
ECOTOX	EPA Ecotoxicology
EDR	Florida Legislature's Office of Economic and Demographic Research
EEEA	East Everglades Expansion Area
EEL	Environmentally Endangered Lands (Program)
EFH	essential fish habitat
EIA	Energy Information Administration
EIS	environmental impact statement
EJ	environmental justice
ELF	extremely low frequency
ELF-EMF	extremely low frequency-electromagnetic field
EMB	Everglades Mitigation Bank
EMF	electromagnetic field
ENP	Everglades National Park
EPA	U.S. Environmental Protection Agency
EPOC	emerging pollutant of concern
EPRI	Electric Power Research Institute
ER	Environmental Report
ESA	Endangered Species Act of 1973, as amended
ESOC	emerging substance of concern
ESRP	Environmental Standard Review Plan (NUREG-1555, Supplement 1, Operating License Renewal)
EW	exploratory well
°F	degree(s) Fahrenheit
FAA	Federal Aviation Administration
FAC	Florida Administrative Code or Fla. Admin. Code
FDEP	Florida Department of Environmental Protection
FDHR	Florida Division of Historic Resources
FDOH	Florida Department of Health

FDOT	Florida Department of Transportation
FEC	Florida East Coast (Railway)
FEFP	Florida Education Finance Program
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FFWCC	Florida Fish and Wildlife Conservation Commission
FIRM	Flood Insurance Rate Map
FKNMS	Florida Keys National Marine Sanctuary
FLUCFCS	Florida Land Use, Cover, and Forms Classification System
FLUM	Future Land Use Map
FMNH	Florida Museum of Natural History
FMP	fishery management plan
FMSF	Florida Master Site File (form)
FNAI	Florida Natural Areas Inventory
FONSI	Findings of No Significant Impact
FPL	Florida Power & Light Company
fps	foot (feet) per second
FPSC	Florida Public Service Commission
FR	*Federal Register*
FRCC	Florida Reliability Coordinating Council
FSAR	Final Safety Analysis Report
FSER	Final Safety Evaluation Report
ft	foot/feet
ft^2	square foot/feet
ft/d	foot (feet) per day
ft^2/d	square foot (feet) per day
ft^3	cubic foot (feet)
ft^3/d	cubic foot (feet) per day
ft^3/yr	cubic foot (feet) per year
FTE	full-time equivalent
FWPCA	Federal Water Pollution Control Act (also known as the Clean Water Act of 1977)
FWS	U.S. Fish and Wildlife Service
FY	fiscal year
µg	microgram(s)
µg/L	microgram(s) per liter
µGy	microgray(s)
g	gram(s) or gravity of Earth (g-force)
gal	gallon(s)
gal/yr	gallon(s) per year

GC	gas centrifuge
g/cm^3	gram(s) per cubic centimeter
GCRP	U.S. Global Change Research Program
GEIS	Generic Environmental Impact Statement (for License Renewal of Nuclear Plants, NUREG-1437)
GHG	greenhouse gas
GIS	geographic information system
gpd	gallon per day
gpm	gallon per minute
gpm/ft	gallon(s) per minute per foot
g/s	gram(s) per second
GU	Interim District (zone)
GW	gigawatt(s)
GWh	gigawatt hour(s)
ha	hectare(s)
HAP	hazardous air pollutant
HAPC	habitat area of particular concern
HBB	health-based benchmark
HDR	HDR Engineering, Inc.
HEC-RAS	Hydrologic Engineering Centers River Analysis System
hr	hour
HUD	U.S. Department of Housing and Urban Development
Hz	hertz
I	Interstate
IAEA	International Atomic Energy Agency
ICRP	International Commission on Radiological Protection
ID	identification
IGCC	integrated gasification combined-cycle
in.	inch(es)
IRWST	in-containment refueling water storage tank
ISFSI	independent spent fuel storage installation
IUCN	World Conservation Union
IWF	industrial wastewater facility (also known as CCS)
K	Standard Peak Hour Factor
kg	kilogram(s)
kg/d	kilogram(s) per day
kg/L	kilogram(s) per liter
kg/yr	kilogram(s) per year

kg/ha/mo	kilogram(s)/hectare/month
kHz	kilohertz
km	kilometer(s)
km^2	square kilometer(s)
km/hr	kilometer(s) per hour
kt	knot(s)
kV	kilovolt(s)
kV/m	kilovolt(s) per meter
kW	kilowatt(s)
kWh	kilowatt-hour(s)
L	liter(s)
lb	pound(s)
lb/yr	pound(s) per year
L_{dn}	day-night average sound level
LEDPA	least environmentally damaging practicable alternative
L_{eq}	noise level equivalent
LFA	Lower Floridan Aquifer
LLC	Limited Liability Company
LLW	low-level waste
LOEC	lowest-observed effect concentration
LOS	level of service
LPZ	low-population zone
LST	local standard time
LWA	Limited Work Authorization
LWR	light water reactor
µmhos/cm	micromhos per centimeter
m	meter(s)
m/s	meter(s) per second
m^2	square meter(s)
m^3	cubic meter(s)
m^3/d	cubic meters per day
m^3/s	cubic meter(s) per second
mA	milliampere(s)
MACCS	MELCOR Accident Consequence Code System
MCU	Middle Confining Unit
MDC	Miami-Dade County
M-DCPS	Miami-Dade County Public School District
MDWASD	Miami-Dade Water and Sewer Department
MEI	maximally exposed individual

mg	milligram(s)
mG	milliGauss
Mgd	million gallon(s) per day
Mgd/yr	million gallon(s) per day per year
Mgm	million gallons per month
Mg/L	milligram(s) per liter
Mg/m^3	milligram(s) per cubic meter
mg N/L	milligrams of nitrate per liter
mg P/L	milligrams of phosphate per liter
mGy	milligray(s)
mGy/d	milligray(s) per day
MFCMA	Magnuson–Stevens Fishery Conservation and Management Act (or Magnuson–Stevens Act)
MHz	megahertz
mi	mile(s)
mi^2	square mile(s)
min	minute(s)
MIT	Massachusetts Institute of Technology
mL	milliliter(s)
MMBtu	one million British thermal units
MMBtu/hr	one million British thermal units per hour
MMBtu/yr	one million British thermal units per year
mo	month(s)
MOU	Memorandum of Understanding
mph	mile(s) per hour
mrad	millirad
mrem	millirem
msl or MSL	mean sea level
mSv	millisievert(s)
MSW	municipal solid waste
MT	metric ton(nes)
MTU	metric ton uranium
MW	megawatt(s)
MWd/MTU	megawatt-days per metric ton of uranium
MW(e)	megawatt(s) electric
MW(t)	megawatt(s) thermal
MWh	megawatt hour(s)
MWh/yr	megawatt hour(s) per year
N	north or nitrogen
NA	not applicable

NAAQS	National Ambient Air Quality Standard
NAD83	North American Datum of 1983
NARUC	National Association of Regulatory Utility Commissioners
NASCAR	National Association for Stock Car Auto Racing
NAVD88	North American Vertical Datum of 1988
NCI	National Cancer Institute
NCRP	National Council on Radiation Protection and Measurements
NEPA	National Environmental Policy Act of 1969, as amended
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NFC	Natural Forest Community
NGCC	natural-gas combined-cycle
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
NIEHS	National Institute of Environmental Health Sciences
NMFS	National Marine Fisheries Service
NNC	Numerical Nutrient Criteria
NO_2	nitrogen dioxide
NO_3+NO_2	nitrate+nitrite
NO_x	nitrogen oxides
NOAA	National Oceanic and Atmospheric Administration
NOEC	no-observed effect concentration
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRC	U.S. Nuclear Regulatory Commission
NRHP	National Register of Historic Places
NSR	new source review
NUREG	U.S. Nuclear Regulatory Commission technical document
NW	northwest
NWS	National Weather Service
O_2	oxygen
O_3	ozone
ODCM	Offsite Dose Calculation Manual
OFW	Outstanding Florida Water
OIG	Office of the Inspector General
ORV	off-road vehicle
OSHA	Occupational Safety and Health Administration
P	phosphorus
PAH	polycyclic aromatic hydrocarbon

PC	personal computer
PCB	polychlorinated biphenyl
pCi/L	picocurie(s) per Liter
pH	measure of acidity or basicity in solution
PHU	panther habitat units
PHU	panther habitat unit
PFA	Panther Focus Area
P/L	phosphorus per liter
PIR	Public Interest Review or Project Implementation Report
PIRF	Public Interest Review Factor
PK-12	preschool through 12th grade
p.m.	post meridian
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter of 10 microns or less
$PM_{2.5}$	particulate matter with an aerodynamic diameter of 2.5 microns or less
PPSA	Power Plant Siting Act
ppm	part(s) per million
ppt	parts per thousand
PRA	probabilistic risk assessment
PSA	probabilistic safety assessment
PSD	Prevention of Significant Deterioration (Permit)
psu	practical salinity unit
PWR	pressurized water reactor
rad	radiation absorbed dose
RAI	Request for Additional Information
RCRA	Resource Conservation and Recovery Act of 1976, as amended
RCW	radial collector well
rem	roentgen equivalent man
REMP	radiological environmental monitoring program
RfC	reference concentration
RFI	Request for Information
RHA	Rivers and Harbors Act of 1899
RIMS II	Regional Input-Output Modeling System
RMS	root mean square
Rn-222	radon-222
ROD	Record of Decision
ROI	region of interest
RPHP	Radiation Public Health Project
RRY	reference reactor year
RSICC	(Oak Ridge) Radiation Safety Information Computational Center

RV	recreational vehicle
RWTF	reclaimed water-treatment facility
Ryr	reactor year
s or sec	second(s)
SAFMC	South Atlantic Fisheries Management Council
SAMA	severe accident mitigation alternative
SAMDA	severe accident mitigation design alternative
SAV	submerged aquatic vegetation
SBO	Station Blackout
SCA	Site Certification Application
scf	standard cubic feet
SCR	selective catalytic reduction
SDWWTP	South District Wastewater Treatment Plant
sec	second(s)
SECA	State Energy Conversion Alliance
SER	Safety Evaluation Report
SFRPC	South Florida Regional Planning Council
SFWMD	South Florida Water Management District
SGWEA	Southern Glades Wildlife Environmental Area
SHA	seismic hazard analysis
SHPO	State Historic Preservation Office (or Officer)
s/m^3	seconds per cubic meter
SO_2	sulfur dioxide
SO_x	oxides of sulfur
SOR	Save Our Rivers (Program)
SPCC	Spill Prevention, Control, and Countermeasure (Plan)
SR	State Route
SRP	Standard Review Plan
SSC	Species of Concern
SU	Standard Unit(s)
Sv	sievert(s)
SW	southwest
SWPPP	stormwater pollution prevention plan
SWS	service-water system
T	ton(s) or tonne(s)
T/B	Tug/Barge
TB_q	terrabequerel
TCP	traditional cultural property
T&E	threatened and endangered

TDS	total dissolved solids
TEDE	total effective dose equivalent
THPO	Tribal Historic Preservation Officer
TIMDEC	decontamination time
TKN	total Kjeldahl nitrogen
TLD	thermoluminescent dosimeter
TLF	Treasured Lands Foundation
TN	total nitrogen
TOC	total organic carbon
TP	total phosphorus
TRC	total reportable cases
TVA	Tennessee Valley Authority
UDB	urban development boundary
UF_6	uranium hexafluoride
UIC	underground injection control
UMAM	Uniform Mitigation Assessment Method
UMTRI	University of Michigan Transportation Research Institute
UNESCO	United National Educational, Scientific and Cultural Organization
UO_2	uranium dioxide
US	U.S. (State Highway)
U.S.	United States
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USCB	U.S. Census Bureau
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USDW	underground source of drinking water
USGS	U.S. Geological Survey
VOC	volatile organic compound
W	west
W.A.T.E.R.	Wetland Assessment Technique for Environmental Review
WCA	water conservation area
Westinghouse	Westinghouse Electric Company, LLC
WHO	World Health Organization
wk	week(s)
WOTUS	waters of the United States
WRDA	Water Resources Development Act
WTP	water treatment plant
WWTP	wastewater treatment plant

χ/Q	atmospheric dispersion factor(s); annual average normalized air concentration value(s)
yd^3	cubic yards
yr	year(s)

7.0 CUMULATIVE IMPACTS

The National Environmental Policy Act of 1969, as amended (NEPA) (42 U.S.C. § 4321 et seq.) (TN661) requires Federal agencies to consider the cumulative impacts of proposals under its review. Cumulative impacts may result when the environmental effects associated with the proposed action are overlaid or added to temporary or permanent effects associated with past, present, and reasonably foreseeable future projects. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time. When evaluating the potential impacts of two new nuclear units at the Turkey Point Nuclear Power Plant (Turkey Point) site proposed by Florida Power & Light Company (FPL) in its application for combined construction permits and operating licenses (combined licenses or COLs) (FPL 2009-TN1229), the U.S. Nuclear Regulatory Commission (NRC) staff and the U.S. Army Corps of Engineers (USACE) staff considered potential cumulative impacts on resources that could be affected by the construction, preconstruction, and operation of two Westinghouse Electric Company, LLC (Westinghouse) AP1000 pressurized water reactors at the site (Westinghouse 2011-TN261). Cumulative impacts result when the effects of an action are added to, or interact with, other past, present, and reasonably foreseeable future effects on the same resources. For the purposes of this analysis, past actions are those taken prior to the receipt of the COL application. Present actions are those related to resources from the time of the COL application until the start of NRC-authorized construction of the proposed new units. Future actions are those that are reasonably foreseeable during the building and operating of the proposed Turkey Point Units 6 and 7, including decommissioning. The effect of climate change on the evaluation of environmental impacts is addressed in more detail in Appendix I. The geographic area over which past, present, and reasonably foreseeable future actions could contribute to cumulative impacts is dependent on the type of resource considered and is described below for each resource area.

The approach for evaluating cumulative impacts in this environmental impact statement (EIS) is outlined in the following discussion. To guide its assessment of environmental impacts of a proposed action or alternative actions, the NRC has established a standard of significance for impacts based on guidance developed by the Council on Environmental Quality (Title 40 of the *Code of Federal Regulations* [CFR] 1508.27 [TN428]). The three significance levels established by the NRC—SMALL, MODERATE, or LARGE—are defined as follows:

> SMALL – Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.
>
> MODERATE – Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.
>
> LARGE – Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

The impacts of the proposed action, as described in Chapters 4 and 5, are combined with other past, present, and reasonably foreseeable future actions near the Turkey Point site that would affect the same resources affected by proposed Units 6 and 7, regardless of what agency (Federal or non-Federal) or person undertakes such actions. These combined impacts are

defined by the Council on Environmental Quality as “cumulative” in 40 CFR 1508.7 (TN428) and include individually minor but collectively significant actions taking place over a period of time. It is possible that an impact that may be SMALL by itself could result in a MODERATE or LARGE cumulative impact when considered in combination with the impacts of other actions on the affected resource. Likewise, if a resource is regionally declining or imperiled, even a SMALL individual impact could be important if it contributes to or accelerates the overall resource decline.

The description of the affected environment in Chapter 2 serves as the baseline for the cumulative impacts analysis, including the effects of past actions. The incremental impacts related to the construction activities requiring NRC authorization (10 CFR 50.10(a)) [TN249]) are described and characterized in Chapter 4 and those related to operations are described in Chapter 5. These impacts are summarized for each resource area in the sections that follow. The level of detail is commensurate with the significance of the impact for each resource area.

The specific resources and components that could be affected by the incremental effects of the proposed action and other actions in the same geographic area were assessed. This assessment includes the impacts of construction and operation of the proposed new units as described in Chapters 4 and 5; impacts of preconstruction activities as described in Chapter 4; impacts of fuel cycle, transportation, and decommissioning as described in Chapter 6; and impacts from past, present, and reasonably foreseeable Federal, non-Federal, and private actions that could affect the same resources affected by the proposed actions.

The review team visited the Turkey Point site from June 7 through 11, 2010 (NRC 2010-TN1457). The team then used the information provided in the Environmental Report, responses to requests for additional information, information from other Federal and State agencies, and information gathered during the visits to the Turkey Point site to evaluate the cumulative impacts of building and operating two new nuclear power plants at the site. To inform the cumulative analysis, the review team searched U.S. Environmental Protection Agency (EPA) databases for recent EISs and for permits for water discharges in the geographic area (to identify water-use projects and industrial facilities). In addition, the review team used the www.recovery.gov website to identify projects in the geographic area funded by the American Recovery and Reinvestment Act of 2009 (ARRA) (26 U.S.C. § 1) (TN1250). Other actions and projects identified during this review and considered in the review team’s independent analysis of the potential cumulative effects are described in Table 7-1. Approximate locations are given with respect to the Turkey Point site.

Table 7-1. Past, Present, and Reasonably Foreseeable Projects and Other Actions Considered in the Cumulative Analysis in the Vicinity of the Turkey Point Site

Project Name	Summary of Project	Location	Status
Everglades Ecosystem Restoration and/or Comprehensive Everglades Restoration Plan Projects (DOI 2016-TN4589)			
Everglades Ecosystem Restoration Project	A major restoration initiative that will restore the quantity, quality, timing, and distribution of fresh water in an effort to reverse decades of unintended environmental decline.	Throughout region	Ongoing (USACE 2016-TN4588; DOI 2016-TN4589)
Comprehensive Everglades Restoration Plan (CERP)	Associated with the Everglades Ecosystem Restoration Project, this effort is made up of numerous projects (e.g., Biscayne Wetlands Restoration Project) in the region. The projects in and around the region are discussed in Section 2.3.1.1.	Throughout region	Made up of numerous project elements in various stages of completion from those that have been proposed to those that have been completed (DOA and DOI 2016-TN4580).
Energy Projects			
Turkey Point Units 1-5	Two 720 MW nuclear and three oil/gas 2,900 MW plants	Adjacent	Operational, Units 3 and 4 underwent license renewal in 2002 (NRC 2012-TN1298; NRC 2012-TN1299) and uprate in 2012 (NRC 2012-TN1438)
Turkey Point Units 3 and 4	General Licensed Independent Spent Fuel Storage Installation	Adjacent	Operational
Conversion of Turkey Point Units 1 and 2 to use as synchronous condensers		Adjacent	Unit 2 converted; Unit 1 will be converted in December 2016 (FPL 2016-TN4579)
Freshening of the water in the cooling canals of the industrial waste water facility	The Florida Department of Environmental Protection issued an Administrative Order requiring FPL to submit to the Department a salinity management plan that would describe how FPL would reduce and maintain the average annual salinity in the cooling-canal system at 34 psu.	Adjacent	Freshening has been underway since summer of 2014 using water from the L-31E Canal, Biscayne aquifer, and Upper Floridan aquifer
Homestead Power Plant	53 MW oil/gas-power–generation plant	9 mi northwest of the Turkey Point site	Operational (EPA 2012-TN1082)

Table 7-1. (contd)

Project Name	Summary of Project	Location	Status
Remediation of hypersalinity plume	FPL and Miami-Dade County entered into a Consent Agreement on October 6, 2015, identifying the steps FPL will take to remediate the hypersaline plume in groundwater such that groundwater with a concentration greater than 19,000 mg/L chloride would be limited to the area within the FPL property boundary.	Adjacent	FPL is developing a plan in response to the Consent Agreement.
Resources Recovery Facility	77 MW waste-to-energy plant	28 mi north of the Turkey Point site	Operational (Miami-Dade County 2012-TN1077)
Medley Landfill	9.6 MW landfill gas power-generation plant	30 mi north of the Turkey Point site	Proposed, Prevention of Significant Deterioration Permit application submitted 2010 (Waste Management 2010-TN1079)
South Dade Landfill	Two 2 MW co-generation gas power-generation project	8.1 mi north of the Turkey Point site	Approved (DOE 2010-TN1476)
Lauderdale Power Plant	Two 884 MW oil/gas-power–generation plants	45 mi north of the Turkey Point site	Operational (FPL 2013-TN2630)
Port Everglades Power Plant	420 MW oil/gas-power–generation plant	47 mi north of the Turkey Point site	Proposed upgrade to existing plant to natural-gas units. Construction to begin 2014 (FPL 2012-TN1081)
Homestead City Utilities – Gordon W. Ivey Power Plant	60 MW oil-power–generation plant	9 mi northwest of the Turkey Point site	Operational (FDEP 2012-TN1083)
Wheelabrator South Broward, Inc. – Waste-to-Energy Facility	67 MW waste-to-power plant	45 mi northeast of the Turkey Point site	Operational (Wheelabrator 2012-TN1086)
Mining Projects			
Florida Rock and Sand – Card	Rock and sand	7 mi west of the Turkey Point site	Operational (EPA 2012-TN1110)
Rinker Materials of Florida, Inc.	Crushed and broken limestone	21 mi northwest of the Turkey Point site	Operational (EPA 2012-TN1111)

Table 7-1. (contd)

Project Name	Summary of Project	Location	Status
Custom Crushing & Material	Nonmetallic minerals	25 mi northwest of the Turkey Point site	Operational (EPA 2012-TN1112)
Florida Rock Industries	Concrete block and brick	26 mi northwest of the Turkey Point site	Operational (EPA 2012-TN1113)
White Rock Quarries	Crushed and broken limestone	28 mi northwest of the Turkey Point site	Operational (EPA 2012-TN1114)
Florida Rock Industries/Sawgrass	Concrete block and brick	36 mi northwest of the Turkey Point site	Operational (EPA 2012-TN1115)
Transportation Projects			
Various Transportation Projects	Road, traffic, pedestrian projects	Throughout region	Ongoing (FDOT 2012-TN1132)
Parks and Aquaculture Facilities			
Biscayne National Park	Biscayne fishery management plan	Adjacent	Proposed, Draft EIS released 2012 (NPS 2012-TN1116)
Florida Keys National Marine Sanctuary	Wildlife areas	Throughout region	Proposed, marine zoning and regulatory review Draft EIS planned for 2014 (NOAA 2012-TN1117)
Crocodile Lake National Wildlife Refuge	Refuge closed to the public	9 to 17 mi south of the Turkey Point site	Development unlikely in this park (FWS 2012-TN706)
Dangy Johnson Key Largo Hammock Botanical State Park	Activities include picnicking, biking, wildlife viewing, and hiking	10 mi south of the Turkey Point site	Development unlikely in this park (Florida State Parks 2012-TN1119)
The Barnacle Historic State Park	Activities include picnicking, wildlife viewing, and hiking	21 mi north of the Turkey Point site	Development unlikely in this park (Florida State Parks 2012-TN1120)
Bill Baggs Cape Florida State Park	Activities include picnicking, boating, swimming, camping, fishing, wildlife viewing, and hiking	20 mi northeast of the Turkey Point site	Development unlikely in this park (Florida State Parks 2012-TN1121)

Table 7-1. (contd)

Project Name	Summary of Project	Location	Status
John Pennekamp Coral Reef State Park	Activities include picnicking, boating, swimming, camping, fishing, wildlife viewing, and hiking	18 to 23 mi southwest of the Turkey Point site	Development unlikely in this park (Florida State Parks 2012-TN1122)
Lignumvitae Key Botanical State Park	Activities include boating, swimming, fishing, and wildlife viewing	43 mi southwest of the Turkey Point site	Development unlikely in this park (Florida State Parks 2012-TN1123)
Long Key State Park	Activities include picnicking, boating, swimming, camping, fishing, wildlife viewing, and hiking	50 mi southwest of the Turkey Point site	Development unlikely in this park (Florida State Parks 2012-TN1124)
San Pedro Underwater Archaeological Preserve State Park	Activities include scuba, boating, and swimming	44 mi southwest of the Turkey Point site	Development unlikely in this park (Florida State Parks 2012-TN1125)
Indian Key Historic State Park	Activities include boating, scuba, swimming, fishing, hiking, and wildlife viewing	43 mi southwest of the Turkey Point site	Development unlikely in this park (Florida State Parks 2012-TN1126)
Windley Key Fossil Reef Geological State Park	Activities include hiking, picnicking, and wildlife viewing	36 mi southwest of the Turkey Point site	Development unlikely in this park (Florida State Parks 2012-TN1127)
Oleta River State Park	Activities include picnicking, swimming, camping, fishing, wildlife viewing, and hiking	36 mi north of the Turkey Point site	Development unlikely in this park (Florida State Parks 2012-TN1128)
John U. Lloyd Beach State Park	Activities include boating, scuba, swimming, fishing, hiking, and wildlife viewing	46 mi north of the Turkey Point site	Development unlikely in this park (Florida State Parks 2012-TN1129)
Everglades National Park	Activities include picnicking, swimming, camping, fishing, wildlife viewing, and hiking	15+ mi west of the Turkey Point site	Development unlikely in this park (NPS 2012-TN1130)
Big Cypress National Preserve	Activities include picnicking, hunting, camping, fishing, wildlife viewing, and hiking	35+ mi northwest of the Turkey Point site	Development unlikely in this park (NPS 2012-TN1131)
Other Actions/Projects			
Tampa–Orlando–Miami High-Speed Intercity Passenger Rail	High-speed rail from Tampa to Miami (through Orlando)	26 mi northeast of the Turkey Point site	Proposed; Phase 1 (Tampa- Orlando corridor) is ongoing. Project development for Phase 2 (Orlando-Miami corridor) began in May 2010 (FRA 2012-TN1297)

Table 7-1. (contd)

Project Name	Summary of Project	Location	Status
Various wastewater treatment plants	Sewage treatment	Throughout region	Operational
Various hospitals using nuclear material	Medical and other industrial isotopes	Throughout region	Ongoing
Various water/flood management projects	Construction of levees, floodwalls, closure structures, and interior drainage structures	Throughout region	Ongoing (USACE 2012-TN1133)
Contender Boats Incorporated	Boat building and repair	6 mi northwest of the Turkey Point site	Operational (EPA 2012-TN1092)
CEMEX Miami	Cement manufacturing	25 mi northwest of the Turkey Point site	Operational (EPA 2012-TN1093)
Aero Kool Corp.	Aircraft equipment	27 mi north of the Turkey Point site	Operational (EPA 2012-TN1094)
Flexible Foam Products, Inc.	Plastics foam products	31 mi north of the Turkey Point site	Operational (EPA 2012-TN1095)
Dyplast Products, LLC	Plastics foam products	32 mi north of the Turkey Point site	Operational (EPA 2012-TN1096)
Exteria Building Products	Plastics products	35 mi north of the Turkey Point site	Operational (EPA 2012-TN1097)
AAR Landing Gear Center	Repair and rebuild aircraft landing gears and brakes	30 mi north of the Turkey Point site	Operational (EPA 2012-TN1098)
American Whirlpool Products Corporation	Acrylic and fiberglass bath and spa manufacturer	43 mi northeast of the Turkey Point site	Operational (EPA 2012-TN1099)
Angler Boat Corporation	Fiberglass boat manufacturer	29 mi northeast of the Turkey Point site	Operational (EPA 2012-TN1100)
Benada Aluminum of Florida, Inc.	Extruded aluminum products manufacturer	29 mi northeast of the Turkey Point site	Operational (EPA 2012-TN1101)
Bertram Yacht, Inc.	Fiberglass boat manufacturer	26 mi northeast of the Turkey Point site	Operational (EPA 2012-TN1102)

Table 7-1. (contd)

Project Name	Summary of Project	Location	Status
Blumberg Industries – Fine Art Lamps	Lamp manufacturer	33 mi north of the Turkey Point site	Operational (EPA 2012-TN1103)
DM Industries, Ltd	Acrylic and fiberglass bath and spa manufacturer	33 mi northeast of the Turkey Point site	Operational (EPA 2012-TN1104)
Dusky Marine, Inc.	Fiberglass boat manufacturer	45 mi northeast of the Turkey Point site	Operational (EPA 2012-TN1105)
Eastern Aero Marine, Inc.	Inflatable vest and raft manufacturer	28 mi northeast of the Turkey Point site	Operational (EPA 2012-TN1106)
Englehard Hex Core	Nomex honeycomb board, and fiberglass honeycomb board and rotor manufacturer	28 mi northeast of the Turkey Point site	Operational (EPA 2012-TN1107)
US Foundry & Manufacturing Corporation	Gray iron foundry and cast iron products manufacturer	30 mi northwest of the Turkey Point site	Operational (EPA 2012-TN1108)
Homestead Air Reserve Base	Military activities	5 mi northwest of the Turkey Point site	Operational (EPA 2012-TN1109)
SR836/Dolphin Expressway Southwest Extension	Transportation infrastructure	14 mi northwest of the Turkey Point site	Proposed (MDX 2013-TN3728)
Future urbanization	Construction of housing units and associated commercial buildings; roads, bridges, and rail; construction of water and/or wastewater treatment and distribution facilities and associated pipelines, as described in local land-use planning documents	Throughout region	Construction would occur in the future, as described in State and local land-use planning documents

7.1 Land-Use Impacts

The description of the affected environment in Section 2.2 serves as a baseline for the following cumulative impacts assessment of land-use impacts. As described in Section 4.1, the NRC staff concludes that the impacts of NRC-authorized construction on land use would be SMALL and no further mitigation would be warranted. The combined impacts from construction and preconstruction were described in Section 4.1 and determined to be MODERATE. As described

in Section 5.1, the review team concludes that the impacts of operations on land use would be MODERATE, but that no further mitigation beyond that required of FPL by State agencies would be warranted.

In addition to land-use impacts from construction, preconstruction, and operation of the proposed Units 6 and 7, the following cumulative impacts analysis also considers other past, present, and reasonably foreseeable future actions that could cumulatively contribute to land-use impacts. For this cumulative analysis, the geographic area of interest comprises land areas extending outward from the 218 ac plant area for a distance of 10 mi, plus lands encompassed by transmission line or pipeline corridors that extend beyond 10 mi. All such lands are part of Miami-Dade County. This geographic area of interest includes the land areas that could be substantially affected by proposed Turkey Point Units 6 and 7. Other past, present, and reasonably foreseeable actions whose impacts might cumulatively interact with those of the proposed Units 6 and 7 are presented in Table 7-1. Distances listed in Table 7-1 are from the Units 6 and 7 plant area unless otherwise noted.

Because the Miami-Dade County 2015–2025 Comprehensive Development Plan designates the unincorporated land in the immediate vicinity of the Turkey Point site as protected land, open land, parkland, or agricultural land, future urban development of this land is not likely to occur. The cities of Homestead and Florida City do designate areas for development, but these areas do not directly adjoin the project site (Miami-Dade County 2012-TN1150).

The geographic area of interest has been substantially altered by a history of agricultural and urban development, as well as by development of Units 1 through 5 on FPL's Turkey Point site. The present and reasonably foreseeable projects noted in Table 7-1 with the greatest potential to influence the cumulative land-use impacts in the geographic area of interest include the following:

- FPL – continued operation and decommissioning of the existing Turkey Point power plant units (Units 1 through 5);
- South Dade Landfill – landfill gas-power–generation project, an approved facility approximately 8.1 mi north from the plant area;
- Contender Boats Incorporated – a boat manufacturing plant in Homestead approximately 6 mi northwest of the plant area;
- Homestead Air Reserve Base, 5 mi northwest of the plant area; and
- continued operations of existing limestone mines in the vicinity.

Other than the proposed action, the only reasonably foreseeable major future action known to the review team to directly involve land on the FPL Turkey Point site is the continued operation and possible decommissioning of Units 1 through 5 (two nuclear and three oil/gas electricity generation plants) and associated support facilities. No major land-use changes would result from operation of these existing facilities, although decommissioning could free up land presently dedicated to energy generation to other purposes. Minor infrastructure improvement projects (e.g., road widening) supporting these facilities as well as Units 6 and 7 and other FPL activities are possible. Routine land-management practices and minor projects for purposes of

conservation by FPL are also possible. These might include stabilization of shorelines, construction and operation of stormwater management facilities, landscaping and landscape management, and removal of exotic or invasive vegetation.

The South Dade Landfill gas-power–generation plant would be built on land used as part of an existing landfill, and would therefore not be expected to result in noticeable land-use impacts. The U.S. Department of Energy (DOE) NEPA determination for this project concluded that there would be no extraordinary impacts or land-use changes, and that the project was categorically excluded from NEPA (DOE 2010-TN1476).

Contender Boats is an existing manufacturing facility located in an industrial area of Homestead. It has been in operation for a substantial period of time, and is consistent with the surrounding land uses. For this reason, its continued operation will not result in land-use changes.

Similarly, the continued operation of the Homestead Air Reserve Base is not expected to result in noticeable land-use changes, and surrounding uses are currently subjected to restrictions related to their location near the base (HAFRC 2007-TN1427). The consistency of land uses between proposed offsite facilities associated with Units 6 and 7 is discussed in Sections 4.1 and 5.1.

The Homestead-Miami Speedway improvement project as proposed includes a change in the land-use designation applied by the City of Homestead to the 120 ac project site from “agriculture” to “business and office.” While this project would increase the permitted capacity of the speedway, it would not constitute a substantial change in land use because the site of the expansion is not used for agriculture, rather for overflow parking during speedway events.

Continued operation of existing limestone mines in the vicinity, especially as they supply materials for Units 6 and 7 and for other anticipated urban development in the area, could contribute to land-use impacts related to hauling. Additional lands presently supporting natural vegetation or agriculture could be used for future limestone mining.

The review team expects that the other projects described in Table 7-1 would have little or no impact on land use within the geographic area of interest around the FPL Turkey Point site. The Miami-Dade Expressway Authority, in coordination with the Florida Department of Transportation, is conducting a Project Development and Environment Study to evaluate the feasibility of a southwest extension of SR 836/Dolphin Expressway from its current terminus at NW 137th Avenue in the vicinity of NW 12th Street to SW 136th Street or some point to the north of SW 136th Street. Potential routes for this project could be located very near one or more of the transmission line corridors. Construction and operation of the SR 836/Dolphin Expressway could increase cumulative impacts in this area. Because the Miami-Dade Comprehensive Development Master Plan designates most of the undeveloped land near the Turkey Point site for conservation or open space purposes (see Section 5.1), substantially increased urban development close to the site is unlikely. The review team does however recognize that urban development will likely increase in the agricultural landscape north and east of the geographic area of interest. Lastly, the review team acknowledges the presence of the Turkey Point site to areas addressed by the CERP, but as noted in Section 4.1.1, building

and operating the proposed facilities would not adversely conflict with the CERP and the associated mitigation would beneficially further the objectives of CERP's.

The incremental land-use impacts associated with development and maintenance of the proposed transmission line corridors for the project in combination with the construction and operation of Units 6 and 7 at the Turkey Point site are the principal contributors to the project land-use impacts. The proposed new transmission line corridors pass through agricultural lands; undisturbed lands, including wetlands and some lands in or close to Everglades National Park and Biscayne National Park; and urbanized lands where the local jurisdictions, including Miami-Dade County and the local cities, have expressed concerns that the proposed transmission line improvements would be incompatible with existing and planned land uses. Local agencies, the National Park Service (NPS), and the State of Florida have identified mitigation measures to be taken. Most of the mitigation focuses on reducing impacts on wetlands and other ecological resources and is discussed in detail in Section 4.3.1.6.

The review team concludes that the cumulative effect of the proposed action on land use, added to effects associated with past, present, or reasonably foreseeable future projects, is MODERATE. This conclusion primarily reflects a history of agricultural and urban development in portions of the geographical area of interest, and possible land-use conflicts resulting from development of new facilities near two national parks and building new transmission lines through urban areas. The incremental contribution of NRC authorized activities associated with the overall Units 6 and 7 project (which would exclude building the transmission lines and certain other facilities) would be a significant contributor to the cumulative impact.

7.2 Water-Use and Water-Quality Impacts

This section analyzes the cumulative impacts of the proposed Turkey Point Units 6 and 7, and other past, present, and reasonably foreseeable projects, on water use and water quality. As described below, the review team identified no hydrological alterations during either the building or operation periods for the proposed plant that would interfere with either the Administrative Order (AO; FDEP 2014-TN4144) or the Consent Agreement (CA; Miami Dade County v. Florida Power & Light 2015-TN4505) activities associated with controlling the industrial wastewater facility (IWF) salinity and mitigating the hypersaline plume that has extended beyond the Turkey Point site. The review team considered a range of future conditions for both the construction and operation reviews to be plausible. Although the exact design of the systems for the AO and CA are not completely specified at this time, the review team has sufficient understanding of plausible designs to make a determination. For instance, pumping and deep-well injection are both mature technologies.

7.2.1 Water-Use Impacts

The cumulative water-use impacts from construction, preconstruction, and operations of proposed Turkey Point Units 6 and 7, and other past, present, and reasonably foreseeable projects, are related to the use of surface water and groundwater.

7.2.1.1 Surface-Water–Use Impacts

The description of the affected environment in Section 2.3 serves as a baseline for the cumulative impacts assessments in this resource area. As described in Section 4.2, the impacts from NRC-authorized construction on surface-water use would be SMALL, and no further mitigation would be warranted beyond the conditions imposed on FPL by the State of Florida final Conditions of Certification. As described in Section 5.2, the review team concludes that the impacts of operations on surface-water use would also be SMALL, and no further mitigation would be warranted beyond the conditions imposed on FPL by the State of Florida final Conditions of Certification (State of Florida 2014-TN3637).

The combined surface-water–use impacts from construction and preconstruction are described in Section 4.2.2 and were determined to be SMALL. In addition to the impacts from construction, preconstruction, and operations, the cumulative impacts analysis considers other past, present, and reasonably foreseeable future actions that could affect surface-water use, as discussed below.

The primary surface-water–use plan that could potentially be affected by Turkey Point Units 6 and 7 is the Comprehensive Everglades Restoration Program (CERP; USACE 2010-TN113; DOA and DOI 2016-TN4580) and its component Biscayne Bay Wetlands Restoration Project (USACE/SFWMD 2011-TN1038). At present, CERP has restoration plans extending to 2020, including several projects located in the region around Turkey Point. These projects are discussed in Section 2.3.1.1.

For this analysis, the geographic area of interest is strongly influenced by the site's proximity to Biscayne Bay. Because the primary water supply for cooling purposes is from reclaimed water, the impacts of surface-water use are limited to the potential for use of Biscayne Bay saltwater as a backup water supply obtained via radial collector wells (RCWs). However, based on discussions with the reclaimed water supply provider about their past operating experience and the incentive of greater cycles of concentration to FPL, the review team determined that any disruption of reclaimed water that would result in use of the backup water supply would likely be infrequent and only for short durations. Consequently, the effect on Biscayne Bay from the use of the RCWs would be minimal.

In accordance with the Florida Department of Environmental Protection (FDEP) AO (FDEP 2014-TN4144), as part of operation of Units 3 and 4, water may be withdrawn from the L-31E Canal to freshen the IWF. This withdrawal would only be allowed during periods of excess flow. Other than the ecological use identified, there are no other identified water users beyond the withdrawal location before the water enters Biscayne Bay. As pointed out earlier, Units 6 and 7 would not use surface-water supplies from the affected environment.

The NRC staff determined that the consumptive use of water from the operation of proposed Turkey Point Units 6 and 7 and all other consumptive uses (existing or likely future uses) would not alter the volume of water in Biscayne Bay. Because of the use of reclaimed water and the limited use of the RCWs, there would be no noticeable alteration of the surface-water resources due to building and operating Units 6 and 7. Based on its evaluation, the NRC staff concludes that the cumulative impacts on surface-water use from construction, preconstruction, and

operations of two new nuclear units and other past, present, and reasonably foreseeable future activities would be SMALL, and likely, no mitigation would be warranted.

7.2.1.2 Groundwater-Use Impacts

The description of the affected environment in Section 2.3 of this EIS serves as a baseline for the cumulative impacts assessments in this resource area. As described in Section 4.2, the impacts from NRC-authorized construction on groundwater use would be SMALL, and no further mitigation would be warranted beyond the conditions imposed by the State of Florida final Conditions of Certification (State of Florida 2014-TN3637). As described in Section 5.2, the review team concludes that the impacts of operations on groundwater use would also be SMALL, and no further mitigation would be warranted beyond the conditions imposed on FPL by the State of Florida final Conditions of Certification.

The combined groundwater-use impacts from construction and preconstruction are described in Section 4.2 and were determined to be SMALL. In addition to the impacts from construction, preconstruction, and operations, the cumulative analysis considers other past, present, and reasonably foreseeable future actions that could affect groundwater use. For this analysis, the geographic area of interest related to groundwater-use impacts is the area in which measureable effects of excavation dewatering or RCW operation are reasonably expected. Potential impacts on groundwater use from preconstruction, construction, and operation of the proposed plants are primarily related to the following:

- preconstruction dewatering of plant excavations involving pumping groundwater from excavations to the IWF cooling canals;
- limited dewatering related to construction and maintenance of facilities, including the reclaimed water treatment facility, pipelines, ancillary buildings, roads, transmission towers, temporary utilities, cooling towers, and wastewater-injection wells; and
- removal of groundwater from the Biscayne aquifer during operation of the RCWs as a backup cooling-water supply and for well maintenance.

As discussed in Section 2.3, groundwater from the Biscayne aquifer provides practically all of the freshwater for Miami-Dade County including the geographic area of interest. This area is located within the South Florida Water Management District (SFWMD), which monitors groundwater resources within the district. Continued development and increasing use of groundwater in the areas west of the Turkey Point site could have a cumulative effect of lowering groundwater levels in the aquifer, which could cause inland movement of the interface between saltwater and freshwater in the aquifer. The review team's determination that the proposed limited operation of the RCWs would have minor impacts on groundwater users is based on the reliability of the reclaimed water supply. Based on discussions with the reclaimed water supply provider about their past operating experience and the incentive of greater cycles of concentration to FPL, the review team determined that any disruption of reclaimed water that would result in use of the backup water supply would likely be infrequent and only for short durations.

The water-surface elevation in the cooling canals would increase as a result of adding water for freshening as required by the AO (FDEP 2014-TN4144). This increase in water-surface elevation would result in increased piezometric heads beneath the IWF. As a result, any eastward groundwater movement from inland would tend to be diverted to the north around the north end of the IWF and to the south away from the south end of the IWF. Also, a decrease in piezometric head may result from pumping from the hypersaline plume in the area around the IWF associated with the CA (Miami Dade County v. Florida Power & Light 2015-TN4505). Pumping for remediation likely would focus on the bottom of the Biscayne aquifer, allowing the density of the hypersaline water to drive itself toward the well screens; whereas, the freshening activities would dominate more in the upper part of the Biscayne aquifer and very near the site. The fraction of the water that enters the RCWs from sources other than Biscayne Bay would likely increase and would be increasingly from the IWF-induced inflow. Model analyses discussed in Appendix G support this assessment.

The review team determined that the consumptive use of water from the operation of Turkey Point Units 6 and 7 would not result in a noticeable alteration of the available groundwater resources within the geographic area of interest for groundwater-use impacts. Based on its evaluation, the review team concludes that the cumulative impacts on groundwater from construction, preconstruction, and operations of two new nuclear units and other past, present, and reasonably foreseeable future activities would be SMALL, and no mitigation would be warranted beyond the conditions imposed on FPL by the State of Florida final Conditions of Certification (State of Florida 2014-TN3637).

7.2.2 Water-Quality Impacts

This section describes cumulative water-quality impacts from construction, preconstruction, and operations of proposed Turkey Point Units 6 and 7, and other past, present, and reasonably foreseeable projects.

7.2.2.1 Surface-Water-Quality Impacts

The description of the affected environment in Section 2.3 of this EIS serves as a baseline for the cumulative impacts assessments in this resource area. As described in Section 4.2, the impacts from NRC-authorized construction on surface-water quality would be SMALL, and no further mitigation would be warranted beyond the conditions imposed on FPL by the State of Florida final Conditions of Certification (State of Florida 2014-TN3637). As described in Section 5.2, the review team concludes that the impacts of operations on surface-water quality would also be SMALL, and no further mitigation would be warranted beyond the conditions imposed on FPL by the State of Florida final Conditions of Certification.

As stated in Section 2.3.3.1 of this EIS, some waterbodies near the Turkey Point site are listed on the State's 303(d) list of impaired waterbodies (FDEP 2010-TN1253). Historical point and non-point-source discharges have affected the water quality of streams and rivers near the Turkey Point site. Portions of the estuary and streams along the southeast Atlantic coast to Biscayne Bay appear on the final 2010 303(d) list as impaired waterbodies because of the presence of copper, fecal coliforms, mercury, and nutrients (FDEP 2010-TN1253). The State of Florida has a Total Maximum Daily Loads program to help protect and restore the quality of

waters. In addition, the State of Florida also designates waterbodies as Outstanding Florida Waters and special waters to which pollutant discharges are generally prohibited. The waters of Biscayne National Park near the Turkey Point site are designated as an Outstanding Florida Waterbody (Fla. Admin. Code 62-302-TN776). Turkey Point Units 6 and 7 have no discharge to Biscayne Bay or to any surface water. All effluent is disposed of via deep-well injection under the Underground Injection Control (UIC) program. As stated above, the State of Florida, under the Total Maximum Daily Loads program, helps protect and restore the quality of impaired waters. Therefore, the review team determined that the cumulative impacts from existing, proposed and reasonably foreseeable future action on these waterbodies would be noticeable but not destabilizing.

Other present and reasonably foreseeable future actions in the geographic area of interest that could contribute to cumulative impacts on surface-water quality include the impact of the uprates of FPL's Units 3 and 4 at Turkey Point, the conversion of Unit 2 to synchronous condenser mode and the planned conversion of Unit 1 to the same, and the potential use of reclaimed water for cooling purposes at Turkey Point Unit 5 (FPL 2015-TN4148). The uprate of Turkey Point Units 3 and 4 has increased the discharge temperature from the two units. The IWF has also recently experienced localized increases in the temperature of the cooling-canal water. Also the conversion of Units 1 and 2 to synchronous condenser mode would reduce flow in the IWF (NRC 2012-TN1438). The staff considered the potential use of reclaimed water for cooling of Turkey Point Unit 5 and the resulting release of contaminants from the cooling-tower drift with subsequent deposition in the surrounding environments. However, based on the review team's analysis of drift deposition from proposed Turkey Point Units 6 and 7, the loading of contaminants to the surrounding environment would be negligible.

As noted in 2.3, recently an algal bloom occurred in the IWF. The IWF also experienced increased water temperatures, increases in concentrations in salinity and nutrients and a decrease in precipitation which may have caused or contributed to the algal bloom. These anomalous conditions in the IWF are not associated with either the construction or operation of the proposed units, since no activity has begun yet. Furthermore, no cooling water from operation of Units 6 and 7 are proposed to be discharged to the IWF. Based on the analysis discussed in Sections 4.2 and 5.2, the review team determined that the construction and operation of the proposed units would have a negligible effect on the IWF and that the conditions in the IWF would not be altered significantly as a consequence of the proposed action.

In accordance with the AO (FDEP 2014-TN4144), water may be removed from L-31E Canal or taken from the Upper Floridan aquifer to freshen the cooling canals. Withdrawal from the L-31E Canal is limited to periods of excess flow to minimize the impact on Biscayne Bay. Units 6 and 7 would not discharge into the IWF. Therefore, building and operation of Units 6 and 7 would not result in greater demand for freshening water withdrawals.

The review team determined that the cumulative impacts from existing, proposed, and reasonably foreseeable future action on these waterbodies would be MODERATE and the incremental impacts from NRC-authorized activities for Turkey Point Units 6 and 7 would be SMALL, and no further mitigation beyond that described in Chapters 4 and 5 would be warranted.

7.2.2.2 Groundwater-Quality Impacts

The description of the affected environment in Section 2.3 of this document serves as a baseline for the cumulative impacts assessments in this resource area. As described in Section 4.2, the impacts from NRC-authorized construction and preconstruction on groundwater quality would be SMALL, and no further mitigation would be warranted beyond the conditions imposed by the State of Florida final Conditions of Certification (State of Florida 2014-TN3637). As described in Section 5.2, the review team concludes that the impacts of operations on groundwater quality would also be SMALL, and no further mitigation would be warranted beyond the conditions imposed by the State of Florida final Conditions of Certification and UIC permits.

In addition to the impacts from construction, preconstruction, and operations, the cumulative analysis considers other past, present, and reasonably foreseeable future actions that could affect groundwater quality. For this analysis, the geographic area of interest is the expected area of migration of wastewater injected into the Boulder Zone of the Lower Floridan aquifer, and the area in the Biscayne aquifer potentially affected by the migration of hypersaline water from the IWF. This distance also encompasses the area in which measureable effects of excavation dewatering, and RCW operation are reasonably expected and, therefore, it is sufficiently large enough to characterize potential cumulative groundwater-quality impacts.

The potential groundwater-quality impacts from dewatering and RCW pumping are based on the risk of increasing saltwater intrusion of the Biscayne aquifer described in Section 2.3.3.2 of this EIS and potential cumulative impacts related to saltwater intrusion in this aquifer. Local and Federal agencies are working to enhance freshwater recharge of the Biscayne aquifer in this area as part of the Biscayne Bay Coastal Wetlands Project of the CERP (USACE/SFWMD 2011-TN1038). In the dry season, the SFWMD uses the canal system to import water from the northwest to increase groundwater elevation and reduce saltwater intrusion. These actions and others planned under the CERP are projected to partially restore the previous natural environment in the area including enhanced freshwater recharge of the aquifer and sheet flow of some of the excess surface water now carried by canals. The review team has determined that future actions implemented under the CERP would not have a negative impact on the Biscayne aquifer, but would potentially have a positive impact by increasing the recharge of freshwater to the Biscayne aquifer and reducing the possibility for westward movement of the saltwater-freshwater interface. Hypersaline water in the IWF cooling canals interacts with groundwater in the Biscayne aquifer. Therefore, changes to the IWF, such as the recent temperature and salinity variations, and the proposed freshening of the IWF cooling canals by adding water pumped from the Upper Floridan aquifer (Tetra Tech 2014-TN4126) may have cumulative impacts on groundwater quality of the Biscayne aquifer. The uprate coincided with temperature and salinity increases within portions of the cooling-canal system (NRC 2012-TN3579). Adding additional brackish water from the Upper Floridan aquifer would likely reduce the temperature, salinity, and concentration of other constituents in the IWF water; which would result in lower concentrations in water seeping into the underlying aquifer. FPL determined that adding 14 mgd of brackish water would increase the water level of the IWF canals by about 0.25 ft (Tetra Tech 2014-TN4126) and eventually reduce salinity to approximately that of Biscayne Bay. The higher water levels would create a slightly greater hydraulic gradient into the

underlying aquifer. However, if a project is implemented to freshen the IWF water, potential impacts on the Biscayne aquifer would be reduced compared to the existing impacts.

Other potential cumulative impacts on groundwater quality are related to the injection of wastewater into the Boulder Zone and include other wastewater-injection well operations, and any potential use of saline groundwater from this aquifer. There are more than 180 active Class 1 injection wells that inject wastewater into the Boulder Zone and 13 of these wells are located at the Miami-Dade South District Wastewater Treatment Plant (SDWWTP) wastewater-injection site approximately 9 mi north of the proposed FPL UIC wells. All Boulder Zone UIC wells must be permitted and monitored by the FDEP UIC program, which is responsible for protecting underground sources of drinking water (USDWs) within Florida. Upward migration of treated municipal waste wastewater injected into the Boulder Zone has been observed at the Miami-Dade SDWWTP (Maliva et al. 2007-TN1483; Starr et al. 2001-TN1251; EPA 2003-TN3658), and has resulted in injected wastewater moving upward into the middle Floridan confining unit. As mentioned in Section 2.3, previous studies reported that injectate had migrated into the Upper Floridan aquifer at the SDWWTP site (Starr et al. 2001-TN1251; EPA 2003-TN3658). However, Walsh and Price (2010-TN3656) report that upwelling has not migrated above the APPZ of the MCU at the SDWWTP. Reese and Richardson (2008-TN3436) provided an explanation for this by recognizing, "the Avon Park Permeable Zone has been identified in previous studies as the…lower part of the Upper Floridan Aquifer in…the southern part of southeastern Florida." The cause of the observed migration of contaminants has been attributed (McNeill 2000-TN4572; McNeill 2002-TN4571) to a lack of adequate geologic confinement, or a well construction problem. However, Starr et al. (2001-TN1251) conclude that "The vertical and spatial distribution of contamination in the Upper Floridan and Lower Floridan aquifers shows a pattern more consistent with point-source contamination, such as leaking wells, than from widespread upward migration through a leaking confining layer."

Variable density modeling of the potential transport of wastewater in the Boulder Zone from the proposed Units 6 and 7 UIC wells (FPL 2014-TN4069) indicate that it is not likely that the injected wastewater may reach the location of the Miami-Dade SDWWTP UIC wells within the operational period of Units 6 and 7. Pressure within the Boulder Zone from continued injection at the SDWWTP would deter movement of injection from the proposed site in that direction and prevent significant commingling of the two injection plumes. As explained in Section 5.2, if this transport did occur, dilution and dispersion would reduce the concentrations within the effluent plume over the transport distance. The FDEP UIC permit for the Miami-Dade SDWWTP UIC wells requires that concentrations of potential contaminants are monitored in the USDW aquifer and in the confining zone separating the injection zone from the USDW aquifer. Remedial action would be taken to protect the USDW if contaminants were detected. The review team concludes that cumulative impacts resulting from operation of both UIC systems are unlikely and would have insignificant effects on water in the Boulder Zone. If transported contaminants migrated upward near the SDWWTP, they would be detected by the monitoring program required by FDEP. These geologic characteristics, fate and transport processes, and monitoring requirements would adequately protect the Upper Floridan aquifer from degradation resulting from cumulative effects of wastewater injection at Units 6 and 7 and the Miami-Dade SDWWTP site. Therefore, the review team determined that the cumulative impact of injecting wastewater in the Boulder Zone would be minor.

Cumulative impacts could also result from the mining of fill needed to build the proposed plants. The mining of fill material in the region of interest creates open ponds that may create a cumulative impact on groundwater quality because of the evaporation of groundwater from the pond surface, or from mixing of groundwater from different depths. Evaporation could result in the increased salinity of water in the ponds that could move into the aquifer intersected by the mine excavation. The annual evaporation rate in Florida is approximately equal to the annual precipitation rate (Shih 1981-TN4070). However, increases in salinity of fill-mine ponds occurs during the dry season. The effect of fill mines on groundwater mixing from different depths in the Biscayne aquifer was studied as part of an investigation conducted for Everglades National Park (Solo-Gabriele and Wilcox 2000-TN4110). Mixing of groundwater from separate permeable layers within the mine pond was observed based on the analysis of stable isotopes of oxygen. The FDEP and SFWMD have developed a proactive groundwater-management program to preserve and manage groundwater resources including groundwater quality (Fla. Admin. Code 62-520-TN1252). The review team determined that State and local regulation of fill-mine operations would be adequate to protect groundwater quality and the cumulative impacts on groundwater quality from fill mining would be minor.

Adding water for freshening as required by the AO (FDEP 2014-TN4144) would increase the water-surface elevation in the cooling canals. This increase in water-surface elevation would result in increased piezometric heads beneath the IWF. As a result, any eastward groundwater movement from inland would tend to be diverted to the north around the north end of the IWF and to the south away from the south end of the IWF. The fraction of the water that enters the RCWs laterals from sources other than Biscayne Bay would likely increase. The increased fraction would be increasingly from the IWF-induced inflow. Because the target for the freshening is an average annual concentration of 34 psu (similar to Biscayne Bay water), the change in salinity in the water recovered in the RCW is not expected to change noticeably. Model analyses discussed in Appendix G support this assessment.

In summary, the evaluation of cumulative impacts performed by the review team analyzed the impacts of enhanced recharge to the Biscayne aquifer from activities related to CERP and freshening of the IWF at the current operating site, evaluated the potential cumulative impact of deep-well injection into the Boulder Zone by the applicant and other wastewater-injection operations and reviewed the impacts of fill mining on water quality. Based on its evaluation, the review team concludes that due to the hydrologic characteristics of the affected aquifers, fate and transport processes, and the monitoring and management programs required by the State of Florida the cumulative impacts on groundwater quality from construction, preconstruction, and operations of two new nuclear units and other past, present, and reasonably foreseeable future activities would be SMALL, and no mitigation would be warranted.

7.3 Ecological Impacts

This section addresses the cumulative impacts on terrestrial, wetlands, and aquatic ecological resources as a result of activities associated with the proposed Turkey Point project and other past, present, and reasonably foreseeable future activities within the geographic area of interest for each resource.

7.3.1 Terrestrial Ecosystem Impacts

The description of the affected environment in Section 2.4.1 provides the baseline for the cumulative impacts assessments for terrestrial ecological resources, including wetlands and important species. As described in Section 4.3.1, the review team concludes that impacts from NRC-authorized construction on terrestrial resources would be SMALL, and additional mitigation beyond that already proposed by the applicant would not be warranted. As described in Section 5.3.1, the impacts of operations on terrestrial resources would be MODERATE. This conclusion accounts for multiple impacts, especially those related to wetlands, increased vehicular collision mortality of wildlife, vegetation control on listed plants, and transmission system operation on listed avian species, especially the Federally threatened wood stork. The combined impacts from construction and preconstruction were described in Section 4.3.1 and determined to be MODERATE. This conclusion accounts for the impacts on wetlands, wildlife, and Federally and State-listed plant and animal species.

In addition to the impacts from construction, preconstruction, and operations, the following cumulative analysis considers other past, present, and future actions that could affect terrestrial resources. For the cumulative analysis of terrestrial ecology, the geographic area of interest is considered to be the 50 mi vicinity for the Turkey Point site and the existing and proposed corridors associated with the transmission, potable water, and reclaimed water systems (as described in Chapter 4). This area is expected to encompass the ecologically relevant landscape features and species potentially affected by the proposed Units 6 and 7.

7.3.1.1 Past, Present, and Reasonably Foreseeable Future Actions Affecting Terrestrial Ecology

Past land practices have had a great influence on the current ecology of South Florida. Because of South Florida's low elevation, relatively flat topography, and wet climate, wetlands are the dominant natural terrestrial landscape feature. Lands of higher elevation have always been limited in extent and also have been more desirable for agriculture and urban development. The result has been a substantial loss of the shallow-soiled pinelands (pine rocklands) that formerly dominated the uplands. Also lost is the diversity of plants and animals that once thrived there as indicated by the number of listed species that occur only in pine rocklands (Tables 2-15 and 2-16). Alteration of surface-water flow during the last 100 years, especially the digging of canals to divert water to supply farms and cities and to build highways across wetlands, has altered hydrologic function and resulted in the substantial loss and degradation of wetlands and wetland function. This habitat loss and degradation caused biota populations that evolved to thrive in this environment to subsequently decline. For example, populations of many wading bird species have drastically decreased from historic levels (USACE/SFWMD 1999-TN116; Bancroft 1989-TN3571).

Specific past, present, and reasonably foreseeable projects and actions that have affected or could affect terrestrial and wetland ecology in the vicinity of Turkey Point are listed in Table 7-1. This list includes a variety of urban development, energy production, mining, manufacturing, transportation and infrastructure development, and other miscellaneous activities that could affect terrestrial and wetland resources. Current efforts, including the CERP and the Southern Glades Addition Restoration that restore ecological integrity to the region, also affect terrestrial

and wetland resources in a beneficial way. The following sections describe the cumulative impacts of past as well as present and reasonably foreseeable future actions on terrestrial and wetland ecology within the geographical region of interest, including those that may be environmentally beneficial.

Habitats and Wildlife

The principal cause of terrestrial habitat degradation and loss of wetland function within the region is related to land use and water management, and it is likely that pressure on land and water managers will continue to increase as the local human population in South Florida continues to grow and coastal habitats are developed further. Development that occurred during the construction of proposed Turkey Point Units 1−5 and the IWF has permanently altered most of the habitat in the immediate vicinity. Mangroves have been cleared for development, leaving scattered remnants in the remaining patches of wetlands. Upland areas have been created by filling and upland vegetation, including specimens of invasive species such as Australian pine, has become established. Natural wetlands have been replaced by canals and spoils within the 2 mi by 5 mi IWF. Hypersaline water released during operation of these units has likely influenced the distribution, abundance, and species composition of vegetation currently present.

Land-management planners in the region have begun to account for increased human habitation when developing and using conceptual ecological models (Ogden et al. 2005-TN196). Formerly, planning efforts had failed to account for an unpredictably large increase in the human population, resulting in unintended ecological consequences (Ogden et al. 2005-TN197). Continued growth of the human population in South Florida could result in more land development, decreased habitat, more hydrological alterations to remaining habitat, and reduced connectivity and ecological function of the remaining habitats. An increase in the amount of impervious surfaces could increase runoff during storm events. Building of more roads and levees could funnel runoff rather than allowing natural sheet flow, thereby affecting area wetlands and the biota that thrive in them. The Comprehensive Development Master Plan for Miami-Dade County and the Coastal Zone Management Program could help minimize these ecological impacts (Miami-Dade County 2012-TN1150; NOAA 2007-TN1244).

The CERP was approved under the Water Resources Development Act of 2000 (33 U.S.C. § 2201 et seq.) (TN1037) and is intended to provide a framework for restoration, protection, and preservation of water resources in central and southern Florida. The primary goals of the CERP are to capture freshwater that now flows into nearshore coastal areas as point sources and redirect it to promote more natural hydrologic conditions and enhance environmental connectivity (CERP 2012-TN1035). As noted by the National Research Council (2008 TN666), the CERP is an extremely complex, long-term restoration program with 68 separate subprojects that require sophisticated scientific knowledge of ecosystem function and dynamics, and the development of new approaches and technologies to support water management. One project within the CERP that could affect resources within the geographic area of interest is the Biscayne Bay Coastal Wetland project (USACE/SFWMD 2011-TN1038). This project is designed to restore wetlands adjacent to Biscayne Bay and Biscayne National Park through the redistribution of sheet flow away from canals to replicate natural runoff processes. Removal of water from the L-31E Canal during periods of excess flow to freshen the IWF, in accordance

with the AO (FDEP 2014-TN4144), could result in less availability for freshwater for the Biscayne Bay Coastal Wetland restoration. The West Preferred Corridor along the eastern boundary of the Everglades National Park could be counterproductive to the future CERP goals because of its presence near the eastern portion of Everglades National Park. The West Transmission Line Corridors (Preferred or Consensus corridors) may require an engineering review by USACE pursuant to Section 14 of the Rivers and Harbors Act of 1899 (33 USC 408) to assess consistency with CERP goals.

Another related CERP project that could affect local resources is the modification of the Tamiami Trail (US Highway 41) roadway to increase water flow into the Everglades National Park. The USACE constructed a 1 mi bridge along Tamiami Trail and raised the elevation of the roadbed elsewhere. This allows for higher water levels in Water Management Area 3A north of the road to flow into Water Management Area 3B south of the road and was constructed done in part to improve Everglade snail kite habitat (USACE 2013-TN2468). The project was completed on December 23, 2014.

The Model Lands Basin and Southern Glades Addition projects represent an effort to manage lands immediately south and west of the Turkey Point site and represent a collaborative effort by the Environmentally Endangered Lands Program of Miami-Dade County and the Save Our Rivers Program of the SFWMD. Programmatic goals include improving the overall condition of about 34,000 ac of freshwater and coastal wetlands through removal of exotic plants, improving access control to sensitive areas, implementing a prescribed fire program, and restoring wetland function through removal of physical barriers to overland flow (SFWMD 2005-TN217). FPL has specifically agreed to raise water elevations within the Everglades Mitigation Bank and fill portions of the Model Lands North Canal as part of the effort to manage hypersaline groundwater coming from the IWF (Miami Dade County v. Florida Power & Light 2015-TN4505). All of these activities would benefit the terrestrial ecology and wetlands of South Florida.

As stated in Section 4.3, building Units 6 and 7 would result in permanent loss of approximately 585 ac of terrestrial and wetland habitats within the Turkey Point site boundary, involving the loss of approximately 307 ac of wetlands, including mostly non-vegetated mudflat and mangrove. An additional 45 ac of undeveloped habitat would be affected by the installation of the reclaimed water-supply systems, including approximately 43 ac of offsite wetlands. Proposed transmission line corridors built or upgraded to support proposed Units 6 and 7 contain more than 3,200 ac composed mostly of wetlands and agricultural lands. Only a portion of these lands, estimated to be less than 10 percent of lands within the corridor, would be permanently occupied by pads and roads (FPL 2015-TN4442). Vegetation maintenance within the corridors would permanently affect forested habitats and could affect additional acreage immediately outside of the rights-of-way. Land-cover classes that would be affected by transmission line corridor development include mangrove swamp, freshwater marsh, mixed wetland hardwoods, shrub and brushland, and herbaceous prairie. Proposed Units 6 and 7 would therefore further contribute noticeably to the regional loss, fragmentation, and degradation of wetland and upland habitats in South Florida.

Important Species and Habitats

Biota listed as Federally endangered, threatened, or candidates for listing as endangered or threatened would also be affected. As discussed in Section 4.3.1.3, three listed plant species, the sand flax (proposed endangered; *Linum arenicola*), Florida brickell-bush (endangered; *Brickellia eupatorioides (mosieri) var. floridana*), and the pineland sandmat (candidate; *Chamaesyce deltoidea ssp. pinetorum*) have been observed growing within proposed transmission line corridors that would support proposed Units 6 and 7 and may be affected. Surveys have not yet been conducted throughout the proposed corridors, and areas not yet surveyed may harbor other listed species. Listed wildlife that could likely be affected by building proposed Units 6 and 7 facilities include the eastern indigo snake (threatened; *Drymarchon corais couperi*), Florida panther (endangered; *Puma (=Felis) concolor coryi*), piping plover (threatened; *Charadrius melodus*), red knot (threatened; *Calidris canutus*), Everglade snail kite (endangered; *Rostrhamus sociabilis plumbeus*), and the wood stork (threatened; *Mycteria americana*). Although one of two known occurrences of the Miami tiger beetle lies in a pine rockland complex immediately adjacent the East transmission right-of-way, it would not be affected by building and maintenance of the right-of-way, which would pass adjacent to but not actually encroach into the pine rockland complex.

Numerous plant and animal species listed by the State of Florida as endangered or threatened could also be affected. Most of the State-listed plants are associated with pine rockland and marl prairie habitats, both of which occur within the preferred western transmission line corridor and either within or alongside the eastern corridor. The distribution and abundance of State-listed species is unknown. Past development has resulted in the loss of approximately 99 percent of pine rockland habitat outside of Everglades National Park. Pine rockland species are threatened by a multitude of issues exacerbated by continued urbanization of South Florida, and are sensitive to the loss of small losses of remaining habitat and even to the loss of individual organisms. Incremental impacts on pine rockland habitat and respective species from the proposed Units 6 and 7 are expected to be minimal because very little pine rockland habitat would be affected and BMPs described in Sections 4.3.1 and 5.3.1 of this EIS would limit the type and extent of impact. In addition the Florida Fish and Wildlife Conservation Commission (FFWCC) has required FPL to conduct pre-clearing and post-construction surveys for all State-listed species in coordination with the FFWCC (FFWCC 2012-TN520). Federally listed species are also State-listed species in Florida (Table 2-12). FPL has stated that it will follow FFWCC-approved survey protocols, conduct regular reporting of results, and implement management actions for specific species or resources as required by FFWCC (FFWCC 2012-TN520).

The Turkey Point site currently contains five power-generating plants. Cooling canals of the closed-loop IWF cool the water for Units 1–4. Prior to 2014, these canals provided habitat and forage for many wading birds. Water within the cooling canals does not directly discharge via surface flow into other bodies of surface water and is hypersaline. An uprate for Units 3 and 4 was approved by the NRC in 2012 (77 FR 20059) (TN1001), increasing the capacity to 823 MW(e). FPL predicted this increase in capacity would increase water temperatures within the cooling canals by 2°F and increase salinity 2–3 ppt (FPL 2014-TN4058). Aquatic species found within the cooling canals are subtropical or tropical and would not likely be affected by the predicted increases in water temperature or salinity from the uprate (77 FR 20059) (TN1001). However, record high salinity and temperature levels along with algal blooms during the

summer of 2014 changed the ecology of the IWF. Although subsequent actions to freshen water within the IWF have returned salinity and temperatures to pre-summer 2014 levels, the ecological functions would likely remain substantially altered. Consequently, terrestrial species that forage on these aquatic species have likely already been affected and the rate of recovery of the IWF to a more normal ecological state is unknown. Unit 5 uses mechanical draft cooling towers to dissipate heat. The current cooling-water source for Unit 5 is groundwater (FPL 2014-TN4058). The deposition of salt from Unit 5 cooling-tower drift would be minimal; the combined salt deposition from Units 5, 6, and 7 would not be expected to exceed ecological threshold levels that could be harmful to area wetlands and biota. It is possible reclaimed water could replace groundwater as the primary coolant in the future. As with proposed Units 6 and 7, use of reclaimed water for cooling Unit 5 would also result in the deposition of chemicals of emerging concern (CECs) in the environment from cooling-tower drift. However, CEC deposition levels from all three units would still not be expected to reach levels that could adversely affect terrestrial or wetland species.

7.3.1.2 Summary of Terrestrial and Wetland Ecology Impacts

Existing terrestrial and wetland ecosystem conditions within the geographic area of interest are a function of past land-use practices. Land development and alteration of surface-water flow has degraded and fragmented much of the terrestrial habitat within the region. Regional planning efforts designed to reverse habitat degradation resulting from past land-use and water-management practices are under way. The CERP is a comprehensive project that could result in substantial long-term landscape-scale benefits to terrestrial and wetland ecosystems in the region. The Model Lands Basin and Southern Glades Addition Restoration projects could also benefit terrestrial and wetland ecosystem function in the Everglades National Park, Biscayne National Park, and other lands in the immediate vicinity of the Turkey Point site. However, the ecological complexity of the south Florida landscape may prevent full recovery of the ecosystem and these planned beneficial activities could at least temporarily exacerbate current ecological conditions.

Development related to human population growth in South Florida is expected to continue, placing increased demand on limited resources that would continue to degrade ecological function. Building the proposed Turkey Point Units 6 and 7 and associated facilities would affect substantial areas of naturally vegetated wetlands and uplands. Many species listed by the U.S. Fish and Wildlife Service (FWS) as endangered, threatened, or candidates and by the State of Florida as endangered or threatened are also likely to be affected. Cumulative effects related to anticipated regional development and population growth would depend on the success of current and future planning efforts to manage growth and development.

The NRC staff concludes that the overall cumulative impacts on terrestrial resources in the geographic area of interest from the past, present, and reasonably foreseeable future actions described above would be MODERATE to LARGE. A range is provided because of the review team's uncertainty about the possible effects from the complex interplay of habitat losses from ongoing development in the area combined with building proposed Units 6 and 7 facilities; habitat loss and degradation from past, ongoing, and anticipated regional land development; the sensitivity of terrestrial habitats in the region to hydrological changes; the number and distribution of Federally and State-listed species present in the region; the presence of two

national parks and numerous other conservation lands in the area. Considering the wetland mitigation proposed for impacts from building the proposed Units 6 and 7 facilities, as well as mitigation measures that FPL proposes to develop with FWS to address possible avian impacts from the new transmission lines, the NRC staff concludes that the possible incremental effects of construction, preconstruction, and operation of the proposed Turkey Point Units 6 and 7 project would be MODERATE, with noticeable but not destabilizing effects on the regional ecology.

The NRC staff concludes that the incremental contribution to cumulative impacts from NRC-authorized construction and operation of the proposed Units 6 and 7 (which excludes site preparation activities and building certain non-safety related buildings associated with the project) would still be MODERATE. Operating the power blocks and maintaining various facilities associated with Units 6 and 7 could still noticeably affect terrestrial habitats in many sensitive terrestrial habitats in the region.

7.3.2 Cumulative Effects for Aquatic Ecology

The description of the affected environment in Section 2.4.2 serves as a baseline for the cumulative impacts assessment in this resource area. As described in Section 4.3.2, the NRC staff concludes that preconstruction, and construction, of Units 6 and 7 would result in SMALL impacts on aquatic resources, except MODERATE impacts on the threatened American crocodile (*Crocodylus acutus*) from preconstruction activities. As described in Section 5.3.2, the NRC staff concludes that the impacts of operations on aquatic resources would be SMALL.

In addition to the impacts from building and operation, the cumulative analysis considers other past, present, and reasonably foreseeable future actions that could affect aquatic ecology. For this analysis, the geographic area of interest includes all aquatic resources in southeastern Florida which includes the Turkey Point site, Biscayne National Park, Florida Keys National Marine Sanctuary north of mile marker 106 in Key Largo, the eastern portion of Everglades National Park, and canal systems (e.g., Card Sound, Mowry, L-31 N, and L-31 E Canals). The geographic area of interest for the proposed transmission line and pipeline corridors is described in Section 3.2.2.3. Surface-water areas within and outside the Turkey Point site provide habitat to ecologically, recreationally, and commercially important species; are hydrologically connected to some extent; and have experienced adverse and beneficial changes from anthropogenic and natural activities that have occurred in the past, and that could occur in the future.

7.3.2.1 Description of Past, Present, and Reasonably Foreseeable Future Actions

Historical Context

Prior to drainage and development activities, the wetland and aquatic ecosystems of southern Florida encompassed approximately 8.9 million acres, and included ridge and slough landscapes, sawgrass plains, cypress and mangrove swamps, and coastal lagoons and bays (USACE/SFWMD 1999-TN116). Ogden et al. (2005-TN196) characterized this pre-drainage condition as a “hydrologically interconnected, slow flowing system that extended from the Kissimmee River and Lake Okeechobee southward over low-gradient lands to the estuaries of

Biscayne Bay, Ten Thousand Islands, and Florida Bay, and eastward and westward to the northern estuaries." Browder et al. (2005-TN151) noted that prior to development, Biscayne Bay possessed both marine and estuarine habitat and fauna, and that construction of major canals and subsequent water drainage affected the salinity gradients and ecotones from the Everglades through coastal wetlands and tidal creeks into Biscayne Bay. Historical accounts suggest that prior to inlet and navigational dredging and related development, the northern and central portions of Biscayne Bay had much lower salinity conditions, low nutrient concentrations, and low turbidity/high light transmittance that promoted the presence of extensive seagrass meadows on the bay bottom (USACE/SFWMD 1999-TN116).

During the late 1800s and early 1900s, flood control was recognized as the principal impediment to development in South Florida. Land was drained to support urban and agricultural development and a series of canals were constructed to support flood control, irrigation, and transportation. In 1948, Congress authorized the creation of the Central and Southern Florida Flood Control Project—one of the largest water-management systems in the world (Ogden et al. 2005-TN196). As a result of this and other projects, a substantial portion of the original wetland system in South Florida was lost or converted to support agriculture, urban development, and related infrastructure. These changes have dramatically reduced sheet flow, and have created point-source discharge of freshwater into estuarine and coastal wetland areas that have substantially changed the dynamics of the system and aquatic species compositions. The effects of these practices have included the creation of deeper water habitats within canal systems, which has contributed to the spread of exotic and nuisance species, the creation of unnatural habitats for predatory fishes and alligators, and unnatural reversals in wet and dry patterns (Ogden et al. 2005-TN197).

Existing Turkey Point Units

The existing Turkey Point site described in Chapter 3 encompasses 11,000 ac and currently contains five power-generating plants. Units 1 and 2 are natural-gas/oil steam electrical generating units that each produce 400 MW(e). Unit 1 has been in service since 1967 and Unit 2 has been in service since 1968. In January 2013, Unit 2 was converted to operate in synchronous condenser mode to provide voltage support for the transmission system in southeastern Florida. In this mode, it no longer generates power. FPL also expects to convert Unit 1 to a similar purpose in December 2016 (FPL 2016-TN4579). Two pressurized water reactors each producing 700 MW(e) and associated facilities (Units 3 and 4) are also located on the site. Unit 3 has been in service since 1972 and Unit 4 has been in service since 1973. Both units received operating license renewals, allowing operation of Unit 3 until 2032 Unit 4 until 2033 (NRC 2012-TN1298; NRC 2012-TN1299). Both Units 3 and 4 received extended power uprates on June 15, 2012 (NRC 2012-TN1438). Unit 5 is a natural-gas combined-cycle unit that began operating in 2007 and is rated to produce 1,150 MW(e). These existing units occupy approximately 195 ac. Units 1 through 4 on the Turkey Point site rely on a system of canals that occupy approximately 5,900 ac on the Turkey Point site to provide cooling water. The canals are used as a closed-loop cooling system, and they are permitted as an IWF. Mechanical draft cooling towers are used to dissipate heat from Unit 5. Water from the Upper Floridan aquifer is withdrawn to provide makeup water to Unit 5. Blowdown from the Unit 5 cooling towers is sent to the cooling canals of the IWF (FPL 2014-TN4058).

Because the existing Units 1–5 have limited connection to Biscayne Bay, Card Sound, the cumulative effects of their operation will likely be confined to species inhabiting the IWF. The operation of the cooling systems for Units 1, 3, 4, and 5 would continue to result in impacts on aquatic resources in the IWF, including impingement, entrainment, and chemical, thermal, and high-salinity discharges. For Units 3 and 4, the NRC has previously assessed the environmental impacts of the 2002 license renewal and of the 2012 extended power uprate. The NRC (2002-TN2605) determined that the impacts of license renewal on aquatic resources in the IWF, Biscayne Bay, and Card Sound would be SMALL. The NRC (2012-TN3579) determined that the extended power uprate would result in additional temperature and salinity increases within the cooling-canal system but that these changes would not result in significant long-term impacts on aquatic resources.

Increases in temperature, salinity, and nutrient levels observed during the summer of 2014, including an extensive algal bloom, had a significant impact on aquatic biota in the IWF. The significance of these events and their potential to affect the water quality of the IWF are discussed in Sections 2.3 and 7.2. American crocodile nesting in the IWF area noticeably decreased during the nesting season in 2015; the decrease appeared to be linked to ongoing changes in IWF water quality and lack of foraging opportunities because of the reduction in quality of the localized ecosystem. However, nesting was observed to have increased in other adjacent habitats outside the IWF, and overall numbers of nests within designated critical habitat throughout South Florida were not reduced (PNNL 2015-TN4446). The presence of the existing units may also require additional protection from sea-level rise, as discussed below that could further affect existing hydrology, and potentially reduce the potential for species introduction into the IWF via storm surge.

Model Lands Basin and Southern Glades Addition Restoration

The Model Lands Basin and Southern Glades Addition projects are located south and west of the Turkey Point site, and represent a collaborative effort by the Environmentally Endangered Lands Program of Miami-Dade County and the Save Our Rivers Program of the SFWMD. The restoration area encompasses about 34,000 ac of freshwater and coastal wetlands, and serves as a key area for freshwater flow to Florida Bay, Biscayne Bay, Card Sound, and Barnes Sound (SFWMD 2005-TN217). Programmatic goals include improving the overall condition of wetlands through removal of exotic plants, improving access control to sensitive areas, implementing a prescribed fire program, and restoring wetland function through removal of physical barriers to overland flow. Although many of the restoration actions do not specifically involve aquatic resources, the overall program will benefit aquatic species by restoring historic flow patterns into Biscayne Bay, Card Sound, and Biscayne National Park, and limiting future impacts through programmatic planning. If successful, these projects could result in ecosystem connection and function that more closely resemble what was present before industrialization and urbanization occurred in South Florida. Unfortunately, detectable changes in aquatic environments may not be evident for many years after project implementation.

Biscayne National Park Fishery Management Plan

In 2014, the NPS finalized a fishery management plan to protect and restore Biscayne National Park's existing fisheries. The plan was intended to ensure that fishing activities were conducted in a sustainable manner and to comply with the NPS mandate to provide inspiration, education,

and enjoyment to future generations (NPS 2014-TN4073). The plan includes the following five alternatives related to future conditions within Biscayne National Park:

1. Maintain status quo: no-action alternative with regard to regulations.
2. Maintain Biscayne National Park fisheries resources at or above current levels: potentially change minimum harvest sizes, bag limits, seasonal closures.
3. Improve conditions over current levels: increase the abundance and size of fishery target species resources by 10 percent compared to existing conditions.
4. Rebuild and conserve park fishery resources: increase the abundance and size of fishery target species resources by 20 percent compared to existing conditions.
5. Restore park fishery resources: increase the abundance and size of fishery target species resources to within 20 percent of their estimated historic (pre-exploitation) levels.

Comprehensive Everglades Restoration Program

The CERP was approved under the Water Resources Development Act of 2000 (33 U.S.C. § 2201 et seq.) (TN1037) and is intended to provide a framework for restoration, protection, and preservation of water resources in central and southern Florida. The program encompasses 16 counties and more than 180,000 mi^2, and is expected to take more than 30 years to complete at a cost of nearly $12 billion in 2007 dollars. The primary goals of the CERP are to capture freshwater that now flows into nearshore coastal areas as point sources and redirect it to promote more natural hydrologic conditions and enhance environmental connectivity (CERP 2012-TN1035; DOA and DOI 2016-TN4580).

One of the key CERP projects that will affect aquatic resources in the vicinity of the Turkey Point site is the Biscayne Bay Coastal Wetlands Phase 1 Project (USACE/SFWMD 2011-TN1038). The lead agency for this project is the USACE Jacksonville District; the SFWMD serves as the non-Federal cost-sharing partner. The overall goal of the project is to rehydrate coastal wetlands and reduce point-source discharge of freshwater into Biscayne Bay by redirecting the water to spreaders in coastal wetlands that are currently bypassed by the canal systems. This is intended to improve nearshore substrate and fish habitat that are affected by high salinity during the dry season, and to reduce excessive freshwater outflow during the rainy season. As designed, the project will divert an average of 59 percent of the freshwater discharged into Biscayne Bay from coastal structures into freshwater and saltwater wetlands (USACE/SFWMD 2011-TN1038). If this program meets its intended goals, it should result in detectable improvements in nearshore habitats and reductions in salinity in Biscayne Bay.

As noted by the National Research Council (2008-TN666), CERP is an extremely complex, long-term restoration program with 68 separate subprojects that require sophisticated scientific knowledge of ecosystem function and dynamics, and the development of new approaches and technologies to support water management. In its second biennial review of CERP progress, the Committee on Independent Scientific Review of Everglades Restoration Progress (National Research Council 2008-TN666) concluded CERP was "…bogged down in budgeting, planning, and procedural matters and is making only scant progress toward achieving restoration goals." The Committee went on to state that the ecosystems CERP is intended to save remain in peril while rising construction costs and ongoing population growth and development make

restoration challenges more difficult (National Research Council 2008-TN666). Unfortunately, in its third biennial review, the National Research Council concluded that natural system restoration progress from the CERP remained slow noted that “continued declines in some aspects of the ecosystem coupled with environmental and societal changes make accelerated progress in Everglades restoration even more important" (National Research Council 2010-TN1036). A similar finding was reached in 2012 (National Research Council 2012-TN2685), and in 2014 (National Research Council 2014-TN4608). Thus, it is difficult to predict whether CERP-related restoration actions, or those funded by other sources, will meet their intended goals and result in a detectable beneficial change to affected aquatic resources in South Florida.

Florida Keys National Marine Sanctuary

Because improved water quality and habitat may positively influence Card Sound and Biscayne Bay, the past, present, and future activities associated with the Florida Keys National Marine Sanctuary (FKNMS) may influence cumulative effects. In 2011, the National Oceanographic and Atmospheric Administration released a report about the condition of FKNMS that summarized the state of the resources with respect to water, habitat, living resources, and maritime archaeological resources (NOAA 2011-TN1847). The conclusions related to water suggested that although some management actions have reduced impacts on water quality, conditions were either declining or had not appreciably changed. A similar conclusion was reached for metrics associated with habitat and living resources. In response to this report, the FKNMS has indicated it will continue implementation of its water-quality protection program in conjunction with the EPA and FDEP to reduce point and nonpoint-source pollution and work collaboratively with State and Federal agencies to provide enforcement of existing laws. The FKNMS will also continue to implement its marine zoning and permitting program to reduce habitat loss and destruction within sanctuary boundaries. These actions are expected to benefit both FKNMS and surrounding waterbodies, including open-ocean environments adjacent to the sanctuary and Card Sound and Biscayne Bay to the north.

Population Growth and Coastal Development

Increased population growth and coastal development have been cited as serious ecological concerns by many Federal and State resource agencies, nongovernmental groups, and researchers studying South Florida ecosystems. For instance, the National Research Council, in its 2008 review of CERP (National Research Council 2008-TN666), noted that an expanding population in South Florida would create competition with ecosystem restoration for finite resources, and that planned restoration efforts could be in conflict with agriculture when farmed areas interrupt intended water flow for rehydration and restoration. Environmental effects related to historical and current population growth have also been incorporated into ecosystem conceptual models for South Florida (Ogden et al. 2005-TN196; Ogden et al. 2005-TN197) and identified as a major threat to Biscayne National Park (Robles et al. 2005-TN198). A similar concern was stated in the Final Integrated Project Implementation Report and EIS for the Biscayne Bay Coastal Wetland Phase 1 Project (USACE/SFWMD 2011-TN1038), which indicated that without the Phase 1 project, further development and creation of impervious surfaces would lead to increased runoff and larger point-source freshwater discharges into nearshore areas. USACE/SFWMD also indicated that if the plan was not implemented, much of

the study area for the project would likely be developed, resulting in increased stormwater runoff and pollution, and additional use of chemicals to reduce mosquito populations and support agricultural development (USACE/SFWMD 2011-TN1038).

7.3.2.2 Summary of Aquatic Ecology Impacts

Clearly, many factors will contribute to the cumulative ecological effects experienced by aquatic communities at or near the Turkey Point site over the next 40 years. Increased development and overpopulation, historic alterations to waterbodies for flood control and agriculture, subsequent destruction of wetlands, introduction of exotics, and habitat degradation have adversely affected aquatic resources in southern Florida. These effects, unrelated to the construction and operation of Units 6 and 7 are observable. Although the effects of construction and operation of proposed Units 6 and 7 may contribute to the overall cumulative impacts experienced by aquatic communities at or near the Turkey Point site, the largest source of uncertainty related to future conditions appears to be the success or failure of existing and pending restoration activities, and the magnitude of hydrological alterations as a result of climate change as discussed in Appendix I, along with State and Federal agency response to climate change impacts. Although the construction and operation of the proposed Turkey Point Units 6 and 7 could contribute to cumulative effects on aquatic resources, including those within Biscayne National Park, it is likely the impacts of construction and operation of these units would be minor compared to (1) the success (or failure) of existing or planned restoration activities and (2) the effect of continued urbanization in South Florida. The NRC staff concludes that the contribution to cumulative impacts on aquatic resources from authorized NRC activities for proposed Units 6 and 7, within the geographic area of interest would likely be SMALL. However, overall, cumulative impacts on aquatic resources in the geographic area of interest would be MODERATE, primarily based on historic alterations to aquatic resources.

7.4 Socioeconomic and Environmental Justice Impacts

The evaluation of cumulative impacts on socioeconomics and environmental justice is described in the following sections.

7.4.1 Socioeconomics

The description of the affected environment in Section 2.5 serves as a baseline for the cumulative impacts assessment in this resource area. As described in Section 4.4, the NRC staff assessed the physical impacts of the NRC-authorized construction on the activities related to building proposed Turkey Point Units 6 and 7 and concluded that physical impacts on workers and the general public, including impacts on existing buildings, roads, waterways, aesthetics, noise levels, and air quality would be SMALL and no further mitigation would be warranted. The NRC staff also concludes that impacts of NRC-authorized construction on demographics, recreation, housing, public services, and education would be SMALL, with MODERATE impacts on traffic in the vicinity of the proposed site for Units 6 and 7. Impacts from NRC-authorized construction on the economy and tax revenues at the State and local levels would be SMALL and beneficial.

The combined impacts from construction and preconstruction are described in Section 4.4 and were determined to be SMALL and adverse with the exception of SMALL and beneficial impacts to the economies of Miami-Dade County, Homestead, and Florida City; MODERATE and beneficial impacts on roads; and MODERATE adverse impacts from traffic in the vicinity of the proposed site for Units 6 and 7. In addition to the impacts from construction, preconstruction, and operations, the cumulative analysis also considers other past, present, and reasonably foreseeable future actions that could have socioeconomic impacts. For this cumulative analysis, the primary geographic area of interest is Miami-Dade County because it is the principal area where Turkey Point site workers would live, where the economy, tax base, and infrastructure would most likely be affected, and therefore where socioeconomic impacts would occur. However, the geographic area of interest was modified as appropriate for specific impact analyses; for example, specific taxation jurisdictions were considered when appropriate.

As described in Section 2.5, Miami-Dade County is the most populous county in Florida. Its population doubled between 1970 and 2010 but its population growth rate has slowed. In 1992 it was hit by Hurricane Andrew and an estimated 40,000 residents left the area and did not return. The Homestead Air Force Base, an important employer in the South Miami-Dade County, was destroyed by the hurricane and today supports contingency and training operations (HARB 2012-TN3551).

The socioeconomic impact analyses in Chapters 4 and 5 of this EIS are cumulative by nature. Past and current economic impacts already have been considered as part of the socioeconomic baseline presented in Section 2.5. For example, the economic impacts of existing enterprises are part of the base used for establishing the Regional Input-Output Model System II multipliers (BEA 2012-TN1569). Regional planning efforts and associated demographic projections formed the basis for the review team's assessment of reasonably foreseeable future impacts. State and County plans along with modeled demographic projections like those used in Sections 2.5, 4.4, and 5.4 include forecasts of future development and population increases. Thus, cumulative impacts associated with general growth in Miami-Dade County construction, preconstruction, and operation of proposed Units 6 and 7 are evaluated in Chapters 4 and 5.

Future foreseeable specific projects that are not part of general growth in the region include the following (Table 7-1; FPL 2014-TN4058):

- Decommissioning of current Turkey Point units would reduce the use of roads in the vicinity of the proposed site, and would remove a local source of employment and tax revenues.
- The independent spent fuel storage installation for Turkey Point Units 3 and 4 is collocated on the Turkey Point site. It would be operational during construction of Units 6 and 7, but no additional workers are expected to be needed for its operations.
- Several CERP (USACE 2010-TN113) initiatives would involve construction within a 30 mi radius of the proposed Units 6 and 7 plant area. Some of these projects are under way and others are still on paper. They would bring additional workers to Miami-Dade County, but information about numbers and dates is still uncertain.
- The INGENCO Resource Recovery Facility is a proposed 8 MW landfill gas-fired power plant to be built 6 mi northwest of the Turkey Point site. The facility would be expected to be built by the time the Units 6 and 7 construction begins.

Other projects are being planned for the area and could bring additional construction workers or traffic (e.g., see Table 7-1), but none have been identified that would add increased pressure on roads and traffic during periods when large numbers of Units 6 and 7 workers are traveling to and from the site (e.g., peak construction period or during outages), or that would be cumulative with adverse aesthetic impacts on Everglades National Park—the resources most severely affected by Turkey Point Units 6 and 7.

The review team has considered the impacts of the construction and operations activities plus all past, present, and reasonably foreseeable future activities over the license period. Because of the existing large population, labor force, and tax base of Miami-Dade County, cumulative socioeconomic impacts are likely to be SMALL and adverse, with the exception of beneficial physical impacts on roads during operations, but adverse impacts on traffic in the vicinity of projects, which are likely to be noticeable. Because of local planning and zoning regulations, noticeable impacts on roads and traffic would not be expected to destabilize existing physical and traffic attributes of the affected area. The incremental impact of NRC-authorized activities would be the principal contributor to the MODERATE adverse impacts on traffic in the vicinity of the proposed site, and the MODERATE and beneficial socioeconomic impacts on road quality near the existing Turkey Point site.

7.4.2 Environmental Justice

The description of the affected environment in Section 2.6 serves as a baseline for the cumulative impacts assessment in this resource area. As described in Section 4.5, the NRC staff identified no disproportionately high and adverse impacts on environmental justice (EJ) populations of interest from construction of the proposed Units 6 and 7. As discussed in Section 5.5., the review team identified no disproportionately high and adverse impacts on EJ populations of interest from the operations of proposed Units 6 and 7.

In addition to the impacts from construction, preconstruction, and operations, the cumulative analysis also considers other past, present, and reasonably foreseeable actions that could disproportionately affect EJ populations of interest. For this cumulative analysis, the general geographic area of interest is considered to be the 50 mi region described in Section 2.5.1—the area likeliest to experience health effects (if any) and provide the workforce for proposed Units 6 and 7. This is the region for which census block groups were assessed. However, subsets of the area were considered based on the area likely to be both influenced by the particular impact of proposed Units 6 and 7 and the other facilities.

Based on the analysis above, the review team determined that there were no disproportionately high and adverse impacts on any EJ populations of interest due to preconstruction, construction, and operations activities for the Turkey Point Units 6 and 7; and that there would most likely be no disproportionately high and adverse impacts on EJ communities from any past, present, or reasonably foreseeable future projects in the 50 mi region.

7.5 Historic and Cultural Resources Impacts

The description of the affected environment in Section 2.7 serves as a baseline for the NEPA cumulative impacts assessment in this resource area. As discussed in Section 2.7, no known

resources are recorded in the Units 6 and 7 project area and, as described in Section 4.6, impacts on cultural resources from NRC-authorized construction would be SMALL and no further mitigation would be warranted. As described in Section 5.6, the review team concludes that the impacts on cultural resources from operations would be SMALL. Mitigation may be warranted in the event of an unanticipated discovery during any ground-disturbing activities associated with construction or maintenance of the operating facility. Mitigation actions would be determined by the USACE in consultation with the Florida State Historic Preservation Office. FPL has proposed that cultural resource procedures for unanticipated discoveries, to be developed as stipulated in the work plans for the site and offsite facilities (FPL 2009-TN1514; FPL 2009-TN1515; FPL 2011-TN95), would be followed if any activity encountered cultural resources during building and operation.

The combined impacts from preconstruction and construction, including transmission lines, are described in Section 4.6 and were determined to be MODERATE by the NRC staff. No known resources are located in the Area of Potential Effect (APE) for the pipelines and access roads and bridges, but known significant cultural resources are located in the direct- and indirect-effects APEs for the transmission line corridors. These resources are described in Section 2.7.3 and consist of numerous archaeological sites, historic buildings, historic districts, and linear resource groups. Construction of the transmission lines could generate visual impacts on above-ground historic period resources. If preconstruction activities associated with the transmission lines result in additional alterations of known cultural resources, then the impact could be greater.

In addition to the impacts from construction, preconstruction, and operations, the cumulative analysis considers other past, present, and reasonably foreseeable projects that could affect historic and cultural resources. The geographic area of interest for this assessment of potential cumulative impacts includes the direct- and indirect-effects APEs for cultural resources at the Turkey Point site, which are defined in Section 2.7, and the offsite facilities including transmission line corridors, water pipelines, access roads, and bridges. The cumulative impacts assessment considers the eligibility of historical properties for listing in the National Register of Historic Places.

The cultural background for the Turkey Point site is described in Section 2.7.1. The area contains a rich record of prehistoric human habitation; thus, there are habitation, burial, and other types of sites throughout the region. Historically, several groups of Native Americans lived in Florida, many of which became extinct or merged with other groups due to non-Native American encroachment by explorers and settlers by the late 1700s. The largest groups were the Miccosukee Tribe of Indians and the Seminole Tribe of Florida. Conflict between settlers and the Seminoles was defined by warfare and slave raids until the mid-nineteenth century, by which time conflict and disease had contributed to the near-extinction of the Seminoles. European-American settlers, dominated by farmers and cattle ranchers, began to move into South Florida in greater numbers in the mid-1800s. By the early 1900s, large tracts of South Florida had been drained and numerous railroad lines were established. This expansion of infrastructure prompted the establishment and rapid growth of local communities, such as Homestead, as well as military-related facilities during World Wars I and II.

Projects within the geographic area of interest that may have a potential cumulative impact on cultural resources include ongoing infrastructure improvements and future urbanization, such as the expansion or creation of roads or pipelines near or intersecting the proposed transmission line corridors. These could include projects listed in Table 7-1, such as the Florida Gas Transmission Company Phase VIII Expansion Project, the Biscayne Bay Coastal Wetlands Project – Phase 1, the C-111 Spreader Canal Western Project, and the C-111 South Dade Project. Development of such projects could affect cultural resources if ground-disturbing activities occur or if new above-ground structures affect the visual APE. As described in Section 2.7, known cultural resources exist in the transmission line corridors. Long linear projects such as new or expanded roads, pipelines, and utilities may intersect the proposed transmission line corridors. Because cultural resources can likely be avoided by long linear projects, and because many will occur alongside existing utilities, additional impacts on cultural resources would likely be minimal. Further, because many of the projects would likely require Federal involvement, impacts would be analyzed through Federal agency compliance with the National Historic Preservation Act (54 U.S.C. § 300101 et seq.) (TN4157) and NEPA (42 U.S.C. § 4321 et seq.) (TN661), and it is likely that adverse effects on historic properties or important cultural resources would be minimized. That said, a large number of historic structures are present along the eastern transmission line corridor, in particular, and visual impacts on any of these resources found eligible for listing in the National Register could occur. If activities associated with building the transmission lines or road and pipeline projects result in significant alterations (both physical alteration and visual intrusion) of cultural resources in the transmission line corridors, then cumulative impacts on cultural resources would be greater.

Cultural resources are nonrenewable. Therefore, the impact of destruction of cultural resources is cumulative. Based on the information provided by the applicant and the NRC staff's independent evaluation, the NRC staff concludes that the cumulative cultural resources impact from preconstruction, construction, and operation of two proposed units at the Turkey Point site, including the transmission lines, and other past, present, and reasonably foreseeable projects would be MODERATE. The potential visual impact of new transmission lines on built resources is the principal contributor to the MODERATE rating of cumulative impacts. The NRC staff further concludes that the incremental impacts associated with the onsite NRC-authorized activities would not significantly contribute to the cumulative impact because no significant historic or cultural resources would be affected by these activities in the geographic area of interest.

7.6 Air-Quality Impacts

The description of the affected environment in Section 2.9 serves as a baseline for the cumulative impacts assessment in this resource area. As described in Section 4.7, the impacts of construction activities on air-quality impacts would be SMALL, and no additional mitigation would be necessary. As described in Section 5.7, the review team concludes that the effect of operations on air-quality impacts would be SMALL.

7.6.1 Criteria Pollutants

The combined impacts from construction and preconstruction were described in Section 4.7 and determined to be SMALL. Emissions associated with these activities would be predominately

fugitive dust from ground-disturbing activities and engine exhaust from heavy equipment and vehicles; these emissions are expected to be temporary and limited in magnitude. Section 5.7 addresses air-quality impacts from operations. Air emissions from operations would be primarily from worker vehicles and stationary combustion sources such as diesel generators and auxiliary boilers. Stationary sources would be permitted and operated in accordance with State and Federal regulatory requirements, and their operation would be infrequent and mostly for maintenance testing. Therefore, potential impacts on air quality from operations would be SMALL. In addition to the impacts from construction, preconstruction, and operations, the cumulative analysis also considers other past, present, and reasonably foreseeable future actions that could contribute to cumulative impacts on air quality (see Table 7-1). For this cumulative analysis of criteria pollutants, the geographic area of interest is Miami-Dade County, which is within the Southeast Florida Intrastate Air Quality Control Region. Air-quality attainment status for Miami-Dade County as set forth in 40 CFR Part 81 (TN255) reflects the effects of past and current emissions from all regulated air-pollutant sources in the region. Miami-Dade County is currently in attainment for all air pollutants for which for the EPA has established National Ambient Air Quality Standards (NAAQSs).

The air-quality impact of site development for proposed Units 6 and 7 would be temporary. The distance from building activities to the site boundary would be sufficient to generally limit air-quality impacts to within the facility boundary. Mobile source emissions from workforce commuting would be the principal source of offsite emissions. The major land-use projects in the immediate vicinity (within 6 mi) are wetland mitigation and restoration projects, but these would have only occasional air-quality impacts from periodic controlled burns and from mobile sources used in maintenance and monitoring activities. Other more distant reasonably foreseeable projects within Miami-Dade County that have the potential to increase air emissions include three landfill gas-power-generation projects. The closest, South Dade Landfill, is 8 mi north of Turkey Point; the two other proposed landfill gas-power plants, Medley and North Dade, are located 30 and 37 mi north of the Turkey Point site, respectively. Emissions from the operation of these landfill gas-power plants would be noticeable but would not alter or destabilize the air quality within the region. Any new projects either would have de minimis impacts or would be subject to permitting by the FDEP. State permits are issued under regulations approved by the EPA and are deemed sufficient to attain and maintain the NAAQSs and comply with other Federal requirements under the Clean Air Act. Given these institutional controls, it is unlikely that the air quality in the region would degrade significantly (i.e., degrade to the extent that the region is in nonattainment of the NAAQSs).

Combustion equipment associated with the operation of Turkey Point Units 3 and 4 is similar to the equipment that would be associated with proposed Units 6 and 7. Releases are intermittent and made at relatively low levels with little vertical velocity. Because of the intermittent nature of the releases (4 hours per month) and the small quantities of effluents being released, the review team expects that the cumulative impacts of combustion product release associated with the four Turkey Point units would be negligible.

Operation of the Units 6 and 7 cooling towers would result in plumes and salt deposition with the highest concentrations occurring within the Turkey Point site. Modeling predictions for proposed Units 6 and 7 show significant salt deposits of around 100 kilogram(s)/hectare/month (kg/ha/mo) at the makeup-water reservoir plant area when using water from the RCWs and with salt

deposition of 10 kg/ha/mo generally confined to the Turkey Point site and the IWF, with the exception of the southeastern perimeter of the site. When operated using reclaimed water, the primary water source, the salt deposition rates would be considerably lower. The natural-gas combined-cycle steam electric generating cooling tower (Unit 5) has plumes that remain primarily on the Turkey Point site as well as salt deposition from the Unit 5 cooling tower estimated to have a maximum average of 6.3 kg/ha/mo at 200 m. For the vegetation in the vicinity of the Turkey Point site these salt deposition rates were found to have minimal impact.

Future development near the Turkey Point site also could lead to increases in gaseous emissions related to transportation. Table 7-1 lists medium potential for growth within Miami-Dade County through construction of the proposed SR836/Dolphin Expressway Southwest Extension and Tampa–Orlando–Miami High-Speed Intercity Passenger Rail. Given the potential for growth, and the contribution of criteria pollutant emissions from the three landfill gas-power−generation projects, the cumulative impact on air quality would be noticeable.

7.6.2 Greenhouse Gas Emissions

As discussed in the state-of-the-science report issued by the U.S. Global Change Research Program (GCRP) (GCRP 2014-TN3472), “The majority of the warming at the global scale over the past 50 years can only be explained by the effects of human influences, especially the emissions from burning fossil fuels (coal, oil, and natural gas) and from deforestation…Oil used for transportation and coal used for electricity generation are the largest contributors to the rise in carbon dioxide that is the primary driver of recent climate change.”

Greenhouse gas (GHG) emissions associated with building, operating, and decommissioning a nuclear power plant are addressed in Sections 4.7, 5.7.1, 6.1.3, and 6.3. The review team concluded that the atmospheric impacts of the emissions associated with the building, operating, and decommissioning a nuclear power plant would be minimal. The review team also concluded that the impacts of the combined emissions for the full plant life cycle would be minimal.

It is difficult to evaluate the cumulative impacts of a single source or combination of GHG emission sources for the following reasons:

- The impact is global rather than local or regional.
- The impact is not particularly sensitive to the location of the release point.
- The magnitude of individual GHG sources related to human activity, no matter how large compared to other sources, is small when compared to the total mass of GHGs that exist in the atmosphere.
- The total number and variety of GHG emission sources are extremely large and are ubiquitous.

These points are illustrated by the comparison of annual emission rates of carbon dioxide (CO_2), one of the principal GHGs, in Table 7-2.

In the United States, the national annual GHG emission rate was 6.5 billion MT CO_2 equivalent (CO_2e) in 2012, and of that amount, 5.0 billion MT CO_2e was from fossil-fuel combustion

(EPA 2014-TN4008). The total GHG emissions in Florida were 290 million MT CO_2e in 2007, and of that amount, 256 million MT CO_2e were from fossil-fuel combustion (FDEP 2010-TN2997). Appendix J provides details of the review team's estimate for a reference 1,000 MW(e) nuclear power plant. The review team estimated the total nuclear power plant lifecycle footprint to be 10,500,000 MT CO_2e, with a 7-year preconstruction and construction phase, 40 years of operation, and 10 years of decommissioning. This value is representative of the proposed Units 6 and 7 at Turkey Point because the new units are AP1000 reactors and have the same electrical output as the reference 1,000 MW(e) reactor in Appendix J. The uranium fuel-cycle phase is projected to generate the highest emissions (see Appendix J of this EIS). Table 7-2 lists the GHG emissions from normal operations, including the uranium fuel cycle, as 260,000 MT CO_2e per year. These emissions are significantly less than the GHG emissions reported from power plants in Florida or from fossil-fuel combustion in the United States for the year 2012.

Even though GHG emission estimates from normal operations are small compared to other sources, the applicant should consider measures that would reduce GHG emissions. These could include, but would not necessarily be limited to, energy-efficient design features and features to reduce space heating and air-conditioning energy requirements, use of renewable energy sources, use of low-GHG-emitting vehicles, and other policies to reduce GHG emissions from vehicle use, such as anti-idling policies and vanpooling or carpooling.

Table 7-2. Comparison of Annual Carbon Dioxide Emission Rates

Source	Metric Tons per Year[(a)]
Global emissions from fossil-fuel combustion (2011)	3.3×10^{10} [(b)]
United States emissions from fossil-fuel combustion (2012)	5.0×10^{9} [(b)]
Florida emissions from fossil-fuel combustion (2007)	2.56×10^{8} [(c)]
1,000 MW(e) nuclear power plant (including fuel cycle, 80% capacity factor)	260,000[(d)]
1,000 MW(e) nuclear power plant (operations only)	4,500[(d)]
Average U.S. passenger vehicle	5[(e)]

Note: 1 metric ton = 1.1 U.S. tons (at 2,000 lb per U.S. ton)

(a) Nuclear power emissions estimates are in units of MT CO_2e whereas the other energy alternatives emissions estimates are in units of MT CO_2. If nuclear power emissions were represented in MT CO_2, the value would be slightly less, because other GHG emissions would not be included.
(b) EPA 2014-TN4008, expressed in metric tons per year of CO_2e.
(c) FDEP 2010-TN2997, expressed in metric tons per year of CO_2e.
(d) Appendix J, expressed in metric tons per year of CO_2e.
(e) EPA 2013-TN2505.

Evaluation of the cumulative impacts of GHG emissions requires the use of a global climate model. The GCRP report referenced above (GCRP 2014-TN3472) provides a synthesis of the results of numerous climate modeling studies; hence, the cumulative impacts of GHG emissions around the world as presented in the GCRP report provide an appropriate basis for the evaluation of cumulative impacts. Based primarily on the scientific assessments of the GCRP and National Research Council, the EPA Administrator issued a determination in 2009 (74 FR 66496) (TN245) that GHGs in the atmosphere may reasonably be anticipated to endanger public health and welfare, based on observed and projected effects of GHGs, their impact on climate change, and the public health and welfare risks and impacts associated with such climate change. Therefore, national and worldwide cumulative impacts of GHG emissions

reflect conditions within the MODERATE impact level for air quality related to GHG emissions—noticeable but not destabilizing. Based on the impacts set forth in the GCRP report, and on the CO_2 emissions criteria in the final EPA CO_2 Tailoring Rule (75 FR 31514) (TN1404), the review team concludes that the national and worldwide cumulative impacts of GHG emissions are noticeable but not destabilizing. The review team further concludes that the cumulative impacts would be noticeable but not destabilizing, with or without the GHG emissions from the proposed project.

Consequently, the review team recognizes that GHG emissions, including CO_2, from individual stationary sources and cumulatively from multiple sources can contribute to climate change and that the carbon footprint is a relevant factor in evaluating energy alternatives. Section 9.2.5 contains a comparison of carbon footprints of the viable energy alternatives.

7.6.3 Summary of Air-Quality Impacts

Cumulative impacts on air-quality resources are estimated based on the information provided by FPL and the review team's independent evaluation. Other past, present, and reasonably foreseeable activities exist in the geographic areas of interest (local for criteria pollutants and global for GHG emissions) that could affect air-quality resources. The cumulative impacts on criteria pollutants from emissions of effluents from the new units at the Turkey Point site and other projects would be noticeable but not destabilizing. The new units and the other projects listed in Table 7-1 would have minimal impacts. The national and worldwide cumulative impacts of GHG emissions are noticeable but not destabilizing. The review team concludes that the cumulative impacts would be noticeable but not destabilizing, with or without the GHG emissions from the new units at the Turkey Point site. The review team concludes that cumulative impacts from other past, present, and reasonably foreseeable future actions on air-quality resources in the geographic areas of interest would be SMALL to MODERATE for criteria pollutants and MODERATE for GHGs. The incremental contribution of impacts on air-quality resources for both criteria pollutants and GHGs from building and operating the new units at the Turkey Point site would be SMALL.

7.7 Nonradiological Health

The description of the affected environment in Section 2.10 of this EIS serves as a baseline for nonradiological health related to Units 6 and 7 at Turkey Point. As described in Section 4.8, the impacts from NRC-authorized construction would be SMALL, and no further mitigation would be warranted. As described in Section 5.8, the nonradiological health impacts from operation of the proposed Units 6 and 7 would also be SMALL, and would warrant no further mitigation.

The combined nonradiological health impacts from construction and preconstruction are described in Section 4.8 and were determined to be SMALL. In addition to the impacts from construction, preconstruction, and operations, the cumulative analysis also considers other past, present, and reasonably foreseeable future actions that could contribute to cumulative impacts to nonradiological health (Table 7-1).

Based on the localized nature of most of the nonradiological health impacts of Turkey Point, the geographic area of interest for this cumulative impacts analysis is expected to be limited to the

immediate vicinity of the Turkey Point site, except for (1) the wastewater underground injection location and receiving aquifers and other waters (as described in Section 2.3), and (2) the geographic area for the transmission system associated with proposed Units 6 and 7 (as described in Section 2.2.2). These two geographic areas, plus the immediate vicinity of the site, are expected to encompass the areas where public and worker health could be influenced by the proposed project in combination with any other past, present, or reasonably foreseeable future actions. No other current energy projects are within the area of interest. As noted in Section 7.1, future development of the adjacent land is not likely to occur and thus no reasonably foreseeable future projects in the geographic areas of interest that could contribute to cumulative impacts for nonradiological health are expected.

Preconstruction, construction, and operation activities that have the potential to affect the nonradiological health of the public and workers include exposure to fugitive dust emissions, occupational injuries, noise from construction and operation, exposure to etiological and chemical agents, exposure to electromagnetic fields (EMFs), and noise and vehicle emissions from the transportation of construction materials and personnel to and from the Turkey Point site. Fugitive dust emissions are addressed in Section 7.6.1. The total occupational injury rate is not expected to be significantly affected by construction and operation of the new units in the area of interest.

The closest significant noise-generating sites to Turkey Point site are the Homestead Air Reserve Base and Homestead-Miami Speedway, both approximately 5 mi away. Based on the noise analysis described in Sections 4.8 and 5.8, however, the nearest resident to Turkey Point is in Homestead Bayfront Park, which is in the general direction of the Reserve Base and speedway. This location would experience little or no discernible difference in noise from site-preparation, construction, or operation of Units 6 and 7, and therefore no cumulative noise impacts are expected.

Existing and potential development of new transmission lines could increase nonradiological health impacts from exposure to acute EMFs. As stated in Section 5.8.3, however, adherence to Federal criteria and State utility codes would create minimal cumulative nonradiological health impacts. With regard to chronic effects of EMFs, the scientific evidence on human health does not conclusively link extremely low-frequency EMFs to adverse health impacts. Noise and vehicle emissions associated with current urbanization, current operations of Turkey Point units, and other activities could contribute to public nonradiological health impacts. However, as discussed in Sections 4.8 and 5.8, the proposed Units 6 and 7 contribution to these impacts would be temporary and minimal, and existing and future facilities would likely comply with local, State, and Federal regulations governing noise and emissions. Section 7.10.2 discusses cumulative nonradiological health impacts related to additional traffic on the regional and local highway networks leading to and from the Turkey Point site, and the review team determined that these impacts would be minimal.

In Sections 5.8.1 and 5.8.5, the review team evaluated the health impacts of operating the two new proposed units at the site with regard to etiological and chemical agents in the cooling water and the wastewater discharge. Based on the lack of complete exposure pathways and other factors, including the review team's independent analysis, the review team determined that the likelihood of impacts from etiological and chemical agents on human health would be minimal and mitigation would not be warranted. The potential use of reclaimed wastewater for

cooling of Turkey Point Unit 5 could result in the release of additional etiological and chemical agents from the cooling-tower drift, which could involve subsequent exposure to workers and the public. Based on the review staff's analysis of chemical exposure from the drift from the proposed Turkey Point Units 6 and 7, however, any additional exposure from Unit 5 would be negligible.

Estimates of cumulative impacts on nonradiological health are based on information provided by FPL and the review team's independent evaluation of impacts resulting from the building and operation of proposed Units 6 and 7, along with a review of potential impacts from other past, present, and reasonably foreseeable projects and urbanization located in the geographic area of interest. The review team concludes that cumulative impacts on public and worker nonradiological health would be SMALL, and that mitigation beyond what is discussed in Sections 4.8 and 5.8 would not be warranted.

7.8 Radiological Impacts of Normal Operations

The description of the affected environment in Section 2.11 serves as a baseline for the cumulative impacts assessment in this resource area. As described in Section 4.9, the NRC staff concludes that the radiological impacts from NRC-authorized construction would be SMALL, and no further mitigation would be warranted. As described in Section 5.9, the NRC staff concludes that the radiological impacts from normal operations would be SMALL, and no further mitigation would be warranted.

The combined impacts from preconstruction and construction were described in Section 4.9 and determined to be SMALL. In addition to impacts from construction, preconstruction, and operations, the cumulative analysis also considers other past, present, and reasonably foreseeable future actions that could contribute to cumulative radiological impacts. For the purposes of this analysis, the geographic area of interest is the area within a 50 mi radius of the Turkey Point site. Historically, the NRC has used the 50 mi radius as a standard bounding geographic area to evaluate population doses from routine releases from nuclear power plants. The area within the 50 mi radius of the proposed Turkey Point Units 6 and 7 includes the existing operating Turkey Point Units 3 and 4 and an independent spent fuel storage installation (ISFSI). There are also likely to be medical, industrial, and research facilities within the 50 mi radius of the site that use radioactive materials. As discussed in Sections 2.11 and 5.9, there is no credible drinking water pathway from groundwater under the Turkey Point site. As described in Section 2.11, quantities of tritium are detected in monitoring wells on and around the Turkey Point site as a result of tritium in the cooling-canal system. As further stated in Section 2.11, the FDEP considers that the tritium levels found in the monitoring wells "does not represent a public health and safety issue."

As described in Section 4.9, the estimate of dose to construction workers during building of the proposed Units 6 and 7 is well within the NRC annual exposure limits (i.e., 100 mrem/yr), which are designed to protect public health. This estimate includes exposure from Turkey Point Units 3 and 4 and the ISFSI. The estimate of doses to construction workers during building Unit 7 includes Unit 6 as a source of exposure. As described in Section 5.9, the public and occupational doses predicted from the proposed operation of two new units at the Turkey Point site are below regulatory limits and standards. In addition, the site boundary dose to the

maximally exposed individual from the existing Turkey Point 3 and 4, the ISFSI and the proposed Turkey Point 6 and 7 at the Turkey Point site would be well within the regulatory standard of 40 CFR Part 190 (TN739).

The NRC staff estimated the cumulative dose to biota other than human from the operation of Turkey Point Units 3, 4, 6, and 7, as presented in Appendix G. The results of the dose estimates are provided in Tables 5-14 and 5-15, and Appendix G. The NRC staff concludes that the cumulative radiological impact on biota other than human would not be significant. The results of the radiological environmental monitoring program (REMP) indicate that effluents and direct radiation from area medical, industrial, and research facilities that use radioactive materials do not contribute measurably to the cumulative dose for biota in the vicinity of the Turkey Point site.

As stated in Section 2.11, FPL has conducted a REMP at the Turkey Point site since 1969. The REMP measures radiation and radioactive materials from all sources, including the Turkey Point site and area medical, industrial, and research facilities. The results of the REMP indicate that the levels of radiation and radioactive material in the environment around the Turkey Point site are generally not above or only a little above natural background levels.

Currently, there are no other nuclear facilities planned within 50 mi of the Turkey Point site. The NRC, the DOE, and the State of Florida would regulate or control any reasonably foreseeable future actions in the region that could contribute to cumulative radiological impacts.

Therefore, the NRC staff concludes that the cumulative radiological impacts of operating two new units, along with the existing units at the Turkey Point site and the influence of other man-made sources of radiation nearby would be SMALL, and no further mitigation would be warranted.

7.9 Nonradioactive Waste Impacts

As described in Section 4.10, the NRC staff concludes that the nonradioactive waste impacts of NRC-authorized construction would be SMALL and no further mitigation would be warranted. As described in Section 5.10, the review team concludes that the nonradioactive waste impacts of operations would be SMALL and no further mitigation would be warranted.

Cumulative impacts on water and air from nonradioactive waste are discussed in Sections 7.2 and 7.6, respectively. The cumulative impact of nonradioactive waste destined for land-based treatment and disposal are primarily related to the available capacity of area treatment and disposal facilities and the amount of waste generated by the proposed project and other reasonably foreseeable projects in Table 7-1. The geographical area of interest for this cumulative analysis is Miami-Dade County because of the availability of landfill capacity within the county and the relatively long haul distances associated with transportation outside of the county. Miami-Dade County currently operates two landfills and a waste-to-energy plant, has contracts with commercial firms for additional landfill capacity, and is currently developing a plan for solid-waste management for future disposal needs (Miami-Dade County 2013-TN2950; Miami-Dade County 2010-TN2953; Miami-Dade County 2012-TN2951).

During construction, offsite land-based waste treatment and disposal would be minimized by production and delivery of modular plant units (FPL 2014-TN4058) and by segregation of

recyclable materials. Building activities would generate small quantities of construction debris, and the construction workforce would produce small quantities of municipal solid waste (MSW). Building waste and trash would be handled, transported, and disposed in accordance with all applicable Federal, State, and local regulations (FPL 2010-TN272). Most of the projects listed in Table 7-1 generally either would not generate significant amounts of solid waste (e.g., plastics and fiberglass manufacturing), would not coincide with the construction of the proposed Turkey Point Units 6 and 7 (e.g., decommissioning Turkey Point Units 1 through 5), or would produce waste streams of a different nature (e.g., mining and park projects).

During operation, FPL estimates that Turkey Point Units 6 and 7 would generate an average of 1,000 tons of nonradioactive, nonhazardous, solid waste annually, equivalent to about 0.03 percent of the 3.2 million tons of MSW managed in Miami-Dade County in 2012 (FDEP 2013-TN2949). Therefore, such disposal impacts would be minimal.

FPL would be classified as a either a conditionally exempt small-quantity generator or a small-quantity generator under the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. § 6901 et seq.) (TN1281). Conditionally exempt small-quantity generators and small-quantity generators combined generate only 7 percent of the hazardous waste produced in Florida. No known capacity constraints exist for the treatment or disposal of hazardous wastes either within Florida or for the nation (FDEP 2007-TN1478).

Of the projects listed in Table 7-1, only the operation and decommissioning of Turkey Point Units 3 and 4 and the hospitals that use radioactive materials have the potential to generate mixed waste. None of the considered projects is expected to generate mixed waste in significant quantities above current rates, and therefore cumulative impacts would be minimal.

Based on the quantity of nonradioactive and mixed waste projected during operation of Turkey Point Units 6 and 7 and the available treatment and disposal capacity, the review team concludes that cumulative impacts of nonradioactive and mixed waste would be SMALL, and additional mitigation would not be warranted.

7.10 Postulated Accidents

As described in Section 5.11.4 of this EIS, the NRC staff concludes that the potential environmental impacts (risk) from a postulated accident related to the operation of proposed Units 6 and 7 would be SMALL, and no further mitigation would be warranted. Section 5.11 of this EIS considers both design basis accidents (DBAs) and severe accidents.

As described in Section 5.11.1, the NRC staff concludes that the environmental consequences of DBAs at the Turkey Point site would be SMALL for an AP1000 reactor. DBAs are addressed specifically to demonstrate that a reactor design is robust enough to meet NRC safety criteria. The consequences of DBAs are bounded by the consequences of severe accidents.

As described in Section 5.11.2.5, the NRC staff concludes that the severe accident probability-weighted consequences (i.e., risks) of an AP1000 reactor at the Turkey Point site are SMALL compared to risks to which the population is generally exposed. The cumulative analysis considers risk from potential severe accidents at all other existing and proposed nuclear power plants that have the potential to increase risks at any location within 50 mi of proposed Units 6 and 7. The 50 mi radius was selected to cover any potential risk overlaps from two or more

nuclear facilities. The only existing reactors within a 50 mi radius of the proposed Units 6 and 7 plant area are Turkey Point Units 3 and 4. Existing reactors that contribute to risk within this geographic area include Turkey Point Units 3 and 4.

Tables 5-15 and 5-16 in Section 5.11.2 provide comparisons of estimated risk for the proposed AP1000 units at the Turkey Point site and current-generation reactors. The estimated population dose risk for the proposed AP1000 units at the Turkey Point site is well below the median value for current-generation reactors. In addition, estimates of average individual early fatality and latent cancer fatality risks are well below the Commission's safety goals (51 FR 30028) (TN594). For existing plants within the geographic area of interest (Turkey Point Units 3 and 4), the Commission has determined that the probability-weighted consequences of severe accidents are small (10 CFR Part 51) (TN250), Appendix B, Table B-1). On this basis, the NRC staff concludes that the cumulative risks of severe accidents at any location within 50 mi of the Turkey Point site likely would be SMALL and no further mitigation would be warranted.

7.11 Fuel-Cycle, Transportation, and Decommissioning Impacts

The cumulative impacts related to the fuel cycle, transportation of radioactive materials (fuel and waste), and facility decommissioning for the proposed site are described below.

7.11.1 Fuel Cycle

As described in Section 6.1, the NRC staff concludes that the environmental impacts of the fuel cycle due to operation of proposed Turkey Point Units 6 and 7 would be SMALL. Fuel-cycle impacts would occur not only at the Turkey Point site but also at other locations in the United States or, in the case of foreign-purchased uranium, in other countries as described in Section 6.1.

In addition to fuel-cycle impacts from proposed Units 6 and 7, this cumulative analysis also considers fuel-cycle impacts from existing Units 3 and 4. There are no other nuclear power plants within 50 mi of the Turkey Point site. The fuel-cycle impact of Units 3 and 4 would be similar to that of proposed Units 6 and 7. The NRC staff concludes the impacts would be acceptable for the 1,000 MW(e) reference reactor (10 CFR Part 51) (TN250). As discussed in Section 6.1 of this EIS, advances in reactors since the development of Table S–3 of 10 CFR 51.51(TN250), would have the effect of reducing environmental impacts relative to the operating reference reactor. For example, a number of fuel-management improvements have been adopted by nuclear power plants to achieve higher performance and to reduce fuel and separative work (enrichment) requirements. Adding the fuel-cycle impacts from existing Units 3 and 4 at a combined 1,632 MW(e) (FPL 2016-TN4579) to the impacts from proposed Units 6 and 7 at a combined 2,230 MW(e) (FPL 2014-TN4058) would not increase the cumulative impacts from the fuel cycle by more than 75 percent. The NRC staff concludes the cumulative fuel-cycle impacts of operating the proposed Units 6 and 7 would be minimal.

The Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel (NUREG–2157) (NRC 2014-TN4117) examines the incremental impacts of continued storage on each resource area analyzed in NUREG–2157 in combination with other past, present, and reasonably foreseeable future actions. Section 6.5 of NUREG–2157 indicates ranges of potential cumulative impacts for multiple resource areas (NRC 2014-TN4117). These ranges

are primarily driven by impacts from activities other than the continued storage of spent fuel at the reactor site; the impacts from these other activities would occur regardless of whether spent fuel is stored during the continued storage period. In the short-term timeframe, which is the most likely timeframe for the disposal of the fuel, the potential impacts of continued storage for at-reactor storage are SMALL and would, therefore, not be a significant contributor to the cumulative impacts. Because the impacts during the short-term timeframe are SMALL, continued storage would not be a significant contributor to the cumulative impacts. In the longer timeframes for at-reactor storage, or in the less likely case of away-from-reactor storage, some of the impacts from the storage of spent fuel could be greater than SMALL. However, other Federal and non-Federal activities occurring during the longer timeframes, as noted in NUREG–2157, include uncertainties as well, contributing to the cumulative impacts. All of these uncertainties lead to the ranges in cumulative impacts as discussed throughout Chapter 6 of NUREG–2157 (NRC 2014-TN4117). The overall cumulative impact conclusions would not be changed if the impacts of continued storage were removed. Taking into account the impacts that the NRC can predict with certainty, which are SMALL; the uncertainty reflected by the ranges in some impacts; and the relative likelihood of the timeframes, the staff finds that the impacts in NUREG–2157 do not change the staff's overall finding regarding the cumulative impacts from the fuel cycle (which includes the impacts associated with spent fuel storage).

7.11.2 Transportation

The description of the affected environment in Section 2.5.2 serves as a baseline for the cumulative impacts assessment in this resource area. As described in Sections 4.8.3 and 5.8.6, the review team concludes that impacts of transporting personnel and nonradiological materials to and from the Turkey Point site would be SMALL. In addition to impacts from preconstruction, construction, and operations, the cumulative analysis also considers other past, and present, and reasonably foreseeable future actions that could contribute to cumulative transportation impacts. For this analysis the geographic area of interest is the 50 mi region surrounding the Turkey Point site.

Nonradiological transportation impacts are related to the additional traffic on the regional and local highway networks leading to and from the Turkey Point site. Additional traffic would result from shipments of construction materials and movements of construction personnel to and from the site. The additional traffic increases the risk of traffic accidents, injuries, and fatalities. A review of the projects listed in Table 7-1 indicates that other projects in the region could potentially increase nonradiological impacts. The most significant cumulative nonradiological impacts in the vicinity of the Turkey Point site would result from major construction projects. A review of Table 7-1 suggests that the only major new construction project in the vicinity of the Turkey Point site is the Tampa-Orlando-Miami Florida High-Speed Rail project. The first phase of the Florida High-Speed Rail project is currently developing the leg from Tampa to Orlando. Because Orlando is more than 250 mi north of the Turkey Point site, it is considered outside of the region of interest for this EIS. However, when construction begins on the Orlando to Miami leg, portions of the new rail line will reside within the region of interest. This interaction will minimally exacerbate nonradiological impacts because construction of the rail line will occur north of Miami, whereas the Turkey Point site is south of Miami. Therefore, traffic overlap between transport of construction materials and personnel to/from the Turkey Point site and to/from the rail line construction site will be minimal. Minor interactions with smaller construction

projects in this vicinity, including the South Dade Landfill gas generation, Medley landfill gas power, and construction activities at the Homestead Air Reserve Base are also anticipated. However, the magnitudes of these projects are small relative to construction of Turkey Point Units 6 and 7. Consequently, interactions among construction traffic are unlikely to exacerbate congestion and potentially increase nonradiological transportation impacts. The other construction projects are more than 25 mi from the Turkey Point site, and therefore the traffic from these projects is not likely to interact with traffic associated with building and operating the Turkey Point site units.

Traffic associated with the existing Turkey Point Units 3 and 4 could interact with traffic associated with proposed Units 6 and 7. However, FPL has identified mitigation measures designed to reduce traffic impacts in the vicinity of the Turkey Point site. Traffic flow to and from operating facilities in the region would be of lesser importance because fewer workers and material shipments are needed to support operating facilities than major construction projects. The operating facilities with potential for cumulative nonradiological impacts include the Resources Recovery Facility, Homestead Power Plant, Gordon Ivey Power Plant, Contender Boats Inc., and Florida Rock and Sand. As with the construction projects, FPL would identify mitigation measures for the proposed new units and would also mitigate traffic concerns and reduce the potential cumulative nonradiological impacts associated with operating facilities.

Finally, 16 parks are listed in Table 7-1. Current initiatives involving the Biscayne National Park and Florida Key National Marine Sanctuary do not involve additional construction (they are primarily legislative and regulation-related proposals). Development in the Crocodile Lake National Wildlife Refuge is considered unlikely. There are also 13 more parks within the region of interest and no reasonably foreseeable potential park improvements have been identified. When potential improvements occur, they are generally of smaller scope and have lower resource and personnel requirements than constructing a new nuclear power plant. Therefore, park improvements are not likely to result in a measurable cumulative impact.

In Sections 4.8.3 and 5.8.6, the review team concluded that the impacts of transporting construction material and construction and operations personnel to and from the Turkey Point site are a small fraction of the existing nonradiological impacts in Miami-Dade County, Florida. FPL has identified mitigation measures designed to improve traffic flow at the Turkey Point site (see Section 4.4.2.2.4). Based on the magnitude of nuclear power plant construction relative to the other construction activities listed in Table 7-1, the review team concludes the cumulative nonradiological transportation impacts of constructing and operating the proposed new reactors at the Turkey Point site would be SMALL, and it is likely no further mitigation would be warranted.

As described in Section 6.2, the NRC staff concludes that the impacts of transporting unirradiated fuel to the Turkey Point site and irradiated fuel and radioactive waste from the Turkey Point site would be SMALL. In addition to impacts from preconstruction, construction, and operations, the cumulative analysis also considers other past, present, and reasonably foreseeable future actions that could contribute to cumulative transportation impacts. For this analysis, the geographic area of interest is the 50 mi region surrounding the Turkey Point site.

Historically, the radiological impacts on the public and environment associated with transportation of radioactive materials in the 50 mi region surrounding the Turkey Point site

have been primarily associated with shipments of fuel and waste to and from existing Turkey Point Units 3 and 4. Radiological impacts of transporting radioactive materials would occur along the routes leading to and from the Turkey Point site, fuel fabrication facilities, and waste disposal sites located in other parts of the United States. No other major activities with the potential for cumulative radiological impacts were identified in the geographic region of interest. The past, present, and reasonably foreseeable impacts in the region surrounding the Turkey Point site are a small fraction of the impacts from natural background radiation.

As discussed in Section 6.2, the addition of the proposed new units to the existing Turkey Point site would result in the need for additional unirradiated nuclear fuel and generation of additional spent nuclear fuel and radioactive waste. The impacts of transporting this fuel and radioactive waste to and from the Turkey Point site would be consistent with the environmental impacts associated with transportation of fuel and radioactive wastes from current-generation reactors presented in Table S–4 of 10 CFR 51.52 (TN250), which the NRC staff considers to be acceptable for the 1,100 MW(e) reference reactor. Advances in reactor technology and operations since the development of Table S–4 would reduce environmental impacts relative to the values in Table S–4. For example, fuel-management improvements have been adopted by nuclear power plants to achieve higher performance and to reduce fuel requirements. This leads to fewer unirradiated and spent fuel shipments than the 1,100 MW(e) reference reactor discussed in 10 CFR 51.52 (TN250). In addition, advances in shipping cask designs to increase their capabilities would result in fewer shipments of spent fuel to offsite storage or disposal facilities.

Therefore, the NRC staff considers the cumulative radiological and nonradiological transportation impacts of operating the proposed new reactors at the Turkey Point site to be minimal.

7.11.3 Decommissioning

As discussed in Section 6.3, the environmental impacts from decommissioning are expected to be SMALL, because the licensee would have to comply with decommissioning regulatory requirements.

In this cumulative analysis, the geographic area of interest is within a 50 mi radius of the Turkey Point site. In addition to proposed Units 6 and 7, the only other nuclear power plants within this geographic area of interest are the existing Turkey Point Units 3 and 4. In Supplement 1 to NUREG–0586, *Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities*, the NRC found the impacts on radiation dose to workers and the public, waste management, water quality, air quality, ecological resources, and socioeconomics to be small (NRC 2002-TN665). In addition, in Section 6.3 the NRC staff concluded that the impact of GHGs on air quality during decommissioning would be minimal.

7.11.4 Summary of Cumulative Fuel Cycle, Transportation, and Decommissioning Impacts

Based on the analysis above, the cumulative impacts from fuel-cycle activities, transportation of radioactive material, and decommissioning would be SMALL, and additional mitigation would not be warranted.

7.12 Summary of Cumulative Impacts

The review team considered the potential cumulative impacts resulting from construction, preconstruction, and operation of Turkey Point Units 6 and 7 together with past, present, and reasonably foreseeable future actions in the same resource-specific geographic area of interest. The specific resources that could be affected by the incremental effects of the proposed action and other actions listed in Table 7-1 were assessed. This assessment included the impacts of construction and operations for the proposed new units as described in Chapters 4 and 5: impacts of preconstruction activities as described in Chapter 4; impacts of fuel cycle, transportation, and decommissioning described in Chapter 6; and impacts of past, present, and reasonably foreseeable Federal, non-Federal, and private actions that could affect the same resources affected by the proposed action.

Table 7-3 summarizes the cumulative impacts by resource area. The cumulative impacts for the majority of resource areas would be SMALL, although there could be MODERATE impacts for some resources as discussed below.

Table 7-3. Cumulative Impacts on Environmental Resources, Including the Impacts of Proposed Turkey Point Units 6 and 7

Resource Category	Impact Level
Land Use	MODERATE
Water-Related	
Water Use – Surface Water	SMALL
Water Use – Groundwater Use	SMALL
Water Quality – Surface Water	MODERATE
Water Quality – Groundwater	SMALL
Ecology	
Terrestrial Ecosystems	MODERATE to LARGE
Aquatic Ecosystems	MODERATE
Socioeconomic	
Physical Impacts	SMALL adverse to MODERATE beneficial impacts on roads
Demography	SMALL
Economic Impacts on the Community	SMALL and beneficial
Infrastructure and Community Services	SMALL to MODERATE
Environmental Justice	NONE[(a)]
Historic and Cultural Resources	MODERATE
Air Quality	SMALL to MODERATE for criteria pollutants and MODERATE for GHGs
Nonradiological Health	SMALL
Radiological Health	SMALL
Nonradiological Waste	SMALL
Postulated Accidents	SMALL
Fuel Cycle, Transportation, and Decommissioning	SMALL

(a) A determination of "NONE" for environmental justice analyses does not mean there are no adverse impacts on minority or low-income populations from the proposed project. Instead, an indication of "NONE" should inform the reader that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

Land-use impacts from placement of new transmission lines would have a MODERATE impact on existing land uses while the incremental impacts of NRC-authorized activities would be SMALL.

MODERATE cumulative impacts on land use result from a history of agricultural and urban development in portions of the geographic area of interest as well as possible land-use conflicts resulting from development of the proposed transmission lines that would serve Units 6 and 7. The incremental contribution of the overall Units 6 and 7 project would be MODERATE, primarily due to possible land-use conflicts from building and operating transmission lines in urban areas and national parks. However, the incremental contribution of NRC-authorized activities would be SMALL because the NRC does not authorize the building of transmission lines.

MODERATE cumulative impacts on surface-water quality result from historical point and non-point-source discharges that have affected the water quality of streams and rivers near the Turkey Point site. Portions of the estuary and streams along the southeast Atlantic coast to Biscayne Bay appear on the final 2010 303(d) list as impaired waterbodies because of the presence of copper, fecal coliforms, mercury, and nutrients (FDEP 2010-TN1253). However, the incremental impacts from NRC-authorized activities would be SMALL and not contribute to the cumulative impacts.

Cumulative impacts on terrestrial resources in the geographic area of interest would be MODERATE to LARGE. A range is provided because of the review team's uncertainty about the possible effects from the complex interplay of habitat losses from building Units 6 and 7 facilities; habitat loss and degradation from past, ongoing, and anticipated regional land development; the sensitivity of terrestrial habitats in the region to hydrological changes; and the number and distribution of Federally and State-listed species present in the region. Considering the wetland mitigation proposed for impacts from building the proposed Units 6 and 7 facilities, as well as mitigation measures that FPL proposes to develop with FWS to address possible avian impacts from the new transmission lines, the review team concludes that the possible incremental effects of construction, preconstruction, and operation of the Turkey Point Units 6 and 7 project would be MODERATE.

Cumulative impacts on aquatic resources in the geographic area of interest would be MODERATE primarily based on historic alterations to aquatic habitats and impacts on species within those habitats. The contribution to cumulative impacts from authorized NRC activities for proposed Units 6 and 7 would likely be SMALL and would not noticeably alter the ecology of the surrounding freshwater, estuarine, and marine environments, and therefore, would not significantly contribute to cumulative impacts.

Because of the large population, labor force, and tax base of Miami-Dade County, cumulative socioeconomic impacts are likely to be SMALL and adverse, with the exception of physical impacts on buildings, and impacts on traffic in the vicinity of projects, which are likely to be MODERATE and adverse. There would be MODERATE and beneficial socioeconomic impacts on road quality near the existing Turkey Point site.

Because of the potential for indirect visual impacts on cultural resources from the construction of offsite transmission lines, cumulative cultural resources impacts are likely to be MODERATE.

However, because the construction of transmission lines is not an NRC-authorized activity, the incremental impacts associated with the onsite NRC-authorized activities would not significantly contribute to cumulative impacts on cultural resources.

MODERATE national and worldwide cumulative impacts of GHG emissions are noticeable but not destabilizing, with or without the GHG emissions of the proposed Turkey Point Units 6 and 7. The incremental contribution of impacts on air-quality resources for both criteria pollutants and GHGs from building and operating the proposed units would be SMALL.

8.0 NEED FOR POWER

Chapter 8 of the U.S. Nuclear Regulatory Commission's (NRC's) NUREG–1555, Environmental Standard Review Plan (ESRP) (NRC 2000-TN614) guides the staff's review and analysis of the need for power for a proposed nuclear power plant. The guidance states the following:

> Affected states or regions continue to prepare need-for-power evaluations for proposed energy facilities. The NRC will review the evaluation for the proposed facility and determine if it is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. If the State's or region's need-for-power evaluation is found acceptable, no additional independent review by NRC is needed, and the State's analysis can be the basis for ESRPs 8.2 through 8.4 (NRC 2000-TN614).

In a 2003 response to a petition for rulemaking (68 FR 55905) (TN733), the NRC concluded that "… need for power must be addressed in connection with new power plant construction so that the NRC may weigh the likely benefits (e.g., electrical power) against the environmental impacts of constructing and operating a nuclear power reactor." The NRC also stated in its response to the petition discussed above that (1) the NRC does not supplant the States, which have traditionally been responsible for assessing the need for power-generating facilities, their economic feasibility, and regulating rates and services; and (2) the NRC has acknowledged the primacy of State regulatory decisions regarding future energy options (68 FR 55905) (TN733). Consequently, the NRC staff's role with regard to a need-for-power review is to identify whether an independently derived needs determination meets the four acceptability criteria and, if it does, report the conclusions of that independently derived determination. No independent assessment of the relevant service area's need for power is necessary for the NRC staff to meet its responsibility under the National Environmental Policy Act of 1969 (42 U.S.C. § 4321 et seq.) (TN661), as amended.

The purpose and need for the Turkey Point Nuclear Power Plant (Turkey Point) Units 6 and 7 project identified in Chapter 1 is to generate 2,200 MW(e) baseload power to meet the need for baseload power within the Florida Power & Light Company (FPL) service territory by 2027 and 2028. In 2008, the Florida Public Service Commission (FPSC) analyzed the need for power upon which the NRC staff relied to reach its conclusion that there is a need for power from Turkey Point Units 6 and 7. The FPSC analysis showed a need for at least that amount of baseload power. Because the demand for baseload power is at least as much as the supply from Units 6 and 7, a need for the power exists. The following sections discuss the need for power in the context of FPSC's determination (FPSC 2008-TN735).

8.1 Description of the Power System

In Florida, investor-owned utilities such as FPL are regulated by a public service commission and serve a well-defined service territory. The State of Florida, through the FPSC, regulates FPL rates, electric service and grid reliability, and the planning and implementation of generation and transmission resources to serve loads within the FPL service territory. Expansion of FPL's power system depends on the determination of the need for additional

power within the FPL service territory. In the case of the proposed Turkey Point Units 6 and 7, FPL has obtained a "Determination of Need" from the FPSC, based on Final Order PSC-08-0237-FOF-EI, dated April 11, 2008 (FPSC 2008-TN735). In its decision, FPSC provides its full reasoning, based on FPL's petition and FPSC's own analysis, for making its determination. For the purposes of this environmental impact statement (EIS), the NRC staff identified FPSC's Determination of Need as an independently derived needs determination that was (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. Therefore, the NRC staff relied upon that FPSC Determination of Need for the remainder of this chapter of the EIS.

The remainder of this chapter characterizes the institutional and physical characteristics of the FPL system, and the NRC staff's basis for relying on FPSC's Determination of Need. Section 8.1.1 reviews the current power system, including geographic considerations, and regional characteristics. Section 8.1.2 provides an assessment of the FPSC's analytical processes in the context of the NRC's four acceptability criteria. It discusses the specific criteria FPSC used to make its determination. Section 8.2 discusses some of the key factors affecting the demand for electricity and provides a table from the FPL Environmental Report (ER) (FPL 2014-TN4058) showing the FPL/FPSC analysis of future demand. Section 8.3 describes the FPL and FPSC assessments of the supply of electricity. Section 8.4 reports the FPSC's conclusions regarding the determination of the need for power as proposed by FPL and verified by the FPSC evaluation.

8.1.1 Description of the FPL System

FPL is an investor-owned utility operating within a defined service territory in southern and northeastern Florida. It serves a population of approximately 10 million people within a 27,650 mi^2 area, and includes the large metropolitan areas of Miami and Fort Lauderdale (see Figure 8-1 for a map of FPL's service area counties) (FPL 2016-TN4579). The region of influence for the proposed action is this 35-county area.

The region of influence is within the administrative region of the Florida Reliability Coordinating Council (FRCC), which is an administrative subregion of the North American Electric Reliability Corporation (NERC). The FRCC, which includes investor-owned utilities, cooperative utilities, municipal utilities, Federal power agencies, power marketers, and independent power producers, was created to ensure the reliability and adequacy of current and future bulk electricity supply in Florida and the United States. The entire FRCC region is within the Eastern Interconnection of the alternating current power grid.

FPL is part of an interconnected power network that enables power exchange between utilities. FPL is interconnected with 19 municipal and rural electric cooperative systems (FPL 2014-TN4058). FPL's transmission system includes approximately 6,897 circuit miles of transmission lines (FPL 2016-TN4579). In 2015, FPL had total summer capacity resources of approximately 26,059 MW, consisting of system firm generation of 25,233 MW and 826 MW of firm purchased power (FPL 2016-TN4579). FPL provided electricity service to over 4.8 million customers in 35 counties in 2015, including retail and wholesale customers, municipalities, utilities, and power agencies (FPL 2016-TN4579.

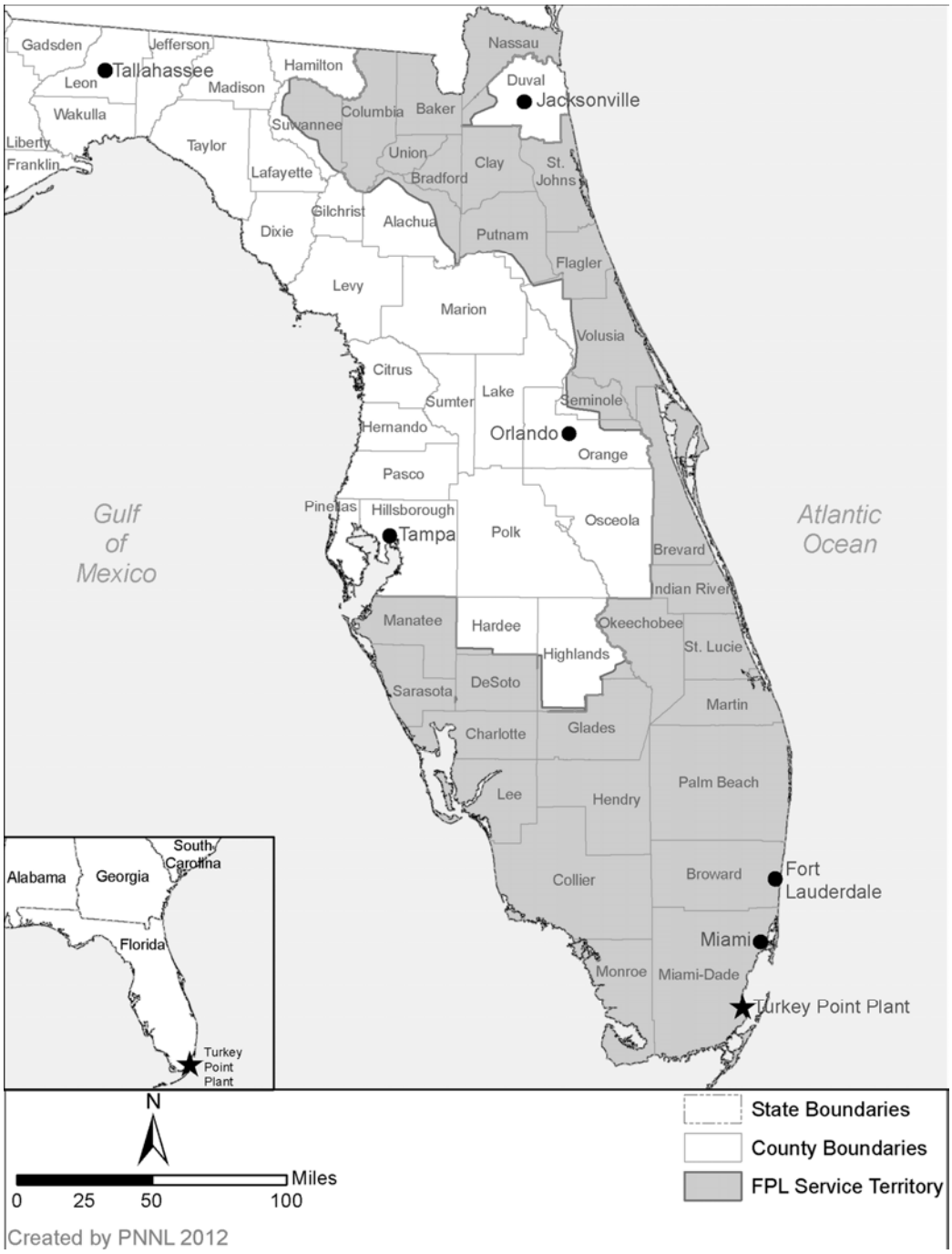

Figure 8-1. FPL Service Territory

Table 8-1 illustrates recent trends in electricity sales by customer class (FPL 2016-TN4579). FPL relies on three measures of reliability in its resource planning. First, a deterministic measure known as "reserve margin" is used to reflect FPL's ability to meet its forecasted seasonal peak load with firm capacity. Simply stated, the reserve margin is the percentage of a utility's total available capacity that must be available for service (firm), over and above the system peak load, as insurance against forced outages and other planned or unplanned events that could cause outages. FPL uses a 20 percent minimum reserve margin criterion in its

resource-supply planning. It uses another measure of reliability—"loss of load probability"—that reflects the probability a company will be unable to meet its load throughout the year. This measure is a utility industry standard reflecting the maximum of 1 day in 10 years (one-tenth of a day per year) loss of load probability. Lastly, FPL has implemented a 10 percent generation-only reserve margin reliability criterion. This measure reflects the reserves provided only by actual generating resources.

Table 8-1. Shares of Electricity Sales by FPL Customer Class (FPL 2016-TN4579)

Customer Class	20011	2012	2013	2014	2015
Residential (%)	51.8	51.2	51.4	50.3	50.5
Commercial (%)	42.7	43.3	43.2	41.6	40.7
Industrial (%)	2.9	2.9	2.8	2.7	2.6
Wholesale (%)	2.1	2.1	2.1	4.9	5.7
Other (%)	51.8	51.2	51.4	50.3	50.5
Total (GWh)	**105,502**	**104,462**	**104,943**	**109,763**	**116,430**

8.1.2 Evaluation of the FPL Analytical Process

In accordance with NUREG–1555 (NRC 2000-TN614), the NRC staff determined the analytical process and need-for-power evaluation performed by the FPSC met the four NRC criteria for being (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. The following sections describe how the FPSC process met the four NRC criteria.

8.1.2.1 Systematic

The NRC staff determined that FPSC used a systematic process for determining the need for the proposed Turkey Point Units 6 and 7. Regulatory provisions in Florida state that, on an annual basis, FPL must provide the most up-to-date forecast and expected resource portfolio, respective of all known current conditions. FPL accomplishes this through an iterative process for load forecasting, which is updated and reviewed annually as directed by the State through the FPSC. Load forecasts use utility industry best practices and methodological approaches to determine the utility's need for power and the most cost-effective strategies to meet its regulatory obligations. In the Determination of Need proceedings, the FPSC staff and other witnesses indicated that FPL's forecasts were reasonable for planning purposes, and the FPSC found that FPL had provided a reliable and appropriate basis for assessing the need for Turkey Point Units 6 and 7. Therefore, the regulatory provisions combined with FPSC's Determination of Need Proceedings demonstrate to the NRC staff that a systematic process was applied for determining the need for Units 6 and 7.

8.1.2.2 Comprehensive

The NRC staff concluded FPSC's analysis of issues affecting the need for power in the FPL service territory is comprehensive. The factors analyzed by FPSC include electric system reliability, the specific need for baseload capacity, the basis for forecasts and cost assumptions, the existence of viable alternatives, and cost-effectiveness. FPSC reviewed FPL's peak demand and energy forecasts which incorporate key influencing factors, such as economic and

demographic trends, weather, and implemented load-reduction programs such as new energy efficiency and demand-side management (DSM) programs. Forecasts generated included each sector of the economy, and separate forecasts were developed to determine both short- and long-term demand. Power-supply forecasts include a comprehensive evaluation of present and planned generating capabilities as well as present and planned power purchases and sales in the service territory. FPL identified all existing generators by fuel type, planned expansions, new construction, and potential closure over the relevant time period, all of which FPSC found reasonable. All analyses are performed with forecasting and statistical modeling and methodological approaches appropriate for the power industry.

The FPSC review process also takes into account the need for a reliable power system, fuel diversity, dependable supply of electricity, baseload power-generating capacity, adequate electricity at reasonable cost, and whether the project is the most cost-effective option (FPSC 2008-TN735). These factors are outside the authority of the NRC review, but demonstrate the standards of the FPSC Determination of Need review process. In view of the above, the NRC staff determined FPSC's analysis of issues affecting the need for power in the FPL service territory is comprehensive.

8.1.2.3 Subject to Confirmation

The NRC staff concluded the process, models, and estimations used in the FPSC Determination of Need are subject to a rigorous confirmation process by expert witnesses and the general public. These proceedings and relevant findings are all documented in the Final Order issued by the FPSC (2008-TN735). The FPSC performed an independent analysis of the FPL assertions made in its application and affirmed the forecasting methods and results. The NRC staff reviewed the FPSC analysis conclusions and did not identify contradictory or unconfirmed conclusions in any other independent sources such as the NERC long-term reliability assessment (NERC 2008-TN734). Accordingly, the NRC staff determined FPSC's process for making the Determination of Need was subject to confirmation.

8.1.2.4 Responsive to Forecasting Uncertainty

The NRC staff also determined that the FPSC Determination of Need was based on a forecasting methodology that incorporated uncertainty by the use of alternative scenario analysis and probabilistic modeling of the electrical system, which are standard industry practices. FPSC relied on FPL analyses that tested the validity of its overall forecast by analyzing the impact of alternative load forecasts (high, medium, and low). In addition, FPSC quantified uncertainty in the load forecast by evaluating the resource portfolios against variations in future sensitivities, such as fuel and construction costs, load forecasts, environmental laws and regulations, and risk. In doing so, FPL developed resource portfolios that quantify the long-term cost to customers under varying potential sensitivities while understanding the fundamental strengths and weaknesses of various resource configurations. Accordingly, the NRC staff determined the forecasting methodology relied upon by FPSC is responsive to forecasting uncertainty.

8.2 Determination of Demand

FPL performs demand forecasts to provide continuous service to its regulated service territory, meet its contractual commitments to wholesale customers, and contribute to the reliability of the

FRCC region. Forecasts are based on expected population growth and other economic factors. These analyses are contained in FPL's annual 10-Year Site Plan and became the basis for FPL's petition to the State of Florida for a Determination of Need for the proposed project. This process is governed by Section 403.519 of the Florida Statutes (Fla. Stat. 29-403.519-TN1057) and by Rule 25-22.080 of Florida Administrative Code (Fla. Admin. Code 25-22-TN1056). The FPSC reviewed FPL's petition for a Determination of Need, which was submitted in October 2007; and the resulting Final Order granting the petition was issued by the FPSC on April 11, 2008 (FPSC 2008-TN735).

8.2.1 Factors in the FPSC Determination of Need

This section discusses key factors affecting the future demand for electricity that FPSC considered in the issuance of its Determination of Need Final Order. The FPSC provides an independent review of the FPL forecasts and other assertions to draw its own conclusions regarding the FPL case that a need exists for both proposed units at the Turkey Point site. Each section below describes a specific factor FPSC considered in granting its Determination of Need.

8.2.1.1 Growth in Demand

The principal factor affecting the change in demand for electricity over time is the change in the number and type of customers needing that power. Electrical demand and energy usage in Florida are unique compared to other states because residential customers make up the largest part of the customer base, composing over 89 percent of Florida's electricity customers and consuming 52 percent of the total generating capacity available in the State. Because population projections are the key factor in determining the demand for electricity in Florida, FPL used population projections as one of its main independent variables. Therefore, FPL used population projections produced by the independent group IHS Global Insight to estimate growth in its customer base to develop its annual Ten-Year Power Plant Site Plan. FPL also applied standard State and national economic assumptions on growth that were produced by the IHS Global Insight. Florida's population surpassed 20 million people in 2015 and is forecasted to exceed 23 million by 2025 (FPL 2016-TN4579). FPL projected that summer peak demand will grow from 22,959 MW in 2015 to 26,572 MW in 2025 (FPL 2016-TN4579).

8.2.1.2 Electric System Reliability

One of the most important functions of an electricity generating unit is to contribute to the protection of the overall distribution system by producing more electricity than its service area demands. This approach is taken as a hedge against unforeseen emergencies that could disrupt the delivery of electricity. This excess production capacity is commonly called a "reserve margin," and FPL applies a 20 percent reserve margin to all of its demand projections (FPL 2014-TN4058). The FPSC reviewed FPL's assertion that, without the proposed action, FPL would be unable to maintain its minimum reserve margin planning requirement beginning in 2018. FPSC also reviewed FPL's assertion that with no growth in demand, there is a need for power solely from power plant retirements and expiration of purchase power agreements. The FPSC found no issue with the forecast assumptions, regression models, and projected system peak demands provided by FPL for this petition and affirmed FPL's reliance on the 20 percent

reserve margin. Table 8-2 presents FPL's reserve margin analysis used in FPL's petition to the State of Florida for a Determination of Need (FPSC 2008-TN735). FPL's current summer reserve margin forecast has changed as have the startup dates for Units 6 and 7. The current summer reserve margin forecast is shown in Table 8-2.

Table 8-2. FPL Summer Reserve Margin Forecast by Case (FPSC 2008-TN735**)**

	FPL Reserve Margin (%)		
Year	**w/ Units 6 and 7[(a)]**	**w/o Units 6 and 7[(a)]**	**No Growth, 2008−2012[(b)]**
2015	23.6	23.6	28.3
2016	20.6	20.6	19.3
2017	21.2	21.2	16.5
2018	22.9	18.6	13.9
2019	20.4	16.2	11.4
2020	21.9	13.7	8.8

(a) Includes previously certified nuclear uprates in 2012 and 2013 as well as new uncertified gas combined-cycle units in 2011, 2015, 2016, and 2017.
(b) Includes previously certified nuclear uprates in 2012 and 2013, but no new gas units.

8.2.1.3 Fuel Diversity

FPSC reviewed FPL's assertion that without the proposed action, nuclear power generation would decline to 16 percent of its portfolio by 2021 and cause FPL to rely on natural-gas power generation for up to 75 percent of its power generation. Under Section 403.519 of the Florida Statutes as amended (Fla. Stat. 29-403.519-TN1057), the FPSC is mandated to consider fuel diversity in its evaluation of electricity generation expansion plans. Section 403.519(4) (b) of the Florida Statutes (Fla. Stat. 29-403.519-TN1057) directs FPSC to account for reductions in the State's dependence on foreign natural gas and fuel oil. The FPSC concluded FPL demonstrated that the proposed action is needed to maintain a diverse fuel supply, reduce the State's dependence on natural gas, and provide a significant source of non-carbon-emitting baseload generation.

8.2.1.4 Baseload Capacity

The FPSC reviewed FPL's assertion that without the proposed action FPL would not meet its baseload needs and reduce carbon emissions because most renewable generation cannot provide baseload capacity. FPSC found that the addition of proposed Units 6 and 7 to the fleet would enable FPL to meet part of its baseload need without the use of more carbon-emitting generation. FPSC found that, by 2020, FPL's baseload needs are expected to increase by 6,000 MW, and even with substantial decreases in load forecasts or increases in DSM and renewable generation, the need for Units 6 and 7 would remain. The FPSC also found that the expected high capacity rates of Units 6 and 7 would represent a substantial addition of baseload capacity in the FPL system. Therefore, neither renewable generation resources nor DSM resources currently available or in the foreseeable future could provide enough baseload capacity to avoid or mitigate the need that would be met by the proposed action.

8.2.1.5 Adequate Electricity at a Reasonable Cost

The FPSC reviewed FPL's assertion that relative to fossil fuels, nuclear fuel will continue to be the most stable in price and lowest-cost fuel available to FPL. The FPSC found FPL's economic

assumptions and estimates of capital cost, transmission cost, and fuel price to be reasonable. These findings are based on FPSC's own analyses and on testimony from several expert witnesses (FPSC 2008-TN735).

The FPSC reviewed whether FPL included a reasonable level of environmental compliance costs associated with the proposed action. The FPSC found that because nuclear power generation is a non-carbon-emitting power-generation source, an increase in environmental compliance costs associated with expected carbon dioxide (CO_2) regulation would increase the overall cost-effectiveness of the proposed new units. Because these costs have not yet been imposed but are expected to be imposed by the time the proposed units become operational, conclusions are based on four independent assessments of potential CO_2 compliance costs.

8.2.1.6 Demand-Side Management and Renewable Energy Sources and Technologies

In its analysis of the Determination of Need for Turkey Point Units 6 and 7, the FPSC considered the availability of viable alternatives. Its findings relative to alternatives are presented here to fully characterize the FPSC's decision about the need for the new units. The NRC analysis of potential alternatives to Units 6 and 7 is documented in Chapter 9 of this EIS. Based on the record reported in its Final Order (FPSC 2008-TN735), the FPSC found that there are no renewable energy resources, technologies, DSM options, or other conservation measures reasonably available to FPL that could supply the need for 2,200 MW(e) of baseload power that Units 6 and 7 would provide. The record reflects the following observations by the FPSC:

- FPL has searched and continues to search for reliable renewable generation sources and technologies.
- FPL offers a wide range of residential and commercial DSM programs, such as load management, building envelope, lighting, and air-conditioning programs.
- Although FPL's load forecast assumes the addition of 144 MW of renewable firm capacity to its portfolio and the extension of 143 MW of renewable firm capacity from expiring municipal waste-to-energy contracts, additional capacity still would be needed to meet the need for baseload generation.
- FPL's DSM programs through 2009 resulted in summer peak reduction of 4,257 MW and energy savings of 51,055 GWh at the generator. In 2004, FPL received approval for 802 MW (at the generator) of additional DSM from 2006 to 2014. By 2020, an additional 1,899 MW (at the generator) of additional summer demand reduction is expected (FPL 2014-TN4058).

8.2.1.7 Most Cost-Effective Source of Power

In accordance with Section 403.519(4) of the Florida Statutes (Fla. Stat. 29-403.519-TN1057), the FPSC reviewed FPL's assertion that the proposed action would provide the most cost-effective source of power. The FPSC found the breadth of planning scenarios that FPL analyzed, including 18 different fuel-cost and/or environmental-cost scenarios, provided a reasonable basis for considering the question of cost-effectiveness. These scenarios included nine different fuel-cost forecasts (low, medium, and high) and environmental-cost projections.

Subsequent FPSC reviews showed the proposed action to be cost-effective in 17 of the 18 scenarios. None of the FPL scenarios included potential Federal incentives that, if considered, would serve to increase the cost-effectiveness in all cases.

Because cost savings were projected from seven of the eight plausible projection cases identified, the FPSC concluded it is highly likely that FPL rate payers would realize net benefits over the life of the proposed new units. It found that the proposed action is projected to result in nearly $1 billion in fuel-cost savings beginning in 2021 and about $94 billion over the life of the permits when compared to reasonable combined-cycle alternatives. According to the FPSC, because nuclear generation is considered a "non-emitting" technology for greenhouse gas emissions, the higher the CO_2-compliance costs imposed on other technologies, the more cost-effective the proposed action becomes.

The FPSC also recognized the role of uncertainty with long lead-time projects such as nuclear power generation, as well as the Florida provisions for early cost recovery through rate increases. As a result, the FPSC recommends that FPL continue to pursue joint ownership opportunities as a means to mitigate rate impacts. Therefore, as part of annual cost-recovery proceedings ordered by the FPSC, FPL must provide updates on its progress in this regard. As part of the annual cost-recovery proceedings, FPL must provide the FPSC with updated fuel forecasts, environmental forecasts, non-binding capital cost estimates, and an accounting of sunk costs. The FPSC then will consider each year's new information and determine the feasibility of continued construction of the proposed Turkey Point Units 6 and 7.

8.2.2 FPL's Demand for Electricity

This section reproduces the expected demand for electricity (Table 8-3) developed by FPL for the ER's Chapter 8, Need for Power. The forecasted values for 2016 through 2025 in Table 8-3 are taken from FPL's Ten-Year Plan (FPL 2016-TN4579). Values from 2026 through 2031 (three years after startup of the last unit) were derived using the growth rate from 2021 through 2025.

8.3 Determination of Supply

The FPSC reported in its 2008 Determination of Need that in 2006, FPL's generation capacity profile in Florida was approximately as follows: 18 percent coal generated, 50 percent natural-gas generated, and 21 percent nuclear generated (FPSC 2008-TN735).

For its power-supply and capacity forecasts, FPL considered its present and planned generating capabilities (including planned uprates, closures of facilities, and additional new power-generation facilities), present and planned purchases of power from generators outside the service territory, and its sales of power to consumers outside the service territory.

FPL is expected to fall below the 20 percent summer reserve margin requirement in 2029. In 2028 the generation-only reserve margin would drop below the 10 percent requirement to 9.7 percent. Table 8-4 below shows the forecasted capacities and reserve margins from 2016 through 2031 (FPL 2016-TN4579). The forecasted values for 2016 through 2025 in Table 8-4 are taken from FPL's Ten-Year Plan (FPL 2016-TN4579). Values from 2026 through 2031 were derived using the growth rate from 2021 through 2025 or, in the case of other public authorities, railroads, and railways, values were held constant. In the case of street and highway lighting 10 GW were added each year in keeping with the trend in the FPL Ten-Year Plan.

Table 8-3. Forecasted Energy Consumption, Capacity, and Peak Demand

	Residential (GWh)	Commercial (GWh)	Industrial (GWh)	Railroads and Railways (GWh)	Street and Highway Lighting (GWh)	Other Public Authorities (GWh)	Total Sales (GWh)	Sales for Resale (GWh)	Utility Use and Losses (GWh)	Net Energy for Load (GWh)
2016	57,282	46,420	3,173	91	478	23	107,467	6,524	5,730	119,614
2017	57,100	46,424	3,255	91	488	23	107,382	5,988	5,606	118,821
2018	57,493	46,616	3,319	91	499	23	108,041	6,013	5,702	119,552
2019	57,889	46,822	3,368	91	509	23	108,703	6,084	5,735	120,266
2020	58,627	47,245	3,407	91	519	23	109,913	6,156	5,814	121,574
2021	59,108	47,485	3,438	91	529	23	110,674	5,651	5,811	121,771
2022	59,557	47,687	3,461	91	539	23	111,359	5,202	5,817	121,954
2023	60,033	47,930	3,479	91	549	23	112,106	5,278	5,857	122,756
2024	60,524	48,235	3,492	91	559	23	112,924	5,354	5,894	123,625
2025	61,034	48,454	3,501	91	569	23	113,673	5,432	5,957	124,452
2026	61,525	48,699	3,517	91	579	23	114,434	5,379	5,994	125,131
2027	62,020	48,946	3,533	91	589	23	115,202	5,326	6,031	125,815
2028	62,520	49,194	3,549	91	599	23	115,975	5,273	6,069	126,501
2029	63,023	49,443	3,565	91	609	23	116,754	5,221	6,107	127,192
2030	63,530	49,693	3,581	91	619	23	117,537	5,170	6,145	127,886
2031	64,041	49,945	3,598	91	629	23	118,327	5,119	6,183	128,585

Source: FPL 2016-TN4579

Table 8-4. Forecasted Capacities and Reserve Margins during the Summer Peak Period

August of the Year	Projections of FPL Unit Capacity (MW)	Projections of Firm Purchases (MW)	Projection of Total Capacity (MW)	Peak Load Forecast (MW)	Summer DSM Forecast (MW)	Forecast of Firm Peak (MW)	Forecast of Summer Reserves (MW)	Forecast of Summer Reserve Margins (%)	Forecast of Generation-Only Summer Reserves (MW)	Forecast of Generation-Only Summer Reserve Margins (%)
2016	26,513	726	27,238	24,170	1,842	22,327	4,911	22.0	3,068	12.7
2017	26,003	879	26,882	24,336	1,935	22,401	4,481	20.0	2,546	10.5
2018	25,984	1150	27,134	24,606	1,995	22,611	4,522	20.0	2,528	10.3
2019	27,657	826	28,482	24,893	2,041	22,852	5,630	24.6	3,589	14.4
2020	27,812	444	28,256	25,206	2,088	23,117	5,138	22.2	3,050	12.1
2021	27,899	624	28,523	25,316	2,136	23,180	5,343	23.0	3,207	12.7
2022	27,984	624	28,608	25,540	2,185	23,355	5,252	22.5	3,068	12.0
2023	27,983	624	28,607	25,833	2,234	23,599	5,008	21.2	2,774	10.7
2024	29,605	624	30,228	26,180	2,284	23,896	6,332	26.5	4,048	15.5
2025	29,604	624	30,227	26,572	2,334	24,238	5,989	24.7	3,655	13.8
2026	29,604	624	30,228	26,896	2,387	24,510	5,718	23.3	3,332	12.4
2027	29,604	624	30,228	27,223	2,440	24,785	5,443	22.0	3,005	11.0
2028	29,604	624	30,228	27,555	2,495	25,063	5,165	20.6	2,673	9.7
2029	29,604	624	30,228	27,890	2,552	25,344	4,884	19.3	2,338	8.4
2030	29,604	624	30,228	28,230	2,609	25,629	4,599	17.9	1,998	7.1
2031	29,604	624	30,228	28,574	2,668	25,916	4,312	16.6	1,654	5.8

Source: FPL 2016-TN4579

8.4 Conclusions

As stated in Section 8.0, the NRC acknowledges the primacy of states to assess and regulate their own power needs. The State of Florida has officially determined that there is a need for about 6,000 MW (e) of additional baseload electricity generation by 2020. Further, the State has determined that, for many reasons, the need should be filled by the proposed action of constructing and operating Turkey Point Units 6 and 7. The FPSC granted FPL a Determination of Need for Units 6 and 7 in April of 2008. The NRC staff outlined in Section 8.1 how the FPSC process was (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. Because its review process met the NRC's four criteria for reliability, the NRC staff finds no reason to challenge the FPSC conclusions. Consequently, the NRC staff finds the applicant's need for power conclusions to be reasonable and establishes a positive need for power for the proposed Turkey Point Units 6 and 7.

9.0 Environmental Impacts of Alternatives

This chapter describes alternatives to the proposed U.S. Nuclear Regulatory Commission (NRC) action for a combined construction permit and operating license (combined license or COL) and the U.S. Army Corps of Engineers' (USACE's) action for a Department of the Army (DA) permit and discusses the environmental impacts of those alternatives. Section 9.1 discusses the no-action alternative. Section 9.2 addresses alternative energy sources. Section 9.3 reviews the region of interest (ROI) evaluated in the site-selection process, the Florida Power & Light Company (FPL) site-selection process, details specific to each one of the respective alternative sites, and summarizes and compares the cumulative environmental impacts for the proposed and alternative sites. Section 9.4 examines plant design alternatives.

The need to compare the proposed action with alternatives arises from the requirement in Section 102(2)(c)(iii) of the National Environmental Policy Act of 1969, as amended (NEPA) (42 U.S.C. § 4321 et seq.) (TN661), that environmental impact statements (EISs) include an analysis of alternatives to the proposed action. The NRC implements this requirement through its regulations in Title 10 of the *Code of Federal Regulations* (CFR) Part 51 (TN250) and its Environmental Standard Review Plan (ESRP) (NRC 2000-TN614). The environmental impacts of the alternatives are evaluated using the NRC's three-level standard of significance—SMALL, MODERATE, or LARGE—developed using Council on Environmental Quality (CEQ) guidelines (40 CFR 1508.27) (TN428) and set forth in the footnotes to Table B-1 of 10 CFR Part 51 (TN250), Subpart A, Appendix B. The issues evaluated in this chapter are the same as those addressed in the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*, NUREG–1437, Volumes 1, 2, and 3 (NRC 2013-TN2654). Although NUREG–1437 was developed for license renewal, it provides useful information for the review of new reactors, and is referenced where appropriate throughout this chapter. Additional guidance on conducting environmental reviews is provided in *Interim Staff Guidance on Environmental Issues Associated with New Reactors* (NRC 2014-TN3767).

As part of the evaluation of permit applications subject to Section 404 of the Clean Water Act, the USACE is required by regulation to apply the criteria set forth in the joint U.S. Environmental Protection Agency (EPA) and USACE CWA Section 404(b)(1) guidelines (40 CFR Part 230) (TN427) (hereinafter "404 (b)(1) Guidelines"). These guidelines establish criteria that must be met for the proposed activities to be permitted pursuant to Section 404, which governs specification of disposal sites for dredged or fill material. Specifically, the 404(b)(1) Guidelines state, in part, that no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge that would have less adverse impacts on the aquatic ecosystem provided the alternative does not have other significant adverse consequences. An area not presently owned by the applicant that could reasonably be obtained, used, expanded, or managed to fulfill the basic purpose of the proposed activity may be considered if it is otherwise a practicable alternative. The USACE will conclude its Clean Water Act Section 404(b)(1) Guidelines and public interest analyses in its Record of Decision.

9.1 No-Action Alternative

For the purposes of an application for a COL, the no-action alternative refers to a scenario in which the NRC would deny the COLs requested by FPL, which would result in the proposed Units 6 and 7 not being built. The USACE no-action alternative is one that results in no construction requiring a DA permit. This could be accomplished by the applicant minimizing project impacts so that all work under the jurisdiction of USACE is eliminated or by USACE denying the DA permit application. Upon receiving such a denial by the NRC or the USACE, the construction and operation of two new nuclear units at the Turkey Point Nuclear Power Plant (Turkey Point) site in accordance with 10 CFR Part 52 (TN251) would not occur and the predicted environmental impacts associated with the project would not occur. Some preconstruction impacts associated with activities not within the NRC's definition of construction at 10 CFR 50.10(a) (TN249) and 10 CFR 51.4 (TN250) may occur nonetheless. However, no activities, including preconstruction activities, involving the discharge of dredged or fill materials into waters of the United States or work in navigable waters of the Unites States, could occur without a DA permit from the USACE.

If no other power plants were to be built in lieu of the proposed project or other strategy implemented to take its place, the benefits of the additional electrical capacity and electricity generation to be provided by the project would not occur. If no additional measures (e.g., conservation, importing power, restarting retired power plants, and/or extending the life of existing power plants) were implemented to realize the amount of electrical capacity that would otherwise be required for power in FPL's ROI (see Section 9.3.1), then the need for baseload power, discussed in Chapter 8, would not be met. Therefore, the purpose and need of this project would not be satisfied if the no-action alternative was chosen and the need for power was not met by other means.

If other generation sources were installed, either at another site or using a different energy source, the environmental impacts associated with these other sources would eventually occur. As discussed in Chapter 8, there is a demonstrated need for power and FPL has regulatory responsibilities in Florida to provide electrical service in its service area. It is reasonable to assume that other options to meet the need for power would be pursued. This needed power may be provided and supported through several alternatives that are discussed in Sections 9.2 and 9.3.

9.2 Energy Alternatives

The purpose and need for the proposed project identified in Section 1.3 is to provide additional baseload electrical generation capacity for use in FPL's current markets. This section examines the potential environmental impacts associated with alternatives to construction of a new baseload nuclear power plant. Section 9.2.1 discusses energy alternatives not requiring new generating capacity. Section 9.2.2 discusses energy alternatives requiring new generating capacity. Other alternatives are discussed in Section 9.2.3. A combination of alternatives is discussed in Section 9.2.4. Section 9.2.5 compares the environmental impacts from new nuclear, coal-fired, and natural-gas−fired generating units and a combination of energy sources at the Turkey Point site.

For analysis of energy alternatives, FPL assumed a bounding target value of 2,200 MW(e) net electrical output (FPL 2014-TN4058). The NRC staff also used this level of output in its analysis of energy alternatives.

The review team's analysis is based on in-service dates of 2027 for Unit 6 and of 2028 for Unit 7 based on FPL's COL Revision 7 (FPL 2015-TN4502). Even if the actual in-service date were to slip by a few years, the NRC staff would not expect such a change to affect the overall conclusions regarding energy alternatives for two reasons. First, the projections by FPL and by the U.S. Department of Energy, Energy Information Administration (DOE/EIA) that the NRC staff has used in its analyses do not change appreciably in the later years and are generally consistent with the data used for 2028. Second, the environmental impacts of the feasible alternatives are not likely to change appreciably, so the NRC staff's conclusions regarding environmental preferability are unlikely to change.

9.2.1 Alternatives Not Requiring New Generating Capacity

Four alternatives to the proposed action that do not require FPL to construct new generating capacity are as follows:

- Purchase the needed electric power from other suppliers.
- Extend the operating life of existing power plants.
- Reactivate retired power plants.
- Implement conservation or demand-side management programs.

9.2.1.1 Purchased Power

If power to replace the capacity of the proposed new nuclear units was to be purchased from sources within the United States or from a foreign country, the generating technology likely would be one of those described in NUREG–1437 (e.g., coal, natural gas, or nuclear) (NRC 2013-TN2654). The environmental impacts of other technologies described in the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*, (NUREG–1437) are representative of the impacts associated with the construction and operation of new generating units at the Turkey Point site. The environmental impacts of coal-fired and natural-gas−fired plants are discussed in Sections 9.2.2.1 and 9.2.2.2, respectively.

Under the purchased power alternative, the environmental impacts of power production would still occur, but they would occur elsewhere in the region or nation. If the purchased power alternative was to be implemented, the most significant environmental unknown would be whether new transmission line corridors would be required. The construction of new transmission lines could have both environmental and aesthetic consequences, particularly if new transmission lines require new corridors (as opposed to collocating new lines with existing lines in existing corridors). The review team concludes that the local environmental impacts from purchased power would be SMALL when existing transmission line corridors are used and could range from SMALL to LARGE if acquisition of new corridors is required. The overall environmental impacts of power generation would depend on the generation technology and location of the generation site and, therefore, are unknown. However, as discussed in Section 9.2.5, the NRC staff concluded that from an environmental perspective, none of the viable

energy alternatives would be clearly preferable to construction of a new baseload nuclear power-generation plant located within FPL's ROI.

9.2.1.2 Reactivating Retired Power Plants or Extending Operating Life

In its Environmental Report (ER) (FPL 2014-TN4058), FPL acknowledged that reactivating or extending the service life of existing plants or extending their capacity through power uprates or other efficiency improvements could theoretically reduce the need for a new nuclear power station. FPL also noted in the 2014 Ten-Year Plan (FPL 2014-TN3360) that it has completed power uprates at FPL's four existing nuclear units (Turkey Point Units 3 and 4 and St. Lucie Units 1 and 2). The capacity uprates have added approximately 520 MW of capacity to FPL's system. In addition, FPL has already received renewed licenses for all of its existing nuclear units that extend the licenses through 2032 to 2043 (depending on the unit). Because extending the service life of these nuclear plants and constructing the proposed Turkey Point Units 6 and 7 are both already considered as part of FPL's future baseload generation capacity, the NRC staff concludes that extending the service life of the existing nuclear plants alone is not a feasible alternative to the proposed Turkey Point Units 6 and 7.

Another potential strategy is repowering one or more of FPL's existing generating plants. Repowering involves modifying a plant to use a different fuel source. In its ER, FPL described plans that were approved by the Florida Public Service Commission (FPSC) in September 2008 and were incorporated in FPL's recent Integrated Resource Plan to repower two existing generating plants, Cape Canaveral and Riviera Beach, each of which consists of two older fossil-fuel−fired steam-generating units that will be converted into new highly efficient natural-gas combined-cycle units. The two-unit plant at FPL's Cape Canaveral site has been replaced with a new combined-cycle plant that has an output of approximately 1,210 MW. This new unit is called the Cape Canaveral Next-Generation Clean Energy Center. The two-unit plant at FPL's Riviera site has also been replaced by a new combined-cycle plant that has an output of approximately 1,210 MW. In its 2016 Ten-Year Plan, FPL noted that the old units at Port Everglades were also replaced, and FPL will add another highly fuel-efficient combined-cycle unit in Okeechobee County in 2019 (FPL 2016-TN4579).

Older existing fossil-fueled plants, predominately coal-fired and natural-gas−fired plants, are likely to need refurbishing to extend plant life for an extended period (the proposed action assumes a minimum operating period of 40 years), and meeting current environmental requirements would also be costly. Such plants would typically be old enough that the refurbished plants would likely be viewed as new sources, subject to the current-day complement of regulatory controls on air emissions and waste management. In the ER of its COL application, FPL identified some deactivated generators within its service area (FPL 2014-TN4058). None of these retired units individually would be able to meet the proposed 2,200 MW(e) output of the Units 6 and 7. The review team also concluded that it is unlikely that a combination of retired units could be developed to meet this demand and successfully meet applicable environmental requirements. In addition, FPL's 2016 Ten-Year Plan no longer considers reactivation of these older units (FPL 2016-TN4579).

Retired generating plants, predominately coal-fired and natural-gas−fired plants that potentially could be reactivated, would ordinarily require extensive refurbishment prior to reactivation.

Such vintage plants would typically require costly refurbishment to meet current environmental requirements. The environmental impacts of any reactivation scenario would be bounded by the impacts associated with coal-fired and natural-gas−fired alternatives (Section 9.2.2), which the NRC staff concludes are not environmentally preferable to the proposed actions (Section 9.2.5). Given both these refurbishment costs and the environmental impacts of operating such facilities, the NRC staff concludes that reactivating retired generating plants would not be a reasonable alternative to the proposed action.

9.2.1.3 Energy Efficiency and Demand-Side Management

Improved energy efficiency and demand-side management (DSM) strategies can potentially cost less than construction of new generation and provide a hedge against market, fuel, and environmental risks. The FPSC approved FPL's current DSM plan in an Order dated August 16, 2011 (FPSC 2011-TN1357), as confirmed in an Order dated December 22, 2011 (FPSC 2011-TN1358). See docket 100155-EG on the FPSC website for more details. In approving the FPL plan, the FPSC determined that two other plans that would have increased DSM would be too costly to the FPL customers. On April 2, 2014, FPL submitted an updated DSM Plan to the FPSC for its review (see docket 130199). New DSM goals for FPL for the 2015 through 2024 time period were set by the FPSC in December 2014. FPL accounts for these DSM goals in its planning process and extends the annual level of DSM beyond the year 2024 (FPL 2016-TN4579).

The need-for-power discussion in Chapter 8 takes planned energy efficiency and DSM programs into account. The NRC staff concluded in Chapter 8 that there is a justified need for power in the FPL service territory even with the implementation of conservation and DSM programs. The NRC staff concludes that improved energy efficiency and DSM programs would not be a reasonable alternative to the proposed action.

9.2.1.4 Summary Statement Regarding Alternatives Not Requiring New Generating Capacity

Based on the preceding discussion, the NRC staff concludes that the options of purchasing electric power from other suppliers, reactivating retired power plants, extending the operating life of existing power plants, and energy efficiency and DSM programs are not reasonable alternatives to providing new baseload power-generation capacity.

9.2.2 Alternatives Requiring New Generating Capacity

Consistent with the NRC's evaluation of alternatives to operating license renewal for nuclear power plants, a reasonable set of energy alternatives to the building and operation of two new nuclear units at the Turkey Point site should be limited to analysis of discrete power-generation sources, a combination of sources, and those power-generation technologies that are technically reasonable and commercially viable (NRC 2013-TN2654). The current mix of baseload power-generation options in Florida is one indicator of the feasible choices for power-generation technology within the state. The electricity produced in Florida in 2014 came mainly from coal (22.6 percent), natural gas (60.9 percent), and nuclear energy (12.1 percent) (DOE/EIA 2016-TN4584). The balance came from renewable energy (2.3 percent, including hydropower) and miscellaneous sources (2.1 percent).

This section discusses the environmental impacts of energy alternatives to the proposed action that would require FPL to construct new generating capacity. The three primary energy sources for generating electric power in the United States are coal, natural gas, and nuclear energy (DOE/EIA 2016-TN4620, Table 8). Natural-gas combined-cycle power-generation plants are often used as intermediate generation sources, but they are also used as baseload generation sources (SSI 2010-TN1405).

Each year, the EIA, a component of the DOE, issues an Annual Energy Outlook. In its updated Annual Energy Outlook 2016, the EIA's reference case projects that total electric generating capacity additions between 2015 and 2040 will add 483 GW of new generating capacity using the following fuels (in GW and the approximate percentages of the total increase): natural gas[(1)] (171 GW/35 percent), renewables (302 GW/63 percent), nuclear (4 GW/1 percent), and coal (1 GW/2 percent) (DOE/EIA 2016-TN4621, Table 9). DOE/EIA also predicts that total coal capacity will decrease by 99 GW by 2040 (DOE/EIA 2016-TN4621, Table 9). The EIA projection includes baseload, intermittent, and peaking units and is based on the assumption that providers of new generating capacity would seek to minimize cost while meeting applicable environmental requirements.

The discussion in Section 9.2.2 is limited to a reasonable range of the individual energy alternatives that appear to be viable for new baseload generation: coal-fired and natural-gas combined-cycle generation. The impacts discussed in Section 9.2.2 are estimates based on present technology. Section 9.2.3 addresses alternative generation technologies that have demonstrated commercial acceptance but may be limited in application, total capacity, or technical feasibility when based on the need to supply reliable, baseload capacity.

The review team assumed that (1) new generation capacity would be located at the Turkey Point site for the coal- and natural-gas−fired alternatives,[(2)] (2) the cooling approach planned for proposed Units 6 and 7 (Section 3.2.2.2) would be used for plant cooling, and (3) two new 500 kV circuits and three new 230 kV circuits would be built to serve a new coal- or natural-gas−fired plant sited at the Turkey Point site, consistent with the FPL proposal for Units 6 and 7 (FPL 2014-TN4058).

9.2.2.1 Coal-Fired Power Generation

For the coal-fired generation alternative, the NRC staff assumed construction of four pulverized-coal−fired units, each with a total net capacity of 550 MW(e). The team's estimates of coal consumption, coal-combustion technology, air emissions, and waste products are based on the EPA's Compilation of Air Pollutant Emission Factors document (EPA AP-42), Section 1.1, Bituminous and Subbituminous Coal Combustion (EPA 2011-TN1088). The NRC staff also assumed that additional transmission line corridors would be acquired, as discussed in Section 2.2.2. The plant was assumed to have an operating life of 40 years. Because FPL assumed a

(1) This includes the projections for "combined cycle," "combustion turbine/diesel," and "distributed generation (natural gas)."

(2) The land needed for the coal alternative might exceed the land available at the site. The applicant might choose to locate the plant elsewhere or dispose of coal-combustion products in an offsite location in such a case. However, for the purposes of this analysis the review team assumed all facilities would be at the Turkey Point site.

pulverized-coal−fired alternative would consist of three boiler units, each with a net capacity of 728.4 MW (FPL 2014-TN4058), the NRC staff compared its analyses to FPL's COL application and found the results to be consistent.

Because the nearest rail line is 11 mi by road from the Turkey Point site (FPL 2014-TN4058), the rail line would have to be extended to the site or coal deliveries would have to be accomplished by barge. In its ER, FPL assumed that coal would be delivered to the site by barge, in the same way that fuel oil had been delivered previously for Units 1 and 2 (FPL 2014-TN4058). The NRC staff used this assumption in its analysis.

The NRC staff also considered integrated gasification combined-cycle (IGCC) coal-fired plants. IGCC is an emerging technology for generating electricity with coal that combines modern coal gasification technology with both gas turbine and steam turbine power generation. The technology is cleaner than conventional pulverized-coal plants because major pollutants can be removed from the gas stream before combustion. The IGCC alternative also generates less solid waste than the pulverized-coal−fired alternative. The largest solid-waste stream produced by IGCC installations is slag—a black, glassy, sand-like material that is potentially a marketable byproduct. The other large-volume byproduct produced by IGCC plants is gypsum, which is produced when sulfur is extracted during the gasification process, and it can be marketed rather than placed in a landfill. IGCC units do not produce ash or scrubber wastes. In spite of the preceding advantages, the NRC staff concludes that, at present, a new IGCC plant is not a reasonable alternative to a 2,200 MW(e) nuclear power-generation facility for the following reasons: (1) IGCC plants are more expensive than comparable pulverized-coal plants (NETL 2010-TN1423), (2) the existing IGCC plants in the United States have considerably smaller plant capacity than the proposed 2,200 MW(e) nuclear plant,[3] (3) system reliability of existing IGCC plants has been lower than that of pulverized-coal plants, and (4) a lack of overall plant performance warranties for IGCC plants has hindered commercial financing (NPCC 2005-TN1406). For these reasons, IGCC plants are not considered further in this EIS.

Therefore, for the coal-fired alternative, the NRC staff assumed that coal and limestone (calcium carbonate) would be delivered to the plant by barge (FPL 2014-TN4058). The NRC staff estimates that the plant would consume 6.55 million T/yr of pulverized bituminous coal with an ash content of approximately 10.3 percent (DOE/EIA 2009-TN1415). Slaked lime or limestone, used in the flue-gas scrubbing process for control of sulfur dioxide (SO_2) emissions, is injected as slurry into the hot effluent combustion gases to remove entrained SO_2. The limestone-based scrubbing solution reacts with SO_2 to form calcium sulfite (a food additive) or calcium sulfate (gypsum), which precipitates and is removed from the process as sludge for dewatering and then sold to industry for use in the manufacture of wallboard or other industrial products. The NRC staff estimates that approximately 450,000 T/yr of limestone, which could come from local sources, would be used for flue-gas desulfurization, generating approximately 700,000 T/yr of marketable scrubber sludge.

(3) The review team is aware that Duke Energy placed a 618 MW(e) IGCC plant into service in June 2013 (Duke 2013-TN2662) and that Mississippi Power is building an IGCC plant in Kemper County, Mississippi, with an output of 582 MW(e) (MPC 2014-TN3776).

Air Quality

The impacts on air quality from coal-fired generation would vary considerably from those of nuclear power generation because of emissions of SO_2, nitrogen oxides (NO_x), carbon monoxide (CO), particulate matter (PM), volatile organic compounds, and hazardous air pollutants such as mercury and lead. The NRC staff estimates that a 2,200 MW(e) coal-fired plant would also have unregulated carbon dioxide (CO_2) emissions of 18.7 million T/yr that could affect climate change (EPA 2011-TN1088).

The coal-fired plant emissions were determined based on factors contained in EPA AP-42 (EPA 2011-TN1088). The estimates of emissions are based on "as fired" and controlled conditions using both combustion and post-combustion technologies to reduce criteria pollutants to maintain local and regional attainment status for the criteria pollutants listed below. Emissions estimates are not necessarily representative of what would be permitted.

A final air permit would likely require applicable Best Available Control Technologies (BACTs). The NRC staff's estimates of the emissions from the coal-fired generation alternative are approximately as follows(4) (PM_{10} is particulate matter with an aerodynamic diameter equal to or less than 10 microns (40 CFR 50.6) (TN1089):

- SO_2 – 7,469 T/yr
- NO_x – 1,638 T/yr
- CO – 1,638 T/yr
- PM – 147 T/yr
- PM_{10} – 34 T/yr(5)
- $PM_{2.5}$ – 20 T/yr
- Mercury – 0.085 T/yr.

The acid rain requirements of the Clean Air Act, as amended (42 U.S.C. § 7401 et seq.) (TN1141) capped the nation's SO_2 emissions from power plants. FPL would need to obtain sufficient pollution credits either from a set-aside pool or purchases on the open market to cover annual emissions from the plant.

Historically, CO_2, an unavoidable byproduct of combustion of carbonaceous fuels, has not been regulated as a pollutant. However, regulations are now under development for CO_2 and other greenhouse gases (GHGs). In response to the Consolidated Appropriations Act of 2008 (Public Law 110-161) (TN1485), the EPA promulgated final mandatory GHG reporting regulations in October 2009, effective in December 2009 (74 FR 56260) (TN1024) (see also http://www.epa.gov/climatechange/emissions/ghgrulemaking.html [EPA 2012-TN1670]). The rules are applicable to major sources of CO_2 (those emitting more than 25,000 T/yr). New utility-scale coal-fired power plants would be subject to those regulations.

(4) Based on 6,552,000 T/yr of bituminous coal and controlled using overfire air in combination with low-NO_x burners and selective catalytic reduction, limestone-based flue-gas desulfurization, and conventional particulate capture technology (EPA 2011-TN1088).

(5) The value for PM_{10} includes particles of smaller diameter, such as $PM_{2.5}$.

The coal-fired alternative plant would qualify as a major generator of GHGs under the "Tailoring Rule" promulgated by the EPA (75 FR 31514) (TN1404). Beginning January 2, 2011, permits issued to major sources of GHGs under the Prevention of Significant Deterioration (PSD) or Title V Federal permit programs must contain provisions requiring the use of BACTs to limit the emissions of GHGs if those sources would be subject to PSD or Title V permitting requirements because of their non-GHG pollutant emission potentials and if their estimated GHG emissions are at least 75,000 T/yr of CO_2 equivalents (CO_2e). The amount of CO_2 released per unit of power produced would depend on the quality of the fuel and the firing conditions and overall firing efficiency of the boiler. Meeting permit limitations for GHG emissions may require installation of carbon capture and sequestration devices on any new coal-fired power plant, which could add substantial power penalties. On October 23, 2015, the EPA published its final rule for new source performance standards to limit CO_2 emissions from new coal-fired power plants (80 FR 64509-TN4388). However, even with the application of this new standard, emissions from a coal-fired power plant would still be far greater than those from a comparably sized nuclear power plant. The relative efficiency penalty for adding CO_2 capture ranges from 21 to 29 percent on average, meaning that a new coal plant would have to be much larger than 2,200 MW(e) to provide a comparable amount of power to proposed Units 6 and 7 (NETL 2010-TN1423). In addition, once extracted the CO_2 would have to be piped either to a permanent sequestration site, or for use in enhanced oil recovery. Regardless of end use, the construction of a CO_2 pipeline would have the potential to increase the impacts on resources such as, but not limited to, terrestrial and aquatic ecology, socioeconomics, and cultural and historic resources. Because the exact location of such sequestration is beyond the scope of this analysis the magnitude of the impacts could not be quantified by the NRC staff. The NRC staff concludes that the cumulative impacts of construction of both a coal-fired power plant and a CO_2 pipeline could increase the level of impacts. For example, SMALL ecological impacts from a coal plant alone may become MODERATE when combined with those of a CO_2 pipeline.

A new coal-fired power-generation plant at the Turkey Point site would need a PSD permit and an operating permit under the Clean Air Act. The plant would need to comply with the new source performance standards for such plants in 40 CFR Part 60 (TN1020), Subpart Da. The standards establish emission limits for PM and opacity (40 CFR 60.42Da), SO_2 (40 CFR 60.43Da), NO_x (40 CFR 60.44Da), and mercury (40 CFR 60.45Da) (TN1020). EPA determined that coal-fired and oil-fired electric utility steam-generating units are significant emitters of the following hazardous air pollutants (HAPs): arsenic, beryllium, cadmium, chromium, dioxins, hydrogen chloride, hydrogen fluoride, lead, manganese, and mercury (65 FR 79825) (TN2536). The EPA concluded that mercury is the HAP of greatest concern and that (1) a link exists between coal combustion and mercury emissions, (2) electric utility steam-generating units are the largest domestic source of mercury emissions, and (3) certain segments of the U.S. population (e.g., the developing fetus and subsistence fish-eating populations) are believed to be at potential risk of adverse health effects resulting from mercury exposures caused by the consumption of contaminated fish (65 FR 79825) (TN2536). On March 28, 2013, the EPA finalized updates to emission standards, including mercury, for power plants under the Mercury and Air Toxics Standards (EPA 2013-TN2537). This rule became effective April 24, 2013 (78 FR 24073) (TN3051). However, the NRC staff recognizes that the environmental impacts of air emissions from the coal-fired plant would be significantly greater than those from a proposed

nuclear power plant at the Turkey Point site, even after application of any new mercury emissions standards.

The NRC staff assumes that fugitive dust emissions from construction activities would be mitigated using Best Management Practices (BMPs), similar to mitigation discussed in Chapter 4 for proposed Turkey Points Units 6 and 7. Such emissions would be limited to the construction period.

The EPA has various regulatory requirements for visibility protection in 40 CFR Part 51 (TN1090), Subpart P, including a specific requirement for review of any new major stationary source in an area designated as in attainment or unclassified for criteria pollutants under the Clean Air Act (40 CFR 51.307(a)) (TN1090). The entire State of Florida is designated as in attainment or unclassified for all criteria pollutants except for Hillsborough County, which is classified as nonattainment for lead (EPA 2012-TN1245), and two small portions of Nassau County and Hillsbourough County, which are classified as nonattainment for 1-hour sulfur dioxide (EPA 2015-TN4515). National Ambient Air Quality Standards for criteria pollutants are in 40 CFR Part 50 (TN1089). Section 169A of the Clean Air Act (42 U.S.C. § 7401 et seq.) (TN1141) establishes a national goal of preventing future impairment of visibility and remedying existing impairment in mandatory Class I Federal areas when impairment is from air pollution caused by human activities. In addition, EPA regulations provide that for each mandatory Class I Federal area located within a state, the State must establish goals that provide for reasonable progress toward achieving natural visibility conditions. The reasonable progress goals must provide for an improvement in visibility on the most-impaired days over the period of the implementation plan and make sure there is no degradation in visibility for the least-impaired days over the same period (40 CFR 51.308(d)(1)) (TN1090). If a new coal-fired power plant was located close to a mandatory Class I or II area, additional air-pollution control requirements could be imposed. There are three mandatory Class I Federal areas in Florida (FPL 2014-TN4058):

- Chassahowitzka Wilderness Area – >250 mi northwest of the Turkey Point site
- St. Marks Wilderness Area – >250 mi northwest of the Turkey Point site
- Everglades National Park – 13 mi west of the Turkey Point site.

Of these, only Everglades National Park is close enough to the Turkey Point site to be potentially affected by air emissions from the site due to the close proximity and prevailing wind directions.

Florida is one of 27 states whose stationary sources of criteria pollutants would have been subject to revised emission limits for SO_2 and NO_x under the Cross-State Air Pollution Rule (CSAPR). Florida stationary sources of SO_2 and NO_x are subject to this rule, as well as complementary regulatory controls developed at the State level (http://www.epa.gov/cair/index.html). On July 6, 2011, the EPA announced the finalization of the CSAPR, (previously referred to as the Transport Rule) (EPA 2011-TN3962) as a response to previous court decisions and as a replacement of the EPA's 2005 Clean Air Interstate Rule. CSAPR took effect on January 1, 2015, for SO_2 and annual NO_x, and on May 1, 2015, for ozone season NO_x (EPA 2015-TN4307). Fossil-fuel power plants in Florida would be subject to the CSAPR and would be required to reduce emissions of SO_2 and NO_x to help reduce downwind ambient concentrations of fine particulates ($PM_{2.5}$) and ozone. However, the NRC staff

recognizes that the environmental impacts of air emissions from the coal-fired plant would be significantly greater than those from a proposed nuclear power plant at the Turkey Point site, even after application of the CSAPR.

NUREG–1437 (NRC 2013-TN2654) indicates that air-quality impacts from a coal-fired power plant can be significant. NUREG–1437 also provides estimates of CO_2 and other emissions (NRC 2013-TN2654). Adverse human health effects, such as cancer and emphysema, have been associated with the byproducts of coal combustion. The fugitive dust emissions from construction activities would be mitigated using BMPs, and would be temporary.

Overall, the NRC staff concludes that air-quality impacts from new coal-fired power generation at the Turkey Point site, despite the availability of BACTs, would be MODERATE. The impacts would be clearly noticeable, but would not destabilize air quality.

Waste Management

Coal combustion generates waste in the form of ash, and equipment for controlling air pollution generates additional ash, spent selective catalytic reduction catalyst, and scrubber sludge. The NRC staff estimates that the coal-fired plants would generate approximately 675,000 T/yr of ash, the largest contributor to coal-combustion residuals (CCR) (DOE/EIA 2009-TN1415). In 2012, approximately 40 percent of CCR was recycled for use in commodity products such as wallboard, concrete, roofing materials, and bricks, thus reducing the total volume needing disposal (EPA 2014-TN4164). Most CCR are managed in dedicated disposal units, i.e., landfills (dry systems) or surface impoundments (wet systems), with lesser quantities disposed of in underground mines or municipal solid-waste landfills.

Effective 6 months after publication of the final rule signed by the EPA Administrator on December 19, 2014, CCR from electric utilities will be regulated as solid waste under Subtitle D of the Resource Conservation and Recovery Act of 1976, as amended (RCRA) (42 U.S.C. § 6901 et seq.) (TN1281). The minimum criteria for new CCR units include location restrictions; design and operating criteria; groundwater monitoring and corrective action; closure requirements and post closure care; and requirements for recordkeeping, notification, and Internet posting. Different criteria apply to landfills and surface impoundments. Any existing CCR units that do not meet the location restrictions or cannot meet the structural integrity criteria must close. Any surface impoundment without a liner that exceeds the groundwater protection standard for any constituent must either install a liner or close, with limited exceptions. Inactive CCR surface impoundments that still contain water and CCR must meet the new criteria or be closed and capped (EPA 2014-TN4164).

Waste impacts on groundwater and surface water could extend beyond the operating life of the plant if leachate or runoff from the waste-storage area occurs. Disposal of the waste could noticeably affect land use (because of the acreage needed for waste) but with appropriate management and monitoring, it would not destabilize any resources. After closure of the waste site and revegetation, the land could be available for some other uses. Construction-related debris would be generated during plant construction activities, and would be disposed of in approved landfills.

For the reasons stated above, the NRC staff concludes that the impacts from waste generated at a coal-fired plant would be MODERATE. The impacts would be clearly noticeable, but would not destabilize any important resource.

Human Health

Coal-fired power generation introduces worker risks from coal and limestone mining, worker and public risk from coal and lime/limestone transportation, worker and public risk from disposal of coal-combustion waste, and worker and public risk from inhalation of stack emissions. Adverse human health effects, such as cancer, asthma, and emphysema, have been associated with the byproducts of coal combustion. In addition, the discharges of uranium and thorium from coal-fired plants can potentially produce radiological doses in excess of those arising from nuclear power plant operations (Gabbard 1993-TN1144).

Regulatory agencies, including the EPA and State agencies, base air emission standards and requirements on human health impacts. These agencies also impose site-specific emission limits as needed to protect human health. Given the regulatory oversight exercised by the EPA and State agencies, the NRC staff concludes that the human health impacts from radiological doses and inhaled toxins and particulates generated from coal-fired generation would be SMALL.

Other Impacts

Land Use

Based on the 1996 version of NUREG–1437 (NRC 1996-TN288), at least 3,700 ac of land would need to be converted to industrial use on the Turkey Point site for the power block, infrastructure and support facilities, coal and limestone storage and handling, reclaimed wastewater line, and landfill disposal of ash and scrubber sludge. Additional land would be needed for five new transmission lines in two corridors, water pipelines, and access roads, consistent with the FPL proposal for Units 6 and 7 (FPL 2014-TN4058). As for nuclear facilities, the coal plant facilities would be in close proximity to Biscayne National Park and the transmission lines would pass close to urban land uses and Everglades National Park. It is assumed that coal mining would occur at an undetermined offsite existing coal mining operation, but land-use changes would also occur if expansion of an existing mine or mines were required to supply coal for the plant. In the 1996 version of NUREG–1437 (NRC 1996-TN288), the NRC staff estimated that approximately 22,000 ac would be needed for coal mining and waste disposal to support a 1,000 MW(e) coal-fired plant over its operating life (corresponding to 48,000 ac for the 2,200 MW(e) plant needed to produce the equivalent baseload generation provided by the proposed Turkey Point Units 6 and 7). Based on the amount of land affected for the site, mining, and waste disposal (see waste-management subsection above), the NRC staff concludes that land-use impacts would be MODERATE.

Water Use and Quality

The amount of water used and the impacts on water use and quality from constructing and operating a coal-fired plant at the Turkey Point site would be comparable to those associated with a new nuclear plant. The new facility would use steam-cycle electrical generation with

closed-cycle cooling. Water consumption due to evaporative cooling in the cooling systems would be somewhat less than that of a new nuclear facility because the coal plant would operate at a somewhat higher thermal efficiency. All discharges would be injected into the Boulder Zone (in the Lower Floridan aquifer) and regulated by the Florida Department of Environmental Protection (FDEP). Water quality would be affected by acids and mercury from air emissions from the coal-fired plant and drift of reclaimed wastewater from the cooling towers. Some of the emissions are regulated to minimize impacts. Given the sensitivity of the local aquatic and terrestrial environments, consideration of emissions, such as mercury, might have impacts even at levels compliant with emission standards. In NUREG–1437, the NRC staff determined that some erosion and sedimentation would likely occur during construction of new facilities (NRC 2013-TN2654). Coal plants require only relatively shallow excavations and foundations. Constructing the plant with stormwater and sediment discharged to cooling canals would ensure the impacts are minor. These impacts would be similar to those for a new nuclear plant. Overall, the NRC staff concludes that the water-use and water-quality impacts would be SMALL.

Ecological Resources

The coal-fired power-generation alternative would introduce ecological impacts from construction and new incremental impacts from operations. The impacts would generally be similar to those of the proposed action at the Turkey Point site and along the transmission line and pipeline corridors, especially losses of mangrove forest and other wetlands. The impacts could include terrestrial and aquatic habitat loss and degradation, habitat fragmentation, reduced productivity, and a local reduction in biological diversity. Impacts on the site could be greater than described for the proposed action because of the greater land-use demands for the coal plants. The impacts could occur not only at the Turkey Point site and offsite corridors, but also at the sites used for coal and limestone mining and effects related to transporting coal to the site. If transportation by barge were used, potential vessel collisions with protected species and potential groundings could occur. Construction and maintenance of new transmission line corridors, access roads, and pipeline corridors would have ecological impacts as described for the proposed action. Stack emissions and disposal of waste products could also affect aquatic and terrestrial resources. Siting of the coal plant at Turkey Point would result in permanent loss of critical habitat for the American crocodile (*Crocodylus acutus*). Additional impacts on threatened and endangered species could result from ash disposal and mining activities, especially if the locations of such activities overlap with habitat for protected species. Overall, the NRC staff concludes that the ecological impacts would be MODERATE, primarily because of potential impacts associated with disposal of ash, impacts on South Florida wetlands and associated important species, and the large area of land affected.

Socioeconomics

Socioeconomic impacts would result from the peak workforce of approximately 2,500 construction workers and the approximately 250 workers needed to operate the coal-fired facility (FPL 2014-TN4058). Overall, the size of the workforce would be smaller than that for the proposed project, which indicates the socioeconomic impacts from building and operating a coal-fired facility at the Turkey Point site would be similar to, but of a lesser magnitude than, the same effects from building and operating the proposed project. Because the Turkey Point site

is a heavily industrialized location relatively isolated from the surrounding population centers and would require fewer workers to construct and operate the plant, the NRC staff determined that the impacts of the proposed Units 6 and 7 establish an upper bound to the socioeconomic impacts of an appropriately sized coal-fired installation. This is especially relevant in the assessment of beneficial impact categories. The overnight capital costs of a coal-fired power plant, the building and operations workforces, and the local expenditures for materials and equipment would be lower for a coal-fired plant than those of a nuclear facility. Therefore, the NRC staff concludes that the tax benefits of a coal-fired plant would be would be SMALL for Miami/Dade County. The NRC staff determined traffic-related impacts during construction and operations for the proposed project would be MODERATE. However, while the increase in traffic in the vicinity of the proposed site would be less than the traffic increase for the proposed action, the construction-related traffic increases would still constitute a noticeable but not destabilizing impact. Therefore, the NRC staff determined the construction-related traffic impacts would still be MODERATE and adverse, but the roads would provide a MODERATE and beneficial impact from identified upgrades. The NRC staff concluded that as was the case for the proposed project, all other socioeconomic impacts would be SMALL.

Coal-fired power generation would introduce mechanical sources of noise that would be much greater than the noise generated at a nuclear power plant and would likely be audible offsite. Sources contributing to the noise produced by plant operation are classified as continuous or intermittent. Continuous sources include the mechanical equipment associated with normal plant operations, such as the equipment related to coal-handling (conveyors, crushers, pulverizers). Intermittent sources include solid-waste disposal, transportation related to coal and lime/limestone delivery, transportation related to the removal of ash and other solid wastes, use of outside loudspeakers horns and sirens, and the commuting of plant employees. The impacts of noise are attenuated by distance. The closest residents and recreational areas are located over 1.5 mi from the proposed site and the NRC staff expects impacts from noise generated at the proposed plant site to be SMALL for the general public. Because power generators would be built adjacent to existing units on the Turkey Point site, the aesthetic impacts of coal-fired power generators at the proposed site are also expected to be SMALL to the general public. However, because the noise level of a coal-fired power plant is much greater than that of a nuclear facility, the impact on visitors to the Biscayne Aquatic Preserve or boaters in the bay would be MODERATE. Any segments of the western transmission line corridor between Everglades National Park and the Levee substation would follow SW 187th Avenue, and the presence of the road would attenuate any visual contrast with the natural environment. The resulting aesthetic impacts are expected to be SMALL.

Environmental Justice

Because the NRC staff did not identify disproportionately high and adverse impacts from any pathway associated with the building and operations of Turkey Point Units 6 and 7, there is no indication that the construction and operation of a coal-fired power plant at the same site would impose any disproportionately high and adverse impacts on minority or low-income populations. Therefore, there would be no disproportionate impacts on minority and low-income populations associated with a coal-fired plant at the Turkey Point site.

Historic and Cultural Resources

The historic and cultural resource impacts of a new coal-fired plant located at the Turkey Point site would be similar to the impacts of a new nuclear plant, as discussed in Sections 4.6 and 5.6. Other lands that would be acquired to support the plant would likely need an inventory of cultural resources, identification and recording of existing historic and archaeological resources, and possible mitigation of the adverse effects from ground-disturbing actions. The studies would likely be needed for all areas of potential disturbance at the plant site, any offsite affected areas, such as mining and waste-disposal sites, and along associated corridors where new construction would occur (e.g., pipeline corridors, roads, and transmission line corridors). The impact on historic or cultural resources at FPL plant property during studies for the new nuclear plant, were determined to be MODERATE because of the visual impacts from transmission lines. The reason the impacts on cultural and historic resources are similar for a coal-fired plant is that both plants would require the same amount of transmission lines and would affect the resource in the same manner. The NRC staff concludes that the historic and cultural resource impacts for a coal plant located at Turkey Point would be similar to those for the nuclear plant; i.e., MODERATE.

The construction and operational impacts of a 2,200 MW(e) coal-fired power-generation plant at the Turkey Point site are summarized in Table 9-1.

Table 9-1. Summary of Environmental Impacts of Coal-Fired Power Generation at the Turkey Point Site

Impact Category	Impact	Comment
Land Use	MODERATE	At least 3,700 ac would be needed for power block; coal-handling, storage, and transportation facilities; infrastructure facilities; and cooling-water facilities. Additional land would be needed for new transmission line and pipeline corridors and access roads. Coal mining (offsite) and waste-disposal activities would require an additional 48,000 ac.
Air Quality	MODERATE	SO_2 – 7,469 T/yr NO_x – 1,638 T/yr CO – 1,638 T/yr PM – 147 T/yr PM_{10} – 34 T/yr $PM_{2.5}$ – 20 T/yr Mercury – 0.085 T/yr CO_2 – 18.7 million T/yr Small amounts of hazardous air pollutants.
Water Use and Quality	SMALL	Impacts would be comparable to the impacts for a new nuclear power plant located at the Turkey Point site.

Table 9-1. (contd)

Impact Category	Impact	Comment
Ecology	MODERATE	Impacts could include terrestrial and aquatic habitat loss and modification, habitat fragmentation, reduced productivity, and a local reduction in biological diversity. Impacts could occur at the Turkey Point site and vicinity, along transmission line corridors, access roads, and pipeline corridors, and at the sites used for coal and limestone mining. Disposal of ash could also affect the terrestrial and aquatic environments. Additional impacts on threatened and endangered species could result from transporting coal to the site and permanent loss of critical habitat to the American crocodile. The project footprint would be larger than needed for the proposed action, resulting in greater permanent impact on habitats and wetlands.
Waste Management	MODERATE	Total volume of combustion wastes would exceed 1 million T/yr (590,000 T/yr ash and 700,000 T/yr scrubber sludge).
Socioeconomics	MODERATE Beneficial to MODERATE Adverse	All socioeconomic impacts are SMALL and adverse, with the exceptions of SMALL beneficial economic and tax impacts throughout the affected region, MODERATE and beneficial impacts from road improvements, and MODERATE adverse impacts from traffic. Impacts during operations would likely be smaller than during construction with the exception of an increased adverse noise impact from operations, which would be MODERATE.
Human Health	SMALL	Regulatory controls and oversight are assumed to be protective of human health.
Historic and Cultural Resources	MODERATE	Any potential impacts could likely be effectively managed. Most of the facility and infrastructure would be built on previously disturbed ground. Impacts may also be associated with new transmission line or pipeline corridors.
Environmental Justice	NONE[(a)]	Based on analysis of census data and field interviews, no disproportionately high and adverse impacts on minority or low-income populations would be anticipated.

(a) A determination of "NONE" for environmental justice analyses does not mean there are no adverse impacts on minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

9.2.2.2 Natural-Gas−Fired Power Generation

For the natural-gas alternative, the NRC staff assumed building and operation of a natural-gas−fired plant at the Turkey Point site. The NRC staff assumed that the plant would use four combined-cycle combustion turbines, with a net capacity of 550 MW(e) per unit. In its COL, FPL assumed three 728.4 MW natural-gas combined-cycle (NGCC) units (FPL 2014-TN4058). The team's estimates of natural-gas consumption, air emissions, and waste products are based on EPA AP-42 (Stationary Gas Turbines; EPA 2011-TN1088). The NRC staff also assumed the construction of two additional transmission line corridors, as discussed in Chapters 2 and 3. The natural-gas−fired plant is assumed to have an operating life of 40 years. The NRC staff estimated that the natural-gas−fired plant would use approximately 114 billion standard cubic feet of gas per year (EPA 2011-TN1088).

Air Quality

Natural gas is a cleaner burning fuel than combusted coal. The associated emissions estimates were estimated based on factors contained in EPA AP-42 (EPA 2011-TN1088) except where noted. It is noted that emissions estimates are based on "as fired" and controlled conditions and are not necessarily representative of what would likely be permitted.

A new natural-gas−fired power-generation plant would need a PSD permit and an operating permit under the Clean Air Act. A new NGCC plant would also be subject to the new source performance standards specified in 40 CFR Part 60 (TN1020), Subparts Da and GG. These regulations establish emission limits for particulates, opacity, SO_2, and NO_x.

The EPA has various regulatory requirements for visibility protection in 40 CFR Part 51 (TN1090), Subpart P, including a specific requirement for review of any new major stationary source in areas designated as in attainment or unclassified under the Clean Air Act. The entire State of Florida is designated as in attainment or unclassified for all criteria pollutants except for Hillsborough County, which is classified as nonattainment for lead (EPA 2012-TN1245), and two small portions of Nassau County and Hillsbourough County, which are classified as nonattainment for 1-hour sulfur dioxide (EPA 2015-TN4515).

Section 169A of the Clean Air Act (42 U.S.C. § 7401 et seq.) (TN1141) establishes a national goal of preventing future impairment of visibility and remedying existing impairment in mandatory Class I Federal areas when impairment is from air pollution caused by human activities. In addition, the EPA regulations provide that for each mandatory Class I Federal area located within a state, the State regulatory agencies must establish goals that provide for reasonable progress toward achieving natural visibility conditions. The reasonable progress goals must provide for an improvement in visibility for the most-impaired days over the period of the implementation plan and make sure there is no degradation in visibility for the least-impaired days over the same period (40 CFR 51.308(d)(1)) (TN1090). If a new natural-gas−fired power plant was located close to a mandatory Class I area, additional air-pollution control requirements could be imposed. As discussed under the coal alternative, there is one mandatory Class I Federal area near the Turkey Point site

A natural-gas−fired plant equipped with appropriate combustion and post-combustion pollution-control technology would have approximately the following emissions.(6)

- SO_2 – 32 T/yr
- NOx – 564 T/yr
- CO – 214 T/yr
- PM – 108 T/yr
- PM_{10} – 108 T/yr(7)
- $PM_{2.5}$ – 108 T/yr.

(6) Emissions are based on 114 × 10E+6 MMBTU/yr and control technology, including lean-premix combustion, and catalytic control for NO_x at a 90 percent reduction rate and for CO at a 75 percent reduction rate.

(7) The value for PM_{10} includes particles of smaller diameter such as $PM_{2.5}$.

The NRC staff estimates that a natural-gas−fired power plant would also have unregulated CO_2 emissions of 6.3 million T/yr that could affect climate change (EPA 2011-TN1088). Historically, CO_2, an unavoidable byproduct of combustion of carbonaceous fuels, has not been regulated as a pollutant. However, regulations are now under development for CO_2 and other GHGs. In response to the Consolidated Appropriations Act of 2008 (Public Law 110-161) (TN1485), the EPA promulgated final mandatory GHG reporting regulations in October 2009, effective in December 2009 (74 FR 56260) (TN1024). The rules are applicable to major sources of CO_2 (those emitting more than 25,000 T/yr). New utility-scale gas-fired power plants would be subject to those regulations.

The combustion turbine portion of the combined-cycle plant would be subject to EPA's National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines (40 CFR Part 63) (TN1403) because the site would be a major source of HAPs.

The NRC staff assumes that fugitive dust emissions from construction activities would be mitigated using BMPs similar to mitigation discussed in Chapter 4 for proposed Turkey Point Units 6 and 7. Such emissions would be temporary.

A new gas-fired generation plant would qualify as a major generator of GHGs under the "Tailoring Rule" recently promulgated by the EPA (75 FR 31514) (TN1404). Beginning January 2, 2011, permits issued to major sources of GHGs under the PSD or Title V Federal permit programs must contain provisions requiring the use of BACTs to limit the emissions of GHGs if those sources would be subject to PSD or Title V permitting requirements because of their non-GHG pollutant emission potentials and if their estimated GHG emissions are at least 75,000 T/yr of CO_2e. Meeting permit limitations for GHG emissions may require installation of carbon capture and sequestration devices on any new natural-gas–fired power plant, which could reduce power output. On October 23, 2015, the EPA published its final rule for new source performance standards to limit CO_2 emissions from new stationary combustion turbines (e.g., NGCC technology) (80 FR 64509) (TN4388). However, the staff's emissions estimate of 6.3 million T/yr was already below the new standard and would, therefore, be unchanged under the new rule. Nevertheless, the review team recognizes that the environmental impacts of air emissions from the natural-gas−fired power plant would be significantly greater than those of a proposed nuclear power plant at the Turkey Point site.

The impacts of emissions from the natural-gas−fired alternative would be noticeable, but would not be sufficient to destabilize air resources. The impacts would be greater than the impacts from the proposed action (which were SMALL), but less than the impacts for the coal alternative (which were MODERATE). Overall, the NRC staff concludes that air-quality impacts resulting from construction and operation of the natural-gas−fired alternative at the Turkey Point site would be SMALL to MODERATE.

Waste Management

In the 1996 version of NUREG–1437, the NRC staff concluded that waste generation from natural-gas−fired technology would be minimal (NRC 1996-TN288). The only significant waste generated at a natural-gas−fired power plant would be spent selective catalytic reduction (SCR) catalyst, which is used to control NO_x emissions. The spent catalyst would be regenerated or

disposed of offsite. Other than spent SCR catalyst, waste generation at an operating natural-gas−fired plant would be largely limited to typical operations and maintenance waste. Construction-related debris would be generated during construction activities. Overall, the NRC staff concludes that waste impacts from natural-gas−fired power generation would be SMALL.

Human Health

Natural-gas−fired power generation introduces public risk related to gaseous emissions. The risk may be attributable to NO_x emissions that contribute to ozone formation, which in turn contributes to health risk. Regulatory agencies, including the EPA and State agencies, base air emission standards and requirements on human health impacts. These agencies also impose site-specific emission limits as needed to protect human health. Given the regulatory oversight exercised by the EPA and State agencies, the NRC staff concludes that the human health impacts from natural-gas−fired power generation would be SMALL.

Other Impacts

Land Use

Based on the 1996 version of NUREG–1437 (NRC 1996-TN288), the natural-gas−fired power-generating plant would require at least 240 ac for the power block and support facilities for the 2,200 MW(e) plant. The plant would still not fit entirely onto the 218 ac island proposed as the site for Units 6 and 7, but the extent of land requirements elsewhere on the Turkey Point site may be somewhat reduced relative to the proposed action. Turkey Point Unit 5 is currently served by an existing 24 in. gas pipeline and it is assumed that if a new line were needed it could be sited within the existing pipeline corridor to minimize land-use impacts (FPL 2014-TN4058). Assuming a new pipeline within the existing corridor, the total land-use commitment, not including natural-gas wells and collection stations, would be at least 240 ac. Consistent with the proposed project, additional land would be needed for five new transmission lines in two corridors (FPL 2014-TN4058). As for nuclear facilities, the gas plant facilities would be in close proximity to Biscayne National Park and the transmission lines would pass close to urban land uses and Everglades National Park. More than 7,000 ac of additional land away from the Turkey Point site would also be required for natural-gas wells and collection stations (NRC 1996-TN288). Overall, the NRC staff concludes that the land-use impacts from new natural-gas−fired power generation would be MODERATE primarily because of the land conflicts related to the transmission lines and the land requirements for the gas wells and collection stations.

Water Use and Quality

The water use for a natural-gas−fired combined-cycle plant is about a third of an equivalent nuclear plant (NREL 2011-TN3850). Because the plant would use reclaimed water for cooling and discharge to the Boulder Zone, the impacts on water use and quality from constructing and operating a natural-gas−fired plant at the Turkey Point site would be comparable to the impacts associated with building and operating a new nuclear facility. The impacts on water quality from sedimentation during construction of a natural-gas−fired plant were characterized in the 1996 version of NUREG–1437 as SMALL (NRC 1996-TN288). The NRC staff also noted in the 1996

version of NUREG–1437 that the impacts on water quality from operations would be similar to, or less than, the impacts from other power-generating technologies (NRC 1996-TN288). Overall, the NRC staff concludes that impacts on water use and quality would be SMALL.

Ecological Resources

A natural-gas−fired plant at the Turkey Point site may have fewer ecological impacts than a new nuclear facility because less land would be affected. However, the plant would still not fit entirely onto the 218 ac plant area proposed as the site for Units 6 and 7 and therefore would require filling mangrove forest outside of the plant area and result in permanent loss of critical habitat for the American crocodile. Constructing a new underground gas pipeline to the site would result in temporary and permanent loss of some terrestrial and aquatic function as well as conversion and fragmentation of habitat, including mangrove forest; however, ecological impacts from the gas pipeline would be limited because there is an existing 24 in. transmission line pipeline to the Turkey Point site to serve Unit 5, and connection to natural-gas distribution systems would occur onsite and would use the existing natural-gas pipeline corridor. Impacts on threatened and endangered species would generally be as described for a new nuclear facility located at the Turkey Point site, despite the somewhat smaller overall onsite footprint. Overall, the NRC staff concludes that ecological impacts would be MODERATE because of the impacts on the American crocodile and impacts from transmission line corridors, access roads, and water supply pipeline corridors (all of which are expected to follow the same routes as described for the proposed nuclear units).

Socioeconomics

Socioeconomic impacts would result from the approximately 1,200 construction workers and 150 workers needed to operate the natural-gas−fired facility (FPL 2014-TN4058). Overall, the size of the workforce would be smaller than that for the proposed project, which indicates the impacts from building and operating a natural-gas facility at the Turkey Point site would be similar to, but of a lesser magnitude than the same effects from building and operating the proposed project. Because the Turkey Point site is a heavily industrialized location relatively isolated from the surrounding population centers and would require fewer workers to construct and operate the plant, the NRC staff determined that the impacts of the proposed Units 6 and 7 establish an upper bound to the socioeconomic impacts of an appropriately sized natural-gas–fired installation. This is especially relevant in the assessment of beneficial impact categories. The overnight capital costs of a natural-gas−fired power plant, the building and operations workforces, and the local expenditures on materials and equipment are substantially lower at a natural-gas plant than those of a nuclear facility. Therefore, the NRC staff concludes that the tax benefits of a natural-gas−fired plant would be would be SMALL for Miami/Dade County. The NRC staff determined traffic-related impacts during building and operations of Turkey Point Units 6 and 7 would be MODERATE. However, while there would be some increase in traffic in the vicinity of the proposed site for the natural-gas plant, that increase would be substantially less than the increase for the proposed action. Therefore, the NRC staff determined the adverse impact from an increase in traffic would be SMALL. The NRC staff concluded that, as was the case for the proposed project, all other socioeconomic impacts would be SMALL.

The turbine buildings, four exhaust stacks (each approximately 200 ft high) and associated emissions, and the gas-pipeline compressors would be visible during daylight hours from offsite. Noise and light from the plant would be detectable offsite. The new transmission lines would have an aesthetic impact. Overall, the NRC staff concludes that the aesthetic impacts associated with new natural-gas−fired power generation at the Turkey Point site would be SMALL. The impact along new transmission lines would be SMALL, similar to the proposed Turkey Point Units 6 and 7.

Environmental Justice

Because the NRC staff did not identify any disproportionately high and adverse impacts from any pathway associated with the building and operations of Turkey Point Units 6 and 7, there is no indication that the building and operation of a natural-gas−fired power plant at the same site would impose any disproportionately high and adverse impacts on minority or low-income populations. Therefore, there would be no disproportionate impacts on minority and low-income populations associated with a natural-gas−fired plant at the Turkey Point site.

Historical and Cultural Resources

Historic and cultural resource impacts for a new natural-gas−fired plant located at the Turkey Point site would be similar to the impacts for a new nuclear plant, as discussed in Sections 4.6 and 5.6. Other lands (if any) that are acquired to support the plant would also likely need an inventory of cultural resources, identification and recording of existing historic and archaeological resources, and possible mitigation of the adverse effect from ground-disturbing actions. The studies would likely be needed for all areas of potential disturbance at the plant site, any offsite affected areas, such as gas wells, collection stations, and waste-disposal sites, and along associated corridors where new construction would occur (e.g., roads and any new pipelines). Given that the impacts on historic or cultural resources at FPL plant property during studies for the new nuclear plant were determined to be MODERATE due to the visual impacts from transmission lines, the NRC staff concludes that the historic and cultural resource impacts for a natural-gas plant located at Turkey Point would also be MODERATE.

The impacts of natural-gas−fired power generation at the Turkey Point site are summarized in Table 9-2.

Table 9-2. Summary of the Environmental Impacts of Natural-Gas−Fired Power Generation

Impact Category	Impact	Comment
Land Use	MODERATE	At least 240 ac would be needed for power block, cooling towers, and support systems, and connection to a natural-gas pipeline. Additional land would be needed for transmission line corridors, gas supply pipeline, other infrastructure, and facilities.

Table 9-2. (contd)

Impact Category	Impact	Comment
Air Quality	SMALL to MODERATE	SO_2 – 32 T/yr NO_x – 564 T/yr CO – 214 T/yr PM – 108 T/yr PM_{10} – 108 T/yr $PM_{2.5}$ – 108 T/yr CO_2 – 6.3 million T/yr Some hazardous air pollutants
Water Use and Quality	SMALL	Impacts would be comparable to the impacts for a new nuclear power plant located at the Turkey Point site.
Ecology	MODERATE	Constructing a new underground gas pipeline to the site would result in loss of some terrestrial and aquatic function as well as conversion and fragmentation of habitat. Most impacts from pipeline construction would be temporary. Impacts on the Turkey Point site would be less than the impacts from new nuclear generating units, although the footprint could still not be confined to the 218 ac island where the main plant facilities would be built. Although permanent impacts on wetlands within the project footprint would occur but would also be proportionally less due to a smaller project footprint, species and habitats would still be affected along transmission line and pipeline corridors. Permanent loss of critical habitat for the American crocodile would occur.
Waste Management	SMALL	The only significant waste would be from spent selective catalytic reduction catalyst used for control of emissions of NO_x.
Socioeconomics	MODERATE Beneficial to SMALL Adverse	Construction and operations workforces would be relatively small and generate small yet positive local impacts on the economy and taxes. Some construction-related impacts would occur, but the impacts would be SMALL and adverse, with the exception of a MODERATE and beneficial impact from road improvements and SMALL beneficial economic and tax impacts throughout the affected region. Aesthetic impacts associated with new natural-gas−fired power generation at the Turkey Point site would be SMALL. The impact along new transmission lines would be SMALL similar to the proposed project.
Human Health	SMALL	Regulatory controls and oversight would be protective of human health.
Historic and Cultural Resources	MODERATE	Most of the facility and infrastructure would be built on previously disturbed ground. Impacts may also be associated with transmission line and pipeline corridors.
Environmental Justice	NONE[(a)]	No disproportionately high or adverse impacts on minority or low-income populations would be anticipated based on analysis of census data and field interviews.

(a) A determination of "NONE" for environmental justice analyses does not mean there are no adverse impacts on minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

9.2.3 Other Alternatives

This section discusses other energy alternatives, the NRC staff's conclusions about the feasibility of each alternative, and the NRC staff's basis for its conclusions. New nuclear units at

the Turkey Point site would be baseload generation units. As discussed in Section 9.2.3 of the ESRP (NRC 2000-TN614), any feasible alternative to the new units would need to generate baseload power. In evaluating other energy technologies, FPL used the technologies discussed in the 1996 version of NUREG–1437 (NRC 1996-TN288). The NRC staff reviewed the information submitted by FPL in its COL and also conducted an independent review. The NRC staff determined that the other energy alternatives are not reasonable alternatives to two new nuclear units that would provide baseload power. Also, the FPSC stated that renewable generation available today or in the foreseeable future cannot provide enough baseload capacity to avoid the need for the addition of proposed Turkey Point Units 6 and 7 (FPSC 2008-TN735).

The NRC staff has not assigned significance levels to the environmental impacts associated with the alternatives discussed in this section because, as noted above, the generation alternatives are not feasible for providing 2,200 MW(e) of baseload power. In addition, some of the generation alternatives would have to be installed at a location other than the Turkey Point site, and any attempt to assign significance levels would require the NRC staff's speculation about the unknown site.

9.2.3.1 Oil-Fired Power Generation

The EIA's reference case in its *Annual Energy Outlook* 2016 Early Release, Table 8, projects that in the United States electric power generation using petroleum will decrease by around 67 percent between 2014 and 2040 (DOE/EIA 2016-TN4620). Oil-fired generation is more expensive than nuclear, natural-gas−fired, or coal-fired generation options. In addition, future increases in oil prices are expected to make oil-fired generation increasingly more expensive. The high cost of oil has resulted in a decline in its use for electricity generation. In Section 8.3.11 of the 1996 version of NUREG–1437, the NRC staff estimated that construction of a 1,000 MW(e) oil-fired plant would require about 120 ac of land (NRC 1996-TN288). Ecological impacts would be less than those identified for the proposed action because less critical habitat for the American crocodile would be lost. Operation of an oil-fired power plant would have air emissions that would be similar to those of a comparably sized coal-fired plant (NRC 1996-TN288).

For the preceding economic and environmental reasons, the NRC staff concludes that an oil-fired power plant would not be a reasonable alternative to construction of a 2,200 MW(e) nuclear power-generation facility that would be operated as a baseload plant within FPL's ROI.

9.2.3.2 Wind Power

Onshore areas within the FPL service territory are in a wind power Class 2 region (average wind speeds lower than 5.1 m/s at 10 m) (NREL 2012-TN1395). Offshore areas around the FPL service territory are in a wind power Class 3 region (average wind speeds 5.1 to 5.6 m/s at 10 m) (NREL 2009-TN1396). Areas designated Class 3 or greater are suitable for most wind turbine applications, whereas Class 2 areas are marginal (NREL 2009-TN1397). Therefore, commercial-scale development of wind energy in Florida would have to be sited in offshore locations. Modern wind turbines typically operate at an average capacity factor of 30 percent to 35 percent compared to 90 percent to 95 percent for a baseload plant such as a nuclear plant

(Wiser and Bolinger 2011-TN1361). The world's largest operating wind farms are less than 1,000 MW, but most are well under 200 MW. The 454 MW Cape Wind Project covers approximately 25 mi^2 (MMS 2009-TN1402). Based on this, a utility-scale offshore wind power-generation project would generally require about 35 ac/MW of installed capacity. The Office of Energy Efficiency and Renewable Energy's 2011 Wind Technologies Market Report indicates that average wind turbine size was about 1.79 MW for U.S. installations in 2010 (Wiser and Bolinger 2011-TN1361). Therefore even with modern wind turbine designs, more than 1,000 wind turbines would be required to produce a peak output that matches the 2,200 MW(e) of the proposed nuclear units. These wind turbines would need to be coupled with a 2,200 MW(e) NGCC plant to provide power when the wind turbines are operating at less than full power. Alternately, in order to match the average annual generation expected from the proposed nuclear units (17,345 GWh) with wind power alone, more than 3,300 2 MW(e) wind turbines would have to be installed, coupled with energy storage on a very large scale. There is no such large-scale energy-storage mechanism available in Florida. Finally, the DOE/EIA's 2016 Table 58.2 projects no growth in wind power in the Florida Reliability Coordinating Council (FRCC), which includes the FPL service territory, from 2015 to 2028 (DOE/EIA 2016-TN4623). Based on this, the NRC staff assumes no growth in wind capacity for FPL from 2012 to 2040.

Because (1) the wind resource in Florida is not optimal for utility-scale generation, (2) the DOE/EIA projects no growth in wind energy in Florida, (3) the capacity factor of wind power is too low for baseload applications, and (4) the offshore area needed (and the associated environmental impacts) would be very large, the NRC staff concludes that a wind-energy facility at the Turkey Point site or elsewhere within FPL's ROI would not be a reasonable alternative to construction of a 2,200 MW(e) nuclear power-generation facility that would be operated as a baseload plant.

9.2.3.3 Solar Power

Solar technologies use energy and light from the sun to provide heating and cooling, light, hot water, and electricity for consumers. Solar energy can be converted to electricity using solar thermal technologies or photovoltaics. Solar thermal technologies use concentrating devices to create temperatures suitable for power production. Concentrating thermal technologies is currently less costly than photovoltaics for bulk power production. They can also be provided with energy storage or auxiliary boilers to allow operation during periods when the sun is not shining (NPCC 2006-TN1408). The largest operational solar thermal plant is the 310 MW(e) Solar Energy Generating System located on approximately 1,500 ac in the Mojave Desert in southern California (NextEra 2012-TN1400).

Solar insolation has a low energy density relative to other common energy sources. Consequently, a large total acreage is needed to gather an appreciable amount of energy. Typical solar thermal power plants require 3 to 8 ac for every megawatt of generating capacity (Mendelson et al. 2012-TN1399). For solar photovoltaics, the National Renewable Energy Laboratory reports 6.38 ac are typically required per megawatt (Roberts 2011-TN1398). For FPL's target capacity of 2,200 MW(e) for Units 6 and 7, land requirements would be approximately 6,600 to 17,600 ac. Solar thermal electric technologies also typically require considerable water supplies. In addition, according to DOE/EIA an average solar capacity factor ranges from 18 to 25 percent in the United States (DOE/EIA 2010-TN1401). Finally, the

DOE/EIA projects limited growth in solar power in the FRCC, which includes the FPL service territory. From 2015 to 2028, DOE/EIA projects solar capacity in the FRCC will increase by about 1,230 MW (DOE/EIA 2016-TN4623). The 2014 Florida State Electricity Profile indicates that FPL generated about 57 percent of the power in the FRCC (DOE/EIA 2016-TN4624). Attributing 57 percent of the growth to FPL, the NRC staff assumes that growth in solar capacity for FPL from 2015 to 2028 would be around 700 MW.

Because (1) the projections for growth in solar energy in Florida are limited, (2) the area needed (and the associated environmental impacts) would be very large, and (3) the capacity factor of solar power is too low for baseload applications, the NRC staff concludes that a solar-energy facility at or in the vicinity of the Turkey Point site would not be a reasonable alternative to construction of a 2,200 MW(e) nuclear power-generation facility that would be operated as a baseload plant.

9.2.3.4 Hydropower

The EIA's reference case in its *Annual Energy Outlook* 2012 projects that U.S. electricity production from hydropower plants will remain essentially stable through the year 2035 (DOE/EIA 2011-TN1368). In the 1996 version of NUREG–1437, the NRC staff estimated that land requirements for hydroelectric power are approximately 1 million ac per 1,000 MW(e) (NRC 1996-TN288). For the target capacity of 2,200 MW(e) for proposed Turkey Point Units 6 and 7, land requirements would thus be 2.2 million ac.

A study conducted by the DOE estimates that there are 13 undeveloped potential hydropower sites in Florida. The results for individual site capacities range from 200 kW to 18 MW. The capacities of the majority (69 percent) of the hydropower sites in Florida are greater than 1 MW, and less than 10 MW. The 13 identified sites are located within one major river basin (Appalachicola River basin) and several minor river basins (Conner and Francfort 1998-TN1367). Thus, the available hydropower in the entire State of Florida is well below the approximate 2,200 MW(e) net capacity of the proposed nuclear project.

Because of the extremely low amount of undeveloped hydropower resource in Florida and the large land-use and related environmental and ecological resource impacts associated with siting hydroelectric facilities large enough to produce 2,200 MW(e), the NRC staff concludes that hydropower is not a feasible alternative within the FPL ROI to construction of a new nuclear power-generation facility operated as a baseload plant at the proposed site.

As discussed in NUREG–1437 (NRC 2013-TN2654), ocean and tidal technologies are being developed but are in their infancy and have not been used at utility scale. In addition, DOE/EIA's 2016 Table 58.2 did not include these technologies in its projections in the *Annual Energy Outlook 2015* (DOE/EIA 2016-TN4623). Therefore, the NRC staff concludes that within the FPL ROI these technologies are not feasible alternatives to construction of a new nuclear power-generation facility operated as a baseload plant at the proposed site.

9.2.3.5 Geothermal Energy

Geothermal energy has an average capacity factor of 90 percent and can be used for baseload power where available. Geothermal plants are most likely to be sited in the western continental United States, Alaska, and Hawaii, where hydrothermal reservoirs are prevalent (DOE 2008-TN1409). Geothermal systems have a relatively small footprint and minimal emissions (MIT 2006-TN1410). Florida has high-temperature geothermal resources that are suitable for space-heating applications, but not for baseload power generation (DOE 2010-TN1411). A study led by the Massachusetts Institute of Technology concluded that a $300-million to $400-million investment over 15 years would be needed to make early-generation enhanced geothermal system power plant installations competitive in the evolving U.S. electricity supply markets (MIT 2006-TN1410).

The University of Florida Geophysical Laboratory has investigated heat flow values for the Gulf coastal plain and north-central Florida. Thermal gradients found in the majority of the wells drilled in Florida ranged from below average to average, indicating little promise of a significant geothermal resource (State of Florida 1984-TN1422).

For these reasons, the NRC staff concludes that a geothermal energy facility at the Turkey Point site or elsewhere in FPL's ROI would not be a reasonable alternative to construction of a 2,200 MW(e) nuclear power-generation facility operated as a baseload plant.

9.2.3.6 Wood Waste

A wood-burning facility can provide baseload power and operate with a high annual capacity factor and with thermal efficiency similar to a coal plant (EPA 2007-TN2660; NREL 1993-TN2661). The fuels required are variable and site-specific. A significant impediment to the use of wood waste to generate electricity is the high cost of fuel delivery and high construction cost per megawatt of generating capacity. Estimates in NUREG–1437 suggest that the overall level of construction impacts per megawatt of installed capacity would be approximately the same as that for a coal-fired plant (NRC 2013-TN2654). Similar to coal-fired plants, wood-waste plants require large areas for fuel storage and processing and involve the same type of combustion equipment. In the *Annual Energy Outlook 2016 Early Release,* Table 58.2 (DOE/EIA 2016-TN4623, DOE/EIA projects that growth in the generating capacity from biomass (which includes wood waste) in the FRCC region between 2015 and 2028 will be about 10 MW(e).

Because of the small projected increase in generating capacity for wood power-generation plants, the NRC staff concludes that wood waste would not be a reasonable alternative to a 2,200 MW(e) nuclear power-generation facility operated as a baseload plant.

9.2.3.7 Municipal Solid Waste

Municipal solid-waste combustors incinerate waste and can use the resultant heat to produce steam, hot water, or electricity. The combustion process reduces the volume of waste and the need for new solid-waste landfills. Mass-burning technologies are most commonly used in the United States. This group of technologies processes raw municipal solid waste with little or no sizing, shredding, or separation before combustion. More than one-fifth of the U.S. municipal solid-waste incinerators use refuse-derived fuel. In contrast to mass burning—where the

municipal solid waste is introduced “as is” into the combustion chamber—refuse-derived fuel facilities are equipped to recover recyclables (e.g., metals, cans, and glass) followed by shredding the combustible fraction into fluff for incineration (EPA 2009-TN1412).

Municipal solid-waste combustors generate SO_2 and NO_x emissions and an ash residue that is buried in landfills. The ash residue is composed of bottom ash and fly ash. Bottom ash refers to the portion of the unburned waste that falls to the bottom of the grate or furnace. Fly ash represents the small particles that rise from the furnace during the combustion process. Fly ash is generally removed from flue gases using fabric filters and/or scrubbers (EPA 2008-TN1413).

Currently, 84 waste-to-energy plants are operating in the United States (Michaels 2014-TN3849). These plants have a combined generating capacity of approximately 2,770 MW(e), or an average of approximately 33 MW(e) per plant (Michaels 2014-TN3849). Given the small average output of existing plants, the NRC staff concludes that generating electricity from municipal solid waste would not be a reasonable alternative to a 2,200 MW(e) nuclear power-generation facility operated as a baseload plant within FPL’s ROI.

One additional generating resource that uses municipal solid waste as a fuel derivative is the capture and combustion of landfill-based gas. There are currently 21 operating landfill-based gas facilities in Florida, generating a total of 83.3 MW. Units range in size from 0.4 to 11.3 MW (EPA 2012-TN1414). Given the relatively small size of the plants and the finite number of usable resources, the NRC staff concludes that generating electricity from landfill-based gas would not be a reasonable alternative to construction and operation of a 2,200 MW(e) nuclear power plant supplying baseload electricity.

9.2.3.8 Other Biomass-Derived Fuels

In addition to wood and municipal solid-waste fuel, several other biomass-derived fuels are available for fueling electric generators, including burning crops, converting crops to a liquid fuel such as ethanol, and gasifying crops (including wood waste). The EIA estimates that wind, solar, and biomass will be the largest sources of renewable electricity generation among the non-hydropower renewable fuels through 2040 (DOE/EIA 2016-TN4622, Table 58).

Co-firing biomass with coal is possible when low-cost biomass resources are available. Co-firing is the most economic option for the near future to introduce new biomass power generation. These projects require small capital investments per unit of power-generation capacity. Co-firing systems range in size from 1 to 30 MW(e) of biopower capacity (DOE 2008-TN1416).

Finally, the DOE/EIA projects limited growth in biomass power in the FRCC, which includes the FPL service territory. From 2015 to 2028, DOE/EIA projects biomass capacity (including wood-burning facilities) in the FRCC will increase by about 10 MW(e) (DOE/EIA 2016-TN4623, Table 58.2). In 2014, FPL generated about 57 percent of the power in the FRCC (DOE/EIA 2016-TN4624). Based on this, the NRC staff assumes that growth in biomass capacity for FPL from 2015 to 2028 would be around 6 MW(e).

The NRC staff concludes that given the relatively small average output of biomass power-generation facilities, biomass-derived fuels do not offer a reasonable alternative to a 2,200 MW(e) nuclear power-generation facility operated as a baseload plant within FPL's ROI.

9.2.3.9 Fuel Cells

Fuel cells work without combustion and its associated environmental side effects. Power is produced electrochemically by passing a hydrogen-rich fuel over an anode, air over a cathode, and then separating the two by an electrolyte. The only byproducts are heat, water, and CO_2. Hydrogen fuel can come from a variety of hydrocarbon resources by subjecting them to steam under pressure. Natural gas is typically used as the source of hydrogen.

Phosphoric acid fuel cells are generally considered first-generation technology. Higher-temperature, second-generation fuel cells achieve higher fuel-to-electricity and thermal efficiencies. The higher temperatures contribute to improved efficiencies and give the second-generation fuel cells the capability to generate steam for cogeneration and combined-cycle operations.

During the past three decades, significant efforts have been made to develop more practical and affordable fuel-cell designs for stationary power applications, but progress has been slow. The cost of fuel-cell power systems must be reduced before they can be competitive with conventional technologies (DOE 2008-TN1417). DOE has an initiative called the Solid State Energy Conversion Alliance (SECA) with the goal of developing large (i.e., 250 MW or greater) fuel-cell power systems, including those based on coal-derived fuels. Another SECA goal is to cut the costs of electricity generated via fuel cells to $700 per kilowatt (electrical) (DOE 2011-TN2083). However, it is not clear whether DOE will achieve these goals and, if so, when the associated fuel cells might reach commercial operations.

The NRC staff concludes that, at the present time, fuel cells are not economically or technologically competitive with other alternatives for baseload electricity generation. Future gains in cost competitiveness for fuel cells compared to other fuels are speculative.

For the preceding reasons, the NRC staff concludes that a fuel-cell energy facility located at or in the vicinity of the proposed site would not currently be a reasonable alternative to construction of a 2,200 MW(e) nuclear power-generation facility operated as a baseload plant.

9.2.4 Combination of Alternatives

Individual alternatives to the construction of two new nuclear units at the Turkey Point site might not be sufficient on their own to generate FPL's target value of 2,200 MW(e) because of the limited availability of the resource or lack of cost-effective opportunities. Nevertheless, it is conceivable that a combination of alternatives might be cost-effective. There are many possible combinations of alternatives. It would not be reasonable to examine every possible combination of alternatives in an EIS. Doing so would be counter to CEQ guidance that an EIS should be analytic rather than encyclopedic, should be kept concise, and should be no longer than absolutely necessary to comply with NEPA and CEQ regulations (40 CFR 1502.2(a),(b) [TN2123]; CEQ 2005-TN1394). Given that FPL's objective is for a new baseload generation

facility, a fossil-fuel energy source, most likely natural gas or coal, would need to be a significant contributor to any reasonable alternative energy combination.

Section 9.2.2.2 assumes the construction of four 550 MW(e) natural-gas−fired, combined-cycle power-generating units at the Turkey Point site using closed-cycle cooling with cooling towers. For a combined alternatives option, the NRC staff assessed the environmental impacts of an assumed 1,915 MW(e) of natural-gas−fired, combined-cycle power-generating units at the Turkey Point site using closed-cycle cooling with cooling towers, and the following contributions from within FPL's ROI: 210 MW(e) from conservation and DSM programs beyond what is currently planned, 330 MW(e) from solar, and 75 MW(e) from biomass sources, including municipal solid waste. Solar energy would need to be combined with a backup power source (most likely NGCC) or an energy-storage mechanism, such as compressed air energy storage, to be used to meet a baseload need. The 1,915 MW(e) natural-gas plant assumed by the NRC staff would provide the backup power source for solar. The NRC staff believes that the preceding contributions are reasonable and representative for FPL's ROI. The contributions reflect the NRC staff's analysis in Sections 9.2.2 and 9.2.3.

The environmental impacts of the natural-gas portion of the combination of energy alternatives would be somewhat less than those for the plant discussed in Section 9.2.2.2. The additional conservation and DSM should not have any direct impacts on the environment, although the program would involve increased costs to FPL customers. Because of its modest size, the biomass component would have minor impacts. The solar portion of the combination could have noticeable impacts on land use and terrestrial resources, depending on how it is implemented (i.e., built on cleared land versus rooftop installations). Overall, this alternative would have impacts similar to those of the natural-gas−only alternative discussed in Section 9.2.2.2. A summary of the NRC staff's characterizations of the environmental impacts associated with the construction and operation of the preceding assumed combination of alternatives is provided in Table 9-3.

Table 9-3. Summary of the Environmental Impacts of a Combination of Power Sources

Impact Category	Impact	Comment
Land Use	MODERATE	A natural-gas−fired plant would have land-use impacts for the power block, new transmission line corridors, cooling towers, and support systems, and connection to a natural-gas pipeline. Solar facilities and transmission lines could have noticeable land-use impacts because of the large footprints required for these facilities, especially the solar facilities.
Air Quality	SMALL to MODERATE	Emissions from the natural-gas−fired plant would be approximately as follows: SO_2 – 27 T/yr NO_x – 466 T/yr CO – 177 T/yr PM_{10} – 89 T/yr $PM_{2\,5}$ –89 T/yr CO_2 – 5.2 million T/yr Some hazardous air pollutants. Biomass would also have some emissions.

Table 9-3. (contd)

Impact Category	Impact	Comment
Water Use and Quality	SMALL	Impacts would be less than the impacts for a new nuclear power plant located at the proposed site.
Ecology	MODERATE	Impacts would be similar to the proposed project. Solar facilities could add to impacts on terrestrial resources. Permanent impact on wetlands within the project footprint would occur.
Waste Management	SMALL	The only significant waste would be from spent selective catalytic reduction catalyst used for control of NO_x emissions and ash from biomass.
Socioeconomics	MODERATE Beneficial to SMALL Adverse	Construction and operation impacts would be similar to those for the natural-gas–fired alternative, with all impacts SMALL and adverse, with the exception of a MODERATE and beneficial impact from road improvements and SMALL beneficial economic and tax impacts throughout the affected region. Some construction-related impacts would occur, but the impacts would be minor because of the small workforce involved. Aesthetic impacts would be SMALL.
Human Health	SMALL	Regulatory controls and oversight would be protective of human health.
Historic and Cultural Resources	MODERATE	The new transmission lines would have a noticeable adverse impact on the viewshed for cultural and historic resources. The impacts could be greater if the biomass or solar component was constructed on a location that contained archaeological resources.
Environmental Justice	NONE[(a)]	No disproportionately high or adverse impacts on minority or low-income populations would be anticipated based on analysis of census data and field interviews.

(a) A determination of "NONE" for environmental justice analyses does not mean there are no adverse impacts on minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

9.2.5 Summary Comparison of Alternatives

Table 9-4 contains a summary of the NRC staff's environmental impact characterizations for constructing and operating new nuclear, coal-fired, and natural-gas−fired power-generating units, and a combination of alternatives at the Turkey Point site. The combination of alternatives shown in Table 9-4 assumes siting of the natural-gas−fired, combined-cycle units at the Turkey Point site and siting of other alternative power-generating units within FPL's ROI. The significance levels used in the comparison table for the nuclear category originate from Chapters 4, 5, and 6 for construction and preconstruction as well as operational impacts. Because all or most of the electrical generation for the alternatives would be sited at the proposed site, the consideration of climate change in Appendix I would be applicable to these energy alternatives.

The NRC staff reviewed the available information about the environmental impacts of power-generation alternatives compared to the construction of new nuclear units at the Turkey Point site. Based on this review, the NRC staff concludes that, from an environmental perspective,

none of the viable energy alternatives is environmentally preferable to construction of a new baseload nuclear power-generation plant at the Turkey Point site.

Table 9-4. Summary of the Environmental Impacts[a] of Construction and Operation of New Nuclear, Coal-Fired, and Natural-Gas–Fired Generating Units and a Combination of Alternatives

Impact Category	Nuclear	Coal	Natural Gas	Combination of Alternatives
Land Use	MODERATE	MODERATE	MODERATE	MODERATE
Air Quality	SMALL	MODERATE	SMALL to MODERATE	SMALL to MODERATE
Water Use and Quality	SMALL	SMALL	SMALL	SMALL
Ecology	MODERATE	MODERATE	MODERATE	MODERATE
Waste Management	SMALL	MODERATE	SMALL	SMALL
Socioeconomics	MODERATE Beneficial to MODERATE Adverse	MODERATE beneficial to MODERATE adverse	MODERATE beneficial to SMALL adverse	MODERATE beneficial to SMALL adverse
Human Health	SMALL	SMALL	SMALL	SMALL
Historic and Cultural Resources	MODERATE	MODERATE	MODERATE	MODERATE
Environmental Justice	NONE[b]	NONE[b]	NONE[b]	NONE[b]

(a) Impact levels for all alternatives are for construction and operation but are not cumulative. Thus, the nuclear impacts identified here may differ from those used to compare impacts with those of the alternative sites, which use cumulative impacts.

(b) A determination of "NONE" for environmental justice analyses does not mean there are no adverse impacts on minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

Because of current concerns related to GHG emissions, it is appropriate to specifically discuss the differences among the alternative energy sources regarding CO_2 emissions. The CO_2 emissions for the proposed action and energy-generation alternatives are discussed in Sections 5.7.1, 9.2.2.1, 9.2.2.2, and 9.2.4. Table 9-5 summarizes the CO_2 emission estimates for a 40-year period for the alternatives considered by the NRC staff to be viable for baseload power generation. These estimates are limited to the emissions from power generation and do not include CO_2 emissions for workforce transportation, construction, fuel cycle, or decommissioning. Among the reasonable energy-generation alternatives, the CO_2 emissions for nuclear power are a small fraction of the emissions of the other viable energy-generation alternatives. Even when the transportation emissions attributable to the nuclear workforce and the fuel-cycle emissions are added in, which would increase the emissions for plant operations over a 40-year period to about 11,000,000 MT CO_2e, this number is still significantly lower than the emissions for the plant operations portion of the other reasonable energy-generation alternatives.

Table 9-5. Comparison of Carbon Dioxide Emissions for Energy Alternatives

Generation Type	Years	CO_2 Emissions (MT)[a]
Nuclear Power[b]	40	362,000
Coal-Fired Generation[c]	40	748,000,000
Natural-Gas–Fired Generation[d]	40	252,000,000
Combination of Alternatives[e]	40	208,000,000

(a) Nuclear power emissions are in units of MT CO_2e whereas the other energy alternatives emissions estimates are in units of MT CO_2. If nuclear power emissions were represented in MT CO_2, the value would be slightly less, because other GHG emissions would not be included.
(b) From Section 5.7.1 for two units operational emissions, not including CO_2 emissions for workforce transportation.
(c) From Section 9.2.2.1.
(d) From Section 9.2.2.2.
(e) From Section 9.2.4

On June 3, 2010, the EPA issued a rule that tailors the applicability criteria. The rule determines which stationary sources and modifications to existing projects become subject to permitting requirements for GHG emissions under the PSD and Title V programs of the Clean Air Act (75 FR 31514) (TN1404). According to the Tailoring Rule, GHG emissions are a regulated New Source Review pollutant under the PSD major source permitting program if the source (1) is otherwise subject to PSD (for another regulated New Source Review pollutant) and (2) has a GHG potential to emit equal to or more than 75,000 T/yr of CO_2e (i.e., "carbon dioxide equivalent" adjusting for different global warming potentials for different GHGs), then the source would be subject to BACT. In addition, on October 23, 2015, the EPA published its final standards to limit CO_2 emissions from new coal- and gas-fired power plants (80 FR 64509) (TN4388). The use of BACT has the potential to reduce the amount of GHGs emitted from stationary source facilities. The implementation of this rule could reduce the amount of GHGs from the values indicated in Table 9-5 for coal and natural gas, as well as from other alternative energy sources that would otherwise have appreciable uncontrolled GHG emissions. The GHG emissions from the production of electricity from a nuclear power source are primarily from the fuel cycle, and such emissions could be reduced further if the electricity from the assumed fossil-fuel source powering the fuel cycle is subject to BACTs. The emission of GHGs from the production of electrical energy from a nuclear power source is orders of magnitude less than those of the reasonable alternative energy sources. Accordingly, the comparative relationship between the energy sources listed in Table 9-5 would not change meaningfully, even if possible reductions to the GHG emissions from the nuclear fuel cycle are ignored, because GHG emissions from the other energy source alternatives would not be sufficiently reduced to make them environmentally preferable to the proposed project.

CO_2 emissions associated with other energy-generation alternatives, such as wind power, solar power, and hydropower, would be associated with workforce transportation, construction, and decommissioning of the facilities. Because these power-generation alternatives do not involve combustion, the review team considers the GHG emissions to be minor and concludes that the GHG emissions would have a minimal cumulative impact. Other energy-generation alternatives involving combustion of oil, wood waste, municipal solid waste, or biomass-derived fuels would produce CO_2 emissions from combustion, as well as from workforce transportation, plant construction, and plant decommissioning. It is likely that the CO_2 emissions from the combustion process for these alternatives would dominate the other CO_2 emissions associated with the generation alternative. It is also likely that the CO_2 emissions from these alternatives

would be of the same order of magnitude as the emissions for the fossil-fuel alternatives considered in Sections 9.2.2.1, 9.2.2.2, and 9.2.4. However, because the review team determined that these alternatives would not meet the need for baseload power generation, their CO_2 emissions were not evaluated quantitatively.

Insofar as some of these alternatives, such as biomass, are considered in the combination of alternatives discussed in Section 9.2.4, they would increase the total CO_2 emissions beyond the numbers shown in Table 9-5; however, the review team considers the small fraction contributed by these technologies in comparison to the contributions of the natural-gas component for the combination of alternatives case to have a minimal further cumulative impact that does not warrant a more precise analysis.

As discussed in Chapter 8, the NRC staff concludes that the need for additional baseload power generation has been demonstrated. Also, as discussed earlier in this chapter, the NRC staff concludes that the viable alternatives to the proposed action all would involve the use of fossil fuels (coal or natural gas). Consequently, the NRC staff concludes that the proposed action results in the lowest level of emissions of GHGs among the viable alternatives.

9.3 Alternative Sites

The NRC's ESRP (NRC 2000-TN614) states that the ER, submitted in conjunction with an application for a COL, should include an evaluation of alternative sites to determine if any obviously superior alternative to the proposed site exists. The NRC's site-selection process guidance calls for identification of a ROI, followed by successive screening to identify candidate areas, potential sites, candidate sites, and the proposed site (NRC 2000-TN614). This section includes a discussion of FPL's ROI for the proposed siting of a new nuclear power plant, and describes its alternative site-selection process. This is followed by the review team's evaluation of the FPL site-selection process, a description of the alternative sites selected, and discussion of the environmental impacts of locating the proposed facilities at each alternative site.

The review of alternative sites consists of a two-part sequential test (NRC 2000-TN614). The first part of the test determines whether any of the alternative sites are environmentally preferable. To determine if a site is environmentally preferable, the NRC staff considers whether the applicant has (1) reasonably identified candidate sites, (2) evaluated the likely environmental impacts of the proposed action at these sites, and (3) used a logical means of comparing sites that led to selection of the proposed site. Based on its independent review, the NRC staff determines whether any of the alternative sites are environmentally preferable to the applicant's proposed site. If the NRC staff determines that one or more alternative sites are environmentally preferable, it then proceeds with the second part of the test.

The second part of the test determines if an environmentally preferable alternative site is not simply marginally better, but obviously superior to the proposed site. The NRC staff examines whether (1) one or more important aspects, either singly or in combination, of an acceptable and available alternative site are obviously superior to the corresponding aspects of the applicant's proposed site, and (2) the alternative site does not have offsetting deficiencies in other important areas. Included in this part of the test is the consideration of estimated costs (i.e., environmental, economic, and time of building the proposed plant) at the proposed site and at the environmentally preferable site or sites (NRC 2000-TN614).

The specific resources that could be affected by the incremental effects of the proposed action and other actions in the same geographic area were assessed. For the purposes of this alternative sites evaluation, impacts evaluated include NRC-authorized construction, operation, and other cumulative impacts including preconstruction activities. Sections 9.3.2 through 9.3.5 provide a site-specific description of the environmental impacts at each alternative site based on issues such as land use, water resources, terrestrial and aquatic ecology, socioeconomics, environmental justice, historic and cultural resources, air quality, nonradiological health, radiological impacts of normal operation, and postulated accidents. Section 9.3.6 contains a table of the NRC staff's characterization of the impacts at the alternative sites and comparison with the proposed site to determine if there are any alternative sites that are environmentally preferable to the proposed site.

9.3.1 Alternative Site-Selection Process

FPL's site-selection process was based on guidance provided in the NRC's ESRP (NRC 2000-TN614), NRC Regulatory Guide 4.7, Revision 2 (NRC 1998-TN1008), and the Electric Power Research Institute (EPRI) siting guide (EPRI 2002-TN1799). The site-selection and comparison process focused on identifying and evaluating sites that represented an acceptable range of alternatives for the proposed Turkey Point Units 6 and 7. The following information details the process used to identify and screen sites in successive steps until a reasonable number of alternative sites were determined and evaluated, and the proposed Turkey Point plant site was selected (FPL 2014-TN4058).

FPL's screening process proceeded through the following steps, which successively reduced the number of sites to the final candidate sites (FPL 2014-TN4058):

- ROI: Largest geographic area of consideration, defined as the FPL service area.
- Candidate Areas: Areas within the ROI that would support the facility as proposed. These areas were determined by using exclusionary and/or avoidance criteria to screen the ROI to eliminate the areas where it would not be feasible to site a nuclear facility because of regulatory, institutional, plant design, and/or significant environmental impacts.
- Potential Sites: Discrete parcels of land found within the candidate areas that would support the facility as proposed. Potential sites were determined by using a refined set of exclusionary and/or avoidance criteria to screen the candidate areas. The screening data set was more refined and of higher detail than the data set used to identify the candidate areas.
- Candidate Sites: Sites that were selected by applying suitability criteria to the potential site list. This selection process used a quantifiable weighting and ranking process, including sensitivity analysis.
- Proposed Site: FPL selected the Turkey Point site based on the exception discussed in ESRP 9.3 (NRC 2000-TN614). FPL also retained the St. Lucie site based on this exception. FPL then compared the proposed and alternative sites on an issue-by-issue basis that allowed the applicant to identify both cost and environmental trade-offs associated with developing each of the sites. This approach provided a high level of assurance that the proposed site had no fatal flaw that could result in environmental impacts outside the identified scope, licensing delays, or increased cost.

ESRP 9.3 (NRC 2000-TN614) recognizes the potential value of including existing nuclear power plant sites that were "previously found acceptable on the basis of a National Environmental Policy Act (NEPA) review, or have [been] demonstrated to be environmentally acceptable on the basis of operating experience, or allocated to an applicant by a state government from a list of state approved power plant sites." Based on FPL's interpretation of ESRP 9.3, of the five final candidate sites, FPL determined that both the Turkey Point and the St. Lucie plant sites met the preceding criteria of having been found previously acceptable after a NEPA review. The NRC staff notes that previous determinations of site acceptability do not exempt that site from the same level of rigor of evaluation applied to the other alternative sites. The ESRP simply recognizes that a significant level of site characterization may have already been conducted, thereby providing a reasonable basis for assessment.

FPL's site-selection process is summarized herein and in its ER (FPL 2014-TN4058). A more detailed discussion of FPL's site-selection process is available in FPL's initial 2006 siting document, *Project Bluegrass New Nuclear Power Generation Final Site Selection Study Report* (FPL 2007-TN3854). Subsequently, the ER and the siting report were supplemented in 2011 with a report titled *Florida Power & Light Company Turkey Point 6 & 7 New Nuclear Power Generation (Formerly Project Bluegrass) Augmented Site Selection Study Report* (FPL 2011-TN36) in response to the NRC's environmental audit and requests for additional information (NRC 2011-TN3751) to demonstrate that the site-selection process was conducted in a manner consistent with NUREG–1555, Section 9.3 (NRC 2000-TN614; FPL 2014-TN4058).

9.3.1.1 Selection of Region of Interest

For this COL application, the FPL defined the ROI as the area within (or immediately adjacent to) the FPL service territory. The FPL service territory is shown in Figure 9-1.

Although FPL's service territory extends north to south across the State of Florida, FPL indicated that its need for power is focused primarily on the load centers for the greater Miami area (FPL 2011-TN36; FPL 2014-TN4058).

9.3.1.2 Selection of Candidate Areas

FPL reduced the ROI to candidate areas by applying the following five exclusionary criteria: (FPL 2014-TN4058)

- areas greater than 10 mi from qualifying rivers and 10 mi from the Atlantic Ocean and the Gulf of Mexico
- areas greater than 10 mi from qualifying wastewater-treatment plants
- census block groups where population density >300 persons/mi^2
- lands designated as national parks, National Wildlife Refuges, National Marine Sanctuary Areas, military installations, Indian lands, and Florida State parks
- critical habitat for the following U.S. Fish and Wildlife Service (FWS)-listed threatened or endangered species: American crocodile (Crocodylus acutus), Cape Sable seaside sparrow (*Ammodramus maritimus mirabili*), Choctawhatchee beach mouse (*Peromyscus polionotus allophrys [Bowen]*), Everglade snail kite (*Rostrhamus sociabilis plumbeus*), frosted flatwoods salamander (*Ambystoma cingulatum [Cope]*), Gulf Sturgeon (*Acipenser oxyrinchus*), Johnson's seagrass (*Halophila johnsonii*), Perdido Key beach mouse (*Peromyscus*

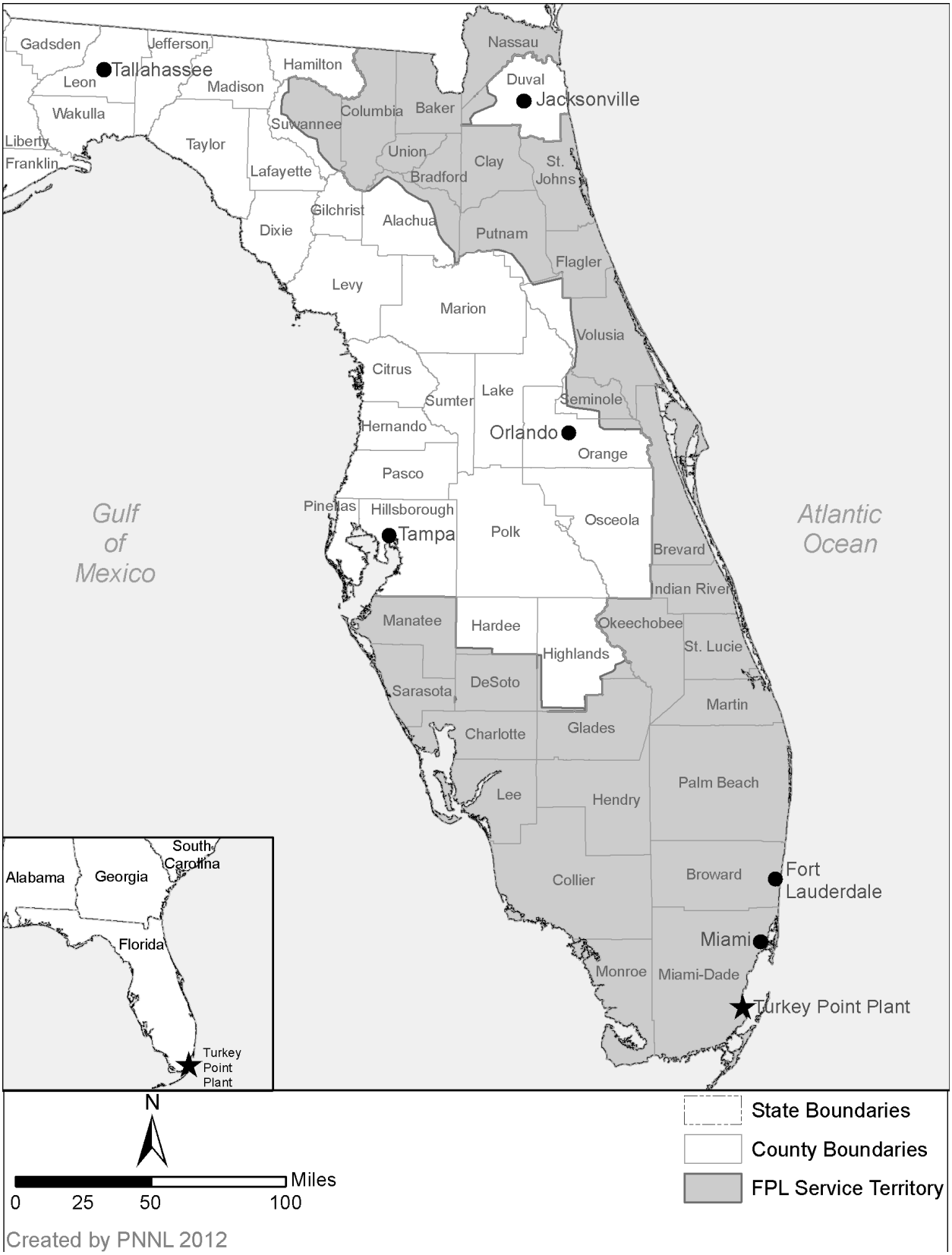

Figure 9-1. FPL Service Territory

polionotus trissyllepsis [Bowen]), piping plover (*Charadrius melodus*), purple bankclimber (*Elliptoideus sloatianus*), rice rat (*Oryzomys palustris*), right whale (*Eubalaena glacialis*), and St. Andrew beach mouse (*Peromyscus polionotus peninsularis*).

After applying these exclusionary criteria, FPL identified the 16 candidate areas identified in Figure 9-2 and Figure 9-3.

9.3.1.3 Selection of Potential Sites

In FPL's initial site-selection process (FPL 2011-TN36) an internal FPL team was canvassed to identify known available sites within or near the FPL service territory. This initial effort identified 23 potential sites consisting of existing FPL power-generation sites, FPL-owned greenfield sites, and other greenfield sites that FPL did not own. These 23 potential sites were qualitatively evaluated using the following criteria (FPL 2014-TN4058):

- sufficient land currently exists for new nuclear power plant construction
- sufficient land can be obtained for new nuclear power plant construction
- adequate sources of water
- transmission feasibility.

Based on this evaluation, the original 23 potential sites were screened and reduced to 15 sites. FPL eliminated four sites because they were too distant from the primary load center of Miami-Dade requiring new, difficult to obtain transmission line rights-of-way. An additional four sites were eliminated by FPL based on insufficient available space and determinations that additional lands were either not available or would be difficult to obtain (FPL 2014-TN4058).

As described previously in Section 9.3.1, in 2011 FPL supplemented its initial screening evaluation with its Augmented Site Selection Study Report (FPL 2011-TN36) and applied the following screening criteria to the 16 candidate areas:

- avoidance of high-population areas
- avoidance of ecologically sensitive and special designation areas
- avoidance of special dedicated land uses (e.g., national parks)
- proximity to target transmission/load centers
- a minimum size of 5,000 ac
- flexibility to optimize site layout and design for cost minimization
- flexibility to optimize site layout and design for avoidance or mitigation of environmental impacts
- optimization of site engineering factors (e.g., topography, foundation conditions, grading requirements) (FPL 2014-TN4058).

Through this process, FPL identified 6 additional greenfield sites to consider as potential sites for a total of 21 potential sites as identified in Figure 9-4.

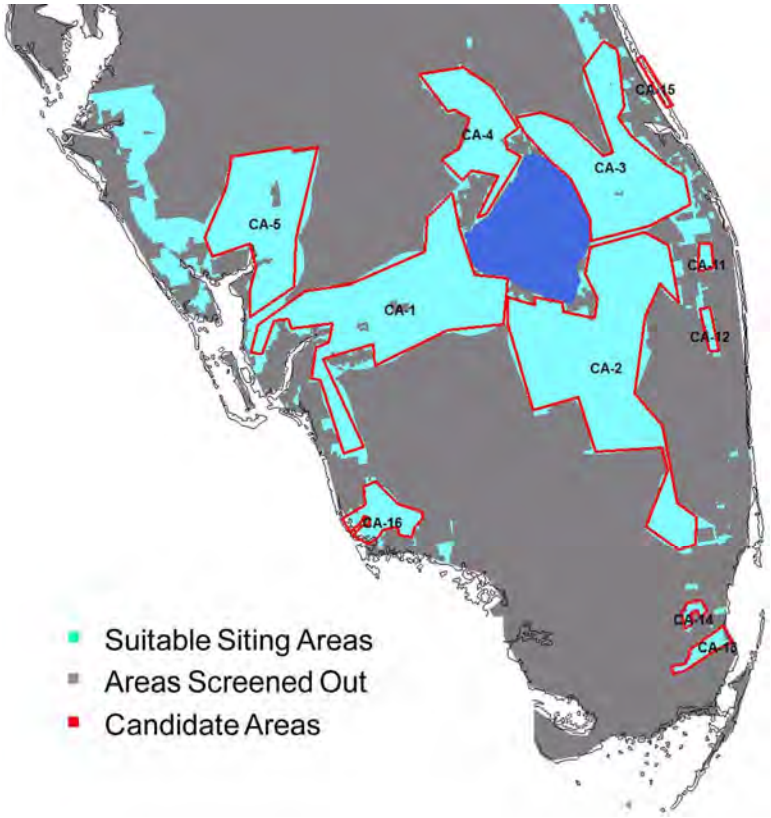

Figure 9-2. Candidate Areas: Southern Service Territory

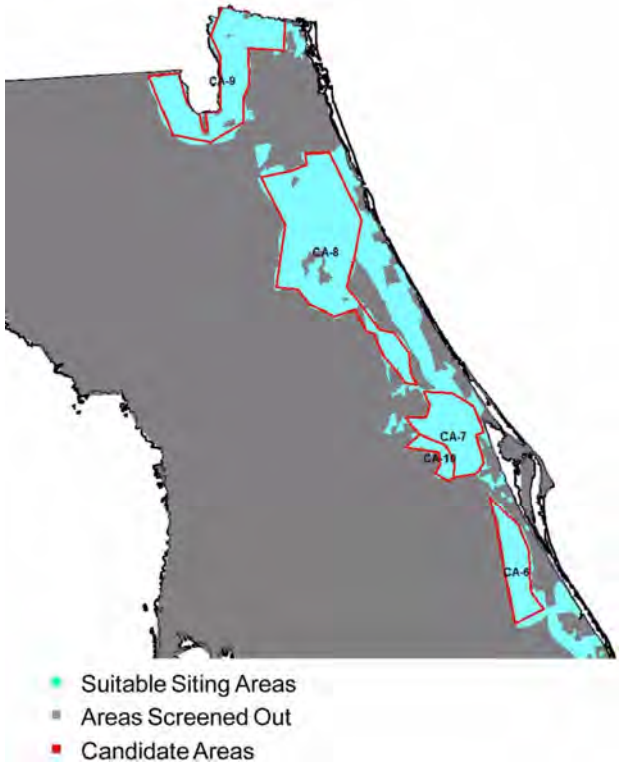

Figure 9-3. Candidate Areas: Northern Service Territory

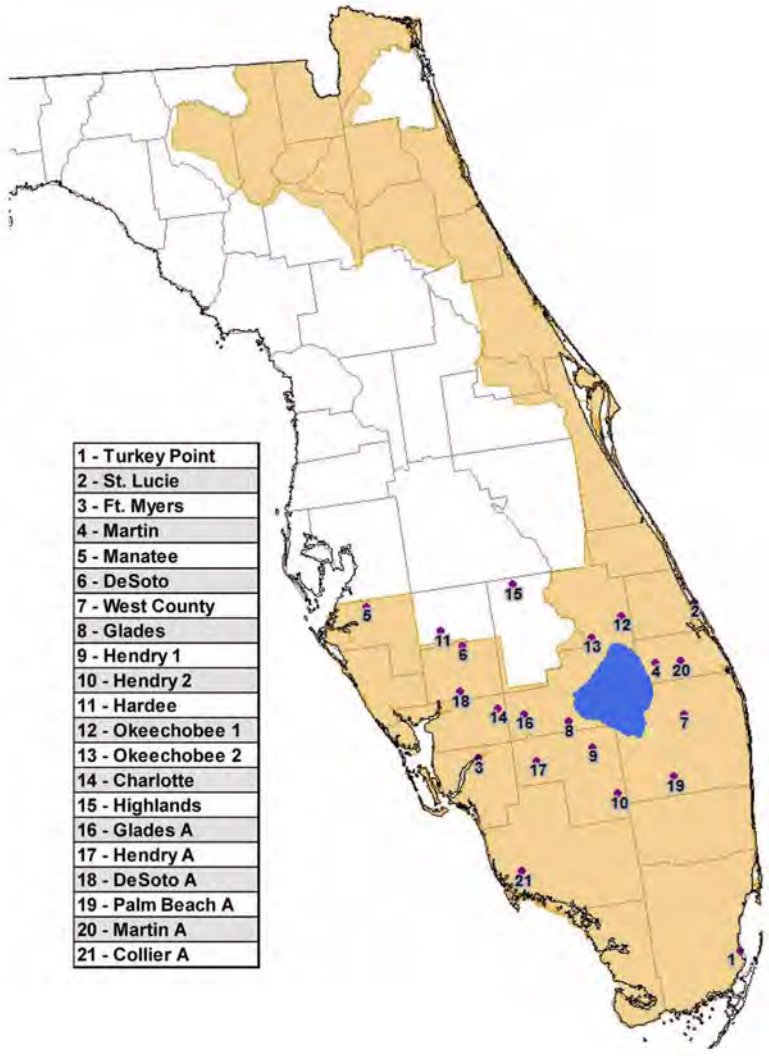

Figure 9-4. Potential Site Locations

FPL evaluated the 21 potential sites against the following 9 weighted screening criteria (FPL 2014-TN4058):

- cooling-water supply
- flooding
- population
- hazardous land uses
- ecology
- wetlands
- railroad access
- transmission access
- land acquisition.

FPL's detailed description of the metrics and rating rationale for each of these criteria is provided in the ER in Table 9.3-3. Of the original 21 potential sites FPL selected the top 8 ranked sites, and even though they ranked below these 8 sites, FPL also retained the Turkey

Point and St. Lucie sites "based on the fact that they are existing, operating nuclear power plant sites within the ROI," and FPL's determination that the sites fall within "the special case (described above) for licensed nuclear power plant sites" (FPL 2014-TN4058). The resulting 10 potential sites were:

- DeSoto
- Glades
- Glades A
- Hendry 1
- Martin
- Martin A
- Okeechobee 1
- Okeechobee 2
- St. Lucie
- Turkey Point.

9.3.1.4 Selection of Candidate Sites

FPL next subjected these 10 potential sites to further evaluation against 34 weighted screening criteria, including 12 health and safety criteria, 8 environmental criteria, 3 socioeconomic criteria, and 11 engineering and cost criteria. A detailed list of all 34 criteria can be found in the ER in Table 9.3-5 (FPL 2014-TN4058).

In the resulting composite scores, the Okeechobee 1, DeSoto, and Hendry 1 sites rated lowest and were eliminated from further consideration. Of the remaining seven sites, FPL determined that neither the Martin A nor the Glades A sites presented any significant advantages over the Martin and Glades sites, respectively (sites that had already been evaluated in detail in the 2006 study), and therefore they were also dropped from further consideration. The resulting five candidate sites proposed by FPL, from highest to lowest composite score, are:

- Turkey Point
- St. Lucie
- Martin
- Okeechobee 2
- Glades.

9.3.1.5 Selection of the Proposed Site

FPL subjected the five candidate sites to an additional qualitative review using the following 11 criteria:

- Environmental impact – existence of ecological or environmental permitting issues
- Transmission – availability of existing right-of-way and cost of upgrades
- Land acquisition – existing land ownership and expected difficulty of acquiring site (if applicable)
- Reliability (transmission) – analysis of reliability from a power-transmission perspective

- Reliability (generation) – qualitative analysis of risk factors for reliable power production and supply
- Public acceptance – ability to obtain public acceptance to support siting activities
- Political (local) – governmental/organizational support at the local level
- Political (state) – governmental and regulatory support at the State and Federal level
- Transmission takeaway – feasibility of constructing the necessary upgrades to deliver power to the system
- Schedule compatibility – level of confidence that site will support commencement of combined license application activities in January 2007
- Site layout feasibility – ability of site to accommodate plant layout.

Using a three-point scoring system where 1 equaled more favorable and 3 equaled less favorable, FPL overall scoring ranked the sites in numerical order as follows:

1. Turkey Point
2. Glades
3. Martin
4. Okeechobee 2
5. St. Lucie.

Thus FPL selected the Turkey Point site as its proposed site based on this ranking and its determination that the site was the preferred site for meeting FPL's overall business objectives (FPL 2014-TN4058).

9.3.1.6 Review Team Evaluation of FPL's Site-Selection Process

The NRC staff evaluated the methodology used by FPL and concluded that the process was reasonable and consistent with the guidelines presented in the ESRP and EPRI's siting guide. The review team found that the systematic alternative siting analysis demonstrated a logical selection process and application of screening and exclusionary siting criteria. The analysis enabled the evaluation of the likely environmental impacts associated with the respective sites, including the evaluation of suitability criteria; identified acceptable alternative sites; and clearly provided the mechanism for selection of the final proposed site.

Following the guidance provided in ESRP 9.3 (NRC 2000-TN614), the review team visited the four alternative sites and collected and analyzed reconnaissance-level information for each site. The review team then used the information in the ER, siting studies, and responses to requests for additional information (RAIs), information from other Federal and State agencies, and information gathered during the site visits to evaluate the environmental impacts of building and operating two new nuclear power plants at those sites. The analysis considered the impacts of NRC-authorized construction and operation as well as potential cumulative impacts associated with other actions affecting the same resources, including but not limited to preconstruction.

The cumulative impact analysis for the alternative sites was performed in the same manner as discussed in Chapter 7 for the proposed site except that, as specified in ESRP 9.3 (NRC 2000-

TN614), the analysis was conducted at the reconnaissance level. The review team researched EPA databases for recent EISs within the State; used an EPA database for permits for water discharges in the geographic area to identify water-use projects; and used www.recovery.gov to identify projects in the geographic area funded by the American Recovery and Reinvestment Act of 2009 (ARRA) (26 U.S.C. § 1) (TN1250). The review team developed tables of the major projects near each alternative site that were considered relevant in the cumulative analysis. The review team used the information to perform an independent evaluation of the direct, indirect, and cumulative impacts of the action at the alternative sites to determine if one or more of the alternative sites were environmentally preferable to the proposed site.

Included are past, present, and reasonably foreseeable Federal, non-Federal, and private actions that could have meaningful cumulative impacts with the action. For the purposes of this analysis, the past is defined as the time period prior to receipt of the COL application. The present is defined as the time period from the receipt of the COL application until the beginning of NRC-authorized construction of proposed Units 6 and 7. Future actions are those that are reasonably foreseeable through NRC-authorized construction and operation of the proposed Units 6 and 7 and decommissioning.

The specific resources and components that could be affected incrementally by the action and other actions in the same geographic area were identified. The affected environment that serves as the baseline for the cumulative impacts analysis is described for each alternative site, and a qualitative discussion of the general effects of past actions is included. The geographic area over which past, present, and future actions could reasonably contribute to cumulative impacts is defined and described for each resource area. The analysis for each resource area at each alternative site concludes with a cumulative impact finding (SMALL, MODERATE, or LARGE). For conclusions greater than SMALL, the review team also discussed whether building and operating the proposed facilities would be a significant contributor to the cumulative impact. In the context of this evaluation, “significant” is defined as a contribution that is important in reaching that impact-level determination.

The review team considered in Appendix I how future climate change could affect the evaluation of the impacts of operating the proposed new nuclear units at the Turkey Point site. The considerations in Appendix I would also apply to the alternative sites because all of the alternative sites are in the same geographic area (the Southeast Region) as the proposed site for the purposes of the analysis in the third National Climate Change Assessment by the U.S. Global Change Research Program (GCRP 2014-TN3472). The inland alternative sites could experience fewer impacts from sea-level rise, but may also experience greater impacts from other climate change indicators, such as rising temperature.

The nonradiological waste impacts described in Sections 4.10 and 5.10 would not substantially vary from one site to another. The types and quantities of nonradiological and mixed waste would be approximately the same for construction and operation of two Westinghouse AP1000 pressurized water reactors at any of the alternative sites. For each alternative site, all wastes destined for land-based treatment or disposal would be transported offsite by licensed contractors to existing, licensed, disposal facilities operating in compliance with all applicable Federal, State, and local requirements. All nonradioactive, liquid discharges would be discharged in compliance with the provisions of the applicable National Pollutant Discharge

Elimination System (NPDES) permit. For these reasons, these impacts are expected to be minimal and will not be discussed separately in the evaluation of each alternative site.

The impacts described in Chapter 6 of this EIS (e.g., nuclear fuel cycle and decommissioning) would likewise not substantially vary from one site to another because the NRC staff assumes the same reactor design (therefore, the same fuel-cycle technology, transportation methods, and decommissioning methods) for all of the sites. As such, these impacts would not differentiate between the sites and would not be useful in the determination of whether an alternative site is environmentally preferable to the proposed site. For this reason, these impacts are not discussed in the evaluation of the alternative sites.

Three of the four alternative sites are located near Lake Okeechobee, the largest lake in the southeastern United States (SFWMD et al. 2011-TN3087). However withdrawal of water from the lake and its tributaries is heavily regulated to meet management and restoration goals for the lake and other resources in South Florida (SFWMD 2012-TN3085). As a result, FPL has proposed a combination of surface water and groundwater resources to meet the cooling-water needs of two nuclear power units at these alternative sites. During periods of excess flow, water from the Kissimmee River/Lake Okeechobee system would be withdrawn and stored in a 3,000 ac reservoir on the site. During periods when this water was not sufficient, groundwater from the Avon Park permeable zone (APPZ) would be withdrawn and treated with reverse osmosis to reduce the salinity of the water so that sensitive plant and animal communities in the area would not be affected by salt drift from the cooling towers (FPL 2013-TN3052). Blowdown water would be disposed of by injecting the water into the Boulder Zone resulting in no discharge of wastewater to surface waters or groundwaters used as potable water supplies.

To minimize the environmental impacts at these alternative sites, the review team considered an alternative configuration of the cooling system that FPL proposed. The review team was unable to confirm that, based on the drift rates provided by FPL for the Turkey Point cooling towers using brackish or saline water, salt deposition would be sufficiently adverse to the ecosystem to preclude the use of groundwater from the APPZ for cooling without a reverse osmosis system. The review team concluded that such a system would not be required. In addition, increased use of groundwater could reduce or eliminate the requirement for a surface-water reservoir. Therefore, the review team performed an analysis that did not include either a surface-water reservoir or a reverse osmosis system as part of the cooling system for each inland alternative site. The review team assumed that the revised design would use surface water only at times of excess flow. The review team acknowledges that the revised cooling-system design would result in a reduced number of cycles of concentration, greater groundwater pumping, and greater deep-well injection, all of which may contribute to greater operational and maintenance costs.

The review team also notes that no power-generating station in Florida relies on groundwater from an aquifer of the depth of the APPZ, and it knows of no individual user of groundwater from this depth that would use water in the quantities necessary to cool two AP1000 units. There is, therefore, significant uncertainty regarding how the cooling system might be implemented at any of these three sites. If such a plant were to be built, State regulators could require actions to address environmental concerns, such as a cooling-water reservoir or a reverse osmosis plant. To address some of this uncertainty, in addition to evaluating the environmental impacts of its

version of the cooling system, the review team qualitatively assessed how those impacts would be different if a 3,000 ac reservoir was included in the design of the system. Based on that assessment, including the reservoir would increase the impacts on land use and terrestrial ecology, while also increasing in a minor way the impacts on aquatic ecology and surface-water use. Impacts on other resources would likely not change appreciably. The review team did not include any assessment of the impacts with reverse osmosis treatment of the water because the team concluded that such treatment would not be necessary.

The cumulative impacts are summarized for each resource area in the subsections that follow. The level of detail is commensurate with the potential significance of the impacts. The four alternative sites are described in the following sections—the Glades site (9.3.2), the Martin site (9.3.3), the Okeechobee 2 site (9.3.4), and the St. Lucie site (9.3.5). A summary comparison of the review team's characterization of the impacts of the proposed action at the proposed and alternative sites is presented in Section 9.3.6 and Table 9-28.

9.3.2 Glades Site

This section covers the review team's evaluation of the potential environmental impacts of siting a new two-unit nuclear power plant on the Glades site. The Glades site is located in an undeveloped area in southeastern Glades County approximately 1 mi south of U.S. Highway 27 (US-27). Nearby towns include Moore Haven (2 mi east), Clewiston (15 mi southeast), La Belle (18 mi west), and Okeechobee (35 mi northeast). The Miami load center is approximately 75 mi southeast of the Glades site. Lake Okeechobee is approximately 5 mi to the northeast (FPL 2014-TN4058). The location of the Glades site is shown in Figure 9-5.

The Glades site is an undeveloped greenfield site approximately 3,000 ac in size (FPL 2014-TN4058). The majority of the site is currently agricultural fields. Topography does not vary considerably over the site.

FPL assumed the facility footprint, including the power units, support buildings, switchyard, storage areas, stormwater-retention ponds, and other structures, would require an estimated 362 ac Figure 9-6. Building at the Glades site would also require the creation of a transmission line corridor approximately 121 mi long, a 1.9 mi access road (23.1 ac), installation of 6.2 mi of railway (74.8 ac), and an intake/makeup pipeline (3.4 ac). Additional area (up to several hundred acres) would be temporarily disturbed for activities such as laydown areas, a batch plant, and for fill and spoil deposition (FPL 2014-TN4058). As discussed in Section 9.3.1.7, the review team considered an alternative configuration of the cooling system that FPL proposed.

The following sections include a cumulative impact assessment conducted for each major resource area. The specific resources and components that could be affected by the incremental effects of the proposed action if implemented at the Glades site and other actions in the same geographic area were considered. This assessment includes the impacts of NRC-authorized construction and operations and impacts of preconstruction activities. Also included in the assessment are past, present, and reasonably foreseeable future Federal, non-Federal, and private actions that could have meaningful cumulative impacts when considered together with the proposed action if implemented at the Glades site. Other actions and projects considered in this cumulative analysis are described in Table 9-6.

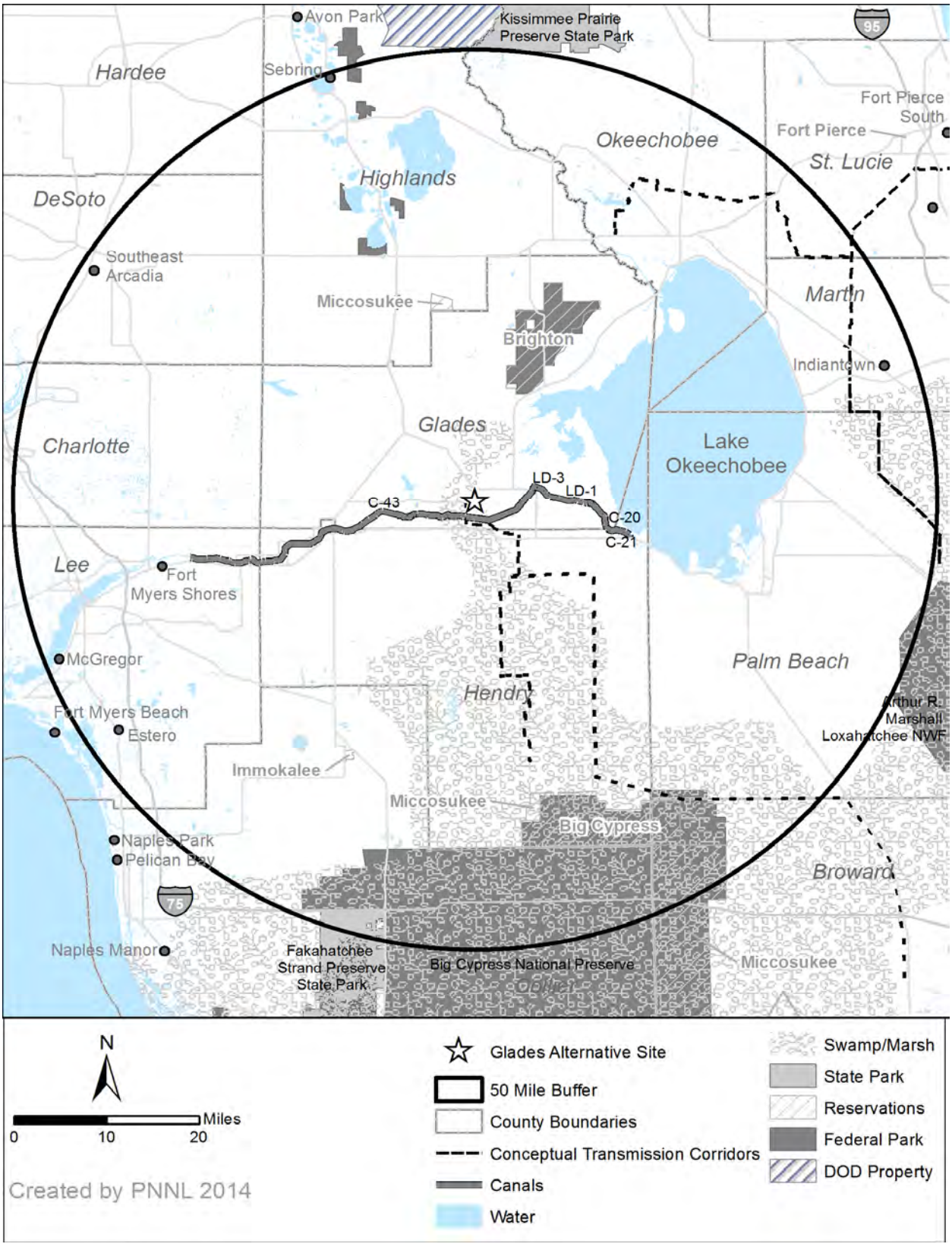

Figure 9-5. The Glades Site Region

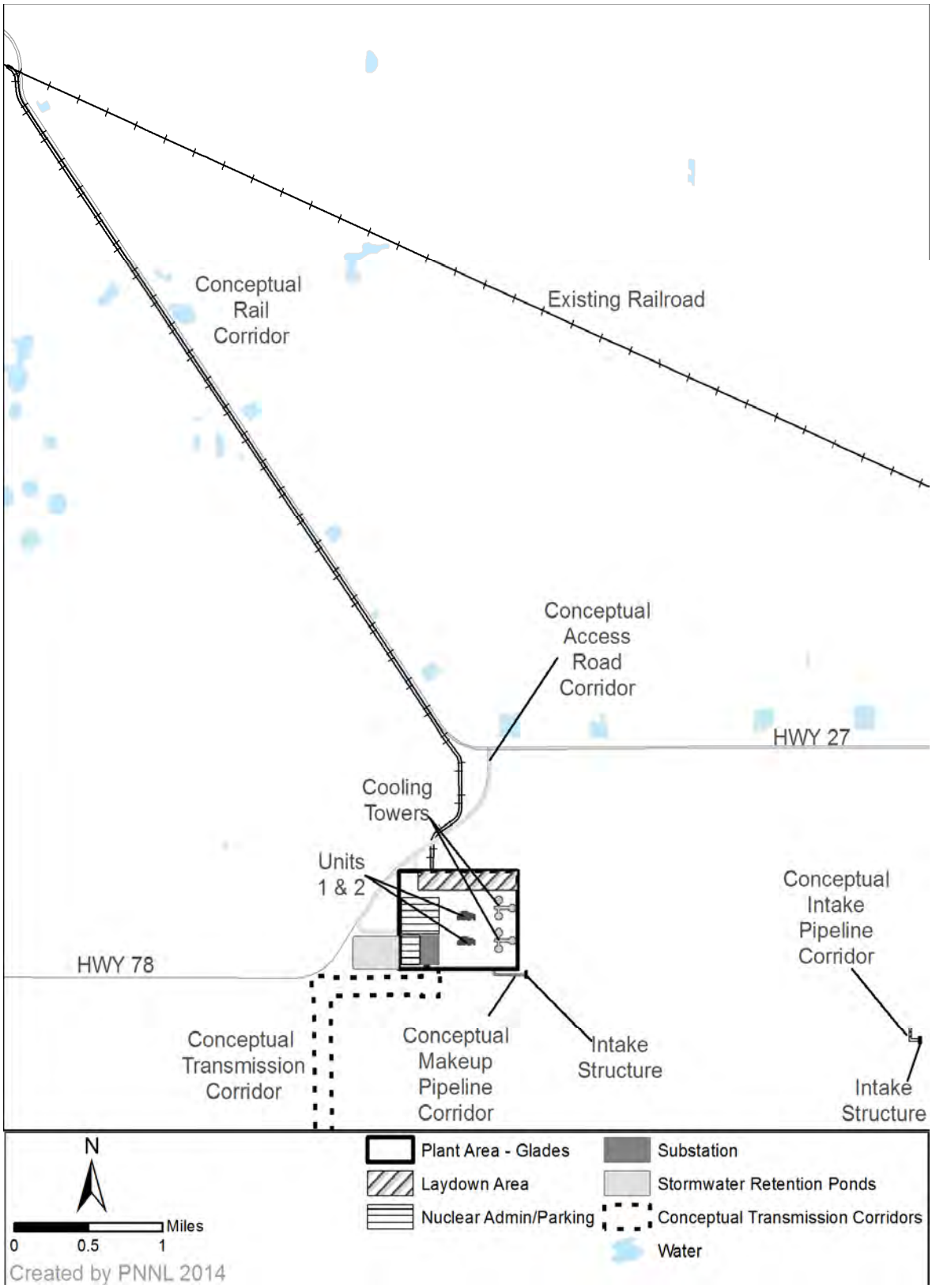

Figure 9-6. Glades Site Footprint

Table 9-6. Past, Present, and Reasonably Foreseeable Projects and Other Actions in the Vicinity of the Glades Alternative Site

Project Name	Summary of Project	Location	Status
Energy Projects			
St. Lucie	Two 3,020 MW(t) nuclear power reactors	68 mi NE of the Glades alternative site	Operational, Units 1 and 2 underwent license renewal in 2003. Units 1 and 2 completed 320 MW(t) power uprates in 2013 (NRC 2012-TN1668; FPL 2014-TN3360)
West County Energy Center	Three 1,250 MW natural-gas−powered units	50 mi SE of the Glades alternative site	Operational (FDEP 2013-TN2965)
Martin	Approximately 4,300 MW from five units, three natural-gas and two oil units with a solar thermal facility generating supplemental steam	41 mi NE of the Glades alternative site	Operational (FPL 2016-TN4579)
Indiantown Cogeneration Company	330 MW coal-fired power plant	43 mi NE of the Glades alternative site	Operational (FDEP 2013-TN2967)
J.H. Phillips Sebring Station	36 MW two-unit oil power facility	45 mi NW of the Glades alternative site	Put in reserve standby status in 2009 (TECO 2014-TN4125)
Ft. Myers	Combination of oil and gas units with a total combined capacity (summer) of 2,396 MW. FPL has proposed to replace 10 of the 12 63 MW oil-fired units with 3 new 200 MW gas-fired units.	39 mi SW of the Glades alternative site	Operational and Proposed. Replacement of 10 of the 12 oil-fired units is planned in 2016 (FDEP 2013-TN3003; FPL 2016-TN4579)
Lee County Waste-To-Energy Plant	Waste-to-energy power generation	39 mi SW of the Glades alternative site	Operational (Lee County 2014-TN2984)
Okeelanta Cogeneration Facility	140 MW biomass power-generation facility	31 mi SE of the Glades alternative site	Operational (FDEP 2013-TN2968)
FPL pipeline	126 mi pipeline from Sabal Trail's Central Florida Hub to FPL's Martin Clean Energy Center	Throughout region NE of the Glades alternative site	Proposed, construction set to begin 2016 (FPL 2014-TN2975)

Table 9-6. (contd)

Project Name	Summary of Project	Location	Status
Floridian Natural Gas Storage Company - Natural Gas Storage Facility	Storage of Natural Gas	40 mi NE of the Glades alternative site	Proposed, FERC Order amending Certificate issued (FERC 2015-TN4599) with associated Environmental Assessment (FERC 2015-TN4600)
DeSoto Next-Generation Solar Energy Center	25 MW solar-energy plant	50 mi NW of the Glades alternative site	Operational (FPL 2014-TN2974)
Energy Projects (contd)			
Southeastern Renewable Fuels Biorefinery and Cogeneration Plant	30 MW biofuel using leftover sweet sorghum stalk fiber	19 mi SE of the Glades alternative site	Proposed, Final air permit issued by FDEP in 2010 (FDEP 2010-TN2970)
Mining Projects			
Five Stone Mining	Stone/quarry mining	37 mi NE of the Glades alternative site	Operational (EPA 2013-TN2959)
Daniel Shell Pit, Phase 6	Stone/quarry mining	32 mi NE of the Glades alternative site	Operational (EPA 2013-TN2956)
Florida Shell and Rock	Stone/quarry mining	40 mi NW of the Glades alternative site	Operational (EPA 2013-TN2960)
Jay Rock Mine	Stone/quarry mining	40 mi NW of the Glades alternative site	Operational (EPA 2013-TN2962)
E R Jahna Industries Inc - Ortona Mine	Stone/quarry mining	8 mi SW of the Glades alternative site	Operational (EPA 2013-TN2958)
Harper Bros Inc - Alico Quarry	Stone/quarry mining	39 mi SW of the Glades alternative site	Operational (EPA 2014-TN2961)
Bonita Grande Properties	Stone/quarry mining	46 mi SW of the Glades alternative site	Operational (EPA 2014-TN2955)
Various other mine and quarry projects	Stone/quarry mining	Throughout region	Operational (FDEP 2010-TN2966)

Table 9-6. (contd)

Project Name	Summary of Project	Location	Status
Transportation Projects			
Various Transportation Projects	Road, traffic, pedestrian projects	Throughout region	Ongoing (FDOT 2014-TN4014)
Parks and Aquaculture Facilities			
Big Cypress National Preserve	Backcountry access plan to provide off-road vehicle secondary trails, non-motorized trails, and a camping management to the backcountry	38 mi S of the Glades alternative site	Proposed, backcountry access plan and EIS being developed by the National Park Service (NPS) (NPS 2014-TN3754)
Arthur R. Marshall Loxahatchee National Wildlife Refuge	Activities include picnicking, boating, fishing, and hiking	27–60 mi SE of the Glades alternative site	Development likely limited within this area (FWS 2013-TN2992)
Okaloacoochee Slough State Forest	Activities include bicycling, camping, hunting, fishing, and hiking	15–22 mi SW of the Glades alternative site	Development likely limited within this area (SFWMD 2014-TN3005)
Everglades Wildlife Management Area	Activities include bicycling, camping, hunting, fishing, and hiking	40 mi SE of the Glades alternative site	Development likely limited within this area (FFWCC 2014-TN2977)
DuPuis Wildlife and Environmental Area	Activities include bicycling, camping, hunting, fishing, and hiking	37–40 mi NE of the Glades alternative site	Development likely limited within this area (FFWCC 2014-TN2977)
Kissimmee River	Activities include bicycling, Horseback riding, hunting, camping, fishing, and hiking	N and NW of the Glades alternative site	Development likely limited within this area (FFWCC 2014-TN3004)
Okeechobee Battlefield State Park	Hiking, camping	36 mi NE of the Glades alternative site	Development likely limited within this area (FDEP 2010-TN2971)
Archbold Biological Station	Ecological research station and preserve; organization owns and protects a 5,193 ac globally significant Florida scrub preserve located on the southern end of the Lake Wales Ridge	28 mi NW of the Glades alternative site	Development likely limited within this area (Archbold Biological Station 2014-TN2954)
Highlands Hammock State Park	Activities include bicycling, camping, picnicking, horseback riding, fishing, and hiking	48 mi NW of the Glades alternative site	Development likely limited within this area (Florida State Parks 2014-TN2972)

Table 9-6. (contd)

Project Name	Summary of Project	Location	Status
Lake June in Winter Scrub State Park	Activities include picnicking, fishing, and hiking	36 mi NW of the Glades alternative site	Development likely limited within this area (Florida State Parks 2014-TN2973)
Lake Okeechobee	730 mi^2 freshwater lake, restoration and protection plan	14 mi E and NE of the Glades alternative site	Ongoing, Florida Legislature in 2007 expanded the Lake Okeechobee Protection Act (SFWMD 2014-TN2988)
Lake Wales Ridge National Wildlife Refuge	Composed of four tracts within Polk and Highlands Counties. Closed to the public	46 mi NW of the Glades alternative site	Development likely limited within this area (FWS 2011-TN2993)
Other State Nature Preserves and Wildlife Management Areas	Public recreational activities	Throughout region	Development likely limited within these areas (FFWCC 2014-TN2981)
Everglades Ecosystem Restoration and/or Comprehensive Everglades Restoration Plan Projects (DOI 2016-TN4589)			
C-43 Basin Aquifer Storage and Recovery	The Comprehensive Everglades Restoration Plan (CERP) Restudy envisioned aquifer storage and recovery wells with a capacity of approximately 220 million gallons per day and associated pre- and post-water quality treatment located in the C-43 Basin in Hendry, Glades, or Lee Counties in conjunction with another project.	24 mi SW of the Glades alternative site	Proposed, Project in Preconstruction, Engineering and Design phase (USACE and SFWMD 2014-TN3009)
Caloosahatchee River (C-43) West Basin Storage	Project to improve the timing, quantity, and quality of freshwater flows to the Caloosahatchee River estuary	21 mi SW of the Glades alternative site	Proposed, Project in Planning phase. (USACE and SFWMD 2014-TN3010)
Indian River Lagoon -South	Project purpose is to improve surface-water management in the C-23/C-24, C-25, and C-44 basins for habitat improvement in the Saint Lucie River Estuary and southern portions of the Indian River Lagoon.	49 mi E of the Glades alternative site	Proposed, Project in Preconstruction, Engineering and Design phase (USACE and SFWMD 2014-TN3013)

Table 9-6. (contd)

Project Name	Summary of Project	Location	Status
Everglades Agricultural Area Storage Reservoirs	The purpose of this project is to improve the timing of environmental deliveries to the Water Conservation Areas, including reducing damaging flood releases from the Everglades Agricultural Area to the Water Conservation Areas.	Throughout region	Proposed, Final Project Implementation Report submitted 2012 (USACE and SFWMD 2014-TN3011)
Flows to Northwest and Central Water Conservation Areas 3A	The purpose of this feature is to increase environmental water-supply availability, increase depths and extend wetland hydropatterns in the northwest corner and west-central portions of Water Conservation Area 3A.	43 mi SW of the Glades alternative site	Proposed, Project in Preconstruction, Engineering and Design phase (USACE and SFWMD 2014-TN3012)
Lake Okeechobee Aquifer Storage and Recovery	A series of aquifer storage and recovery wells adjacent to Lake Okeechobee	2 mi E of the Glades alternative site	Proposed, Project in Preconstruction, Engineering and Design phase (USACE and SFWMD 2014-TN3014)
Lake Okeechobee Watershed Project	Project to increase aquatic and wildlife habitat, regulate extreme highs and lows in lake staging, reduce phosphorus loading, and reduce damaging releases to the surrounding estuaries	Throughout Okeechobee County	Proposed, Project in Preconstruction, Engineering and Design phase (USACE and SFWMD 2014-TN3015)
Melaleuca Eradication and other Exotic Plants	The project includes (1) upgrading and retrofitting the current quarantine facility in Gainesville, and (2) large-scale rearing of approved biological control organisms for release at multiple sites within the South Florida ecosystem to control Melaleuca, Brazilian pepper, Australian pine, and Old World climbing fern.	Throughout region	Operational, Facility completed in 2013 (USACE and SFWMD 2014-TN3020)
Miccosukee Tribal Water Management Plan	Construction of a managed wetland on the Tribe's Reservation in western Broward County.	43 mi SE of the Glades alternative site	Proposed, Project in Preconstruction, Engineering and Design phase (USACE and SFWMD 2014-TN3016)

Table 9-6. (contd)

Project Name	Summary of Project	Location	Status
Modify Holey Land Wildlife Management Area Operation Plan	Modification of the current operating plan and rules for Holey Land Wildlife Management Area will be made to implement rain-driven operations for this area to improve the timing and location of water depths within this wildlife management area.	35 mi SE of the Glades alternative site	Proposed, Project in planning phase. (USACE and SFWMD 2014-TN3017)
Modify Rotenberger Wildlife Management Area Operation Plan	Modification of the current operating plan for the Rotenberger Wildlife Management Area will be made to implement rain-driven operations for this area as needed. Water deliveries are made to the Rotenberger Area from Stormwater-Treatment Area 5.	32 mi S of the Glades alternative site	Proposed, Project in planning phase. (USACE and SFWMD 2014-TN3018)
Palm Beach County Agriculture Reserve Aquifer Storage and Recovery	Supplement water supplies for central and southern Palm Beach County by capturing and storing excess water currently discharged to the Lake Worth Lagoon.	46 mi E of the Glades alternative site	Proposed, Project in Preconstruction, Engineering and Design phase (USACE and SFWMD 2014-TN3019)
Herbert Hoover Dike Major Rehabilitation Project	Rehabilitation Project and Dam Safety Modification Study	5-37 mi NE of the Glades alternative site	Environmental Assessment and FONSI (Findings of No Significant Impact) issued in 2015 (USACE 2015-TN4598) Draft Environmental Report issued (DOI 2016-TN4589)
Kissimmee River Restoration	When restoration is completed in 2017, more than 40 mi^2 of river-floodplain ecosystem will be restored, including almost 20,000 ac of wetlands and 44 mi of historic river channel.	Along Kissimmee River 30-50 mile N/NW of the Glades site	Ongoing (USACE 2014-TN3061; DOI 2016-TN4589)
Other Actions/Projects			
Atlantic Sugar Association	Sugar manufacturing	32 mi E of the Glades alternative site	Operational (FDEP 2013-TN2964)
Southern Gardens Citrus Processing Corp.	Food production/distribution	6 mi SE of the Glades alternative site	Operational (FDEP 2013-TN2969)

Table 9-6. (contd)

Project Name	Summary of Project	Location	Status
United States Sugar Corporation Clewiston	Sugar manufacturing	15 mi SE of the Glades alternative site	Operational (EPA 2014-TN2963)
Various wastewater-treatment plant facilities	Sewage treatment	Throughout region	Operational
Various Hospitals Using Nuclear Material	Medical and other industrial isotopes	Throughout region	Ongoing
Various water/flood-management projects	Water and flood management	Throughout region	Ongoing (USACE 2012-TN1133)
Future Urbanization	Construction of housing units and associated commercial buildings; roads, bridges, and rail; construction of water- and/or wastewater-treatment and distribution facilities and associated pipelines, as described in local land-use planning documents	Throughout region	Construction would occur in the future, as described in State and local land-use planning documents

The geographic area of interest for cumulative impacts considers all existing and proposed nuclear power plants that have the potential to increase the probability-weighted consequences (i.e., risks) from a severe accident at any location within 50 mi of the Glades site. An accident at a nuclear plant within 100 mi of the Glades site could potentially increase this risk.

9.3.2.1 Land Use

The following analysis includes land-use impacts from building activities and operations. The analysis also considers other past, present, and reasonably foreseeable future actions that affect land use, including other Federal and non-Federal projects listed in Table 9-6. For the analysis of land-use impacts at the Glades site and the area within the transmission line corridors, the review team determined that a 10 mi radius, similar to that used for the Turkey Point site, would encompass an effective geographic area of interest for cumulative impact assessment for land use. The geographic area of interest includes the site and associated facilities. It also includes the nearest community, the small city of Moore Haven (2009 population of 2,358), 2 mi east of the Glades alternative site. In evaluating the land-use impacts of using the Glades site, the review team used, in addition to the project application, readily obtainable data from the Internet or published sources, including aerial photographs of the site and vicinity, U.S. Department of Agriculture (USDA) soils information, local zoning and planning documents, and data acquired from the Florida Land Use, Cover, and Forms Classification System (FLUCFCS). Impacts from both building and station operation are discussed.

Building and Operation Impacts

Existing land uses in the vicinity of the Glades alternative site consist predominantly of cultivated agriculture. The nearest community is Moore Haven, which is the County seat of Glades County. The larger region is primarily devoted to agriculture, and scattered small rural communities. The closest population center with more than 25,000 population is Fort Myers (2009 population 61,870) (FPL 2014-TN4058; USCB 2009-TN3395), 45 mi to the west. The Glades alternative site is located approximately 5 mi southwest of Lake Okeechobee.

Existing land uses at the Glades site consist predominantly of cultivated agriculture, primarily sugar cane (FPL 2014-TN4058). No commercial mineral resources are identified on the site and in vicinity (Calver 1956-TN3752; Spencer 1993-TN3753). Based on a site visit (NRC 2010-TN3304) and inspection of aerial photographs included on Google Earth, it appears that no substantial areas of developed land uses occur on or within the vicinity of the site. Wildlife management areas and recreational areas are located to the east, nearer Lake Okeechobee, several miles from the alternative plant site. The Glades County 2020 Comprehensive Plan (Glades County 2010-TN3303) identifies the existing land use at and in the vicinity of the Glades alternative site as "Agriculture" and the future land use on the Future Land Use Map (FLUM) (Glades County 2010-TN3303) as "Commercial" and "Transition." The map depicts a small rural community that includes a roughly 1 mi^2 area on the north and south sides of US-27 of "Transition" surrounding a small commercial area. Areas to the south are designated as Agricultural. "Transition" is defined in the Glades 2020 Comprehensive Plan (Glades County 2010-TN3303) as follows:

> **Transition:** Mixed Use Areas in which the present primary use is agricultural, but which have scattered residential and nonresidential use areas and are likely to be infilled with additional residential uses. This category will not include more than 2.5% of the total land area of Glades County. The maximum densities are a gross residential density of 7 residential units per acre and the maximum floor to area ratio for nonresidential uses shall be 0.3.

Therefore, the review team believes that use of the Glades alternative site for a power plant would be inconsistent with the current Glades County FLUM. This does not mean that the plant could not be built at this location, but a change in the current FLUM would be needed. Building and operating a major industrial facility at this location would constitute a land-use change not in keeping with general plans for development in this area.

No Prime farmland is identified on or in the vicinity of the site. However, most of the soils on and in the vicinity of the plant site are considered farmlands of Unique Importance. (USDA 2014-TN3358). Unique farmland is defined in Section 2(c) of the Farmland Protection Policy Act (7 U.S.C. § 4201 et seq.) (TN708) as "land, other than Prime farmland, that has combined conditions to produce sustained high quality and high yields of specialty crops, such as citrus, nuts, fruits, and vegetables when properly managed." No portion of the alternative plant site or site vicinity falls within the Coastal Zone (FPL 2014-TN4058). No rivers are located near the alternative plant site, as shown on the Federal Emergency Management Agency (FEMA) Flood Zones 2020 map in the Glades 2020 Comprehensive Plan (Glades County 2010-TN3303), but, as FPL states in its application (FPL 2014-TN4058), portions of the plant site fall

within the 100-year flood zone. The 15 ft fill that the ER states would be required at the alternative plant site (FPL 2014-TN4058) could noticeably affect the flood plain, because it is such a large area and such a large amount of fill.

Building and operation of the project at the Glades site would result in the conversion of existing land uses, including approximately 296.8 ac from agriculture to power-generation uses as shown in Table 9-7. Because this is a small amount of farmland in the context of the large amount of farmland under cultivation in Glades County, conversion of this amount of farmland to another use would not substantially affect the agricultural economy of the region.

Additional land-use impacts include possible additional growth and land conversions in the vicinity to accommodate new workers and services (induced development). This could result in the loss of additional farmland. Because the workforce would be dispersed over larger geographic areas in the labor supply region, the impacts from land conversion for residential and commercial buildings induced by new workers relocating to the local area could likely be absorbed in the wider region. Therefore, the review team concludes that such impacts would be minimal.

Table 9-7. Glades Site Land-Use Impacts (Acres)

	Agricultural Lands (FLUCFCS 200 Land Use Series)	Non-Agricultural Lands (all other FLUCFCS designations)	Total
Plant Site	207	113	320
Access Roads	18	5	23
Rail Corridor	47	28	75
Intake Pipeline Corridor	0	1	1
Makeup Pipeline Corridor	2	0.1	2
Stormwater-Retention Ponds	22	20	42
Total[(a)]	297	167	463
Transmission Line Corridors	3,966	1,851	5,824
Grand Total	4,559	2,185	6,750

(a) Totals may not add due to rounding

Sources: FPL 2011-TN59 and FPL 2014-TN4058

Approximately 121 mi of new transmission lines would have to be built to serve the plant. FPL states in its application (FPL 2014-TN4058) that none of the transmission lines would pass through the Coastal Zone. Approximately 5,824 ac of land would be at least temporarily affected. Of this land, approximately 3,966 ac are agricultural land, and the remainder primarily open lands and roadways. The agricultural land within the transmission line corridors would be converted from agricultural use to transmission line use, although FPL states in its application (FPL 2014-TN4058) that agriculture could continue within and along the transmission line rights-of-way. Therefore, much of the affected agricultural land would not necessarily be permanently converted to other land uses.

Under the Florida Site Certification Application process explained in Section 4.1, the State approves a corridor and the applicant chooses a specific right-of-way within the approved corridor. The objective of this process, as stated in the electrical power plant and transmission

line statute (FDEP 2013-TN2629), is "that the location of transmission line corridors and the construction, operation, and maintenance of electric transmission lines produce minimal adverse effects on the environment and public health, safety, and welfare" and "to fully balance the need for transmission lines with the broad interests of the public in order to effect a reasonable balance between the need for the facility as a means of providing reliable, economical, and efficient electric energy and the impact on the public and the environment resulting from the location of the transmission line corridor and the construction, operation, and maintenance of the transmission lines." Engineering considerations and costs are likely to suggest designs that favor collocation with existing transmission lines in existing corridors. The siting criteria identified by FPL in the application include land-use considerations to minimize potential disruption to such areas as national, state, and county parks; wildlife refuges; estuarine sanctuaries; landmarks; and historical sites. FPL states in its application that, in its development of the conceptual transmission line corridor for the Glades alternative site, it attempted to select corridors that would allow collocation with existing transmission line corridors and avoided populated areas or residential land uses to some extent (FPL 2014-TN4058). The State certification review process would also include a determination of land-use consistency with local land-use plans and zoning ordinances (Fla. Stat. 29-403.50665-TN1470).

The review team concludes that the land-use impacts from building and operating two new nuclear units at the Glades alternative site would be noticeable, but not destabilizing.

Cumulative Impacts

Within the geographic area of interest, there are no other reasonably foreseeable future projects with the potential to affect cumulative land-use impacts. The Glades County FLUM does not identify other non-agricultural future land uses near the Glades alternative site, other than the area designated for Transition and Commercial uses noted above that covers the Glades alternative site (Glades County 2010-TN3303).

Summary Statement

Based on the information provided by FPL and the review team's independent review, the review team concludes that the cumulative land-use impacts of building and operating the power plant at the Glades alternative site would be MODERATE. This conclusion primarily reflects the fact that land-use plans do not call for large-scale establishment of industrial or urban land uses in the area surrounding the Glades site. The incremental impact from the proposed project at the alternative site would be a significant, and principal contributor to the MODERATE impacts due to conflicts with the Glades 2020 Comprehensive Plan (Glades County 2010-TN3303).

9.3.2.2 Water Use and Quality

The following impact analysis includes impacts from building and operating two new nuclear units at the Glades site. The analysis also considers other past, present, and reasonably foreseeable future actions that affect water use and quality, including the other Federal and non-Federal projects listed in Table 9-6. The Glades site is located in rural Glades County in Florida southwest of Lake Okeechobee and near the Caloosahatchee River, which is also known as the C-43 Canal (Figure 9-6).

The geographic area of interest for surface water at the Glades site is the Kissimmee-Okeechobee-Everglades watershed because this is the resource that would be affected if the proposed project were located at the Glades site. The Kissimmee-Okeechobee-Everglades watershed includes an area of about 9,000 mi^2 (McPherson and Halley 1996-TN98). For groundwater, the ROI includes 1) the surficial aquifer and the Upper Floridan aquifer at the site, 2) the APPZ of the Middle Floridan aquifer upgradient and downgradient of the site for water withdrawals, and 3) the Boulder Zone of the Lower Floridan aquifer upgradient and downgradient of the site for disposal of blowdown water.

Building Impacts

The water use for building activities at the Glades site would be comparable to the proposed water use for building activities for the Turkey Point site. During building, peak water use is estimated to be 565 gpm (0.8 Mgd) (see Table 3-4). The review team assumes that water for building the two units at the Glades site would come from a combination of surface water and groundwater. Surface water from the Caloosahatchee River or Lake Okeechobee may be available for building purposes during times of high surface-water flow. At less than 1 percent of the inflow for even the lowest month reported (January 1963), the peak water-use rate of 0.8 Mgd during the building phase is inconsequential when compared to the historic average monthly flow into Lake Okeechobee. Surface water from onsite stormwater ponds and groundwater from excavation dewatering may also be used, when available, for building purposes. The South Florida Water Management District (SFWMD) would regulate any use of surface water or shallow groundwater for plant construction.

The review team concludes that the impact of groundwater and limited surface-water use for building the potential units at the Glades site would be minimal for the following reasons:

- Withdrawal is inconsequential compared to the water resources in the Lake Okeechobee watershed.
- Any use of surface water or shallow groundwater would be regulated by SFWMD and be limited to time periods when there would not be a negative impact on the Lake Okeechobee system or shallow aquifers.
- Water use for building would be limited to the building period and the peak use of 0.8 Mgd is much less than the average 22.26 Mgd groundwater withdrawal rate reported for Glades County in 2005 (Marella 2009-TN1521).

The review team assumes that the impact of dewatering the excavations needed for building two units at the site would be managed through the installation of diaphragm walls and grouting as is proposed for the Turkey Point site. Therefore, because there would be no use of non-saline groundwater and the impact of dewatering would be controlled, the review team determined that there would be little or no impact on groundwater availability.

Surface-water quality would potentially be affected by stormwater runoff during site preparation and the building of the facilities. The FDEP would require FPL to develop an erosion and sediment control plan and a stormwater pollution prevention plan (SWPPP) before initiation of site-disturbance activities (FPL 2014-TN4058).

The plans would identify BMPs to control the impacts on surface-water quality caused by stormwater runoff. The review team anticipates that FPL would construct new detention/infiltration ponds and drainage ditches to control delivery of sediment from the disturbed area to onsite waterbodies. Sediment carried with stormwater from the disturbed area would settle in the detention ponds and the stormwater would infiltrate into the shallow aquifer. Implementation of BMPs should minimize impacts on surface waterbodies near the Glades site. Therefore, the surface-water−quality impacts near the Glades site would be temporary and minimal.

While building new nuclear units at the Glades site, groundwater quality may be affected by leaching of spilled effluents into the subsurface. The review team assumes that the BMPs FPL has proposed for the Turkey Point site would be in place during building activities and therefore the review team concludes that any spills would be quickly detected and remediated. In addition, groundwater impacts would be limited to the duration of these activities, and therefore, would be temporary. The review team reviewed the general BMPs that could be expected to be required at such a site (State of Florida 2014-TN3637). Because any spills related to building activities would be quickly remediated under BMPs, and the activities would be temporary, the review team concludes that the groundwater-quality impacts from building at the Glades site would be minimal.

Wastewater streams from building activities could be injected into the Boulder Zone of the Lower Floridan aquifer as planned at Turkey Point (FPL 2014-TN4058). Construction and operation of the disposal wells would be performed under the conditions of an Underground Injection Control (UIC) permit issued by the FDEP, with the objective of protecting water quality within the APPZ and overlying aquifers.

Operations Impacts

FPL (2014-TN4058) indicates that the water needed to operate two units would be approximately 50,000 gpm or 72.7 Mgd. As indicated in Chapter 3, evaporative losses from cooling two units would be approximately 28,800 gpm (41.5 Mgd). The review team assumed that the two units at the Glades site would primarily use brackish groundwater from the permeable zone (APPZ) within the Avon Park formation for makeup cooling water. This relatively permeable zone is considered part of the Middle Floridan aquifer and is more than 1,000 ft below ground surface near the Glades site. The SFWMD has informed the NRC that consumptive use of surface water from Lake Okeechobee or its tributaries would be limited (SFWMD 2012-TN3085). Use of water from Lake Okeechobee and the Caloosahatchee River would also have to avoid any negative impact on restoration projects in South Florida. Therefore, surface water from Lake Okeechobee and the Caloosahatchee River could be used only at times of excess surface-water flow that typically occur during the wet season.

The APPZ aquifer is not generally used because of the salinity of its water (FPL 2013-TN3052). Therefore, the current impacts of using this water for power production are minor. Because brackish or saline groundwater is not in demand, use of this resource will not result in water-use conflicts. However, groundwater in the Middle Floridan aquifer at this site is a potential source of brackish water for desalinization. If demand for desalinization source water increases, water for the plant may be obtained from deeper, more saline formations.

Blowdown discharge and other wastewater streams would be pumped into the Boulder Zone of the Lower Floridan aquifer. The Boulder Zone is isolated from the APPZ by low-permeability units. Additional low-permeability confining units separate the APPZ from the overlying Upper Floridan aquifer. Construction and operation of the disposal wells would be performed under the conditions of a UIC permit issued by the FDEP.

As indicated in Chapter 3, the consumptive water use due to evaporative losses from cooling two units would be approximately 28,800 gpm (41.5 Mgd). However, the review team assumed that surface water would only be consumed during periods of excess flow, thereby precluding water-use conflicts.

During the operation of two new nuclear units at the Glades site, impacts on surface-water quality would be minimal because wastes would be injected into the Boulder Zone and not released to the surface water. The FDEP would require FPL to develop a SWPPP (FPL 2014-TN4058). The SWPPP would identify measures to be used to control stormwater runoff. All discharges to surface waterbodies would be required to comply with limits established by FDEP in a NPDES permit.

During the operation of the two units at the Glades site, impacts on groundwater quality could result from potential spills. Spills that might affect the quality of groundwater would be controlled and mitigated by BMPs. Like the proposed site, any wastewater at this inland alternative site would be combined with cooling-tower blowdown and discharged into the Boulder Zone with no loss of beneficial uses of the water resource.

Cumulative Impacts

In addition to water-use and water-quality impacts from building and operations activities, cumulative analysis considers past, present, and reasonably foreseeable future actions that affect the same water resources.

For the cumulative analysis of impacts on surface water and groundwater at the Glades site, the geographic area of interest is the same as what was considered for building and operational impacts, and was defined earlier in this section.

Actions that have past, present, and future potential impacts on water supply and water quality near the Glades site include existing agriculture and existing and future urbanization in the region.

Cumulative Impacts on Water Use

The impacts of the other projects listed in Table 9-6 are considered in the analysis included above or would have little or no adverse impact on surface-water use. The projects believed to have little impact are excluded from the analysis either because they are too distant from the Glades site, use relatively little or no surface water, or have little or no discharge to surface water. Some projects (for example park and forest management) are ongoing, and changes in their operations that could have large impacts on surface-water use appear to be unlikely.

In 2000, the Florida Legislature passed the Lake Okeechobee Protection Act to establish a restoration and protection program for Lake Okeechobee (SFWMD et al. 2011-TN3087;

SFWMD 2010-TN3086). Part of the focus of this Act was to restore the natural hydrology of the system after years of altering the natural drainage around the lake to permit development of the land and to reduce flood damage. The State of Florida and the Federal government are spending hundreds of millions of dollars to restore the Lake Okeechobee and other water resources in the watershed; therefore, the review team concluded that the cumulative impact on surface-water use would be MODERATE.

Surface-water use during the building and operation of two units at the Glades site would be dominated by water use for operations. As discussed above, surface water would only be withdrawn during periods of excess flow. Therefore, the review team concluded that building and operating the proposed units at the Glades site would not be a significant contributor to the MODERATE impacts on surface-water use.

As stated above, the review team assumed that any use of shallow groundwater to build the units at the Glades site would be regulated by the SFWMD. If this source is not available in sufficient quantity for building activities, brackish groundwater from the APPZ could be used for some building activities. Groundwater impacts from dewatering would be controlled with diaphragm walls and grouting. Brackish groundwater from the APPZ would be used to operate the plant except when excess surface water is available. The APPZ aquifer is not generally used because of the salinity of its water (FPL 2013-TN3052). Because brackish or saline groundwater is not in demand, use of this resource will not result in water-use conflicts.

The impacts of the other projects listed in Table 9-6 are considered elsewhere in this analysis or else would have little or no adverse impact on groundwater use. The projects believed to have little impact are excluded from the analysis either because they are too distant from the Glades site, or use relatively little or no groundwater. Some projects (for example park and forest management) are ongoing, and changes in their operations that would have large impacts on groundwater use appear unlikely. Therefore, the review team concludes that cumulative impacts on groundwater use would be SMALL.

Cumulative Impacts on Water Quality

Point and non-point source discharges have affected the surface-water quality of the Lake Okeechobee watershed and the Caloosahatchee River upstream and downstream of the site. Water-quality information presented above for the impacts of building and operating the proposed new units at the Glades site would also apply to evaluation of cumulative impacts. Lake Okeechobee has been the target of extensive efforts to reduce nutrient loading and improve water quality (SFWMD et al. 2011-TN3087). During the operation of two new nuclear units at the Glades site, impacts on surface-water quality from the units would be minimal because plant discharges would be injected into the Boulder Zone and not released to the surface water. The State of Florida requires an applicant to develop a SWPPP (FPL 2014-TN4058) and all discharges to surface waterbodies would be required to comply with limits established by FDEP in a NPDES permit. Such permits are designed to protect water quality. The SWPPP would identify measures to be used to control stormwater runoff (FPL 2014-TN4058). Therefore, the review team concluded that the cumulative impact on surface-water quality of the receiving waterbody would be MODERATE.

The review team concluded that building and operating the proposed units at the Glades site would not be a significant contributor to the MODERATE impacts on surface-water quality, because industrial and wastewater discharges from the proposed units would be discharged directly to the Boulder Zone and any stormwater runoff from the site during operations would be managed in compliance with the SWPPP (FPL 2014-TN4058).

The APPZ aquifer is not generally used because of the salinity of its water (FPL 2013-TN3052). Because brackish or saline groundwater is not in demand, use of this resource will not result in water-use conflicts. The review team also concludes that with the implementation of BMPs, the impacts on shallow groundwater quality from building and operating two new nuclear units at the Glades site would likely be minimal. Therefore, the cumulative impact on groundwater quality would be SMALL. The impacts of other projects listed in Table 9-6 are either considered in the analysis included above or would have little or no impact on surface-water and groundwater quality.

9.3.2.3 Terrestrial and Wetland Resources

This section addresses potential impacts on terrestrial resources from siting two new nuclear units on the Glades site and a transmission line corridor, which begins in Glades County and crosses portions of Hendry, Palm Beach, and Broward Counties. Most of the Glades site has been disturbed and is primarily used for agriculture, especially sugar cane. Small areas are maintained as improved and unimproved pasture. Natural upland habitats that include hardwood forest and coniferous plantations cover only small areas on the site. The remainder includes various wetland habitats including exotic and mixed wetland hardwoods, ditches, wet prairies, freshwater marsh, holding ponds (FPL 2011-TN59).

Glades County hosts multiple terrestrial species that are listed as Federally endangered or threatened (Table 9-8). Surveys were not conducted at the Glades site or along the conceptual transmission line corridor to determine the presence and distribution of listed species. However, surveys were conducted at the formerly proposed FPL Glades Power Park site that has similar topography and habitat (FPL 2014-TN4058). The review team determined the likelihood of occurrence at project sites based on habitat preferences of each species and the land-cover types expected to be affected at Glades site and within the conceptual transmission line corridor. Audubon's crested caracaras (*Polyborus plancus audubonii*), wood storks (*Mycteria americana*), and Everglade snail kites were observed during surveys at the formerly proposed FPL Glades Power Park site, which is located approximately 4 mi north of the Glades site. Life history information for most of these species can be found in Section 2.4.1. Species not previously discussed in this document are discussed below.

Audubon's crested caracara is a raptor that occurs in the United States from Florida west to Arizona, and also in Cuba, Mexico, and Central and South America (FWS 1999-TN136). Only the Florida population is listed in the United States. It forages in open habitats including agricultural fields, pastures, and wet prairies. Audubon's crested caracaras are known to congregate in an area north of US-27 in Glades County in an area of expansive improved pasture (FWS 1999-TN136). The Glades site is south of US-27. Wood storks are colonial nesters that often use historic colonies that are located in trees over water. Wood storks forage in shallow water largely free from vegetation and often use ditches and seasonal water features

(FWS 1999-TN136). Everglade snail kites also prefer to nest over water, but prefer to feed exclusively on apple snails.

Table 9-8. Federally Listed Terrestrial Species that May Occur on the Glades Site or within the Conceptual Transmission Line Corridor

Scientific Name	Common Name	Federal Status
Birds		
Polyborus plancus audubonii	Audubon's crested caracara	Threatened
Ammodramus savannarum floridanus	Florida grasshopper sparrow	Endangered
Rostrhamus sociabilis plumbeus	Everglade snail kite	Endangered
Aphelocoma coerulescens	Florida scrub jay	Threatened
Campephilus principalis	Ivory-billed woodpecker	Endangered
Picoides borealis	Red-cockaded woodpecker	Endangered
Mycteria americana	Wood stork	Threatened
Grus americana	Whooping crane	Endangered
Charadrius melodus	Piping plover[(a)]	Threatened
Calidris canutus rufa	Red knot[(a)]	Threatened
Dendroica kirtlandii	Kirtland's warbler[a]	Endangered
Mammals		
Puma concolor coryi	Florida panther	Endangered
Peromyscus polionotus niveiventris	Southeastern beach mouse[(a)]	Threatened
Reptiles		
Drymarchon corais couperi	Eastern indigo snake	Threatened
Eumeces egregious	Bluetail mole skink	Threatened
Neoseps reynoldsi	Sand skink	Threatened
Invertebrates		
Cyclargus thomasi bethunebakeri	Miami blue[(a)]	Endangered
Strymon acis bartrami	Bartram's scrub-hairstreak[(a)]	Endangered
Anaea troglodyte floridalis	Florida leafwing[(a)]	Endangered
Plants		
Warea carteri	Carter's mustard	Endangered
Cucurbita okeechobeensis ssp. okeechobeensis	Okeechobee gourd	Endangered
Jacquemontia reclinata	Beach jacquemontia[(a)]	Endangered
Polygala smallii	Tiny polygala[(a)]	Endangered
Asimina tetramera	Four-petal pawpaw[(a)]	Endangered

(a) Additional listed species occur in Broward, Palm Beach, or Hendry Counties (FWS 2014-TN3761; FWS 2014-TN3759; FWS 2014-TN3760).

The Florida grasshopper sparrow (*Ammodramus savannarum floridanus*) only occurs in treeless tracts of dry prairie habitat frequented by wildfire (FWS 2008-TN2516). Florida scrub jays (*Aphelocoma coerulescens*) prefer early successional upland shrub-dominated landscapes that historically were maintained by natural wildfire in South Florida. Ivory-billed woodpeckers (*Campephilus principalis*) have historically occurred in extensive old-growth bottomland and wetland hardwood forests (FWS 1999-TN136). This species was believed to be extirpated from

the United States since the 1940s. A reported sighting in 2005 in Arkansas has resulted in the FWS drafting an ivory-billed woodpecker recovery plan (FWS 2010-TN2574). Red-cockaded woodpeckers require forest dominated by pine trees that are generally 60 years in age or older (FWS 1999-TN136). Florida panthers (*Puma (=Felis) concolor coryi*) have been recorded in many different habitat types, including those found on the Glades site. Eastern indigo snakes (*Drymarchon corais couperi*) use a wide variety of habitats including upland habitats, wetlands, and human-altered habitats including agricultural fields. Both the bluetail mole skink (*Eumeces egregius lividus [Mount]*) and sand skink (*Neoseps reynoldsi Stejneger*) occur in dry upland habitats found in sandy soil associated with the Lake Wales Ridge (FWS 1999-TN136) Neither the bluetail mole skink nor the sand skink are known to occur anywhere in Glades County. Carter's mustard is a fire-dependent herb found in dry habitats of the Lake Wales Ridge (FWS 1999-TN136). The Okeechobee gourd (*Cucurbita okeechobeensis*) historically grew under pond apple (*Annona glabra*), elderberry (*Sambucus canadensis*), and buttonbush (*Cephalanthus occidentalis*) trees at sites that had frequent disturbance such as seasonal flooding from Lake Okeechobee and alligator nesting, and within mowed power line and road rights-of-way (FWS 1999-TN136).

The regular use of pesticides and herbicides along with frequent human presence further reduce habitat value for native species in a predominantly agricultural landscape already highly fragmented with few native plants or habitats. Wading birds have been observed using the canals. Wading birds are an ecologically important group in the South Florida ecosystem, and both herons and ibises are considered ecological indicators (FWS 1999-TN136). Wading bird species observed in a similar setting at the FPL Glades Power Park include the cattle egret (*Bubulcus ibis*), green heron (*Butorides virescens*), great egret (*Ardea albus*), glossy ibis (*Plegadis falcinellus*), least bittern (*Ixobrychus exilis*), great blue heron (*Ardea herodias*), black-crowned night-heron (*Nycticorax nycticorax*), and yellow-crowned night-heron (*N. violaceus*). Wetlands in the surrounding landscape also provide habitat much more suitable for wading birds and other wildlife species than the canals present on the Glades site.

Recreationally important species observed at the FPL Glades Power Park and also expected to occur on the Glades site include white-tailed deer (*Odocoileus virginianus*), feral hog (*Sus scrofa*), raccoon (*Procyon lotor*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), mourning dove (*Zenaida macroura*), and bobwhite quail (*Colinus virginianus*). Waterfowl are also hunted in Florida and numerous species could occur in suitable habitats on the Glades site.

Building Impacts

Typical impacts from building nuclear units include permanent and temporary habitat loss from development, habitat fragmentation and degradation, disturbance and displacement of individuals, exposure of wildlife to increased noise levels and human presence, and increased risk of vehicle collision mortality. The conversion of fully developed and stable plant communities to earlier successional communities dominated by lower growing vegetation during development of linear transmission or pipeline corridors often results in a high degree of habitat fragmentation within the landscape.

FPL assumed a 362 ac area within the Glades site for evaluating the potential impacts of building two new nuclear power reactors and associated infrastructure and an additional

3,000 ac for a cooling-water storage reservoir (FPL 2014-TN4058) (see Figure 9-6). The review team determined cooling water could be obtained from groundwater beneath the Glades site and that the cooling-water storage reservoir was unnecessary. FPL stated offsite facilities and development would also be needed to construct and operate nuclear power plants at the Glades site. FPL estimated a 121 mi transmission line would be necessary to service power plants at the Glades site. FPL also assumed a 1.9 mi access road, 6.2 mi rail line, and pipeline corridors connecting the C-43 Canal to the site (assumed cooling-water source) would be necessary.

Impacts from the plant area, access road, rail line, and pipeline corridors are discussed first below. Impacts from the transmission line are discussed in a separate section below. The access road would contribute 23 ac to the project footprint; the rail line would contribute 75 ac; and the intake/makeup pipeline corridors would contribute 3.4 ac.

Plant Facilities

If the plant facilities, access road, rail line, and pipelines were built within the proposed footprint, FPL estimated 464 ac would be affected (Table 9-9). Approximately half (243 ac) of this area is currently used for row crops. With the inclusion of other field crops as well as improved and unimproved pastures, agricultural lands cover 64 percent (297 ac) of the proposed footprint. Wetlands cover an additional 30 percent (141 ac) of the proposed footprint and include exotic and mixed wetland hardwoods, ditches, wet prairies, and freshwater marshes. The remainder (26 ac) is conifer plantation, upland hardwood forest, or existing roads and highways.

Table 9-9. Acreage within the Conceptual Footprint at the Glades Site

FLUCFCS Code	Description	Site and Non-Transmission (ac)	Transmission (ac)
200-series	Agriculture	297	3,966
300-series	Uplands	0	108
400-series	Forest	26	91
500-600 series	Wetlands	141	1,627
800-series	Developed	0.1	32
Total		464	5,824

Source: FPL 2011-TN59

Surveys of the occurrence, abundance, and distribution of Federally listed species have not been performed for the Glades site. Audubon's crested caracaras, wood storks, and Everglade snail kites were observed during surveys at FPL's formerly proposed Glades Power Park site, which is nearby and in a similar landscape. The Glades site appears to provide habitat suitable for Audubon's crested caracara, including 37 ac of improved pasture. Wood storks may also use the ditches and wetlands for foraging. The 9.5 ac of freshwater marsh may be used by foraging storks as well as Everglade snail kites. However, it does not appear there is habitat suitable for nesting present for any of these three listed bird species. Florida panthers are known to occur in Glades County and may also occur on the Glades site, but they generally prefer upland habitats over wetlands and use native landscapes more than agricultural fields (FWS 1999-TN136). White-tailed deer, feral hogs, and many other medium-sized mammals are prey for Florida panthers. Although their abundance and distribution is unknown at the Glades site, their presence may indicate suitable habitat is present for panthers. The fragmented natural habitat and agricultural nature of the Glades site would likely preclude substantial use by

Florida panthers, but the site lies very near the eastern boundary of the FWS-designated primary dispersal zone. Florida panthers may pass through the site while dispersing to more suitable habitats to the north, especially if prey is in abundance. Eastern indigo snakes are habitat generalists, widely distributed, and likely occur on the Glades site. They would be prone to increased mortality from off-road vehicle use during land clearing and increased traffic during construction and operation. Limited distribution and/or lack of suitable habitat likely preclude the occurrence of the other listed species on the Glades site.

Although the Florida grasshopper sparrow has historically occurred in Glades County, it has not been observed there in recent years (FWS 2008-TN2516). The Florida scrub jay may currently occur in Glades County, but distribution information indicates this species is restricted to areas within the county west of the Glades site (FWS 2007-TN2517). High-quality forested wetlands are present on the Glades site, but large contiguous forested wetlands of the type that might harbor remnant individuals of ivory-billed woodpecker are not present. The Glades site contains both upland forest and conifer plantations, but the extent of forest and degree of forest fragmentation within the general landscape makes these habitats poorly suited to red-cockaded woodpeckers (*Picoides borealis*). The Lake Wales Ridge is not near the Glades site, excluding the occurrence of the blue mole skink, sand skink, and Carter's mustard (*Warea carteri*). The Okeechobee gourd is now limited to nine sites outside of Glades County (FWS 1999-TN136). Therefore, it is the staff's conclusion that Audubon's crested caracara, the wood stork, Everglade snail kite, Florida panther, and the eastern indigo snake could occur at the Glades site.

Potential foraging habitat for the caracara, stork, kite, and panther would be permanently lost during site preparation at the Glades site. Approximately 39 ac of both improved and unimproved pasture potentially suitable for caracaras would be lost. Lost ditch and freshwater marsh habitat that storks could forage in would total 19 ac. If apple snails are present in the wetland habitats within the Glades site, kites could lose less than 10 ac of habitat. The loss of 9.7 ac of upland forest and habitats that support panther prey and the subsequent loss of prey could also affect Florida panthers. However, the Glades site does not provide nesting or breeding habitat for any of the listed species and the suitability of these habitats would likely be low due to fragmentation within the landscape from agricultural development. Eastern indigo snakes could use most of the Glades site, and would likely be affected the most by preconstruction activities. Because they use burrows, they are also prone to direct mortality during preconstruction activities such as land clearing and grading. Snakes in general are also prone to vehicle collision mortality, and increased traffic could increase the risk of death to eastern indigo snakes on local roads. As with construction and operation at the Turkey Point site, mitigation requirements by the Florida Fish and Wildlife Conservation Commission (FFWCC) including staff awareness training and reporting would minimize negative impacts on the eastern indigo snake. Loss of habitats would also affect local populations of wildlife not Federally listed, but expected to occur within the region in suitable habitat. However, these effects are not expected to be noticeable and would not destabilize even local populations of any of these animals.

Transmission Lines and Access Roads

FPL stated offsite facilities and development would also be required to construct and operate nuclear power plants at the Glades site. The conceptual transmission line corridor is estimated to occupy 5,824 ac of additional land (Table 9-9). Because the conceptual transmission line corridor would pass through Glades, Hendry, and Broward Counties and could also pass through Palm Beach County, depending on the exact route ultimately selected, the review team also considered impacts on Federally listed species and those species proposed for Federal listing known to occur in those counties. Similar to the Glades site, the major land cover within the conceptual corridor is agriculture. Most of the corridor is used for agricultural purposes, including field crops, row crops, citrus groves, and pastures. Wetlands, including freshwater marsh, mixed wetland hardwoods, and wet prairies, account for much of the remainder of the conceptual corridor. There are also some areas of upland habitats, including improved pasture and dry prairie, and others (FPL 2014-TN4058). Forested areas would be converted to more open habitats with low ground cover including grass (FPL 2014-TN4058).

FPL estimated approximately 1,780 ac of potential Audubon's crested caracara habitat would be altered within the conceptual transmission line corridor (FPL 2011-TN59). Approximately 1,037 ac of potential wood stork habitat would also be altered. Alteration of 995 ac of wetland habitats, including 902 ac of freshwater marsh, could affect the Everglade snail kite. Removal of trees could affect the quality and quantity of nesting habitats for these three bird species. The likelihood of non-native plants being accidentally introduced would also increase and could result in habitat alteration. Conversion of uplands into open habitats to accommodate the transmission right-of-way could increase foraging habitat for the caracara. The sum of remaining natural, upland habitats that would be crossed by the conceptual transmission line corridor and that could provide habitat value to panther's amounts to almost 150 ac or approximately 2.5 percent of the corridor (FPL 2011-TN59). Alteration of natural land cover from agricultural conversion has highly fragmented the landscape north of Everglades National Park. This conversion and fragmentation not only reduces the amount of natural habitats usable by Florida panthers, it further reduces the value of habitats still present.

Two large swaths of land designated as Everglade snail kite critical habitat lie between the Glades site and the Andytown substation. A gap between these two swaths approximately 1.25 mi wide lies at the intersection of I-75 and SR-27 in Broward County. If the transmission line is built through this gap, then impacts on this critical habitat could be avoided. If not, then adverse impact on designated critical habitat for the Everglade snail kite could result. FPL would be expected to reduce and mitigate for increased mortality risk as well as lost habitat for listed species as required by the FFWCC and FWS. Effects from building the transmission lines would not be expected to result in a measurable decrease in the productivity of most local populations except possibly local populations of the Everglade snail kite. Impacts on designated critical habitat could measurably affect the snail kite and recovery efforts to save the species from extinction.

Operations Impacts

The operation of two nuclear units at the Glades site would create noise, fogging and dissolved solid deposition from cooling towers, runoff from increased impermeable surfaces, light

pollution, and increased vehicle collision mortality of local wildlife populations. Operation of transmission lines could increase the risk of bird collision and electrocution mortality.

Operational noise from the cooling towers would only displace individual animals from the immediate vicinity of the cooling towers, as the use of splash guards on air inlets and stacks on mechanical fans would limit cooling-tower noise to approximately 73 dBA at a distance of 200 ft from the cooling towers (FPL 2014-TN4058). The review team determined the salinity of the groundwater used for cooling would be less than or equal to that of seawater and salt deposition from cooling-tower drift at the Glades site would be similar in scale and intensity to deposition at the Turkey Point site. Most of the salt would likely be deposited on developed land near the cooling towers, and concentrations as high as 10 kg/ha/mo that have resulted in observable effects on sensitive plant species could be expected as far as 1.25 mi from the cooling towers. Unlike Turkey Point, the Glades site is located inland, and vegetation growing there would not be expected to be as tolerant to atmospheric-deposited salt. Some sensitive vegetation could be affected by salt drift, but the spatial extent would be limited and the climate of South Florida would quickly dissipate salt deposited in the landscape.

The creation of impermeable surfaces at the Glades site would likely result in the concentration of stormwater runoff into surrounding wetlands. Increased runoff could result in siltation, pollutant deposition, and decreased habitat value of these areas to local natural communities.

Light pollution during facility operation could affect wildlife residing on or migrating through the Glades site. Design criteria could include minimization of upward lighting, turning off unnecessary lighting between 11 p.m. and sunrise, and luminary selection and mounting to provide light only where needed (FPL 2014-TN4058). If these actions are taken, the review team expects that impacts from light pollution on wildlife would be minimal.

The impacts of transmission line operation consist of bird collisions with transmission lines, electromagnetic field (EMF) effects on flora and fauna, and habitat alteration by vegetation control. Direct mortality resulting from birds colliding with tall structures has been observed (Avatar et al 2004-TN892). Factors that appear to influence the rate of avian impacts with structures are diverse and related to bird behavior, structure attributes, and weather. Migratory flight by flocking birds during darkness has contributed to the largest mortality events. Tower height, location, configuration, and lighting also appear to play roles in avian mortality. Weather, such as low cloud ceilings, advancing fronts, and fog, also contribute to this phenomenon. Waterfowl may be particularly vulnerable due to their low, fast flight and flocking behavior (EPRI 1993-TN73). However, in NUREG–1437, the NRC staff concluded that the threat of avian collision as a biologically significant source of mortality is very low because only a small fraction of total bird mortality could be attributed to collision with nuclear power plant structures, including transmission line corridors with multiple transmission lines (NRC 1996-TN288). Although collision may contribute to local losses, thriving bird populations can withstand these losses without threat to their existence (EPRI 1993-TN73). Transmission line structures, conductors, and guy wires all pose a potential avian collision hazard for all resident birds that live in the vicinity of the transmission lines and for migratory birds that may pass through these areas. At least 41 species of birds are known to have been killed by interaction with Florida electrical utility structures, 20 of which have been killed by FPL electrical utility structures (FPL 2011-TN1283). Transmission lines connecting the Glades site to the Andytown substation

would pass through core foraging areas of multiple wood stork nesting colonies (FWS 2014-TN3732). Although the NRC has concluded that bird collisions with transmission lines at existing U.S. nuclear power plants are of small significance, including transmission line corridors with variable numbers of transmission lines (NRC 2013-TN2654), the Federally listed wood stork, whooping crane (*Grus canadensis*), and Audubon's crested caracara are particularly prone to transmission line collision mortality and members of all of these species have been killed by collision with and electrocution by electrical utility structures in Florida (FPL 2011-TN1283). Wading birds are not particularly agile flyers and many large bird species are especially uncoordinated when young. Wood storks also routinely perch on tall structures, and their large wing span could pose an increased risk of electrocution by bridging the gap between live wires and ground circuits.

The FWS Southeast Florida Ecological Services Office recognizes a 0.47 mi nest colony buffer. The FWS also recommends the establishment of at least a 500 ft primary zone around stork nesting colonies where no vegetation should be removed. Wetland vegetation under and surrounding the colony shall be maintained. Power-transmission lines, roadways, and other infrastructure should not be built within the primary zone. Also, humans should not get within 300 ft of the colony and human activity patterns should not be changed when storks are present at the colony. FWS also recommends the establishment of a secondary zone that extends 1,000 to 2,000 ft beyond the primary zone. The FWS also recommends that transmission lines not be built within 1 mi of stork nest colonies to lower the probability of low-flying stork strikes. FWS guidelines drafted to address management of the wood stork foraging habitat recommend an 18.6 mi core foraging area management zone around all known wood stork colonies that have had active nests within the last 10 years in South Florida. Human activity should be restricted within 300 ft of forage sites when storks are present and no closer than 750 ft if there is no vegetation to screen human activities from feeding storks (FWS 2010-TN226). It is not known whether the conceptual transmission line corridor contains any wood stork colonies or is within the range of the various protection distances (300 ft–18.6 mi) recognized by the FWS.

If construction and operation were to occur at the Turkey Point site, FPL would be required by the FWS and FFWCC to conduct numerous activities and actions to minimize impacts on wood storks, and it is reasonable to assume the same requirements would apply for the use of the Glades site. Among these activities and actions are preconstruction and post-construction flight surveys of known wood stork nesting colonies to determine the flight corridors of fledging wood storks. FPL would be expected to conduct pre-clearing aerial surveys of transmission line corridors if nesting by wading birds is confirmed to occur within 0.5 mi of proposed transmission line corridors. FPL would be expected to conduct post-construction monitoring during the breeding season after transmission line installation near wood stork colonies. Monitoring would include carcass searches and flight behavior observation near operating transmission lines. FPL had proposed to evaluate the loss of wood stork foraging habitat within designated core foraging areas that would be intersected by transmission line corridors emanating from the Turkey Point site if the plants were located there. Impacts on suitable foraging habitats from building at Turkey Point would require mitigation (FWS 2010-TN226) and the staff assumed these requirements would also occur if needed at the Glades site. Audubon's crested caracaras have also been electrocuted by electric utility structures in Florida (FPL 2011-TN1283), so installation and operation of transmission lines through caracara habitat could also increase the

risk of electrocution mortality to this species. Mitigation to dissuade large birds from perching on transmission structures would benefit caracaras. Operational effects on other important species would be minimal.

FPL stated field surveys would be conducted for listed species as part of the permitting process before any preconstruction activities (FPL 2014-TN4058). Preconstruction activities would be conducted in accordance with all Federal and State regulations, permit conditions, good construction practices, and BMPs, including the use of directed drainage ditches and silt fencing. Acreage within the conceptual transmission line corridor was minimized to the extent possible by using the most direct route while avoiding areas with important resources and high biological value. FPL also stated that any Glades site wetland functions affected would be replaced or restored.

EMFs are unlike other agents that have an adverse impact (e.g., toxic chemicals and ionizing radiation) in that dramatic acute effects cannot be demonstrated and long-term effects, if they exist, are subtle (NRC 2013-TN2654). A careful review of biological and physical studies of EMFs did not reveal consistent evidence linking harmful effects with field exposures (NRC 2013-TN2654). The impacts of EMFs on terrestrial flora and fauna are of small significance at operating nuclear power plants, including transmission line systems with variable numbers of power lines and lines energized at levels less than 765 kV (NRC 2013-TN2654). Since 1997, more than a dozen studies have been published that looked at cancer in animals that were exposed to EMFs for all or most of their lives (Moulder 2005-TN1329). These studies have found no evidence that EMFs cause any specific types of cancer in rats or mice (Moulder 2005-TN1329). Therefore, the incremental EMF impact posed by operation of existing transmission lines and the addition of new lines for two new nuclear units would be negligible at the Glades alternative site.

Transmission line corridor vegetation-management activities (cutting and herbicide application) and related impacts on floodplains and wetlands in transmission line corridors are of minor significance at operating nuclear power plants, including those with transmission line corridors of variable widths (NRC 2013-TN2654). Consequently, the incremental effects of transmission line corridor maintenance and associated impacts on floodplains and wetlands for two new nuclear units would be negligible at the Glades site.

Cumulative Impacts

The geographic area of interest for the assessment of the potential cumulative impacts of building and operating a new reactor at the Glades site and other past, present, and reasonably foreseeable future actions on terrestrial resources and wetlands is defined as a 50 mi radius around the Glades site. A list of past, present, and reasonable foreseeable actions within 50 mi of the Glades site is presented in Table 9-6. This list includes a variety of energy-production projects, stone mining, manufacturing, transportation and infrastructure-development projects, set-aside areas for recreation and conservation, CERP-related projects, and other miscellaneous activities that could affect terrestrial and wetland resources.

Past land use in South Florida, especially agriculture and more recently urbanization, has greatly affected the distribution and abundance of unfragmented plant and wildlife habitats still

remaining. Development and urbanization of higher elevation lands for energy, infrastructure, and manufacturing projects have further reduced the amount of pine flatwoods and other remaining upland habitat. Ditching and draining created more dry land, reducing the amount of wetlands available as habitat. The continued operation and maintenance of existing facilities would likely not exacerbate the current situation with respect to terrestrial and wetland ecosystems. New mining activities have the potential to expand their footprint and development in general on the landscape, as does continued human population growth in South Florida. Lands set aside for recreation and conservation provide buffers against development, provide habitat for plants and animals, and serve to preserve fragments of the ecosystem of South Florida. Projects that continue to incrementally reverse changes in land cover due to man-made changes in surface water flow, including CERP-related activities, would continue to benefit the terrestrial and wetland ecology of the region.

As described in Chapter 7, terrestrial and wetland environments in South Florida may also be affected by continued population growth and related development. The overall impact from past, present, and reasonably foreseeable future activities on regional terrestrial and wetland ecology is substantial.

Summary Statement

Most land cover in the Glades site landscape is already converted to agriculture. Approximately 140 ac of wetland and 26 ac of upland habitats would be permanently lost including high-quality forested wetlands. Although most of the conceptual transmission line corridor is currently used for agriculture, installation and operation of a 121 mi long transmission system could affect an undefined subset of the 1,627 ac of wetlands and nearly 200 ac of uplands contained within the conceptual transmission line corridor. Although the entire corridor would not be developed and all lands lost as habitat, some portion would be lost to pole installation, access road development, or altered to low-growing vegetation. Substantial amounts of ecologically valuable land-cover types would be affected and include freshwater marsh, wet prairies, and mixed wetland hardwoods. Intact habitats that reside in an already fragmented landscape would be fragmented further. Substantial amounts of potentially suitable habitat for Audubon's crested caracara, the wood stork, and Florida panther would be altered.

Based on the information provided by FPL and the review team's independent evaluation, the review team concludes that the cumulative impacts on terrestrial and wetland resources of building and operating two new nuclear units at the Glades alternative site, including impacts attributable to permanent conversion of habitat for the facility footprint as well as operation of the cooling towers and transmission lines would be MODERATE. The incremental effect of the building and operation of two new nuclear units at the Glades site would be a significant contributor to this impact primarily because of the proposed length of the transmission line corridor.

9.3.2.4 Aquatic Resources

What follows is an assessment of the potential impacts on aquatic resources that may occur if the two nuclear reactors described by FPL (2014-TN4058) were constructed and operated at the Glades alternative site. Based on a review of potential cooling-water sources discussed in

Section 9.3.2.2, the review team assumes no cooling ponds or reverse osmosis facilities would be required for the Glades site. Unless otherwise noted, the information presented in this section was obtained from FPL's ER, Revision 6 (FPL 2014-TN4058).

The Glades site is an undeveloped greenfield site in the southeastern portion of Glades County that encompasses approximately 3,000 ac of primarily agricultural land. The site is located just north of the C-43 Channel (Caloosahatchee Canal) and Lake Hicpochee, and is approximately 5 mi southwest of Lake Okeechobee (Figure 9-4). The size and elevation of Lake Hicpochee is directly influenced by the water-management activities occurring at Lake Okeechobee to maintain the existing Lake Okeechobee level. Lake Hicpochee also receives stormwater from Lake Okeechobee during storm events. Thus, Lake Hicpochee may support aquatic biota during the wet season, while resembling a sandy desert plain during the dry season. For this assessment, the review team assumes FPL would use groundwater as a primary water source for reactor cooling, supplemented by additional water from the C-43 Channel during high surface-water flow periods using a conventional intake structure. Cooling-tower blowdown would be injected into the Boulder Zone.

The C-43 Channel connects to Lake Okeechobee just east of the Glades site, and likely contains aquatic resources that are similar to the lake. Lake Okeechobee is the largest lake in Florida, and the center of South Florida's regional water-management system, providing commercial and sport fisheries, flood control, and a source of potable and irrigation water. The lake encompasses over 730 mi^2, and has an average depth of about 9 ft (FFWCC 2013-TN2842). Desired lake elevations (stages) are between 12.5 ft and 15.5 ft (USACE and SFWMD 2009-TN2848). Major natural tributaries to the lake are Fisheating Creek, Taylor Creek, and the Kissimmee River. Approximately 70 percent of the water entering the lake is associated with these tributaries; rainfall accounts for the remaining 30 percent. Evaporation accounts for about 70 percent of the water loss, and the remaining water exits the lake through engineered outfalls (FFWCC 2013-TN2842).

As described in Section 2.4, water-management practices in South Florida over the past 100 years have dramatically changed the regional hydrology and sheet-water flow, and influenced the aquatic plants and animals in the area. Creation of levees, canals, and channels to support agriculture and development has confined Lake Okeechobee to a smaller area than historically present, and resulted in a variety of water-management activities to maintain the lake level during the dry season and reduce flooding during the wet season. Lake Okeechobee and the connecting rivers, canals, channels, and engineered outfalls are also greatly affected by weather events. During the hurricane season of 2004, Hurricanes Frances and Jeanne created high water surges of over 18 ft, and created turbid conditions that affected submerged aquatic vegetation; the drought of 2006 lowered the level of Lake Okeechobee to an all-time record of 8.82 ft msl (FFWCC 2013-TN2842). Currently, the USACE is responsible for managing water levels in Lake Okeechobee between 12.5 and 15.5 ft NGVD (National Geodetic Vertical Datum of 1929) to balance flood control, public safety, navigation, water supply, and public health (SFWMD 2012-TN2883).

Based on the information provided by FPL (2014-TN4058), the facility footprint at the Glades site will encompass approximately 362 ac. Although the affected area is primarily farmland, building activities have the potential to directly or indirectly affect aquatic resources present in

small streams or ponds at or near the site. Installation of the water-intake structure for intermittent cropping of water in the C-43 Channel may temporarily affect resident aquatic biota, and the construction of a water pipeline to the site may temporarily affect surface-water habitats. As described by FPL (2014-TN4058), approximately 121 mi of transmission lines encompassing 5,823 ac may also affect aquatic resources in areas where the transmission lines support structures or access roads are adjacent to surface-water habitats. During the operation of the nuclear reactors, cooling water obtained from two intake structures on the C-43 Channel during high-flow periods creates the potential for impingement and/or entrainment of aquatic biota present in the channel, or those entering the channel from Lake Okeechobee. Because Lake Okeechobee and the rivers, streams, channels, and canals in the vicinity of the Glades site are highly connected, it is assumed the biota present in the lake are indicative of the aquatic resources that might be affected by the building and operation of two nuclear reactors, as described below.

Commercial and Recreational Species

As noted above, the review team assumes the fish and invertebrates present in the Lake Okeechobee would be representative of species occurring in the C-43 Channel and other surface water habitats near the lake, given the hydrological connections that are present. Recreational species present in Lake Okeechobee include Largemouth Bass (*Micropterus salmoides*), Black Crappie (*Pomoxis nigromaculatus*); commercial fishing also occurs for various species of catfish (Ictaluridae) and bream (*Lepomis* spp.).

Important Species

The USACE (2013-TN2847) reports 69 species of fish present in Lake Okeechobee and the Okeechobee Waterway, ranging from small forage fish like the Threadfin Shad (*Dorosoma petenense)* and Inland Silversides (*Menidia beryllina)* to larger predatory species like the Largemouth Bass and Black Crappie (*P. nigromaculatus*). Electrofishing studies conducted by the FFWCC at 21 stations during the fall of 2011 yielded 34 species. Dominant species based on abundance, were Bluegill (*L. macrochirus*), Redear Sunfish (*Lepomis microlophus*), Largemouth Bass, Inland Silverside, and Gizzard Shad (*D. cepedianum*). Dominant species based on biomass were Largemouth Bass, Striped Mullet (*Mugil cephalus*), Bluegill, Florida Gar (*Lepisosteus platyrhincus*), Bowfin (*Amia calva*), Redear Sunfish, and Channel Catfish (*Ictalurus punctatus*). Lake-wide trawl sampling from 2005 to 2011 resulted in the capture of 3,281 fish. Dominant species by abundance were Threadfin Shad, Bluegill, White Catfish (*Ameiurus catus*) and Black Crappie. Dominant species based on biomass were White Catfish, Bluegill, Black Crappie, Florida Gar, Channel Catfish, Threadfin Shad, and Redear Sunfish (Zhang and Sharfstein 2013-TN2894).

Lake Okeechobee also supports a wide variety of benthic invertebrates. Because the restoration of Lake Okeechobee is one of the primary goals of CERP, a 3-year project funded by SFWMD was conducted by FFWCC to establish pre-CERP environmental conditions in the lake. During the 2005 to 2008 study period, sampling was conducted at 18 stations during wet and dry seasons. A total of 118 aquatic invertebrate taxa representing 28 major taxonomic group were collected. Samples were numerically dominated by oligochaete worms and larval

chironomid midges. Pelecypod, amphipods, gastropods, and isopods were also observed in the samples (Warren et al. 2009-TN2846).

Non-Native or Nuisance Species

Of the 69 fish species present in Lake Okeechobee, the USACE (2013-TN2847) noted 17 species were non-native, including several species of catfish, carp, tilapia and cichlids. Additional information about exotic species is provided in the Lake Okeechobee Protection Program Exotic Species Plan, which includes the lake and 39 surrounding hydrologic basins identified in the Lake Okeechobee Surface Water Improvement and Management Plan (SFWMD 2003-TN2852). Exotic plants identified in the plan included hydrilla (*Hydrilla verticillata*), waterhyacinth (*Eichornia crassipes*), and waterlettuce (*Pista stratiotes*). Exotic aquatic animals identified in the plan included Blue Tilapia (*Oreochromis aureus*), Asian swamp eel (*Monopterus albus*), spiny water flea (*Daphnia lumholtzii*), Asiatic clam (*Corbicula fluminea* or *C. manilensis*), and Sailfin Catfish (*Pterygoplichthys multiradiatus*). Work by Harvey et al. (2010-TN3158) has shown that up to 70 percent of the fish community within a canal system may be composed of non-native species, and that the canals can also act as a conduit that enables invasive species to colonize new areas. Given the hydrological connections that exist in and around Lake Okeechobee, many or all of the above species could be present at or near the Glades site.

Federally and State-Listed Species and Critical Habitat

Federally and State-listed aquatic species present in Glades County that could occur at or near the Glades site include the endangered Florida manatee (*Trichechus manatus latirostis*), the threatened American crocodile, and the threatened American alligator (*Alligator mississippiensis*); the alligator is listed because of its similarity in appearance to the American crocodile (FNAI 2013-TN2850). Detailed information about these species is found in Section 2.4.2. Critical habitat for manatee and crocodile is not present at the Glades site, but the manatee consultation area includes Lake Okeechobee (FWS 2003-TN2916).

Building Impacts

Building-related impacts on aquatic species are unlikely at the Glades site, because the majority of the land required for the facility footprint is currently used for farming and agriculture. Some existing drainage ditches that support a seasonal population of some of the fish species listed above may be adversely affected. Building of the surface-water intake on the C-43 Channel may result in short-term increases in water turbidity, and some disturbance of the shoreline area, but it is expected these impacts would be temporary and minor, and addressed primarily by the use of BMPs discussed by FPL (2014-TN4058). Installation of the transmission line system necessary to connect the new facility to the power grid would disturb approximately 5,000 ac of agricultural land, with limited aquatic resources expected to be present. Building activities are not expected to affect the recreational and commercial aquatic resources in Lake Okeechobee or the C-43 Channel, or any Federal or State-listed species that may occur at or near the building area. FPL has also indicated that field surveys for listed species would occur before land preparation or building activities occurred. Building activities related to the facility and transmission line systems would be conducted in accordance with State and Federal regulations, permits, and BMPs. Installation of the intake structure would use turbidity curtains, silt screens,

or similar technology to minimize impacts. The use of BMPs during tower erection and conductor installation would minimize building-related impacts along transmission line corridors.

Operations Impacts

Based on the review team assumptions described above, the majority of the water required to operate the cooling-water system for the two nuclear facilities at the Glades site would be obtained from groundwater resources, limiting the potential for impingement or entrainment of aquatic biota to periods of surface-water use. During times of excess surface-water flow that typically occurs during the wet season, supplemental water would be obtained from a surface-water intake located in the C-43 Channel. Impingement and entrainment of organisms from the intake canal would be the most likely operational impacts on aquatic populations that would occur. Assuming a closed-cycle cooling system and compliance with the EPA's 316(b) Phase I requirements for intake structures (66 FR 65256) (TN243), the intake is considered protective of aquatic life. The anticipated impacts attributed to impingement and entrainment are considered by the review team to be minimal. Furthermore, the intakes would likely be only operated intermittently throughout the year when excess surface water is available. Impingement or entrainment that does occur should not result in noticeable changes to aquatic biota species composition or abundance. Because cooling-tower blowdown would be discharged into the Boulder Zone of the Lower Floridan aquifer via deep-injection wells, surface-water resources would not be adversely affected. There is no available information about biological communities that may be present in the Boulder Zone formations near the Glades site, so it is not possible to determine whether a complete exposure pathway is present or assess potential biological effects. Thus, the potential risk of chemical exposure to aquatic resources resulting from discharge of cooling-tower blowdown cannot be determined. Based on an NRC assessment of a similar cooling system proposed at the Levy site in western Florida using brackish saltwater for cooling-tower makeup water (NRC 2012-TN1976), cooling-tower drift impacts on aquatic resources would likely be minimal, because deposition would be expected to occur primarily on plant property or adjacent agricultural lands. No detectable increase in surface-water salinity resulting from salt-drift deposition is anticipated.

Cumulative Impacts

A list of past, present, or reasonably foreseeable projects in the vicinity of the Glades site is presented in Table 9-6. As shown in the table, a wide variety of energy, mining, transportation, and restoration projects exist within the vicinity of the Glades site that have the potential to noticeably alter the surrounding landscape and affect plant, animal, and human populations. In addition, a variety of parks, wildlife refuges, and recreational areas are and will continue to provide both protection for wildlife and recreational opportunities for residents and visitors to South Florida. The operational or proposed regional energy facilities are powered by coal, oil, natural gas, biofuels, or solar energy. Collectively, these projects occupy land that was previously drained and channelized, as discussed in Section 2.4.2. Continued operation of these facilities may affect aquatic biota through interference with natural drainage patterns and consumptive water use. Rock-mining activities have the potential to negatively affect terrestrial and wetland species during excavation processes. However, rock mining may provide limited benefits to some aquatic species through the creation of new habitat after mining activities are completed.

As discussed above, the presence of parks, preserves, refuges, and natural areas will provide a net positive benefit to aquatic biota by maintaining or enhancing existing populations, providing recreational opportunities to residents and tourists, and ensuring that the potential impact of new projects near these areas are protective of the environment. Specific projects listed in Table 9-6 with the potential to provide a positive environmental benefit to aquatic resources are associated with the ongoing CERP. Examples include a proposed project to increase water-storage capacity in the C-43 Basin (USACE and SFWMD 2014-TN3009); a project to improve the timing, quantity, and quality of freshwater flows into the Caloosahatchee River estuary (USACE and SFWMD 2014-TN3010); and various regional projects to improve surface-water management and reduce damaging flood releases (USACE and SFWMD 2014-TN3013; USACE and SFWMD 2014-TN3011; 78 FR 1164 [TN2991]). In addition, a proposed project to increase aquatic and wildlife habitat, regulate extreme fluctuations in Lake Okeechobee elevations, and reduce nutrient loading will likely improve water quality in adjacent canal systems as well as coastal areas east and west of the Glades site (USACE and SFWMD 2014-TN3015). As discussed in Section 7.3.2, aquatic environments in this region of South Florida may also be affected by continued population growth and related development. Overall the review team concludes that the cumulative impacts on aquatic resources in the vicinity of the Glades site would be MODERATE.

Summary Statement

Based on a review of the information provided by FPL and the review team's independent assessment, it is likely the building and operation of a nuclear generating plant at the Glades site would contribute only minimally to the cumulative effects on aquatic species likely to occur in that portion of South Florida. Although the building of nuclear units at the Glades site would displace some existing agricultural land, surface-water habitats would be likely minimally affected. During the normal operation of the plant, groundwater would be used for reactor cooling, and deep aquifer discharge of cooling-tower blowdown would be employed, eliminating the need for conventional surface-water intake and discharge structures. During periods of excess surface-water flow, cooling water from the C-43 Channel (Caloosahatchee Canal) would be withdrawn for cooling. Some impingement and entrainment losses would be expected; however, assuming a closed-cycle cooling system and compliance with the EPA's 316(b) Phase I requirements for intake structures (66 FR 65256) (TN243), the intake is considered protective of aquatic life and the anticipated impacts attributed to impingement and entrainment are considered minimal. Furthermore, the intakes would likely be only operated intermittently throughout the year when surface water is available. Impingement or entrainment that does occur should not result in noticeable changes to aquatic biota species composition or abundance. Thus, the review team concludes that the cumulative impacts of building and operation of two new nuclear reactors at the Glades site, combined with the other past, present, or reasonably foreseeable future activities on aquatic resources would be MODERATE, but building and operating two new nuclear units at the Glades site would not be a significant contributor to the MODERATE impact.

9.3.2.5 Socioeconomics

The following impact analysis includes impacts from building activities and operations. The analysis also considers other past, present, and reasonably foreseeable future actions that affect socioeconomics, including other Federal and non-Federal projects listed in Table 9-6.

For the analysis of socioeconomic impacts at the Glades site, the geographic area of interest is considered to be the 50 mi region centered on the Glades site with special consideration of Glades, Hendry, Highland, Lee, and Okeechobee Counties because that is where the review team expects socioeconomic impacts to be the greatest. In evaluating the socioeconomic impacts of site development and operation at the Glades site near Moore Haven in Glades County, the review team used readily obtainable data from the Internet or published sources. Impacts from both building and station operation are discussed.

Physical Impacts

People who work or live around the site would be exposed to noise, fugitive dust, and gaseous emissions from building and operations activities. Noise, dust, and air-pollution emissions generated within the boundaries of the Glades site would be expected to be similar to those for the Turkey Point site. Because the surrounding site is rural and sparsely populated and because noise and air-pollution impacts are attenuated by distance, members of the surrounding population exposed would be relatively few and the impacts would be expected to be negligible. Best practices and applicable regulations would be expected to protect building workers and personnel working onsite. Truck and vehicle traffic related to building and operations would generate noise, fugitive dust, and gaseous emissions offsite. In addition, offsite structures include a transmission line and intake/makeup pipelines (FPL 2014-TN4058). Because the area affected by offsite structures would be rural and sparsely populated and because FPL would be expected to implement a dust-control plan similar to that for the Turkey Point site, noise and air-pollution impacts from these offsite activities would be expected to be minor.

Based on FPL's conceptual site layout for the Glades site (FPL 2011-TN59) and on aerial photography, there is one structure within the boundaries of the proposed site. There are also agricultural crops that would be lost. Offsite project-related building activities include construction of an access road and widening of 1.9 mi of SR-78, and a 6.2 mi railway. The impact on road quality based on any road improvements made by the applicant to facilitate project-related traffic would only affect a small population base, and therefore that impact would be minor and beneficial. Offsite project-related building activities also includes construction of a 121 mi transmission line, and intake/makeup pipelines (FPL 2014-TN4058). The conceptual design of these activities routes them, to the extent possible, along existing rights-of-way and avoids populated areas and residences (FPL 2014-TN4058). The physical impacts on existing structures and crops within the proposed site and offsite areas for supporting infrastructure would be minimal.

The area around the site is relatively flat, sparsely populated, and is used mainly as farmland. Building would use cranes (which could exceed 400 ft in height) and would alter the regional viewscape. Construction of the transmission lines would pose similar impacts. The power plant and water-intake facilities would likely be visible from several angles and contrast highly with the present viewscape. Building and operation would noticeably alter the aesthetics of the area. Because of the sparse population, the negative impact would likely not interfere with the daily routine of local public around the Glades site and would not destabilize the aesthetic characteristics of the area.

Based on the information provided by FPL (2014-TN4058) and the review team's independent analysis, the review team concludes that the overall physical impacts of building activities and operations would be minor and adverse, with the exceptions of minor and beneficial impacts on road quality and noticeable but not destabilizing adverse aesthetic impacts near the Glades site.

Demography

The Glades site is located in Glades County, 2.0 mi west of Moore Haven (2012 population 2,700) and 45 mi east of Fort Myers (2012 population 63,427), the closest population center with more than 25,000 residents (FPL 2014-TN4058; USCB 2012-TN4098). The population distribution within and around the Glades site is typically rural with low population densities. There are 11 counties within the 50 mi area, but the review team estimates the areas in which workers would most likely live and from which they would commute are within Glades, Hendry, Highland, Okeechobee, Palm Beach, and Lee Counties, based on current commuter patterns[8] (USCB 2011-TN4078). For the purposes of assessing potential socioeconomics impacts, the review team excluded Palm Beach County as a potential area of residence for construction and operation workers: the main residential areas in this county are along the coast, in cities such as West Palm Beach (at nearly a 2-hour driving distance), which would be less likely to accommodate workers than closer communities, such as Fort Myers, in Lee County. Because the population of Palm Beach would be over 60 percent of the population of the six counties together, the impacts would be distorted by the inclusion of Palm Beach County in the potential area of residence. The remainder of the analysis focuses on the five-county area encompassing Glades, Hendry, Highland, Okeechobee, and Lee Counties.

FPL estimated the peak number of workers during building would be 3,983, including 33 operation workers. The review team assumed that the share of construction and operation workers relocating from outside the five-county area would be 87 percent of the estimated peak number of workers. This assumption was reached by using the assumption made for the proposed Turkey Point site as a reference and assuming that the share of workers that would come from outside the region is inversely proportional to the population of the region[9] (USCB 2009-TN3395). As described in Section 4.4, 70 percent of the construction workforce and 100 percent of the operation workforce that moved to the area were assumed to bring their families. Based on these assumptions, a peak of 3,437 construction and 29 operation workers would relocate to the area during the project construction phase, and 2,435 of these workers would bring their families. Based on an average household size of 3.25 people, the total increase in population attributable to the peak total workforce at the Glades site would be 8,946 people. An influx of 8,946 people represents a 1.1 percent increase in the five-county 2012 population of 814,289.

(8) Over 80 percent of the workers in Glade County currently reside in one of these six counties (USCB 2011-TN4078).

(9) The proposed Turkey Point site analysis assumed 50 percent of the peak workers would come from outside the 50 mi region and that 83.3 percent of them would reside in Miami-Dade County; i.e., 41.65 percent (0.5 × 0.833) of the peak workers would migrate into Miami-Dade County. Because the population of the five-county area is approximately 32 percent of that of Miami-Dade County (814,289/2,512,219; USCB 2012-TN4098), the review team assumed the share of peak workers migrating into the five-county area would be 1-(0.32 × 0.4165) ≈ 87 percent.

FPL estimated the total onsite operations workforce to be 806 workers. As explained above, the review team assumed that 87 percent of these workers (702) would relocate from outside the five-county area. For this analysis, the review team assumed that 100 percent of operation workers who relocate would bring their families. Based on an average household size of 3.25 people, the total population increase attributable to project operations is 2,282 (702 × 3.25) people. This represents a 0.3 percent increase in the five-county area.

The review team concluded that the impact on the local demography would not be noticeable.

Economic Impacts on the Community

Economy

FPL estimated the peak number of workers during building would be 3,983, including 33 operation workers. Employment of 3,983 construction and operation workers would have positive economic impacts in the five-county area. Based on a multiplier of 1.7604 jobs (direct and indirect) for every construction job and 2.3016 for every operation job, 3,983 new construction and operation jobs would create 3,047 indirect jobs, for a total of 7,030 new jobs in the five-county area during peak employment (3,950 × 1.7604 + 33 × 2.3016) (FPL 2011-TN56).[10] This represents a 2.0 percent increase in the total employment in the five-county area.[11] Peak employment would last 1 month and the average employment generated during the 10-year building period would be about half of that of peak employment. This added employment would generate added earnings to the economy of the five-county area, but the added employment and earnings would not be noticeable to most of those living or working in the area.

An estimated 806 workers would be required for the operation of two nuclear power facilities. Based on a multiplier of 2.3016 jobs (direct and indirect) for every operations job at the new units (FPL 2011-TN56), an influx of 806 workers would create 904 indirect jobs for a total of 1,855 new jobs in the region. This represents a 0.5 percent increase in the total employment in the five-county area. This added employment would also generate added earnings to the economy of the five-county area, but the added employment and earnings would not be noticeable to most of those living or working in the area.

Taxes

State corporate income taxes and sales and use taxes paid at the Glades site during construction and operations of the proposed units would be similar to those paid by the same units at the proposed Turkey Point site. As discussed in Sections 4.4 and 5.4, State taxes paid by the proposed units would not exceed 2 percent of the annual collected State corporate income and sales and use taxes. The impact would be minor and beneficial. County surtax rates in the five-county area are typically 1 percent, with the exception of Lee County, for which the rate is zero percent (FDOR 2014-TN3393). County surtax collections from the proposed units would be highest during construction when annual expenses related to the proposed units

(10) Multipliers are for a four-county area (excluding Highlands County) and are used as an approximation.
(11) Employment of 348,759 (BLS 2013-TN4085)

would be estimated to reach up to $1.56 billion (Section 4.4). A 1 percent sales surtax would generate $15.6 million in revenues for the five-county area.[12] This would correspond to approximately 1.1 percent of total County revenues in the five-county area for 2012.[13] The impact would be minor and beneficial. County and school district governments in Florida may levy taxes up to 10 mills each (1 percent) in property taxes (FDOR 2012-TN459). If the value of property taxes for the two nuclear reactors at the Glades site were the same as the value estimated for Units 6 and 7 at the Turkey Point site in Section 5.4.3.2, FPL would pay $20 million in property taxes to the Glades County School District and $20 million to Glades County. These payments would correspond to up to 1.7 times the Glades County School District 2011-2012 total revenues ($20 million compared $11.7 million) (FLDOE 2012-TN3391) and 0.8 times the Glades County 2011-2012 total revenues ($20 million compared to $26.3 million) (FLDFS 2013-TN3392). Because property taxes paid to school districts are reallocated through Florida's Education Finance Program, the benefit to the Glades County School District would be diluted to some extent, and the exact amount distributed to each school district is not known at this time. Because of the value of project-related property tax payments relative to current property taxes, the review team considers the impacts on tax revenues to both the Glades County School District and Glades County to be substantial and beneficial

The review team concluded that the economic impact would not be noticeable and would be beneficial, with the exception of property tax revenues to Glades County and to the Glades County School District, which would be beneficial and substantially alter current property tax levels in Glades County and the Glades County School District.

Infrastructure and Community Service Impacts

Traffic

Workforce access to the Glades site would occur through US-27 coming from the east and the west, and from the north through SR-78. The review team estimated the current level of service (LOS) of these roads at three Florida Department of Transportation (FDOT) traffic-monitoring sites based on the peak hour directional traffic and FDOT LOS thresholds. Peak hour directional traffic information was obtained from FDOT Florida Traffic Online (FDOT 2013-TN3558) and consists of the Annual Average Daily Traffic (AADT) at each traffic-monitoring site, a Standard Peak Hour Factor (K) and a Directional Distribution Factor (D). The multiplication of these three elements (AADT × K × D) provides an estimate of the current peak hour directional traffic volume. The LOS was determined comparing this peak hour directional traffic volume with the maximum thresholds for each LOS in Table 9 (areas less than 5,000 population) of FDOTs Generalized Service Volume Tables (FDOT 2013-TN3297). The review team used FDOT's 2011 LOS Reports by County (FDOT 2011-TN3557) to determine the correct classification of each road for the purposes of identification of the appropriate threshold in the Generalized Service Volume Tables (e.g., whether the road should be considered highway or a freeway; whether the area should be considered rural developed or rural undeveloped). Based on the procedure described above, the LOS at all three traffic-monitoring sites is B. To estimate

(12) To the extent that some of the expenditures would be made in Lee County, and to the extent that the sales surtax rate in that County is kept at zero, the total sales surtax collected would be smaller.
(13) $1,405 million (FLDFS 2013-TN3392).

the project impact on the traffic LOS during the project's peak workforce building period, the review team followed a methodology similar to that described in Section 4.4: The peak workforce of 3,983 construction and operation workers were divided into two shifts, with 70 percent assigned to shift 1 (6:00 a.m. to 4:30 p.m.) and 30 percent to shift 2 (5:00 p.m. to 3:00 a.m.). The hour of peak commuting traffic would be 4:30 p.m. to 5:30 p.m. The review team also assumed up to 36 trucks per hour. The project-related directional traffic during the peak commuting hour would be 2,824 vehicles (70 percent × 3,983 + 36). The review team assumed that one-third of the project-related traffic would come from each of the three directions—east, west, and north[14] (USCB 2011-TN4078). The results of this analysis are presented in Table 9-10 below. The additional building traffic would keep the roadway at a LOS classification of B in the western direction, and drop it to a LOS classification of C in the eastern direction. The LOS classification at the northern portion of SR-78 would drop the roadway to a LOS classification of D. The proposed widening of SR-78, however, would allow the LOS classification to remain at a B.

Table 9-10. Peak Workforce Traffic LOS Analysis for the Glades Site

Traffic-Monitoring Site	Baseline Peak Hour Directional Traffic	Baseline LOS	Distribution of Project-Related Peak Traffic	Added Peak Hour Directional Traffic	Peak Hour Directional Traffic with Project	LOS with Project
US-27 west of site	376	B	0.33	932	1,308	B
SR-78 north of site	145	B	0.33	932	1,077	D (B)[a]
US-27 east of site	533	B	0.33	932	1,465	C

(a) LOS with proposed widening of road.

Source: Review team calculations based on FDOT 2011-TN3557, FDOT 2013-TN3558 and FDOT 2013-TN3297

FPL estimated the total onsite operations workforce to be 806 workers. If access of this workforce to the Glades site were distributed among the three directions equally, the LOS at each of the three monitoring sites would remain at B.

Based on the above analysis, the review team concludes that the impact of building and operations of the proposed nuclear reactors at the Glades site would be minor, after widening of SR-78, although noticeable on US-27 east of the site during the building phase.

Recreation

The Glades site is located approximately 11 mi from Lake Okeechobee and the Lake Okeechobee Scenic Trail that circles the lake. The lake is used for boating, fishing, and duck hunting, and the scenic trail is used for hiking and bird watching (Palm Beach County 2013-TN3298). The Nicodemus Slough is located at approximately 5 mi north of the site. Other parks and recreational areas exist within the county. The influx of project-related population to the five-county area would increase the number of local users of recreational facilities. Because the in-migrating population would be less than 2 percent of the local population, the review team expects the impact on current recreational infrastructure to be negligible.

(14) Based on U.S. Census Bureau commuter patterns (USCB 2011-TN4078) it was not possible to determine the likely direction of outgoing project-related traffic.

Housing

The review team estimates that 3,466 construction and operation workers would migrate into the five-county area, and each of these workers would need a place to live. Based on American Community Survey 2008–2012 5-Year estimates, within the five-county area, there are 466,004 housing units of which 156,022 are vacant (33.5 percent). This includes housing that is designated as seasonal, recreational, or occasional use (USCB 2012-TN4089). The review team estimates that, in absolute numbers, the available housing would be sufficient to house the construction workforce. The in-migrating construction and operation workforce would occupy no more than 2.3 percent of vacant housing units in the five-county area. FPL estimated that approximately 806 workers would be needed for operation of two nuclear power facilities at the Glades site, and the review team assumed that 87 percent of these workers (702) would relocate from outside the region and would settle in the five-county area. Based on these assumptions, the entire operations workforce would occupy no more than 0.5 percent of vacant housing units in the five counties. The review team concludes that impact on housing would be minor.

Public Services

In-migrating construction workers and plant operations staff would also likely affect local municipal water, wastewater-treatment facilities, police and fire-protection services, and other public services in the region. These impacts would be expected to be in proportion with the demographic impacts experienced in the region. In-migration to the five-county area would represent an estimated 1.1 percent of the local population (less during operations). The review team concludes that the impact on public services would be minor.

Education

Based on data for the 2011-2012 school year, there are approximately 109,547 full-time equivalent students in public schools in the five-county area[(15)] (FLDOE 2013-TN3299). The review team estimated that 3,466 construction and operation workers would migrate to the area, and that 2,435 workers would bring a family. Based on an estimate of 0.8 school-aged children per family (Malhotra and Manninen 1981-TN1430), an estimated 1,948 (2,435 × 0.8) school-aged children would be migrating into the five-county area. This would yield a 1.8 percent increase in the student population. During operations, the review team assumed that 702 operation workers and their families would relocate from outside the region. This would include an estimated 562 (702 × 0.8) children in the PK-12 school range. This influx of students would increase the student population in the five-county area by 0.5 percent. The review team concludes that impact on education would be minor.

Based on the information provided by FPL (2014-TN4058) and the review team's independent analysis, the review team concludes that the overall infrastructure and community service impacts of building activities and operations at the Glades site would be minor except for noticeable, but not destabilizing adverse impacts on traffic.

(15) Full-time equivalent (FTE) is a measure of enrollment based on the number of full-time students that it would take to fill the number of classes offered.

Cumulative Impacts

In addition to the socioeconomic impacts from building and operations of the proposed project at the Glades site, the cumulative analysis also considers other past, present, and reasonably foreseeable future actions that could have socioeconomic impacts.

The socioeconomic impacts of past and present actions in the affected area are largely captured by the current baseline conditions used for analysis above of project impacts. For example, the impacts of past and present actions on the demography and economy of the area are largely captured by current baseline data on population, employment, and tax revenues, and are incorporated in the baseline and trend assessments of the Regional Input-Output Modeling System (RIMS II) multipliers.

Reasonably foreseeable future actions are listed in Table 9-6. Several of these future actions would be expected to have cumulative socioeconomic impacts with the proposed project at the Glades site. The Southeastern Renewable Fuels Biorefinery and Cogeneration Plant is proposed for Hendry County, approximately 20 mi southeast of the Glades site. During construction the plant would generate local employment and earnings and construction traffic on nearby roads. When operational, it would purchase sorghum from adjacent agricultural fields, also generating local employment and earnings, and also generating truck traffic, particularly during harvest (FDEP 2010-TN3394). The Herbert Hoover Dike Rehabilitation Project and Dam Safety Modification Study will likely generate some local expenditures in the affected area. Other proposed projects that would generate employment and earnings during construction and operations include various proposed CERP water projects. The Florida Southeast Connection pipelines proposed through Highlands, Okeechobee, and Martin Counties (construction 2016–2017; FSC 2014-TN3301) would not pass close enough to the Glades site to contribute to the a cumulative socioeconomic impact.

Summary Statement

The cumulative impact of the projects identified above with the proposed project at the Glades site would depend largely on the timing of construction, when employment and earnings impacts are expected to be highest. However, based on the location of the identified future projects and their magnitudes, the cumulative socioeconomic impacts would be expected to be SMALL and adverse; with the exception of MODERATE adverse physical impacts on roads, aesthetics, and traffic. However, as a result of road improvements there would be a SMALL beneficial physical impact on road quality near the Glades site The staff expects LARGE and beneficial impacts of property tax revenues to Glades County and to the Glades County School District. Building and operating two new nuclear units at the Glades alternative site would be a significant contributor to the MODERATE adverse impacts.

9.3.2.6 Environmental Justice

The following impact analysis includes impacts from building activities and operations. The analysis also considers other past, present, and reasonably foreseeable future actions that affect environmental justice, including other Federal and non-Federal projects listed in Table 9-6.

The 2008–2012 American Community Survey block groups were used to identify minority and low-income population distributions in the area (USCB 2012-TN4098). The census data for Florida characterizes 15.9 percent of the population as Black; 0.3 percent as American Indian or Alaskan Native; 2.5 percent as Asian; 0.1 percent as Native Hawaiian or other Pacific Islander; 2.6 percent as other single minorities; 2.2 percent as multiracial; 22.5 percent as Hispanic ethnicity; and 42.2 percent as aggregate minority. There are 611 block groups within 50 mi of the Glades site. Following the criteria described in Section 2.6.1, Black minority populations exist in 64 block groups; American Indian or Alaskan Native minority populations exist in 1 block group; Asian minority populations exist in 5 block groups; other race minority populations exist in 31 block groups; multiracial minority populations exist in 2 block groups; ethnic Hispanic minority populations exist in 99 block groups; and aggregate minority populations exist in 180 block groups. There are no block groups containing Native Hawaiian or other Pacific Islander minority populations within 50 mi of the Glades site. Three Indian Reservations lie within 50 mi of the Glades site: the Brighton Indian Reservation, the Big Cypress Indian Reservation, and a portion of the Miccosukee Indian Reservation. The locations of the aggregate minority populations and Indian Reservations within 50 mi of the Glades site are shown in Figure 9-7. The locations of Hispanic minority populations and Black minority populations within the 50 mi of the Glades site are shown in Figure 9-8 and Figure 9-9, respectively.

The U.S. Census Bureau (USCB) data characterize 15.3 percent of Florida residents as low income (USCB 2012-TN4098). Out of a possible 611 block groups within 50 mi of the Glades site, 91 block groups contain low-income populations. The locations of the low-income populations within 50 mi of the Glades site are shown in Figure 9-10.

The NRC's environmental justice (EJ) methodology includes an assessment of affected populations of particular interest or with unusual circumstances, such as minority communities that are exceptionally dependent on subsistence resources or identifiable in compact locations (e.g., Native American reservations) and those that have a high density of minority or low-income groups. Based on literature research, the review team did not identify high-density minority or low-income presence near the site, nor differentiated subsistence consumption of natural resources by EJ populations of interest.

The analyses of impacts of building and operating new nuclear reactors at the Glades site identified noticeable adverse impacts on land use, terrestrial and wetland ecosystems, aesthetics, traffic, and historic and cultural resources. The review team did not identify any special pathways through which any impacts would disproportionately affect EJ populations of interest. Therefore, the review team concluded there would be no disproportionately high and adverse impacts on EJ populations of interest.

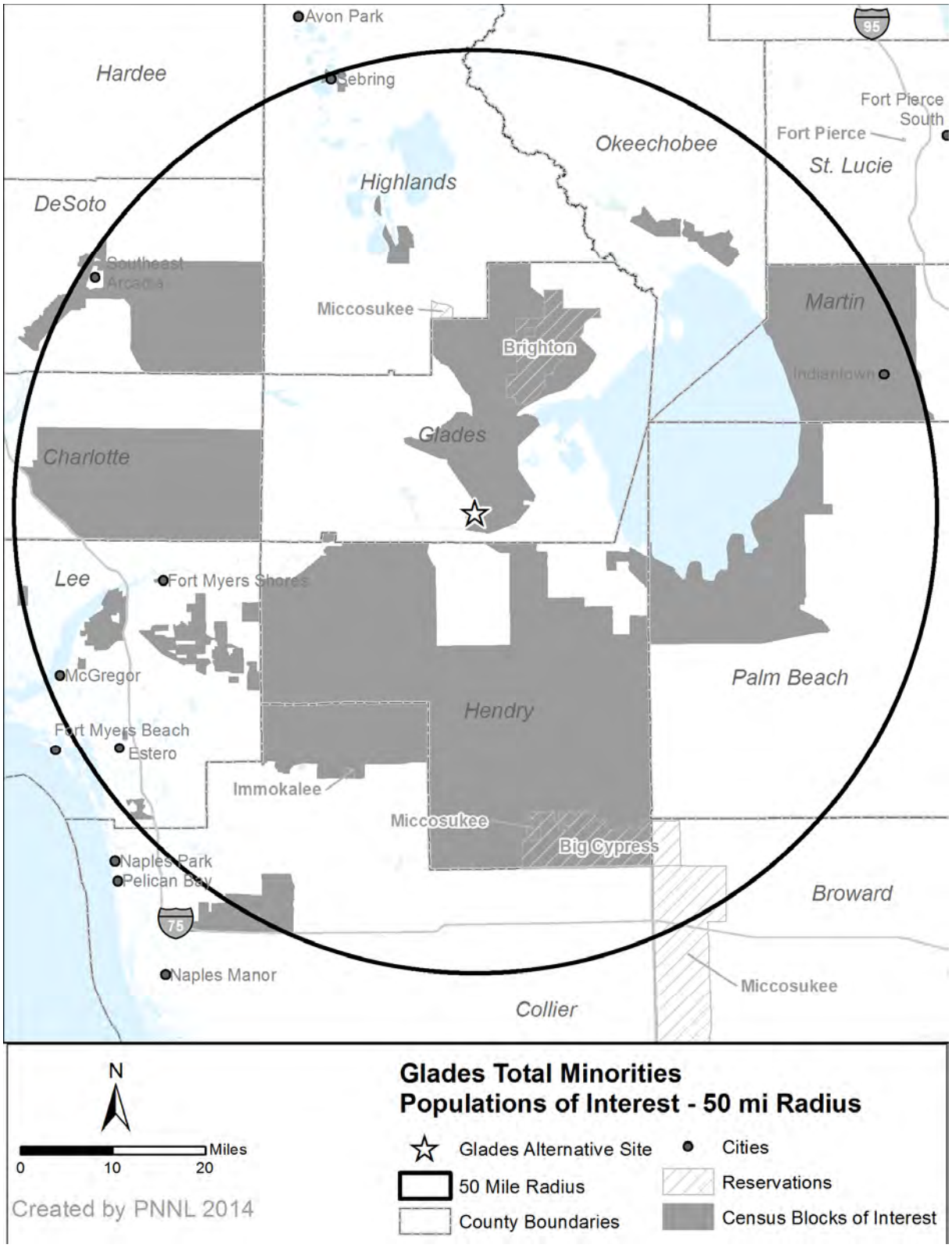

Figure 9-7. Aggregate Minority Populations in Block Groups that Meet the Environmental Justice Selection Criteria within 50 mi of the Glades Alternative Site

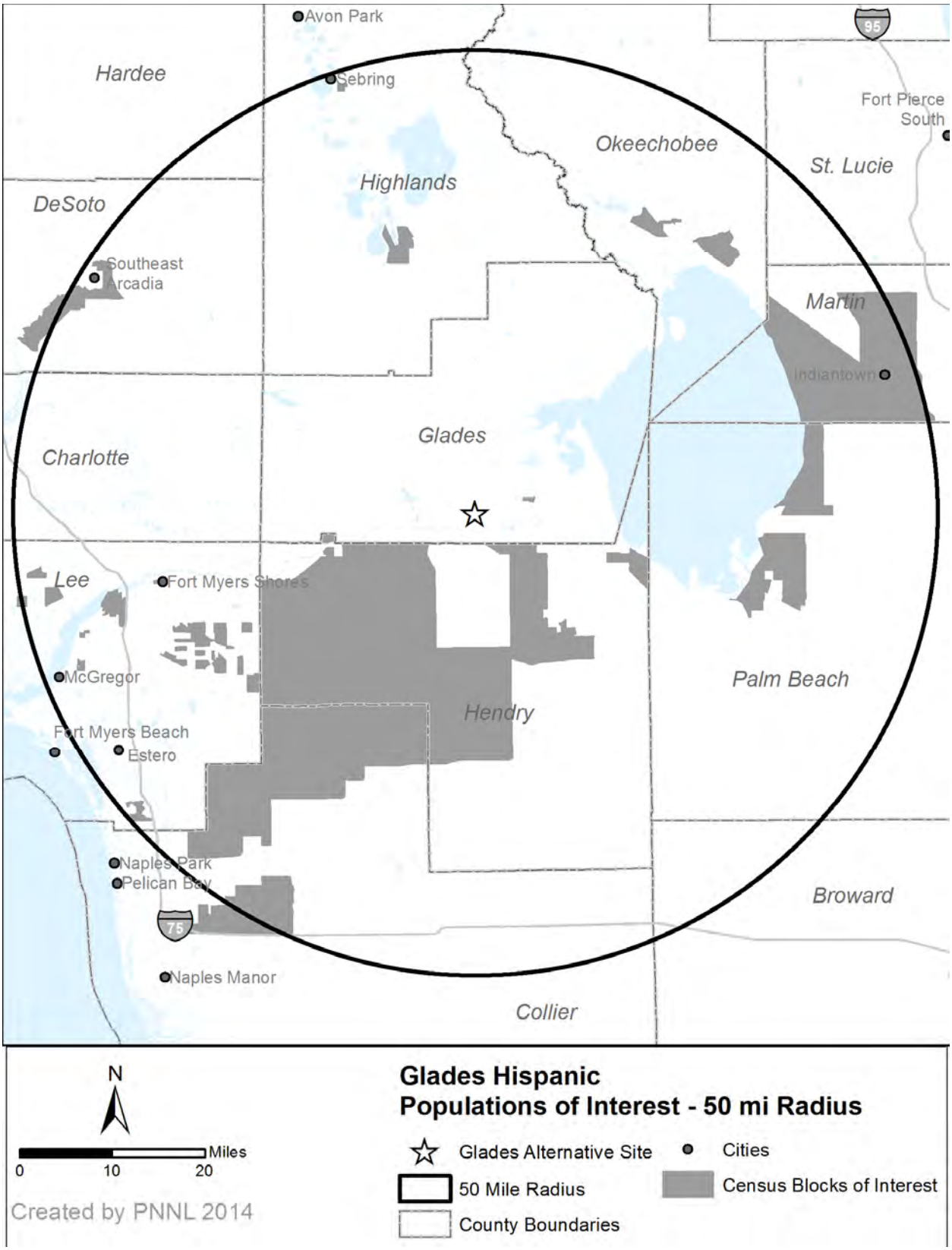

Figure 9-8. Hispanic Populations in Block Groups that Meet the Environmental Justice Selection Criteria within 50 mi of the Glades Alternative Site

Figure 9-9. African American Populations in Block Groups that Meet the Environmental Justice Selection Criteria within 50 mi of the Glades Alternative Site

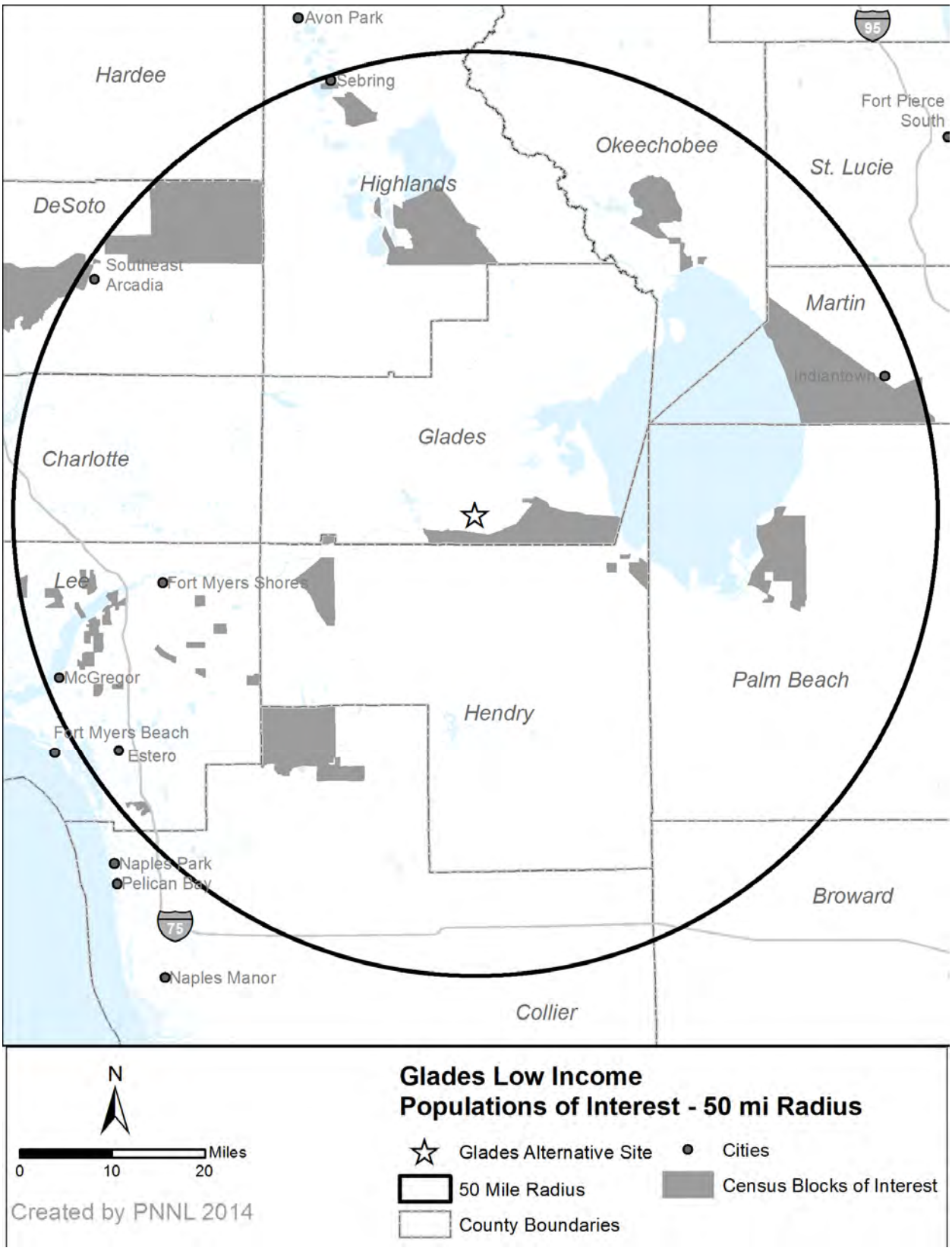

Figure 9-10. Low-Income Populations in Block Groups that Meet the Environmental Justice Selection Criteria within 50 mi of the Glades Alternative Site

Cumulative Impacts

In addition to the EJ impacts from building and operations of the proposed project at the Glades site, the cumulative analysis also considers other past, present, and reasonably foreseeable future actions that could have EJ impacts. Based on a literature review of past and present actions in the affected area, and based on the reasonably foreseeable actions listed in Table 9-6, the review team found no evidence that the cumulative effects would disproportionately affect EJ populations.

9.3.2.7 Historic and Cultural Resources

The following cumulative impact analysis addresses building and operating two new nuclear generating units at the Glades site. The analysis also considers other past, present, and reasonably foreseeable future actions that could affect cultural resources, including other Federal and non-Federal projects and the projects listed in Table 9-6. For the analysis of cultural impacts at the Glades site, the geographic area of interest is considered to be the Area of Potential Effect (APE) that would be defined for this proposed undertaking. This includes the direct effects APE, defined as the area physically affected by the site-development and operation activities at the site and transmission line corridors. The indirect effects APE is defined as the area visually affected and includes an additional 0.5 mi radius APE around the transmission line corridors and a 1 mi radius APE around the cooling towers.

Reconnaissance activities in a cultural resource review have particular meaning. Typically, they include preliminary field investigations to confirm the presence or absence of cultural resources. However, in developing this EIS, the review team relied upon reconnaissance-level information to perform its alternative site evaluation in accordance with ESRP 9.3 (NRC 2000-TN614). Reconnaissance-level information consists of data that are readily available from agencies and other public sources. It can also include information obtained through visits to the site area. The following information was used to identify the historic and cultural resources at the Glades site:

- NRC Alternative Sites Visit, July 2010 (NRC 2010-TN3304)
- FPL ER Revision 6 (FPL 2014-TN4058)
- Florida Historical Markers program (FDHR 2014-TN3875)
- National Register of Historic Places database (NPS 2014-TN3879).

The approximately 3,000 ac Glades site occurs in predominantly agricultural land. Historically, the Glades site and vicinity have remained largely undeveloped. Over time, the area has been disturbed by low-impact development including agriculture and low-density rural development, and it likely contains intact archaeological sites and other cultural resources associated with the past 10,000 years of human settlement. A search of the National Register shows that two significant historic districts are located within 10 mi of the Glades site (FPL 2014-TN4058; NPS 2014-TN3879). These two resources are the Glades Moore Haven Downtown Historic District and the Glades Moore Haven Residential Historic District, located several miles away. A total of 61 properties was found in four counties in the vicinity of the Glades site—Glades, Lee, Okeechobee, and Hendry Counties. A National Register search of the indirect effects APE for the proposed transmission line corridor shows that only the two properties noted above, the

Glades Moore Haven Downtown Historic District and the Glades Moore Haven Residential Historic District, are located along the route, though still outside the indirect effects APE. Numerous historic properties are located within the urban coastal area of Broward County, toward the southeastern end of the transmission line corridor, but these occur more than 10 mi from the APE.

A search of the Florida Historical Markers Program revealed that there are two historic markers in Glades County (FDHR 2014-TN3875). One is for the "Lone Cypress" and Everglades Drainage in the city of Moore Haven. The marker is near the two Glades Moore Haven Historic Districts. The other is for the hurricane of 1924, and is located about 10 mi to the west of the Glades site.

In 2006, FPL conducted background research for a proposed project located north of the Glades site (FPL 2014-TN4058). That work identified five prehistoric sites and one prehistoric archaeological district in the vicinity of that project, but none has been evaluated for National Register eligibility. The resources include primarily prehistoric habitation sites and burial mounds, as well as the Fort Center Archaeological District, which contains numerous prehistoric archaeological sites and a historic period Seminole War fort. None of these resources has been evaluated for eligibility for listing in the National Register. In addition, a historic district, the Herbert Hoover Dike, dating to the 1930s, is located in the area and has been determined eligible for listing in the National Register, but it is not listed. None of these resources is located within the direct effects APE of the Glades site, but they do indicate that archaeological sites and historical resources are located in the area.

In addition, there are three Indian Reservations in the area. These include the Brighton Seminole Indian Reservation in Glades County approximately 12 mi to the northeast of the Glades site, the Big Cypress Seminole Reservation in Hendry and Palm Beach Counties, approximately 33 mi to the southeast, and the Miccosukee Indian Reservation 5 mi farther south in Broward County. A portion of the proposed transmission line for the Glades site passes through the northern portion of the Big Cypress Seminole Indian Reservation, and within 5 mi of the Miccosukee Indian Reservation, but in this area the proposed transmission line follows an existing transmission line corridor.

While there are no known historic properties located within the direct effects APE of the Glades site, reconnaissance-level information shows that there are cultural, historic, and archaeological resources in the general vicinity of the site, including two historic districts located a few miles from the property (though outside the direct and indirect effects APE) and potentially significant archaeological resources associated with Lake Okeechobee, including burial mounds. No archaeological or architectural surveys have been conducted at the Glades site, and locating the nuclear plants there would require formal cultural resources survey and consultation with the State Historic Preservation Office (SHPO), Tribes, and other interested parties. If any significant cultural, historic, or archaeological resources are identified, the project could cause adverse effects and appropriate mitigation measures would need to be put in place before construction and operation.

Building Impacts

To accommodate the building of two nuclear units and associated facilities at the Glades site, FPL estimates that the total area of land that would be disturbed would involve approximately 362 ac for the facility footprint. In addition, a 1.9 mi long paved road and a 6.2 mi long railroad spur would need to be constructed in the predominantly agricultural land (FPL 2014-TN4058). Further, portions of SR-78 would need to be widened. An additional 3.4 ac would be required for pipelines and associated facilities (FPL 2014-TN4058). If the Glades site were chosen for the proposed project, identification of cultural resources would be accomplished through additional cultural resource surveys and consultation with the SHPO, Tribes, and interested parties. The results would be used in the site-planning process to address cultural resources impacts. If significant cultural resources were identified by these surveys, the review team assumes that FPL would use the same protective measures used at the Turkey Point site, and therefore the impacts would be minimal. If direct effects on significant cultural resources could not be avoided, land-clearing, excavation, and grading activities could potentially destabilize important attributes of historic and cultural resources.

There are no existing transmission lines connecting directly to the Glades site, and Section 9.3.2.1 discusses the proposed transmission lines, which would extend for a total of 121 mi through areas likely containing cultural and historic resources. FPL has stated that consideration would be given to sensitive environmental and built resources in determining a route for the transmission lines (FPL 2014-TN4058), but visual impacts from transmission lines may result in significant alterations to the visual setting of cultural and historic resources within the geographic area of interest. These include the Glades Moore Haven Downtown Historic District and the Glades Moore Haven Residential Historic District, both listed in the National Register. While both districts are located outside the indirect effects APE, both the nuclear generating plant and the new transmission lines likely would be visible from them. The effects would be particularly noticeable given that the setting in the area is primarily rural, without existing industrial development. If the Glades site were chosen for the proposed project, the review team assumes that FPL would conduct its transmission line-related cultural resource surveys and procedures in a manner similar to that for the Turkey Point site. In addition, the review team assumes that the State of Florida's final Conditions of Certification (State of Florida 2014-TN3637) regarding transmission line siting and building activities would also apply at this site. If direct effects on significant cultural resources could not be avoided, land-clearing, excavation, and grading activities could potentially destabilize important attributes of historic cultural resources. Similarly, both the transmission lines and nuclear generating units could indirectly affect cultural and historic resources through visual impacts on the setting of the resources.

Operations Impacts

Impacts on historic and cultural resources from operation of two new nuclear generating units at the Glades site include those associated with the operation of new units and maintenance of transmission lines. The review team assumes that the same procedures developed by FPL for the Turkey Point site, as well as the State of Florida's final Conditions of Certification, would be used for onsite and offsite maintenance activities. Consequently, the incremental effects of the maintenance of transmission line corridors and operation of the two new units and associated

impacts on the cultural resources would be negligible for the direct and indirect effects APEs. However, the indirect visual impacts would continue throughout the life of the transmission lines.

Cumulative Impacts

Past actions in the geographic area of interest that have similarly affected historic and cultural resources include rural and agricultural development and activities associated with these land-disturbing activities such as road development. Table 9-6 lists past, present, and reasonably foreseeable projects and other actions that may contribute to cumulative impacts on historic and cultural resources in the geographic area of interest. Projects from Table 9-6 that may fall within the geographic area of interest for cultural resources include the Ortona Sand Mine Expansion and future urbanization, such as new or expanded roads and other infrastructure. These projects may significantly affect historic and cultural resources in a manner similar to those associated with the building and operation of two new nuclear generating units.

Long linear projects such as roadways and pipelines may intersect the proposed transmission line corridors. Because cultural resources can likely be avoided by long linear projects, impacts on cultural resources would likely be minimal. However, this is not necessarily the case for transmission lines, which can have indirect effects on cultural resources through alteration of the visual setting. If building associated with such activities results in significant alterations of cultural resources in the transmission line corridors, either physical or visual, then cumulative impacts on cultural and historic resources would be greater.

Summary Statement

Cultural resources are nonrenewable. Therefore, the impact of the destruction or visual alteration of cultural resources is cumulative. Based on the information provided by FPL and the review team's independent evaluation, the review team concludes that the cumulative impacts from building and operating two new nuclear generating units on the Glades site would be MODERATE. The impacts of building and operating the project at the Glades site would be a significant contributor to the MODERATE impact primarily because of the indirect viewshed impacts from the nuclear power-generating plant and transmission lines on historic properties. This impact-level determination is based on reconnaissance-level information and the review team assumes that, if the Glades site were to be developed, cultural resource surveys and evaluations would be conducted and FPL, in consultation with SHPO, Tribes, and interested parties, would assess and resolve any adverse effects of the undertaking. If additional cultural or historic resources are present, and if there are adverse effects to those resources, the project could result in greater cumulative impacts.

9.3.2.8 Air Quality

The following impact analysis includes impacts from building activities and operations. The analysis also considers other past, present, and reasonably foreseeable actions that affect air quality, including other Federal and non-Federal projects listed in Table 9-6. As described in Section 9.3.2, Glades is a greenfield site; there are currently no nuclear facilities on the site. The geographic area of interest for the Glades site is Glades County, which is in the Southwest Florida Intrastate Air Quality Control Region (40 CFR 81.97) (TN255).

Sections 4.7 and 5.7 discuss air-quality impacts during building and operation. The emissions related to building and operating a nuclear power plant at the Glades alternative site would be similar to those at the Turkey Point site. The air-quality attainment status for Glades County, as set forth in 40 CFR Part 81 (TN255), reflects the effects of past and present emissions from all pollutant sources in the region. Glades County is in attainment of all National Ambient Air Quality Standards.

As described in Chapters 4 and 5, the criteria pollutants from building and operation were found to have a SMALL impact on air quality. In Chapter 7, the cumulative impacts of criteria pollutants were evaluated and determined to be SMALL to MODERATE because of nearby emission sources. Reflecting on the projects listed in Table 9-6, there are no significant projects within the area of interest that would contribute in a meaningful way to the cumulative impacts of criteria pollutants for the Glades site.

The air-quality impacts from development of the Glades site would be local and temporary. The applicant would develop a dust-control plan that identifies specific measures to minimize fugitive dust emissions during building activities. The distance from building activities to the site boundary would be sufficient to generally avoid significant air-quality impacts. There are no land uses or projects in Table 9-6 that would have emissions during site development that would, in combination with emissions from the Glades site, result in degradation of air quality in the region. Emissions from operation of two new nuclear units at the Glades site would be intermittent and made at low levels with little or no vertical velocity, similar to operational impacts at the Turkey Point site as discussed in Section 5.7, and the associated air-quality impacts would be SMALL. Other sources of emissions in Table 9-6 would likely have de minimis impacts due to their distance from the site. Given that these projects are subject to Clean Air Act permitting requirements, it is unlikely that the air quality in the region would degrade to the extent that the region would be in nonattainment of the National Ambient Air Quality Standards.

The cumulative impacts of GHG emissions related to nuclear power are discussed in Section 7.6. The impacts of the emissions are not sensitive to location of the source. Consequently, the discussion in Section 7.6 is applicable to a nuclear power plant located at the Glades site. The review team concludes that the national and worldwide cumulative impacts of GHG emissions are noticeable but not destabilizing. The review team further concludes that the cumulative impacts would be noticeable but not destabilizing, with or without the GHG emissions of two new nuclear units at the Glades site.

Summary Statement

The review team concludes that cumulative impacts from other past, present, and reasonably foreseeable future actions on air-quality resources in the geographic areas of interest would be SMALL for criteria pollutants and MODERATE for GHG emissions. The incremental contribution of impacts on air-quality resources from building and operating two units at the Glades site would not be a significant contributor to the MODERATE impacts.

9.3.2.9 Nonradiological Health Impacts

The following analysis considers nonradiological health impacts from building and operating two new nuclear units at the Glades site. The analysis also includes past, present, and reasonably foreseeable future actions that could contribute to cumulative nonradiological health impacts on site workers (construction and operation workers) and members of the public, including other Federal and non-Federal projects and the projects listed in Table 9-6 within the geographic area of interest. Nonradiological health impacts at the Glades site are estimated based on information provided by FPL and the review team's independent evaluation. For the analysis of nonradiological health impacts at the Glades site, the geographic area of interest is the site and the immediate vicinity (~2 mi radius) and the associated road and transmission line corridors. This geographic area of interest is based on the localized nature of nonradiological health impacts and is expected to encompass all nonradiological health impacts.

Building activities that have the potential to affect the health of members of the public and workers at the Glades site include exposure to dust and vehicle exhaust, occupational injuries, noise, and increased traffic associated with the transport of construction materials and personnel to and from the site. The operations-related activities that have the potential to affect the health of members of the public and workers include exposure to etiological (disease-causing) agents, noise, EMFs, occupational injuries, and impacts from the transport of workers to and from the site.

Building Impacts

Nonradiological health impacts on construction workers and members of the public from building two new nuclear units at the Glades site would be similar to those evaluated in Section 4.8 for the Turkey Point site. During the site-preparation and building phase FPL would comply with applicable Federal and State regulations on air quality and noise (FPL 2014-TN4058). The Glades site is located in a rural area, and building impacts would likely be negligible on the surrounding populations, which are classified as medium- and low-population areas. The incidence of construction worker accidents would be the same as that for the Turkey Point site.

The review team concludes that nonradiological health impacts on construction workers and the public from building two new nuclear units and associated transmission lines at the Glades site would be minimal. Nonradiological health impacts associated with traffic accidents during building activities at the Glades alternative site were evaluated in Section 4.8.3 and the review team concludes that the impacts would be minimal.

Operations Impacts

Nonradiological health impacts on operation workers and members of the public would include those associated with the operation of cooling towers and transmission lines as described in Section 5.8. Based on the configuration of the proposed new units at the Glades site (see Chapter 3 for a detailed site layout description), etiological agents would not be an issue with regard to members of the public because cooling-tower blowdown would be discharged into deep-injection wells not into surface waters. Impacts on workers' health from occupational injuries, noise, and EMFs would be similar to those described in Section 5.8 for the Turkey Point

site. Noise and EMF exposure would be monitored and controlled in accordance with applicable Occupational Safety and Health Administration (OSHA) regulations. Although no detailed noise modeling has been performed for the Glades site, it is likely that noise impacts would be similar to those predicted for operations at the Turkey Point site. Effects of EMFs on human health would be controlled and minimized by conformance with National Electrical Safety Code criteria and adherence to the standards for transmission systems regulated by the FDEP.

The review team concludes that nonradiological health impacts on workers and the public from operating two new nuclear units and associated transmission lines at the Glades site would be minimal. Impacts associated with traffic accidents during operations at the Glades alternative site were evaluated in Section 5.8.6 and the review team concludes that the impacts would be minimal.

Cumulative Impacts

Table 9-6 identifies no past or present projects within the geographic area of interest that could affect nonradiological human health in a way similar to the building of two nuclear units at the Glades site. All of the projects that could apply are more than 10 mi from the Glades site.

Reasonably foreseeable projects that could affect nonradiological human health in a way similar to the building of two nuclear units at the Glades site identified in Table 9-6 include various transportation (roads, traffic, pedestrian) and mining/quarry projects that are planned throughout the region.

There are no past, present, or reasonably foreseeable projects within the geographic area of interest that would affect nonradiological human health in a way similar to operating two nuclear units at the Glades site.

Summary Statement

Impacts on nonradiological health from building and operation of two new units at the Glades site are estimated based in the information provided by FPL and the review team's independent evaluation. Although some future activities in the geographical area of interest could affect nonradiological health in ways similar to the building and operation of two new units at the Glades site and associated offsite facilities, those impacts would be localized and managed through adherence to existing regulatory requirements. The review team concludes that nonradiological health impacts on workers and the public resulting from the building of two new nuclear units and associated road and transmission lines at the Glades site would be minimal. The review team expects that the nonradiological health impacts on the operations employees and the public of two new nuclear units at the Glades site would be minimal. Finally, the review team concludes that cumulative impacts on nonradiological health from past, present, and reasonably foreseeable actions in the geographic area of interest would be SMALL.

9.3.2.10 Radiological Impacts of Normal Operations

The following impact analysis includes impacts from building activities and operations. The analysis also considers other past, present, and reasonably foreseeable actions that affect radiological health, including other Federal and non-Federal projects listed in Table 9-6. As

described in Section 9.3.2, Glades is a greenfield site; there are currently no nuclear facilities on the site. The geographic area of interest is the area within a 50 mi radius of the Glades site. There are no major facilities that potentially affect radiological health within the 50 mi radius of the Glades site. However, there are likely to be medical, industrial, and research facilities within 50 mi of the Glades site that use radioactive materials.

The radiological impacts of building and operating the two proposed Westinghouse AP1000 nuclear power units at the Glades site include doses from direct radiation and liquid and gaseous radioactive effluents. These pathways would result in low doses to people and biota offsite that would be well below regulatory limits. These impacts are expected to be similar to those estimated for the Turkey Point site.

The NRC staff concludes that the dose from direct radiation and effluents from hospitals and industrial facilities that use radioactive material would be an insignificant contribution to the cumulative impact around the Glades site. This conclusion is based on data from the radiological environmental monitoring programs conducted around currently operating nuclear power plants.

Based on the information provided by FPL and the NRC staff's independent analysis, the NRC staff concludes that the cumulative radiological impacts from building and operating the two proposed Westinghouse AP1000 nuclear power units and other existing and planned projects and actions in the geographic area of interest around the Glades site would be SMALL.

9.3.2.11 Postulated Accidents

The following impact analysis includes radiological impacts from postulated accidents from the operation of two nuclear units at the Glades alternative site. The analysis also considers other past, present, and reasonably foreseeable future actions that affect radiological health from postulated accidents, including other Federal and non-Federal projects and the projects listed in Table 9-6. As described in Section 9.3.2, the Glades site is a greenfield site; there are currently no nuclear facilities at the site. The geographic area of interest considers all existing and proposed nuclear power plants that have the potential to increase the probability-weighted consequences (i.e., risks) from a severe accident at any location within 50 mi of the Glades alternative site. Facilities potentially affecting radiological accident risk within this geographic area of interest are the existing two units of St. Lucie—Units 1 and 2.

As described in Section 5.11.1, the NRC staff concludes that the environmental consequences of design basis accidents (DBAs) at the Turkey Point site would be minimal for AP1000 reactors. DBAs are addressed specifically to demonstrate that a reactor design is robust enough to meet NRC safety criteria. The environmental consequences of DBAs depend on the plant design and the atmospheric dispersion. The AP1000 design is independent of site conditions and the differences in the meteorology of the Glades alternative and Turkey Point sites are not significant with regard to the conditions that are important to assessing DBAs. Therefore, the NRC staff concludes that the environmental consequences of DBAs at the Glades alternative site would be minimal.

With a lower population density and the land-use values for the Glades alternative site, the NRC staff expects the risks from a severe accident for an AP1000 reactor located at the Glades

alternative site to be similar to or lower than those analyzed for the proposed Turkey Point site. The risks for the proposed Turkey Point site are presented in Tables 5-14 and 5-15 and are well below the median value for current-generation reactors. In addition, as discussed in Section 5.11.2, estimates of average individual early fatality and latent cancer fatality risks are well below the Commission's safety goals (51 FR 30028) (TN594). For existing plants within the geographic area of interest (St. Lucie Units 1 and 2), the Commission has determined that the probability-weighted consequences of severe accidents are small (10 CFR Part 51 [TN250], Appendix B, Table B-1). On this basis, the NRC staff concludes that the cumulative risks from severe accidents at any location within 50 mi of the Glades alternative site would be SMALL.

9.3.3 Martin Site

This section covers the review team's evaluation of the potential environmental impacts of siting a new two-unit nuclear power plant on the Martin site. The site is located in western Martin County, approximately 40 mi northwest of West Palm Beach, 5 mi east of Lake Okeechobee, and 7 mi northwest of Indiantown. The Miami load center is approximately 65 mi to the south-southeast. The site is bounded on the west by the Florida East Coast Railway and the adjacent SFWMD L-65 Canal; on the south by the St. Lucie Canal (C-44 or Okeechobee Waterway); and on the northeast by SR-710 and the adjacent CSX Railroad (FPL 2014-TN4058). The Martin site is an 11,300 ac area that includes five fossil-fuel–fired power units and a solar unit. The majority of the site is currently used for agriculture. The elevation reaches as high as 28 ft above sea level (FPL 2011-TN40), and the entire site lies outside the 100-year floodplain (FPL 2011-TN40). The location of the Martin site is shown in Figure 9-11.

The facility footprint (Figure 9-12), including the power units, support buildings, switchyard, storage areas, stormwater-retention ponds, and other structures, would encompass an estimated 363 ac. Use of the Martin site would also require the development of a 31 mi transmission line corridor (763.6 ac), a 39.3 mi access road (473.3 ac), a 4.3 mi railway (51.5 ac), and an intake/makeup pipeline connected to the C-44 Canal/St. Lucie Canal (21.7 ac). These additional features (not counting the transmission line) would add an estimated 547 ac to the overall permanent footprint at the site, and an additional area (up to several hundred acres) would have to be temporarily disturbed for activities such as laydown areas, a batch plant, and spoil deposition.

As discussed in Section 9.3.1.7, the review team considered an alternative configuration of the cooling system that FPL proposed.

The following sections include a cumulative impact assessment conducted for each major resource area. The specific resources and components that could be affected by the incremental effects of the proposed action if implemented at the Martin site and other actions in the same geographic area were considered. This assessment includes the impacts of NRC-authorized construction and operations and impacts of preconstruction activities. Also included in the assessment are past, present, and reasonably foreseeable future Federal, non-Federal, and private actions that could have meaningful cumulative impacts when considered together with the proposed action if implemented at the Martin site. Other actions and projects considered in this cumulative analysis are described in Table 9-11.

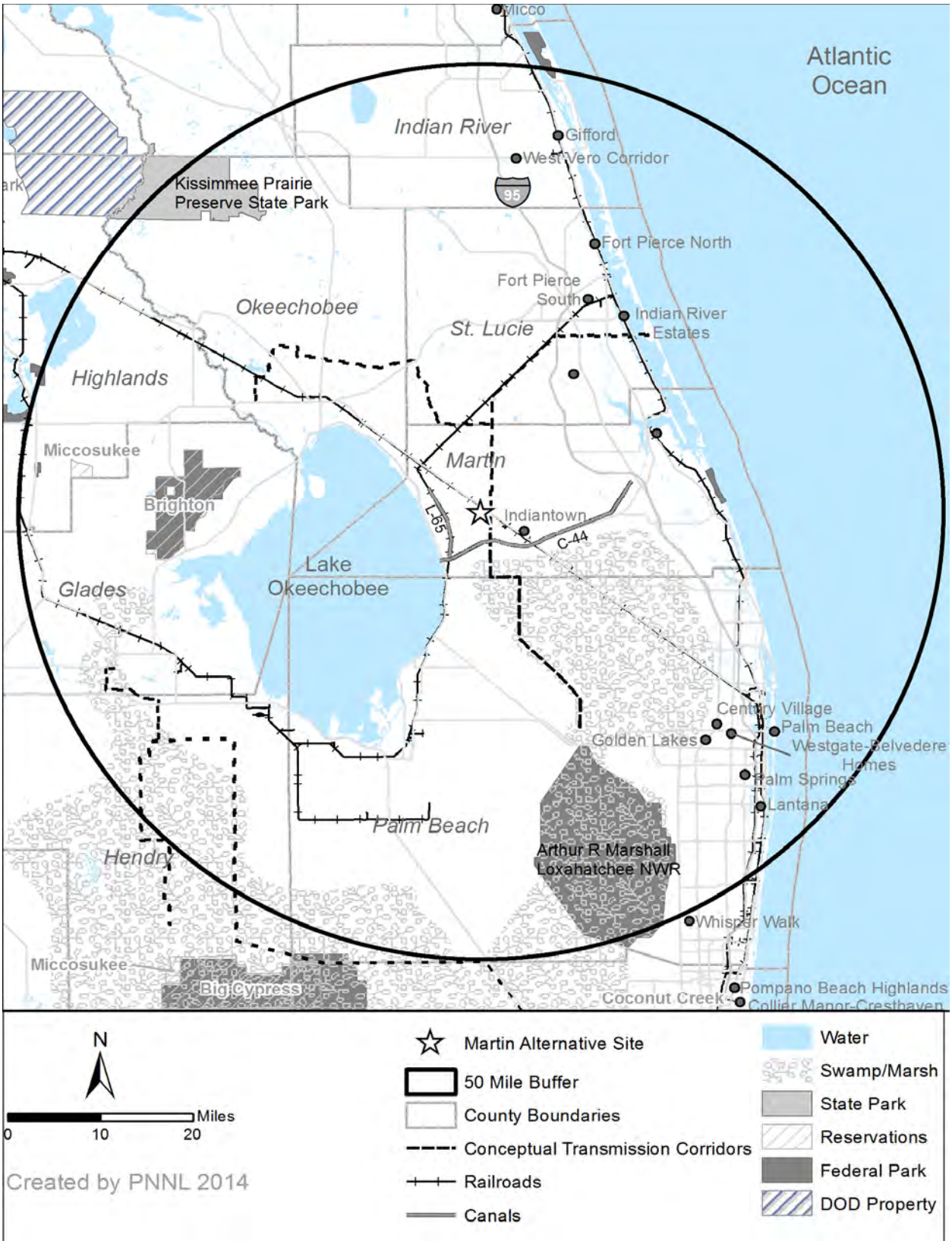

Figure 9-11. Martin Site Region

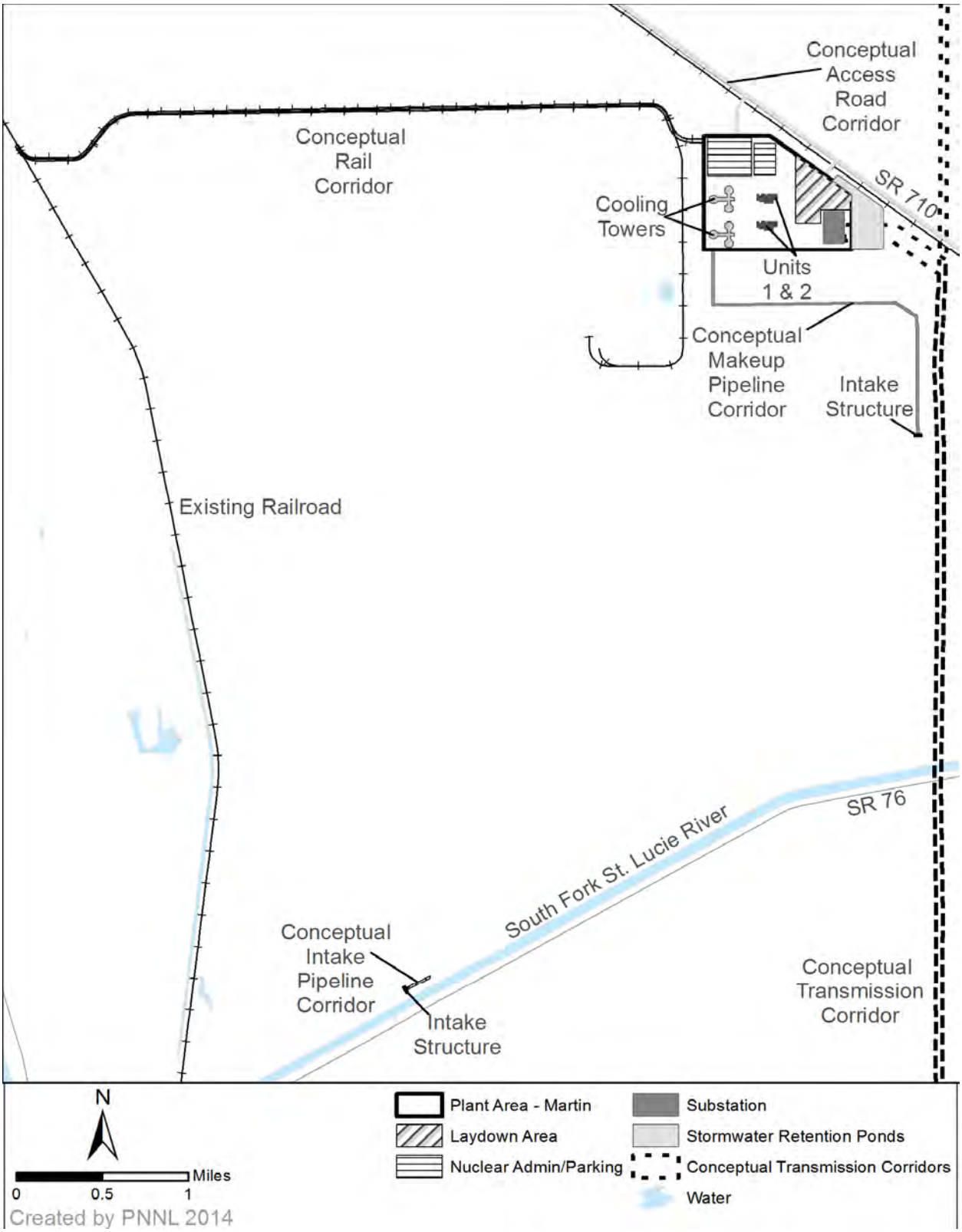

Figure 9-12. Martin Site Footprint

Table 9-11. Past, Present, and Reasonably Foreseeable Projects and Other Actions in the Vicinity of Martin Site

Project Name	Summary of Project	Location	Status
Energy Projects			
St. Lucie	Two 3,020 MW(t) nuclear power reactors	28 mi NE of the Martin alternative site	Operational, Units 1 and 2 underwent license renewal in 2003. Units 1 and 2 completed 320 MW(t) power uprates in 2013 (NRC 2012-TN1668; FPL 2014-TN3360)
West County Energy Center	Three 1,250 MW natural-gas−powered units	28 mi SE of the Martin alternative site	Operational (FDEP 2013-TN2965)
Martin	Approximately 4,300 MW from five units, 3 natural-gas and 2 oil units with a solar thermal facility generating supplemental steam. Combined natural-gas/oil and solar power-generating station	Adjacent	Operational (FPL 2016-TN4579)
Indiantown Cogeneration Company	330 MW coal-fired power plant	4 mi E of the Martin alternative site	Operational (FDEP 2013-TN2967)
Okeelanta Cogeneration Facility	140 MW biomass power-generation facility	35 mi SW of the Martin alternative site	Operational (FDEP 2013-TN2968)
FPL pipeline	126 mi pipeline from Sabal Trail's Central Florida Hub to FPL's Martin Clean Energy Center	Throughout region	Proposed, construction set to begin 2016 (FPL 2014-TN2975)

Table 9-11. (contd)

Project Name	Summary of Project	Location	Status
Floridian Natural Gas Storage Company – Natural Gas Storage Facility	Storage of natural gas	4 mi E of the Martin alternative site	Proposed, FERC Order amending Certificate issued (FERC 2015-TN4599) with associated Environmental Assessment (FERC 2015-TN4600), amendment to modify application sent to FERC in 2013 (78 FR 58529) (TN3002)
Southeastern Renewable Fuels Biorefinery and Cogeneration Plant	30 MW biofuel using leftover sweet sorghum stalk fiber	41 mi SW of the Martin alternative site	Proposed, final air permit issued by FDEP in 2010 (FDEP 2010-TN2970)
Treasure Coast Energy Center	300 MW natural-gas power plant	25 mi NE of the Martin alternative site	Operational (FMPA 2014-TN3029)
Tom G. Smith Power Plant (Lake Worth)	Three-unit, 105 MW gas- and oil-fired plant	43 mi SE of the Martin alternative site	Operational (EPA 2014-TN3031)
INEOS New Planet Bioenergy Center	6.3 MW bioenergy facility	37 mi NE of the Martin alternative site	Operational (EPA 2014-TN3032)
Riviera Beach Energy Center	1,250 MW gas-fired plant	37 mi SE of the Martin alternative site	Operational and completed in 2014 (FPL 2014-TN3033)
Okeechobee Landfill energy	Waste-to-Energy facility	21 mi NW of the Martin alternative site	Operational (Waste Management 2014-TN3034)
Mining Projects			
FiveStone Mining	Stone/quarry mining	8 mi SW of the Martin alternative site	Operational (EPA 2013-TN2959)

Table 9-11. (contd)

Project Name	Summary of Project	Location	Status
Daniel Shell Pit, Phase 6	Stone/quarry mining	33 mi NW of the Martin alternative site	Operational (EPA 2013-TN2956)
E R Jahna Industries Inc. – Ortona Mine	Stone/quarry mining	48 mi SW of the Martin alternative site	Operational (EPA 2013-TN2958)
Florida Rock Industries/Fort Pierce	Stone/quarry mining	13 mi NE of the Martin alternative site	Operational (EPA 2014-TN3038)
Hammond Sand Mine	Sand/quarry mining	44 mi NE of the Martin alternative site	Operational (EPA 2014-TN3044)
Various other mine and quarry projects	Stone/quarry mining	Throughout region	Operational (FDEP 2010-TN2966)
Transportation Projects			
Various Transportation Projects	Road, traffic, pedestrian projects	Throughout region	Ongoing (FDOT 2012-TN1132)
Parks and Aquaculture Facilities			
Arthur R. Marshall Loxahatchee National Wildlife Refuge	Activities include picnicking, boating, fishing, and hiking	27-60 mi SE of the Martin alternative site	Development likely limited within this area (FWS 2013-TN2992)
DuPuis Wildlife and Environmental Area	Activities include bicycling, camping, hunting, fishing, and hiking	3mi S of the Martin alternative site	Development likely limited within this area (FFWCC 2014-TN2977)
Okeechobee Battlefield State Park	Hiking, camping	17 mi NW of the Martin alternative site	Development likely limited within this area (FDEP 2010-TN2971)
Archbold Biological Station	Ecological research station and preserve, organization owns and protects a 5,193 ac globally significant Florida scrub preserve located on the southern end of the Lake Wales Ridge	49 mi NW of the Martin alternative site	Development likely limited within this area (Archbold Biological Station 2014-TN2954)

Table 9-11. (contd)

Project Name	Summary of Project	Location	Status
Lake Okeechobee	730 mi^2 freshwater lake, restoration and protection plan	5−28 mi W of the Martin alternative site	Ongoing, Florida Legislature in 2007 expanded the Lake Okeechobee Protection Act (SFWMD 2014-TN2988)
Johnathan Dickinson State Park	Activities include bicycling, camping, boating, horseback riding, picnicking, fishing, and hiking	28 mi E of the Martin alternative site	Development likely limited within this area (Florida State Parks 2014-TN3048)
Savannas Preserve State Park	Activities include bicycling, boating, horseback riding, picnicking, fishing, and hiking	24 mi NE of the Martin alternative site	Development likely limited within this area (Florida State Parks 2014-TN3050)
Fort Pierce Inlet State Park	Activities include bicycling, camping, boating, swimming, picnicking, fishing, and hiking	33 mi NE of the Martin alternative site	Development likely limited within this area (Florida State Parks 2014-TN3053)
Pepper Beach State Recreation Area	Activities include swimming, picnicking, fishing, and hiking	33 mi NE of the Martin alternative site	Development likely limited within this area (St. Lucie County 2014-TN3054)
St. Sebastian River Preserve State Park	Activities include bicycling, camping, boating, picnicking, fishing, and hiking	49 mi N of the Martin alternative site	Development likely limited within this area (Florida State Parks 2014-TN3055)
Hobe Sound National Wildlife Refuge	Activities include fishing, and hiking	26 mi E of the Martin alternative site	Development likely limited within this area (FWS 2013-TN3056)
John D. Macarthur Beach State Park	Activities include boating, swimming, picnicking, fishing, and hiking	35 mi SE of the Martin alternative site	Development likely limited within this area (Florida State Parks 2014-TN3057)
Peanut Island Park	Activities include boating, picnicking, fishing, and hiking	37 mi SE of the Martin alternative site	Development likely limited within this area (Palm Beach County 2014-TN3058)

Table 9-11. (contd)

Project Name	Summary of Project	Location	Status
Other State nature preserves and wildlife management areas	Public recreational activities	Throughout region	Development likely limited within these areas (FFWCC 2014-TN2981)
Everglades Ecosystem Restoration and/or Comprehensive Everglades Restoration Plan Projects (DOI 2016-TN4589)			
Acme Basin B	Goals of this project include capturing surface water for reuse for the Arthur R. Marshall Loxahatchee National Wildlife Refuge and the Lake Worth Drainage District municipal water supply that would otherwise be routed through Basin A to C-51 and lost to tide; and to reduce harmful discharges to the Lake Worth Lagoon.	35 mi SE of the Martin alternative site	Proposed, project in Preconstruction, Engineering and Design phase (USACE and SFWMD 2014-TN3045)
Indian River Lagoon – South	Project purpose is to improve surface-water management in the C-23/C-24, C-25, and C-44 basins for habitat improvement in the Saint Lucie River Estuary and southern portions of the Indian River Lagoon.	2 mi N of the Martin alternative site	Proposed, project in Preconstruction, Engineering and Design phase (USACE and SFWMD 2014-TN3013)
Everglades Agricultural Area Storage Reservoirs	The purpose of this project is to improve the timing of environmental deliveries to the Water Conservation Areas, including reducing damaging flood releases from the Everglades Agricultural Area to the Water Conservation Areas.	Throughout region	Proposed, Final Project Implementation Report submitted 2012 (USACE and SFWMD 2014-TN3011)

Table 9-11. (contd)

Project Name	Summary of Project	Location	Status
Flows to Northwest and Central Water Conservation Areas 3A	The purpose of this feature is to increase environmental water-supply availability, increase depths and extend wetland hydropatterns in the northwest corner and west-central portions of Water Conservation Area 3A.	50 mi S of the Martin alternative site	Proposed, project in Preconstruction, Engineering and Design phase (USACE and SFWMD 2014-TN3012)
Lake Okeechobee Aquifer Storage and Recovery	A series of aquifer storage and recovery wells adjacent to Lake Okeechobee	4 mi W of the Martin alternative site	Proposed, project in Preconstruction, Engineering and Design phase (USACE and SFWMD 2014-TN3014)
Lake Okeechobee Watershed Project	Project to increase aquatic and wildlife habitat, regulate extreme highs and lows in lake staging, reduce phosphorus loading and reduce damaging releases to the surrounding estuaries	Throughout Okee-chobee County	Proposed, project in Preconstruction, Engineering and Design phase (USACE and SFWMD 2014-TN3015)
Melaleuca eradication and other exotic plants	The project includes (1) upgrading and retrofitting the current quarantine facility in Gainesville, and (2) large-scale rearing of approved biological control organisms for release at multiple sites within the South Florida ecosystem to control Melaleuca, Brazilian pepper, Australian pine, and Old World climbing fern.	Throughout region	Operational, facility completed in 2013 (USACE and SFWMD 2014-TN3020)
Modify Holey Land Wildlife Management Area Operation Plan	Modification of the current operating plan and rules for Holey	43 mi S of the Martin alternative	Proposed, project in planning phase. (USACE and

Table 9-11. (contd)

Project Name	Summary of Project	Location	Status
	Land Wildlife Management Area will be made to implement rain-driven operations for this area to improve the timing and location of water depths within this wildlife management area.	site	SFWMD 2014-TN3017)
Modify Rotenberger Wildlife Management Area Operation Plan	Modification to the current operating plan for the Rotenberger Wildlife Management Area will be made to implement rain-driven operations for this area as needed. Water deliveries are made to the Rotenberger Area from Stormwater-Treatment Area 5.	48 mi SW of the Martin alternative site	Proposed, project in planning phase. (USACE and SFWMD 2014-TN3018)
Palm Beach County Agriculture Reserve Aquifer Storage and Recovery	Supplement water supplies for central and southern Palm Beach County by capturing and storing excess water currently discharged to the Lake Worth Lagoon.	42 mi SE of the Martin alternative site	Proposed, project in Preconstruction, Engineering and Design phase (USACE and SFWMD 2014-TN3019)
Palm Beach County Agriculture Reserve Reservoir	Project to supplement water supplies for central and southern Palm Beach County by capturing and storing excess water currently discharged to the Lake Worth Lagoon	42 mi SE of the Martin alternative site	Proposed, project in Preconstruction, Engineering and Design phase (USACE and SFWMD 2014-TN3019)
Loxahatchee National Wildlife Refuge Internal Canal Structures	Project to improve the timing and location of water depths within the Refuge	28 mi NW of the Martin alternative site	Proposed, project in Preconstruction, Engineering and Design phase (USACE and SFWMD 2014-TN3046)

Table 9-11. (contd)

Project Name	Summary of Project	Location	Status
Strazzulla Wetlands	Project to provide a hydrological and ecological connection to the Loxahatchee National Wildlife Refuge and expand the spatial extent of protected natural areas	36 mi SE of the Martin alternative site	Proposed, Project in Preconstruction, Engineering and Design phase (USACE and SFWMD 2014-TN3047)
Other Actions/Projects			
Herbert Hoover Dike Major Rehabilitation Project	Rehabilitation Project and Dam Safety Modification Study	5–35 mi W of the Martin alternative site	Proposed - Environmental Assessment and FONSI issued in 2015 (USACE 2015-TN4598), Draft Environmental Report issued (DOI 2016-TN4589)
Comprehensive Shoreline Stabilization Project in Palm Beach County	Discharge fill for the purpose of shoreline stabilization	Shoreline of Palm Beach County	USACE submitted Notice of Intent in 2013 (78 FR 40128) (TN3059); EIS completed (CB&I 2014-TN4015)
Lake Worth Inlet Project	Deepening and widening of the Lake Worth Inlet	38 mi SE of the Martin alternative site	USACE completed integrated feasibility report and environmental impact statement in 2014 (USACE 2014-TN4016);
Kissimmee River Restoration	When restoration is completed in 2017, more than 40 mi^2 of river-floodplain ecosystem will be restored, including almost 20,000 ac of wetlands and 44 mi of historic river channel.	Along Kissimmee River	Ongoing (USACE 2014-TN3061; DOI 2016-TN4589)
Other Actions/Projects			
Atlantic Sugar Association	Sugar manufacturing	26 mi SW of the Martin alternative	Operational (FDEP 2013-TN2964)

Table 9-11. (contd)

Project Name	Summary of Project	Location	Status
		site	
Southern Gardens Citrus Processing Corp.	Food production/distribution	41 mi SW of the Martin alternative site	Operational (FDEP 2013-TN2969)
United States Sugar Corporation Clewiston	Sugar manufacturing	32 mi SW of the Martin alternative site	Operational (EPA 2014-TN2963)
Harbor Branch Oceanographic Institute	Oceanic science and research	35 mi SE of the Martin alternative site	Operational (EPA 2014-TN3071)
Pratt & Whitney	Aircraft engine and engine parts manufacturing	19 mi SE of the Martin alternative site	Operational (EPA 2014-TN3062)
Maverick Boat Company	Fiberglass boat manufacturing	33 mi NE of the Martin alternative site	Operational (EPA 2014-TN3063)
Tropicana Products Inc.	Citrus and animal feed	24 mi NE of the Martin alternative site	Operational (EPA 2014-TN3068)
S2 Yachts Inc.	Fiberglass boat manufacturing	32 mi NE of the Martin alternative site	Operational (EPA 2013-TN3069)
Twin Vee Inc.	Fiberglass boat manufacturing	28 mi NE of the Martin alternative site	Operational (EPA 2013-TN3070)
Various wastewater-treatment plant facilities	Sewage treatment	Throughout region	Operational
Various hospitals using nuclear material	Medical and other industrial isotopes	Throughout region	Ongoing
Various water/flood-management projects	Water and flood management	Throughout region	Ongoing (USACE 2012-TN1133)
Future urbanization	Construction of housing units and associated commercial buildings; roads, bridges, and rail; construction of water- and/or wastewater-treatment	Throughout region	Construction would occur in the future, as described in State and local land-use planning documents

Table 9-11. (contd)

Project Name	Summary of Project	Location	Status
	and distribution facilities and associated pipelines, as described in local land-use planning documents		

The geographic area of interest for cumulative impacts considers all existing and proposed nuclear power plants that have the potential to increase the probability-weighted consequences (i.e., risks) of a severe accident at any location within 50 mi of the Martin site. An accident at a nuclear plant within 100 mi of the Martin site could potentially increase this risk. However, other nuclear plants in Florida, Alabama, and Georgia that are more than 100 mi from the Martin site are not included in the cumulative impact analysis.

9.3.3.1 Land Use

The following analysis includes land-use impacts from building activities and operations. The analysis also considers other past, present, and reasonably foreseeable future actions that affect land use, including other Federal and non-Federal projects listed in Table 9-11. For the analysis of land-use impacts at the Martin site and its associated transmission line corridors, the review team determined that a 10 mi radius, similar to that used for the Turkey Point site, would encompass an effective geographic area of interest for cumulative impact assessment for land use, because it would include the site and associated facilities. In evaluating the land-use impacts of using the Martin site, the review team used information from the project application and other readily obtainable data from the Internet or published sources, including aerial photographs of the site and vicinity, USDA soils information, local zoning and planning documents, and FLUCFCS data. Impacts from both building and station operation are discussed.

Existing land uses in the vicinity of the Martin alternative site consist predominantly of cultivated agriculture. The nearest community is Indiantown, approximately 7 mi to the southeast, an unincorporated town in Martin County of just under 7,000 population (Martin County 2014-TN3306). The nearest incorporated city is Port St. Lucie, 20 mi to the east. The Martin alternative site is located approximately 5 mi east of Lake Okeechobee.

Existing land uses at the Martin site consist of an operating power plant and other energy-generation uses FPL states in its application (FPL 2014-TN4058). In response to RAI EIS 9.3.1-8 (eRAI 6353), FPL acknowledged that its solar facility used available lands and that additional new land would have to be acquired in order to develop the new units (FPL 2012-TN1727). No commercial mineral resources are identified within the site and in the vicinity (Calver 1956-TN3752; Spencer 1993-TN3753). Based on a review of aerial photos available on Google Earth, no substantial areas of developed land uses other than existing energy-generating uses occur on or within the vicinity of the site (CleanEnergy 2012-TN3307). Wildlife management areas and recreational areas are located several miles from the alternative plant site. FPL has entered into a voluntary partnership with the Treasured Lands Foundation to protect approximately 400 ac of old-growth bald cypress swamp on the Martin site termed the

Barley Barber Swamp, and offers public tours of an interpretative boardwalk traversing the swamp (TLF and FPL 2014-TN3755). The Barley Barber Swamp is located on a peninsula on the western shore of a reservoir in the central part of the Martin site.

Building and Operation Impacts

The Martin County FLUM (Martin County 2014-TN3756) designates the site as "Major Power Generation" and the land in the vicinity of the site as "Agricultural." Martin County zoning (Martin County 2012-TN3351) designates the site as a mix of industrial designations, and the vicinity as Agriculture. Therefore, the review team believes that use of the Martin alternative site for a power plant would be compatible with the Martin County FLUM. However, the review team notes that the applicant would have to acquire agricultural land adjoining the site in order to build and operate the proposed new facilities.

Most of the soils on and in the vicinity of the plant site, with the exception of those areas developed for energy-generation and related facilities, are considered farmlands of Unique Importance. Unique farmland is defined in Section 2(c) of the Farmland Protection Policy Act (7 U.S.C. § 4201 et seq.) (TN708) as "land, other than Prime farmland, that has combined conditions to produce sustained high quality and high yields of specialty crops, such as citrus, nuts, fruits, and vegetables when properly managed." No Prime farmland soils are identified in the vicinity (USDA 2014-TN3353). For the purposes of this analysis, the review team assumes that the entire site consists of farmland of Unique Importance. The plant site and transmission line corridors fall within the Coastal Zone (FPL 2014-TN4058). The site falls within an area designated on the Flood Insurance Rate Map (FIRM; as shown on FEMA FIRM for Martin County Panel 250 of 527 dated October 4, 2002) as Zone X: areas of 500-year flood, areas of 100-year flood with average depths of less than 1 ft or with drainage areas less than 1 mi^2, and areas protected from the 100-year flood by levees (FEMA 2002-TN4119).

Building and operation of the project at the Martin site would result in the conversion of existing land uses, including approximately 264 ac owned by FPL, and additional lands FPL would need to acquire, from agriculture to power-generation uses as shown in Table 9-12.

Table 9-12. Martin Alternative Site Land-Use Impacts (acres)

	Agricultural Lands (FLUCFCS 200 Land-Use Series)	Urban Developed Lands, including Power Generation (other than roads and pipelines)	Other Non-Agricultural Lands (all other FLUCFCS designations)	Total
Plant Site	60	260	0	320
Access Roads	195	260	18	473
Rail Corridor	1	50	0	52
Intake Pipeline Corridor	0	1	0	1
Makeup Pipeline Corridor	0	20	0	20
Stormwater-Retention Ponds	8	34	0	42
Total[(a)]	264	626	18	908
Transmission Line Corridor	100	0	663	764
Grand Total	364	627	680	1,672

(a) Totals may not add due to rounding

Sources: FPL 2011-TN59 and FPL 2014-TN4058

Because this is a small amount of farmland in the context of the large amount of farmland under cultivation in Martin County, conversion of this amount of farmland to another use would not substantially affect the agricultural economy of the region. Although there could be a loss of more than 300 ac of farmlands of Unique Importance, the review team expects that the loss would not noticeably affect regional agriculture, considering the regional abundance of such farmland. However, because additional lands beyond those currently owned by FPL and used for power generation would have to be acquired, potentially noticeable land-use conflicts are possible.

The review team does not expect building or operation of the new units on the Martin site to interfere with continued public tours of the Barley Barber Swamp and boardwalk. The swamp and boardwalk are already operated within the confines of a privately owned and operated power-generation facility, and the two new units would be built near the periphery of the FPL-owned property and not immediately adjacent to the swamp.

Additional land-use impacts include possible additional growth and land conversions in the vicinity to accommodate new workers and services (induced development). Because the workforce would be dispersed over larger geographic areas in the labor supply region, the impacts from land conversion for residential and commercial buildings induced by new workers relocating to the local area can be absorbed in the wider region. Therefore, the review team concludes that such impacts would be minimal.

Use of the Martin site would also require the development of approximately 31 mi of transmission line corridor. FPL states in its application (FPL 2014-TN4058) that the new transmission lines would pass through the Coastal Zone. Approximately 763.6 ac of land would be at least temporarily affected by building and operating the transmission lines. Much of this land is agricultural land; the remainder is primarily open lands and roadways. The agricultural land within the transmission line corridors would be converted from agricultural use to transmission line use, although FPL states in its application (FPL 2014-TN4058) that agriculture could continue within and along the transmission line rights-of-way. The land uses along the conceptual corridors for new transmission lines to serve the Martin alternative site are identified in Table 9-12.

Under the Florida Site Certification Application process explained in Chapter 4.1, the State approves a corridor and the applicant chooses a specific right-of-way within the approved corridor. The objective of this process, as stated in the electrical power plant and transmission line statute (Fla. Stat. 29-403.501 2011-TN1068) is “that the location of transmission line corridors and the construction, operation, and maintenance of electric transmission lines produce minimal adverse effects on the environment and public health, safety, and welfare” and “to fully balance the need for transmission lines with the broad interests of the public in order to effect a reasonable balance between the need for the facility as a means of providing reliable, economical, and efficient electric energy and the impact on the public and the environment resulting from the location of the transmission line corridor and the construction, operation, and maintenance of the transmission lines.” Finalized siting plans and permitting conditions that would be imposed by the various affected State and local agencies would minimize impacts within the corridors. Engineering considerations and costs are likely to suggest designs that favor collocation with existing transmission lines in existing corridors. The siting criteria include

land-use considerations to minimize potential disruption to areas such as national, state, and county parks; wildlife refuges; estuarine sanctuaries; landmarks; and historical sites. FPL states in its application that, in its development of the conceptual transmission line corridor for the Martin alternative site, it attempted to select corridors that would allow collocation with existing transmission line corridors and avoided populated areas or residential land uses to some extent (FPL 2014-TN4058). The State certification review process also includes a determination of land-use consistency with local land-use plans and zoning ordinances (Fla. Stat. 29-403.50665-TN1470).

The review team concludes that the land-use impacts from building and operating two new nuclear units at the Martin alternative site would be noticeable, primarily because of the lack of adequate land on the Martin site and the expected need for FPL to acquire additional offsite land, likely from private owners.

Cumulative Impacts

The review team expects that the principal contribution to cumulative land-use impacts in the geographic area of interest defined for the Martin site would be from the two subject nuclear units. Within the geographic area of interest, there are several other reasonably foreseeable projects with the potential to affect cumulative land-use impacts as listed in Table 9-11, including the Lake Point Mine project and other existing and proposed power-generation uses at the Martin site. In addition, the Martin County FLUM designates land for future industrial uses near the Martin alternative site. But because these other projects are consistent with the existing and planned uses in the geographic area of interest, the review team does not expect them to noticeably contribute to cumulative land-use impacts.

Other linear projects are proposed for lands near the proposed conceptual corridor, including the Florida Gas Transmission Phase VIII Expansion Project, as listed in Table 9-11. However, the review team expects that the corridor would have only a minimal cumulative land-use impact.

Summary Statement

Based on the information provided by FPL and the review team's independent review, the review team concludes that the cumulative land-use impacts of building and operating the power plant at the Martin alternative site would be MODERATE. Building and operating the proposed nuclear units at the Martin site would be a significant, and the principal, contributor to these impacts primarily because of the lack of adequate land on the Martin site and the expected need for FPL to acquire additional offsite land, likely from private owners.

9.3.3.2 Water Use and Quality

The following impact analysis includes impacts from building and operating two new nuclear units at the Martin site. The analysis also considers other past, present, and reasonably foreseeable future actions that affect water use and quality, including the other Federal and non-Federal projects listed in Table 9-11. The Martin site is located in rural Martin County in Florida near an existing power plant and approximately 5 mi east of Lake Okeechobee and 2 mi north of the St. Lucie Canal.

The geographic area of interest for surface water at the Martin site is the Kissimmee-Okeechobee-Everglades watershed because this is the resource that would be affected if the proposed project were located at the Martin site. The Kissimmee-Okeechobee-Everglades watershed includes an area of about 9,000 mi^2 (McPherson and Halley 1996-TN98). For groundwater, the ROI includes (1) the surficial aquifer and the Upper Floridan aquifer at the site; (2) the APPZ of the Middle Floridan aquifer upgradient and downgradient of the site for water withdrawals; and (3) and the Boulder Zone of the Lower Floridan aquifer upgradient and downgradient of the site for disposal of blowdown water.

Building Impacts

Water use for building activities at the Martin site would be comparable to the proposed water use for building activities for the Turkey Point site. During building, water use is estimated to be 565 gpm (0.8 Mgd) (see Table 3-4). The review team assumes that water for building the two units at the Martin site would come from a combination of surface water and groundwater. Surface water from the St. Lucie Canal or Lake Okeechobee may be available for building purposes during times of high surface-water flows. The peak water-use rate during the building phase is inconsequential when compared to the historic average monthly flows into Lake Okeechobee from the Kissimmee River; the rate of 0.8 Mgd is less than 1 percent of the river discharge for even the lowest month reported (January 1963). Surface water from stormwater ponds and groundwater from excavation dewatering may also be used, when available, for building purposes. Groundwater from the surficial aquifer would be used for building purposes when excess surface water is not available. The SFWMD would regulate any use of surface or shallow groundwater for plant construction.

The review team concludes that the impact of surface-water use for building the potential units at the Martin site would be minimal for the following reasons:

- Withdrawal is small compared to the water resources in the Lake Okeechobee watershed.
- Any use of surface water or shallow groundwater would be regulated by SFWMD and limited to time periods when there would not be a negative impact on the Lake Okeechobee system or shallow aquifers.
- Water use would be temporary and limited to the building period, and the peak use of 0.8 Mgd is much less than the average 37.72 Mgd groundwater withdrawal rate reported for Martin County in 2005 (Marella 2009-TN1521).

The review team assumes that the impact of dewatering the excavations needed for building two units at the site would be managed through the installation of diaphragm walls and grouting as is proposed for the Turkey Point site. Therefore, because groundwater withdrawal caused by dewatering would be controlled, the review team determined that there would be little or no impact on groundwater resources.

Surface-water quality would potentially be affected by stormwater runoff during site preparation and the building of the facilities. The FDEP would require FPL to develop an erosion and sediment control plan and a SWPPP before initiation of site-disturbance activities (FPL 2014-TN4058).

The plans would identify BMPs to control the impacts on surface-water quality caused by stormwater runoff. The review team anticipates that FPL would construct new detention/infiltration ponds and drainage ditches to control delivery of sediment from the disturbed area to onsite waterbodies. Sediment carried with stormwater from the disturbed area would settle in the detention ponds and the stormwater would infiltrate into the shallow aquifer. Implementation of BMPs should minimize impacts on surface waterbodies near the Martin site. Therefore, the impacts on surface-water-quality near the Martin site would be temporary and minimal.

While building new nuclear units at the Martin site, groundwater quality may be affected by leaching of spilled effluents into the subsurface. The review team assumes that the BMPs FPL has proposed for the Turkey Point site would be in place during building activities and therefore the review team concludes that any spills would be quickly detected and remediated. In addition, groundwater impacts would be limited to the duration of these activities, and therefore, would be temporary. The review team reviewed the general BMPs that could be expected to be required at such a site (State of Florida 2014-TN3637). Because any spills related to building activities would be quickly remediated under BMPs, and the activities would be temporary, the review team concludes that the groundwater-quality impacts from building at the Martin site would be minimal.

Wastewater streams from building activities could be injected to the Boulder Zone of the Lower Floridan aquifer as planned at Turkey Point (FPL 2014-TN4058). Construction and operation of the disposal wells would be performed under the conditions of a UIC permit issued by the FDEP, with the objective of protecting water quality within the APPZ and overlying aquifers.

Operations Impacts

FPL (2014-TN4058) indicates that the water needed to operate two units would be approximately 50,000 gpm or 72.7 Mgd. As indicated in Chapter 3, evaporative losses from cooling two units would be approximately 28,800 gpm (41.5 Mgd). The review team assumed that the two units at the Martin site would primarily use brackish groundwater from the permeable zone (APPZ) within the Avon Park formation for makeup-cooling water. This relatively permeable zone is considered part of the Middle Floridan aquifer and is more than 1,000 ft below the ground surface near the Martin site. The SFWMD has informed the NRC that consumptive use of surface water from Lake Okeechobee or its tributaries would be limited (SFWMD 2012-TN3814). Use of water from Lake Okeechobee and the St. Lucie Canal would also have to avoid any negative impact on restoration projects in South Florida. Therefore, surface water from Lake Okeechobee and the St. Lucie Canal could be used only at times of excess surface-water flow that typically occur during the wet season.

The APPZ aquifer is not generally used because of the salinity of its water (FPL 2013-TN3052). Therefore, current impacts of using this water for power production are minor. Because brackish or saline groundwater is not in demand, use of this resource will not result in water-use conflicts. However, groundwater in the Middle Floridan aquifer at this site is a potential source of brackish water for desalinization. If demand for desalinization source water increases, water for the plant may be obtained from deeper, more saline formations.

Blowdown discharge and other wastewater streams would be pumped into the Boulder Zone of the Lower Floridan aquifer. The Boulder Zone is isolated from the APPZ by low-permeability units. Additional low-permeability confining units separate the APPZ from the overlying Upper Floridan aquifer. Construction and operation of the disposal wells would be performed under the conditions of an UIC permit issued by the FDEP.

As indicated in Chapter 3, the consumptive water use due to evaporative losses from cooling two units would be approximately 28,800 gpm (41.5 Mgd). However, the review team assumed that surface water would only be consumed during periods of excess flow, thereby precluding water-use conflicts.

During the operation of two new nuclear units at the Martin site, impacts on surface-water quality would be minimal because wastes would be injected into the Boulder Zone and not released to the surface water. FDEP would require FPL to develop a SWPPP (FPL 2014-TN4058). These plans would identify measures to be used to control stormwater runoff. All discharges to surface waterbodies would be required to comply with limits established by FDEP in a NPDES permit.

During the operation of the two units at the Martin site, impacts on groundwater quality could result from potential spills. Spills that might affect the quality of groundwater would be prevented and mitigated by BMPs. Like the proposed site, any wastewater at this inland alternative site would be combined with cooling-tower blowdown and discharged into Boulder Zone with no loss of beneficial uses of the water resource.

Cumulative Impacts

In addition to water-use and water-quality impacts from building and operations activities, cumulative analysis considers past, present, and reasonably foreseeable future actions that affect the same water resources.

For the cumulative analysis of impacts on surface water and groundwater at the Martin site, the geographic area of interest is the same as what was considered for building and operational impacts, and was defined earlier in this section.

Actions that have past, present, and future potential impacts on water supply and water quality near the Martin site include existing agriculture and existing and future urbanization in the region.

Cumulative Impacts on Water Use

The impacts of the other projects listed in Table 9-11 are considered in the analysis included above or would have little or no adverse impact on surface-water use. The projects believed to have little impact are excluded from the analysis either because they are too distant from the Martin site, use relatively little or no surface water, or have little or no discharge to surface water. Some projects (for example park and forest management) are ongoing, and changes in their operations that could have large impacts on surface-water use appear unlikely.

In 2000, the Florida Legislature passed the Lake Okeechobee Protection Act to establish a restoration and protection program for Lake Okeechobee (SFWMD et al. 2011-TN3087; SFWMD 2010-TN3086). Part of the focus of this act was to restore the natural hydrology of the

system after years of altering the natural drainage around the lake to permit development of the land and to reduce flood damage. The State of Florida and the Federal government are spending hundreds of millions of dollars to restore the Lake Okeechobee and other water resources in the watershed; therefore, the review team concluded that the cumulative impact on surface-water use would be MODERATE.

Surface-water use during the building and operation of two units at the Martin site would be dominated by water use for operations. As discussed above, surface water would only be withdrawn during periods of excess flow. Therefore, the review team concluded that building and operating the proposed units at the Martin site would not be a significant contributor to the MODERATE impacts on surface-water use.

As stated above, the review team assumed that any use of shallow groundwater to build the units at the Martin site would be regulated by the SFWMD. If this source is not available in sufficient quantity for building activities, brackish groundwater from the APPZ could be used for some building activities. Groundwater impacts from dewatering would be controlled with diaphragm walls and grouting. Groundwater from the APPZ would be used to operate the plant except when excess surface water is available. The APPZ aquifer is not generally used because of the salinity of its water (FPL 2013-TN3052). Because brackish or saline groundwater is not in demand, use of this resource will not result in water-use conflicts.

The impacts of the other projects listed in Table 9-11 are considered elsewhere in this analysis or else would have little or no adverse impact on groundwater use. The projects believed to have little impact are excluded from the analysis either because they are too distant from the Martin site, or use relatively little or no groundwater. Some projects (for example park and forest management) are ongoing, and changes in their operations that would have large impacts on groundwater use appear unlikely. Therefore, the review team concludes that cumulative impacts on groundwater use would be SMALL.

Cumulative Impacts on Water Quality

Point and non-point source discharges have affected the surface-water quality of the Lake Okeechobee watershed upstream, and the St. Lucie Canal and other discharge canals downstream of the Martin site. Water-quality information presented above for the impacts of building and operating the proposed new units at the Martin site would also apply to evaluation of cumulative impacts. Lake Okeechobee has been the target of extensive efforts to reduce nutrient loading and improve water quality (SFWMD et al. 2011-TN3087). Therefore, the review team concluded that the cumulative impact on surface-water quality of the receiving waterbody would be MODERATE. During the operation of two new nuclear units at the Martin site, impacts on surface-water quality from the units would be minimal because plant discharges would be injected into the Boulder Zone and not released to the surface water. The State of Florida requires an applicant to develop a SWPPP (FPL 2014-TN4058) and all discharges to surface waterbodies would be required to comply with limits established by FDEP in a NPDES permit. Such permits are designed to protect water quality. The SWPPP would identify measures to be used to control stormwater runoff (FPL 2014-TN4058).

The review team concluded that building and operating the proposed units at the Martin site would not be a significant contributor to the MODERATE impacts on surface-water quality, because industrial and wastewater discharges from the proposed units would be discharged

directly to the Boulder Zone and any stormwater runoff from the site during operations would be managed in compliance with the SWPPP (FPL 2014-TN4058).

The APPZ aquifer is not generally used because of the salinity of its water (FPL 2013-TN3052). Because brackish or saline groundwater is not in demand, use of this resource would not result in water-use conflicts. The review team also concludes that with the implementation of BMPs, the impacts on shallow groundwater quality from building and operating two new nuclear units at the Martin site would likely be minimal. Therefore, the cumulative impact on groundwater quality would be SMALL. The impacts of other projects listed in Table 9-11 are either considered in the analysis included above or would have little or no impact on surface-water and groundwater quality.

9.3.3.3 Terrestrial and Wetland Resources

The following section addresses potential impacts on terrestrial resources from siting two new nuclear units on the Martin site and transmission line corridors, which cross through portions of Martin and Palm Beach Counties. The proposed Martin power plant site presently supports existing power units that occupy about 300 ac along with a 6,500 ac cooling-water reservoir serving those units (FPL 2014-TN4058). A 1,200 ac wetland mitigation site exists immediately north of the reservoir and contains a 400 ac wetland forest preserved as a natural area known as the Barley Barber Swamp (FPL 2014-TN3750). Other wetland habitats include freshwater marsh and wet prairie. A significant portion of the site and vicinity also exists as upland land-cover classes including pine flatwoods, palmetto prairie, hardwood-conifer forest, and dry prairie. Habitats in the surrounding vicinity include pasture, rangeland, upland forest, wetland forest, freshwater marsh, and wet prairie.

Martin and Palm Beach Counties host multiple terrestrial species that are listed as Federally endangered or threatened (Table 9-13). Nine of the listed species also occur in Glades County. Habitat preferences for those nine species were discussed in the Glades alternative site section, and only the other nine species that are unique to Martin County are described here. Surveys were not conducted at the Martin site or along the conceptual transmission line corridor to determine the presence and distribution of listed species. Therefore, the staff determined the likelihood of occurrence at project sites based on habitat preferences of each species and the land-cover types expected to be affected at Martin site and within the conceptual transmission line corridor. Kirtland's warbler (*Dendroica kirtlandii*) is a migrant songbird that does not nest in Florida and occurs there during spring and fall migration (FWS 1999-TN136). During migration, Kirtland's warblers use dense scrub vegetation less than 1.5 m (5 ft) in height. The piping plover is a shorebird that overwinters in Florida on wide beaches, mudflats, and other open coastal wetlands (FWS 1999-TN136). The Miami blue (*Cyclargus thomasi bethunebakeri*) is a butterfly that historically occurred in Martin County in tropical coastal hammocks, scrub, and pine rocklands (Daniels 2005-TN141). It is now only known to occur in on the Bahia Honda Key in Monroe County. The southeastern beach mouse (*Peromyscus polionotus niveiventris*) is found in sea oats (*Uniola paniculata*) and shrubs that grow on coastal sand dunes (FWS 1999-TN136). Beach jacquemontia (*Jacquemontia reclinata*) is a coastal species found on sand dunes (FWS 1999-TN136). Florida perforate cladonia (*Cladonia perforata*) is a species of lichen that grows among scrub habitat found high sand dune ridges along the Atlantic Coast as well as the Lake Wales Ridges (FWS 1999-TN136). Four-petal pawpaw (*Asimina tetramera*) is a shrub or small tree that inhabits coastal scrub vegetation of pine, oak, or palmetto on the

Atlantic Coastal Ridge. This species is known to occur at one location each in northern and southern Martin County (CPC 2010-TN3729). Lakela's mint (*Decerandra immaculata*) is a small shrub that grows in sand scrub (CPC 2010-TN3730). This species was translocated to the Hobe Sound National Wildlife Refuge in Martin County and this is the only location within Martin County this plant is known to occur (CPC 2010-TN3730). The tiny polygala (*Polygala smalii*) is a herbaceous plant species that occurs in very dry habitats prone to natural fire including pine rocklands, scrub vegetation, high pine, and coastal spoil found on the Atlantic Coastal Ridge (FWS 1999-TN136).

Table 9-13. Federally Listed Terrestrial Species that May Occur on the Martin Site or within the Conceptual Transmission Line Corridor

Scientific Name	Common Name	Federal Status
Birds		
Polyborus plancus audubonii	Audubon's crested caracara	Threatened
Rostrhamus sociabilis plumbeus	Everglade snail kite	Endangered
Aphelocoma coerulescens	Florida scrub jay	Threatened
Campephilus principalis	Ivory-billed woodpecker	Endangered
Dendroica kirtlandii	Kirtland's warbler	Endangered
Charadrius melodus	Piping plover	Threatened
Picoides borealis	Red-cockaded woodpecker	Endangered
Grus americana	Whooping crane	Endangered
Mycteria americana	Wood stork	Threatened
Calidris canutus rufa	Red knot	Threatened
Mammals		
Puma concolor coryi	Florida panther	Endangered
Peromyscus polionotus niveiventris	Southeastern beach mouse	Threatened
Reptiles		
Drymarchon corais couperi	Eastern indigo snake	Threatened
Invertebrates		
Cyclargus thomasi bethunebakeri	Miami blue	Endangered
Strymon acis bartrami	Bartram's scrub-hairstreak[(a)]	Endangered
Anaea troglodyte floridalis	Florida leafwing	Endangered
Plants		
Jacquemontia reclinata	Beach jacquemontia	Endangered
Asimina tetramera	Four-petal pawpaw	Endangered
Decerandra immaculata	Lakela's mint	Endangered
Polygala smallii	Tiny polygala	Endangered
Cucurbita okeechobeensis ssp. okeechobeensis	Okeechobee gourd[(a)]	Endangered

(a) Additional listed species occurring in Palm Beach County (FWS 2014-TN3759)

Source: FWS 2014-TN3731

The Martin site is dominated by a 6,500 ac water reservoir and supporting dikes that provide cooling water for five fossil-fuel power units. The site also has a solar power-generation unit. FPL assumed a footprint of 362 ac for the new nuclear power units. The proposed site of the

new nuclear power units contains both upland and wetland habitats (FPL 2011-TN59). Upland cover types include palmetto prairie, pine flatwoods, hardwood-coniferous forest, shrub and brushland, dry prairie, upland hardwood forest, woodland pasture, and unimproved pasture. Wetland cover types include freshwater marsh, wet prairies, and mixed wetland hardwoods (FPL 2011-TN59). Wading birds have been observed using the stormwater basin and ditch system for the existing units. White ibis (*Eudocimus albus*), little blue heron (*Egretta caerulea*), tricolored heron (*Egretta tricolor*), snowy egret (*Egretta thula*), wood stork, and sandhill crane (*Grus canadensis*) have either been observed or would be expected to occur in the project area (FPL 2014-TN4058). Wading birds are an ecologically important group in the South Florida ecosystem, and both herons and ibises are considered ecological indicators (FWS 1999-TN136). The wood stork is a Federally threatened species. Recreationally important species observed at the Martin site include white-tailed deer, feral hog, and turkey (*Meleagris gallopavo osceola*). Waterfowl are also hunted in Florida and numerous species could occur in suitable habitats on the Martin site.

Building Impacts

Typical impacts from building nuclear units include permanent and temporary habitat loss from development, habitat fragmentation and degradation, disturbance and displacement of individuals, exposure of wildlife to increased noise levels and human presence, and increased risk of vehicle collision mortality. The conversion of fully developed and stable plant communities to earlier successional communities dominated by lower growing vegetation during development of linear transmission line or pipeline corridors often results in a high degree of habitat fragmentation within the landscape.

FPL assumed a 362 ac area for the main power plant site within the Martin site for evaluating potential impacts of building two new nuclear power reactors and associated infrastructure and an additional 3,000 ac for a cooling-water storage reservoir (FPL 2014-TN4058). The review team determined cooling water could be obtained from groundwater beneath the Martin site and that the cooling-water storage reservoir was unnecessary. FPL stated offsite facilities and development would also be needed to construct and operate nuclear power plants at the Martin site. FPL estimated a 39 mi long corridor approximately 100 ft wide for road access and also plans to install 4.3 mi of rail line and pipeline corridors connecting the C-44 Canal to the site (assumed cooling-water source).

Impacts from the plant area, access road, rail line, and pipeline corridors are discussed first below. Impacts from the transmission line are discussed in a separate section below.

Plant Facilities

If the nuclear power units, access road, rail line, and pipeline were built within the proposed footprint, an estimated total of 909 ac would be affected (Table 9-14). Approximately 362 ac of this area is naturally vegetated uplands, approximately 283 ac is currently used for agriculture, and approximately 151 ac is open water and wetlands (FPL 2011-TN59). Approximately 112 ac of the proposed footprint has been previously developed (FPL 2011-TN59). Although access to the Martin site is currently available to service the existing fossil units, SR-710 would require widening to accommodate additional traffic during construction of the new nuclear plant.

Additional acreage may be permanently or temporarily disturbed when used for laydown areas, a batch plant, and fill and spoil deposition. FPL would use cleared land to the greatest extent possible and temporary use areas would be reclaimed (FPL 2014-TN4058). Impacts from building the plant area, access road, rail line, and pipeline corridors are discussed first because most of these activities result in permanent habitat loss. Many of the impacts from building the transmission line represent habitat alteration rather than loss and are discussed in a separate section below.

Table 9-14. Acreage within the Conceptual Footprint at the Martin Site

FLUCFCS Code	Description	Site and Offsite Non-Transmission (ac)	Transmission (ac)
200-series	Agriculture	283	100
300-series	Uplands	162	288
400-series	Forest	200	53
500-600 series	Water and Wetlands	151	321
100, 700, and 800 series	Developed	112	2
Total		908	764

Source: FPL 2011-TN59

Surveys of the occurrence, abundance, and distribution of Federally listed species have not been performed for the Martin site. Only species that could be affected by the new nuclear power units at the Martin site are discussed here, because limited distribution and/or lack of suitable habitat likely preclude impacts on the ivory-billed woodpecker, piping plover, Miami blue, southeastern beach mouse, beach jacquemontia, Florida perforate cladonia, four-petal pawpaw, and Lakela's mint. Audubon's crested caracaras nest in palmetto prairie habitat and also use other open habitats such as both wet and dry prairie as well as improved pasture. Almost 87 ac of palmetto prairie at the Martin site would be permanently lost, as would approximately 169 ac of wet prairie, dry prairie, and improved pasture. Approximately 64 ac of freshwater marsh would also be lost. Everglade snail kites rely on freshwater marsh. Although their presence has not been documented at the site, the distribution of this species includes Lake Okeechobee and Martin County. Florida scrub jays and Kirtland's warblers thrive in scrub vegetation, especially oak scrub. Preconstruction activities would eliminate 27 ac of shrub and brushland cover. The red-cockaded woodpecker nests in mature pine forest and forages in mixed pine forest. Pine flatwoods is the single most affected cover type that is found on the Martin site and FPL estimated 143 ac would be permanently lost during preconstruction activities, including 124 ac in the plant area. However the Martin site is not within the FWS red-cockaded woodpecker consultation area so the loss of these habitats on the site should not affect this species (FWS 2014-TN3734). Whooping cranes use wetlands, including freshwater marsh and wet prairies, and the combined acreage expected to be permanently lost is 78 ac. The wood stork is the only species that has either been observed at the Martin site or would be expected to occur there (FPL 2014-TN4058) and the loss of freshwater marsh could also affect this species. Wood storks nest and forage in forested wetlands and 4 ac of mixed wetland hardwoods would be lost. Although no known stork nest colony is present on the site, the site lies within the core foraging area of at least one wood stork nest colony (FWS 2014-TN3732). The Florida panther uses many upland habitats, and preconstruction activities would permanently affect 320 ac of uplands within the FWS Florida panther consultation area (FWS 2012-TN3733). Eastern indigo snakes use a variety of upland habitats including pine

flatwoods, dry prairie, and edges of freshwater marsh. The permanent loss 320 ac of uplands including 143 ac of pine flatwoods and 15 ac of dry prairie would represent lost habitat for the eastern indigo snake. They would also be prone to increased mortality from off-road vehicle use during land clearing and increased traffic during construction and operation. The tiny polygala is known to occur in pine rocklands, scrub vegetation, and under upland pine forest (FWS 1999-TN136). Loss of shrub and brushland cover as well as pine flatwoods and other mixed pine forest would also represent lost habitat for the tiny polygala.

The review team expects that the FWS would establish eastern indigo snake mitigation requirements similar to those established for the Turkey Point site, including preconstruction surveys, staff awareness training, and reporting mortality incidents (FPL 2014-TN4058; State of Florida 2014-TN3637). The 2013 Standard Protective Measures for the Indigo Snake are typically prescribed by FWS to conclude the Endangered Species Act consultation process (FWS 2013-TN3749).

Loss of habitats would also affect local populations of wildlife not Federally listed, but expected to occur within the region in suitable habitat. However, these effects are not expected to be noticeable and would not destabilize even local populations of any of these animals.

Transmission Lines and Access Roads

Offsite facilities and development required to construct and operate nuclear power plants at the Martin site include transmission lines and an access road. FPL estimated the 39.3 mi of transmission line would occupy an additional 764 ac. Similar to the Martin plant site, much of the corridor is upland cover types. Uplands and forest compose 341 ac of the conceptual transmission corridor, with approximately 190 ac, being herbaceous dry prairie. Pine flatwoods, shrub and brushland, mixed rangeland, hardwood-coniferous forest, and a small amount of palmetto prairie would also be contained within the corridor. Wetlands and water compose approximately 42 percent of the conceptual transmission line corridor including 179 ac of freshwater marsh, 55 ac of wet prairie, 24 ac of mixed wetland hardwoods, 18 ac of emergent aquatic vegetation, and small amounts cypress and waterbodies such as lakes, streams, and waterways. Approximately 13 percent (100 ac) of the corridor is used for agriculture including 79 ac of citrus groves, 14 ac of improved pasture, and 8 ac of field crops. Cover types that are dominated by low herbaceous vegetation, such as dry prairie, would not be altered extensively except where the tower pads would be placed and access roads created. Tall vegetation, including trees and wood brush, would have to be removed or mowed under power lines. Therefore, much of the pine flatwoods, hardwood-coniferous forest, palmetto prairie, mixed wetland hardwoods, cypress, and possibly the shrub and brushland would in essence be permanently lost when it would be converted to and maintained as low-growing vegetation cover. The likelihood of non-native plants being accidentally introduced would also increase and could result in habitat alteration.

Loss or conversion of palmetto and dry prairie could reduce the quality of Audubon's crested caracara habitat. Permanent loss from tower pads and access roads would occur and the risk of introducing non-native invasive plants would increase. However, plants within these cover types are low-growing and would not require clearing or vegetation control under transmission lines. In addition, the conversion of woody habitats into low-growing herbaceous habitats could

increase the amount of habitat suitable for caracaras. Building transmission lines through 179 ac of freshwater marsh would likely exclude Everglade snail kites from wetlands at least temporarily and could also permanently degrade habitat through uncontrolled runoff and erosion. Snail kites would not be particularly prone to electrocution or collision with power lines. Shrub and brushland is a component within the transmission line corridor, but the elimination of trees from this component should not substantially affect either the Florida scrub jay or Kirtland's warbler and the conversion of forest cover to shrub-dominated habitats could result in a net increase of habitat for these two species within the transmission line corridor. Elimination of trees from 43 ac of pine flatwoods and 9 ac of mixed hardwood-coniferous forest could reduce the amount of habitat available to the red-cockaded woodpecker because the conceptual transmission line corridor is very near the border of the FWS red-cockaded woodpecker consultation area (FWS 2014-TN3734). Cutting a corridor through large patches of forest could also cause fragmentation and reduce the value of surrounding habitat. Freshwater marsh is a predominant habitat within the transmission line corridor, and approximately 55 ac wet prairie habitat would also exist within the corridor. Both of these habitats could potentially be used transiently by the whooping crane. These habitats would not necessarily be altered because they are already dominated by low-growing vegetation.

Native upland forested habitats are preferred by the Florida panther. The Martin site is within the Florida Panther Secondary Management Zone. Although building a 39.3 mi long transmission line corridor would result in more habitat conversion than permanent habitat loss, the conversion of habitats would likely result in panther habitat fragmentation, degradation, and ultimately loss of habitat value. The tiny polygala is associated with pine rocklands and scrub vegetation. Periodic maintenance of vegetation within the transmission line corridor could mimic periodic disturbances necessary to inhibit succession of rockland and shrub habitats into forest, possibly increasing habitat suitability for the tiny polygala. The eastern indigo snake inhabits many upland habitats. Conversion of habitats from forest to low-growing vegetation would not decrease habitat suitability for this species, and increased heterogeneity within the landscape may actually increase habitat quality. FPL stated field surveys would be conducted for Federally listed and State-protected species as part of the permitting process before any preconstruction activities would occur at the Martin site (FPL 2014-TN4058). Preconstruction activities would be conducted in accordance with all Federal and State regulations, permit conditions, good construction practices, and BMPs including the use of directed drainage ditches and silt fencing. Acreage within the conceptual transmission line corridor was minimized to the extent possible by using the most direct route while avoiding areas with important resources and high biological value. FPL also stated that any wetland functions affected within the transmission line corridor would be replaced or restored.

Operations Impacts

The review team assumed the facility configuration and operation at the Martin site would be similar to that at the Turkey Point site. Operation of two nuclear units at the Martin site would create noise, fogging and dissolved solid deposition from cooling towers, runoff from increased impermeable surfaces, light pollution, and increased vehicle collision mortality to local wildlife populations. Operation of transmission lines could increase the risk of bird collision and electrocution mortality.

Operational noise from the cooling towers would only displace individual animals from the immediate vicinity of the cooling towers, because the use of splash guards on air inlets and stacks on mechanical fans would limit cooling-tower noise to approximately 73 dBA at a distance of 200 ft from the cooling towers. The review team determined the salinity of the groundwater used for cooling would be less than or equal to that of seawater and salt deposition from cooling-tower drift at the Martin site would be similar in scale and intensity to deposition at the Turkey Point site if the radial collector wells were the sole cooling-water source. Most of the salt would be deposited on developed land very near the cooling towers, and concentrations as high as 10 kg/ha/mo that have resulted in observable effects on sensitive plant species could be expected as far as 1.25 mi from the cooling towers. The Barley Barber Swamp, located on a peninsula within the cooling pond for the existing power units and the Martin site, is more than 1.25 mi from the existing plants and would be even farther from any new units at the Martin site and would not be expected to be affected by salt from cooling-tower drift.

The creation of impermeable surfaces at the higher relative elevations of the Martin site would likely result in the concentration of stormwater runoff into surrounding wetlands, including the 6,500 ac water reservoir and supporting dikes that provide cooling water for five fossil-fuel power units and perhaps affect the 400 ac Barley Barber Swamp within the 1,200 ac mitigation site. Other wetlands, including nearby freshwater marsh and wet prairie, would also receive runoff. Although BMPs would be expected to be followed, runoff could result in silt and pollutant deposition into these areas.

Light pollution during facility operation could affect wildlife residing on or migrating through the Martin site. Design criteria could include minimization of upward lighting, turning off unnecessary lighting between 11 p.m. and sunrise, and luminary selection and mounting to provide light only where needed (FPL 2014-TN4058). If these actions are taken, the review team expects that impacts from light pollution on wildlife would be minimal.

Proposed transmission lines to support additional units at the Martin site could pose a risk to listed wildlife. Direct mortality resulting from birds colliding with tall structures has been observed (Avatar et al 2004-TN892). Factors that appear to influence the rate of avian impacts with structures are diverse and related to bird behavior, structure attributes, and weather. Migratory flight by flocking birds during darkness has contributed to the largest mortality events. Tower height, location, configuration, and lighting also appear to play roles in avian mortality. Weather, such as low cloud ceilings, advancing fronts, and fog, also contribute to this phenomenon. Waterfowl may be particularly vulnerable due to their low, fast flight and flocking behavior (EPRI 1993-TN73). However, in NUREG–1437, the NRC staff concluded that the threat of avian collision as a biologically significant source of mortality is very low because only a small fraction of total bird mortality could be attributed to collision with nuclear power plant structures, including transmission line corridors with multiple transmission lines (NRC 2013-TN2654). Although collision may contribute to local losses, thriving bird populations can withstand these losses without threat to their existence (EPRI 1993-TN73). Transmission line structures, conductors, and guy wires all pose a potential avian collision hazard for all resident birds that live in the vicinity of the transmission lines and for migratory birds that may pass through these areas. At least 41 species of birds are known to have been killed by interaction with Florida electrical utility structures, 20 of which have been killed by FPL electrical utility structures (FPL 2011-TN1283). Although the NRC (NRC 2013-TN2654) has concluded that

bird collisions with transmission lines at existing U.S. nuclear power plants are of small significance, including transmission line corridors with variable numbers of transmission lines, listed wildlife including the wood stork, whooping crane, and Audubon's crested caracara could still be at risk. Although endangered, whooping cranes in the Kissimmee Prairie in central Florida are the result of efforts to establish a nonmigratory whooping crane population officially designated as an experimental nonessential population (58 FR 5647) (TN3324). During 2001, additional efforts were initiated to establish a population of migratory whooping cranes that would winter on the Chassahowitzka National Wildlife Refuge in Citrus County, Florida. Chassahowitzka National Wildlife Refuge is approximately 165 mi northwest of the Martin site, while Kissimmee Prairie Preserve State Park is approximately 50 mi northwest. Whooping cranes are large birds that travel long distances and the conceptual transmission line corridor supporting the Martin site contains suitable whooping crane habitats. Transmission lines connecting the Martin site to the Corbett substation would have to pass through the core foraging areas of multiple wood stork nesting colonies (FWS 2014-TN3732). However, like the whooping crane, the risk of collision and electrocution mortality for the wood stork increases if transmission lines are operated within their range and there is suitable habitat within the transmission right-of-way. The level of risk is commensurate with the location of the transmission lines and wood stork nesting colonies, foraging habitat, and travel corridors. Operational effects on other important species would be minimal.

EMFs are unlike other agents that have an adverse impact (e.g., toxic chemicals and ionizing radiation) in that dramatic acute effects cannot be demonstrated and long-term effects, if they exist, are subtle (NRC 2013-TN2654). A careful review of biological and physical studies of EMFs did not reveal consistent evidence linking harmful effects with field exposures (NRC 2013-TN2654). The impacts of EMFs on terrestrial flora and fauna are of small significance at operating nuclear power plants, including transmission systems with variable numbers of power lines and lines energized at levels less than 765 kV (NRC 2013-TN2654). Since 1997, more than a dozen studies have been published that looked at cancer in animals that were exposed to EMFs for all or most of their lives (Moulder 2005-TN1329). These studies have found no evidence that EMFs cause any specific types of cancer in rats or mice (Moulder 2005-TN1329). Therefore, the incremental EMF impact posed by operation of existing transmission lines and the addition of new lines for two new nuclear units would be negligible at the Martin alternative site.

Transmission line corridor vegetation-management activities (cutting and herbicide application) and related impacts on floodplains and wetlands in transmission line corridors are of minor significance at operating nuclear power plants, including those with transmission line corridors of variable widths (NRC 2013-TN2654). Consequently, the incremental effects of transmission line corridor maintenance and associated impacts on floodplains and wetlands for two new nuclear units would be negligible at the Martin site.

Cumulative Impacts

The geographic area of interest for the assessment of the potential cumulative impacts of building and operating a new reactor at the Martin site and other past, present, and reasonably foreseeable future actions on terrestrial resources and wetlands is defined as being within a 50 mi radius around the Martin site. A list of past, present, and reasonable foreseeable actions

within 50 mi of the Martin site is presented in Table 9-11. This list includes a variety of energy-production projects, stone mining, manufacturing, transportation and infrastructure-development projects, set-aside areas for recreation and conservation, CERP-related projects, and other miscellaneous activities that could affect terrestrial and wetland resources.

Past land use in South Florida, especially agriculture and more recently urbanization, has greatly affected the distribution, quality, and quantity of plant and wildlife habitats still remaining. Development and urbanization of higher elevation lands for energy, infrastructure, and manufacturing projects have further reduced the amount of pine flatwoods and other remaining upland habitat. Ditching and draining created more dry land, reducing the amount of wetlands available as habitat. The continued operation and maintenance of existing facilities would likely not exacerbate the current situation with respect to terrestrial and wetland ecosystems. New mining activities have the potential to expand their footprint and development in general on the landscape, as does continued human population growth in South Florida. Lands set aside for recreation and conservation provide buffers against development, provide habitat for plants and animals, and serve to preserve fragments of the ecosystem of South Florida. Projects that continue to incrementally reverse changes in land cover due to man-made changes in surface-water flow, including CERP-related activities, would continue to benefit both terrestrial and wetland ecology of the region.

As described in Chapter 7, terrestrial and wetland environments in South Florida may also be affected by continued population growth and related development. The overall impact from past, present, and reasonably foreseeable future activities on regional terrestrial and wetland ecology is substantial.

Summary Statement

The landscape around the Martin site is composed mostly of upland cover types with scattered wetlands, in addition to a large cooling-water reservoir. Approximately 909 ac of upland and wetland habitat would be permanently lost at (and just outside of) the plant site, and approximately 764 ac of upland and wetland habitat would be affected by building and operating the transmission line corridor. Although the entire corridor would not be developed and all lands would not be lost as habitat, some portion would be lost to pole installation, road development, or altered to low-growing vegetation. Effects could involve the Florida panther, Audubon's crested caracara, Everglade snail kite, wood stork, and eastern indigo snake among others. Although the 39.3 mi long conceptual transmission line corridor is relatively short compared to the other sites considered, upland habitat would still be degraded through fragmentation if it were developed. Whooping cranes from the Chassahowitzka National Wildlife Refuge could range south and risk collision with transmission lines.

Based on the information provided by FPL and the review team's independent evaluation, the review team concludes that the cumulative impacts on terrestrial and wetland resources of building and operating two new nuclear units at the Martin alternative site, including impacts attributable to permanent conversion of habitat for the facility footprint as well as operation of the cooling towers and transmission lines, would be MODERATE. The incremental effect of the building and operation of two new nuclear units at the Martin site would be a significant contributor to this impact primarily because of the proposed impacts on undeveloped upland, forest, and wetland habitats and their respective species.

9.3.3.4 Aquatic Resources

What follows is an assessment of the potential impacts on aquatic resources that may occur if the two nuclear reactors described by FPL (2014-TN4058) were constructed and operated at the Martin alternative site. Based on a review of potential cooling-water sources discussed in Section 9.3.3.2, the review team assumes no cooling ponds or reverse osmosis facilities would be required for the Martin site. Unless otherwise noted, the information presented in this section was obtained from FPL's ER, Revision 6 (FPL 2014-TN4058).

The Martin site is located in western Martin County, approximately 40 mi northwest of West Palm Beach, 5 mi east of Lake Okeechobee, and 7 mi northwest of Indiantown, Figure 9-11. The existing 22,300 ac site includes five fossil-fuel–fired electrical generating units and a solar unit. The site is bounded on the west by SFWMD L-65 Canal and on the south by the St. Lucie Canal, also known as the C-44 Canal or Okeechobee Waterway. Onsite surface waterbodies at the Martin site include an existing cooling pond and a makeup/discharge canal that supports the fossil units, Barley Barber Swamp, and the Northwest Parcel mitigation area. FPL indicated in its ER that a 1,200 ac area north of the proposed site has been set aside as a mitigation area (FPL 2014-TN4058). The facility footprint for the proposed units would occupy approximately 362 ac. New transmission lines to support the nuclear power-generating units would be 31 mi long and encompass 764 ac that include previously disturbed areas, existing rights-of-way, forests, and agricultural land. As a basis for this assessment the review team assumes the primary water source for the reactor cooling system would be groundwater, with additional water obtained from the C-44 (St. Lucie) Channel during high-flow periods using a conventional intake. Cooling-tower blowdown would be injected into the Boulder Zone.

The C-44 Channel connects to Lake Okeechobee just west of the Martin site, and likely contains aquatic resources that are similar to those in the lake. Lake Okeechobee is the largest lake in Florida, and the center of South Florida's regional water-management system, providing commercial and sport fisheries, flood control, and a source of potable and irrigation water. The lake encompasses over 730 mi^2, and has an average depth of about 9 ft (FFWCC 2013-TN2842). Desired lake elevations (stages) are between 12.5 and 15.5 ft (USACE and SFWMD 2009-TN2848). Major natural tributaries to the lake are Fisheating Creek, Taylor Creek, and the Kissimmee River. Approximately 70 percent of the water entering the lake is associated with these tributaries; rainfall accounts for the remaining 30 percent. Evaporation accounts for about 70 percent of the water loss, and the remaining water exits the lake through engineered outfalls (FFWCC 2013-TN2842).

As described in Section 2.4, water-management practices in South Florida over the past 100 years have dramatically changed the regional hydrology and sheet-water flow, and influenced the aquatic plants and animals in the area. Creation of levees, canals, and channels to support agriculture and development has confined Lake Okeechobee to a smaller area than historically present, and resulted in a variety of water-management activities to maintain the lake level during the dry season and reduce flooding during the wet season. Lake Okeechobee and the connecting rivers, canals, channels, and engineered outfalls are also greatly affected by weather events. During the hurricane season of 2004, Hurricanes Frances and Jeanne created high water surges of over 18 ft, and created turbid conditions that affected submerged aquatic vegetation; the drought of 2006 lowered the level of Lake Okeechobee to an all-time record of

8.82 ft msl (FFWCC 2013-TN2842). Currently, the USACE is responsible for managing water levels in Lake Okeechobee between 12.5 and 15.5 ft NGVD (National Geodetic Vertical Datum of 1929) to balance flood control, public safety, navigation, water supply, and public health (SFWMD 2012-TN2883).

Based on the information provided by FPL (2014-TN4058), the facility footprint at the Martin site would encompass approximately 362 ac. Although the affected area is primarily farmland, building activities have the potential to directly or indirectly affect aquatic resources present in small streams or ponds at or near the site. Installation of the water-intake structure for intermittent cropping of water in the C-44 Channel may temporarily affect resident aquatic biota, and the construction of a water pipeline to the site may temporarily affect surface-water habitats. As described in FPL 2014 (TN4058), approximately 31 mi of transmission lines encompassing 764 ac may also affect aquatic resources in areas where the transmission lines support structures or access roads are adjacent to surface-water habitats. During the operation of the nuclear reactors, cooling water obtained from two intake structures on the C-44 Channel during high-flow periods creates the potential for impingement and/or entrainment of aquatic biota present in the channel, or those entering the channel from Lake Okeechobee. Because Lake Okeechobee and the rivers, streams, channels, and canals in the vicinity of the Martin site are highly connected, it is assumed the biota present in the lake are indicative of the aquatic resources that might be affected by the building and operation of two nuclear reactors, as described below.

Commercial and Recreational Species

Because the St. Lucie and L-65 Canals both connect to Lake Okeechobee, it is assumed the aquatic biota are similar, and the general descriptions of fish and invertebrates presented for the Glades alternative site would apply (Section 9.3.2.4). Thus, the canal systems adjacent to the Martin site would likely support a diverse food web that includes smaller bait fish and larger piscivores, including Largemouth Bass, crappie, catfish, and bream, which have recreational and commercial importance.

Important Species

Based on the hydraulic connections described above, the important species described for the Martin site would be similar to those at the Glades site (Section 9.3.2.4). These would include a variety of forage fish, like Threadfin Shad and Inland Silversides, and larger predators like the Largemouth Bass and Black Crappie (USACE 2013-TN2847; Zhang and Sharfstein 2013-TN2894).

Non-Native or Nuisance Species

As noted previously in the discussion of the Glades site (Section 9.3.2.4), Lake Okeechobee and the connecting canal systems contain a variety of non-native and nuisance species. Many of these species would likely be present in the St. Lucie and L-65 Canal systems.

Federally and State-Listed Species and Critical Habitat

Based on information obtained from the Florida Natural Areas Inventory database (FNAI 2013-TN2900) Federally and State-listed aquatic species and Species of Concern present in Martin County include a variety of species that are found at or near the site: Striped Croaker (*Bairdiella sanctaeluciae*), the Opossum Pipefish (*Microphis brachyurus*), the American alligator (*Alligator mississippiensis*), and four species of sea turtle—loggerhead (*Caretta caretta*), green (*Chelonia mydas*), leatherback (*Dermochelys coriacea*), and hawksbill (*Eretmochelys imbricata*) (FNAI 2013-TN2900). FPL also noted the endangered Smalltooth Sawfish (*Pristis pectinata*) and the threatened American crocodile has been reported from Martin County (FPL 2012-TN2043). Of these species, only the manatee and alligator would likely occur near the Martin site. Critical habitat for manatee and crocodile is not present at the Martin site, but the manatee consultation area includes Lake Okeechobee (FWS 2003-TN2916). FPL has indicated no listed species have been observed in St. Lucie Canal near the Martin site (FPL 2012-TN2043).

Building Impacts

Building of the proposed nuclear units at the Martin site would occur primarily within the industrial area containing the existing fossil-fuel plants, or in small areas of farmland adjacent to the site. Some existing drainage ditches that support a seasonal population of some of the fish species listed above may be adversely affected. Building of the surface-water intake on the C-44 (St. Lucie) Canal would likely result in short-term turbidity and temporary displacement of aquatic resources, which would be expected to quickly recolonize after building is completed. Building activities related to the transmission lines would occur in previously disturbed areas, existing rights-of-way, and forest or agricultural land. FPL has indicated field surveys for Federally or State-listed species would be conducted prior to construction at the site or within transmission line corridors. Installation of the intake structure would use turbidity curtains, silt screens, or similar technology to minimize impacts. The use of BMPs during tower erection and conductor installation would minimize building-related impacts along transmission line corridors. Impacts would be comparable to those described for the Glades site (Section 9.3.2.4).

Operations Impacts

Based on the review team assumptions described above, the majority of the water required to operate the cooling-water system for the two nuclear facilities at the Martin site would be obtained from groundwater resources, limiting the potential for impingement or entrainment of aquatic biota to periods of surface-water use. During times of excess surface-water flow that typically occurs during the wet season, supplemental water would be obtained from a surface-water intake located in the St. Lucie Canal. Impingement and entrainment of organisms from the intake canal would be the most likely operational impacts on aquatic populations that would occur. Assuming a closed-cycle cooling system and compliance with the EPA's 316(b) Phase I requirements for intake structures (66 FR 65256) (TN243) the intake is considered protective of aquatic life. The anticipated impacts due to impingement and entrainment are considered by the review team to be minimal. Furthermore the intakes would likely be only operated intermittently throughout the year when excess surface water is available. Impingement or entrainment that does occur should not result in noticeable changes in aquatic biota species composition or abundance in the canal or Lake Okeechobee. Because cooling-tower blowdown

would be discharged into the Boulder Zone of the Lower Floridan aquifer via deep-injection wells, surface-water resources would not be adversely affected. There is no available information about biological communities that may be present in the Boulder Zone formations near the Martin site, so it is not possible to determine if a complete exposure pathway is present or assess potential biological effects. Thus, the potential risk of chemical exposure to aquatic resources resulting from discharge of cooling-tower blowdown cannot be determined. Based on an NRC assessment of a similar cooling system proposed at the Levy site in western Florida using brackish saltwater for cooling-tower makeup water (NRC 2012-TN1976), cooling-tower drift impacts on aquatic resources would likely be minimal, because deposition would be expected to occur primarily on plant property or adjacent agricultural lands. Impacts would be comparable to those described for the Glades site (Section 9.3.2.4). No detectable increase in surface-water salinity resulting from salt-drift deposition is anticipated.

Cumulative Impacts

Past, present, and reasonable foreseeable projects and other actions in the vicinity of the Martin site are presented in Table 9-11. As described above for the Glades site, these activities include existing and proposed energy projects, mining activities, transportation projects, parks and aquaculture facilities, and restoration activities associated with CERP goals and objectives that are designed to improve surface-water management practices, restore hydrologic and natural process, and protect and restore natural resources. With the exception of the St. Lucie nuclear facility, most energy projects in the vicinity of the Martin site use coal, natural gas, oil, or biomass/biofuel to produce electrical power. These facilities require pipelines, transmission lines, and access to water to function, resulting in permanent loss of habitat and disturbance to both terrestrial and aquatic resources. Rock mining is also common in areas near the Martin site (five project examples are included in Table 9-11). These sites have the potential to affect hydrological patterns as well as terrestrial and aquatic resources. Areas near the Martin site have also provided opportunities for outdoor recreation and ecological research. The continued existence of these areas will provide sanctuaries and refuges for terrestrial and aquatic wildlife, and additional construction or development near these areas is expected to be limited. Restoration projects sponsored by CERP and others include integrated efforts to better manage surface-water resources, provide flood protection, and explore strategies for increasing aquifer storage. Given the proximity of the Martin site to Lake Okeechobee and the C-44 Canal, restoration activities designed to improve water quality and increase habitat in Lake Okeechobee and the adjacent canals, including the C-44 Canal, are expected to provide a positive benefit to both aquatic and terrestrial biota.

As shown in Table 9-11, a variety of existing, pending, or proposed projects will contribute to the overall cumulative effects that will occur near the Martin site. In some cases, the projects will contribute to habitat loss and lack of hydrologic connectivity that has plagued South Florida since the beginning of the last century. In other cases, the projects will contribute to the overarching goal of CERP to restore lost hydrologic and ecological function, providing an overall positive environmental benefit. As discussed in Section 7.3.2, aquatic environments in this region of South Florida will also be affected by continued population growth and related development, and short- or long-term changes in climate that have the potential to alter weather patterns and influence hydrology. Overall, the review team concludes that the cumulative impacts to aquatic resources in the vicinity of the Martin site are MODERATE.

Summary Statement

Based on a review of the information provided by FPL and the review team's independent assessment, it is likely the building and operation of a nuclear generating plant at the Martin site would contribute only minimally to the cumulative effects on aquatic species likely to occur in that portion of South Florida. Although the building of nuclear units at the Martin site would displace some existing agricultural land, surface-water habitats would be likely minimally affected. During the normal operation of the plant, groundwater would be used for reactor cooling, and deep aquifer discharge of cooling-tower blowdown would be employed, eliminating the need for conventional surface-water intake and discharge structures. During periods of excess surface-water flow, cooling water from the C-44 Channel would be withdrawn for cooling. Some impingement and entrainment losses are expected, however assuming a closed-cycle cooling system and compliance with the EPA's 316(b) Phase I requirements for intake structures (66 FR 65256) (TN243) the intake is considered protective of aquatic life and the anticipated impacts due to impingement and entrainment are considered minimal. Furthermore, the intakes would likely be only operated intermittently throughout the year when surface water is available. Impingement or entrainment that does occur should not result in noticeable changes to aquatic biota species composition or abundance. Thus, the review team concludes that the cumulative impacts of building and operation of two new nuclear reactors at the Martin site, combined with the other past, present, or reasonably foreseeable future activities on aquatic resources would be MODERATE. Building and operating two new nuclear units at the Martin site would not be a significant contributor to the MODERATE impact.

9.3.3.5 Socioeconomics

The following impact analysis includes impacts from building activities and operations. The analysis also considers other past, present, and reasonably foreseeable future actions that affect socioeconomics, including other Federal and non-Federal projects listed in Table 9-11. For the analysis of socioeconomic impacts at the Martin site, the geographic area of interest is considered to be the 50 mi region centered on the Martin site with special consideration of Martin, Okeechobee, St. Lucie, and Palm Beach Counties because that is where the review team expects socioeconomic impacts to be the greatest. In evaluating the socioeconomic impacts of site development and operation at the Martin site near Indiantown in Martin County, the review team used readily obtainable data from the Internet or published sources.

Physical Impacts

People who work or live around the site would be exposed to noise, fugitive dust, and gaseous emissions from building and operations activities. Noise, dust, and air-pollution emissions generated within the boundaries of the Martin site would be expected to be similar to those for the Turkey Point site. Because the surrounding site is rural and sparsely populated and because noise and air-pollution impacts are attenuated by distance, the surrounding population exposed would be relatively few and the impacts would be expected to be negligible. Best practices and applicable regulations would be expected to protect building workers and personnel working onsite. Truck and vehicle traffic related to building and operations would generate noise, fugitive dust, and gaseous emissions offsite.

In addition, offsite structures include a transmission line and intake/makeup pipelines (FPL 2014-TN4058). Because the area affected by offsite structures and traffic would also be

rural and sparsely populated and because FPL would be expected to implement a dust-control plan similar to that for the Turkey Point site, noise and air-pollution impacts from these offsite activities would be expected to be minor.

Offsite project-related building activities include widening of 39.1 mi of SR-710 and a 4.3 mi railway. The impact on road quality based on any road improvements made by the applicant to facilitate project-related traffic would be noticeable and beneficial. Other offsite project-related building activities include a 31 mi transmission line and intake/makeup pipelines (FPL 2014-TN4058). The conceptual design of these activities routes them, to the extent possible, along existing rights-of-way and avoids populated areas and residences (FPL 2014-TN4058). The physical impacts on existing structures and crops within the proposed site and offsite areas for supporting infrastructure would be minor.

The area around the site is relatively flat, sparsely populated, and is used mainly as farmland. Building would use cranes (which could exceed 400 ft in height) and would alter the regional viewscape. Construction of the transmission lines would pose similar impacts. The power plant and water-intake facilities would likely be visible from several angles. Building and operations would noticeably alter the aesthetics of the area. However, because there is already a power plant at the proposed site, the contrast with the existing viewscape would be somewhat attenuated. Because of the sparse population and existence of other power plants on the proposed site, the negative impact would likely not interfere with the daily routine of local public around the Martin site and would not destabilize the aesthetic characteristics of the area.

Based on the information provided by FPL (2014-TN4058) and the review team's independent analysis, the review team concludes that the overall physical impacts of building activities and operations would be minor and adverse, with the exceptions of noticeable and beneficial impacts on road quality and noticeable but not destabilizing adverse impacts on aesthetics near the Martin site.

Demography

The Martin site is located in Martin County, 7 mi northwest of Indiantown (2012 population 6,730) and 20 mi southwest of Port St. Lucie (2012 population 163,748), the closest population center with more than 25,000 residents (FPL 2014-TN4058; USCB 2012-TN4098). The population distribution within and around the Martin site is typically rural with low population densities. There are nine counties within the 50 mi area, but the review team estimates the areas in which workers would most likely live in and from which they would commute are within Martin, St. Lucie, Palm Beach, and Okeechobee Counties, based on current commuter patterns of the FPL staff working on the existing Martin site power units.(16)

FPL estimated the peak number of workers during building would be 3,983, including 33 operation workers. The review team assumed that the share of construction and operation workers relocating from outside the four-county area would be 70 percent of the estimated peak number of workers. This assumption was reached by using the assumption made for the proposed Turkey Point site as a reference and assuming that the share of workers that would

(16) The entire workforce of these power units lives in this four-county area (FPL 2014-TN4058).

come from outside the region is inversely proportional to the population of the region.[17] As in Section 4.4, 70 percent of the construction workforce and 100 percent of the operation workforce that moved to the area were assumed to bring their families. Based on these assumptions, a peak of 2,765 construction and 24 operation workers would relocate to the area during the project construction phase, and 1,960 of these workers would bring their families. Based on an average household size of 3.25 people, the total increase in population attributable to the peak total workforce at the Martin site would be 6,370 people. An influx of 6,370 people represents a 0.4 percent increase in the four-county 2012 population of 1,788,607.

FPL estimated the total onsite operations workforce to be 806 workers. As explained above, the review team assumed that 70 percent of these workers (565) would relocate from outside the four-county area. For this analysis, the review team assumed that 100 percent of operation workers who relocate would bring their families. Based on an average household size of 3.25 people, the total population increase attributable to project operations is 1,837 (565 x 3.25) people. This represents a 0.1 percent increase in the four-county area.

The review team concluded that the impact on local demography would not be noticeable.

Economic Impacts on the Community

Economy

FPL estimated the peak number of workers during building would be 3,983, including 33 operation workers. Employment of 3,983 construction and operation workers would have positive economic impacts in the four-county area. Based on a multiplier of 1.7289 jobs (direct and indirect) for every construction job and 2.2799 for every operation job, 3,983 new construction and operation jobs would create 3,047 indirect jobs, for a total of 7,104 new jobs in the four-county area during peak employment (3,950 × 1.7289 + 33 × 2.2799) (FPL 2011-TN56). This represents a 0.9 percent increase in the total employment in the four-county area.[18] Peak employment would last 1 month and the average employment generated during the 10-year building period would be about half of that of peak employment. This added employment would generate added earnings to the economy of the four-county area, but the added employment and earnings would not be noticeable to most of those living or working in the area.

An estimated 806 workers would be required for the operation of two nuclear power facilities. Based on a multiplier of 2.2799 jobs (direct and indirect) for every operations job at the new units (FPL 2011-TN56), an influx of 806 workers would create 1,032 indirect jobs for a total of 1,838 new jobs in the region. This represents a 0.2 percent increase in the total employment in the four-county area. This added employment would also generate added earnings to the

(17) The proposed Turkey Point site analysis assumed 50 percent of the peak workers would come from outside the 50-mi region and that 83.3 percent of those would reside in Miami-Dade County, i.e., 41.65 percent (0.5 x 0.833) of the peak workers would migrate into Miami-Dade County. Because the population of the four-county area is approximately 71 percent of that of Miami-Dade County (USCB 2012-TN4098), the review team assumed the share of peak workers migrating into the four-county area would be 1-(0.71 x 0.4165) ≈ 70 percent.

(18) Employment of 793,457 (BLS 2013-TN4085).

economy of the four-county area, but the added employment and earnings would not be noticeable to most people living or working in the area.

Taxes

State corporate income taxes and sales and use taxes paid at the Martin site during construction and operations of the proposed units would be similar to those paid by the same units at the proposed Turkey Point site. As discussed in Sections 4.4 and 5.4, State taxes paid by the proposed units would not exceed 2 percent of the annual collected State corporate income and sales and use taxes. The impact would be minor and beneficial. County sales surtax rates in the four-county area for the 2014 calendar year are zero percent for Martin and Palm Beach Counties, one-half percent for St. Lucie, and 1 percent for Okeechobee County (FDOR 2014-TN3393). County surtax collections from the proposed units would be highest during construction when annual expenses related to the proposed units would be estimated to reach up to $1.56 billion (Section 4.4). A 1 percent sales surtax would generate $15.6 million in revenues for the four-county area.[19] This would correspond to less than 1 percent of total County revenues in the four-county area for 2014.[20] The impact would be minor and beneficial. County and school district governments in Florida may levy taxes up to 10 mills each (1 percent) in property taxes (FDOR 2012-TN459). If the value of property taxes for the two nuclear reactors at the Martin site were the same as the value estimated for Units 6 and 7 at the Turkey Point site in Section 5.4.3.2, FPL would pay $20 million in property taxes to the Martin School District and $20 million to Martin County during operations. These payments would correspond to 15.6 percent of the Martin School District 2011-2012 total revenues ($20 million compared to $128 million)[21] and to 6.2 percent the Martin County 2011-2012 total revenues ($20 million compared to $322.2 million).[22] Because property taxes paid to school districts are reallocated through Florida's Education Finance Program, the benefit to the Martin School District would be diluted to some extent, and the exact amount distributed to each school district is not known at this time. Because of the value of project-related property tax payments relative to current property taxes, the review team considers the impacts on tax revenues to the Martin School District to be noticeable and beneficial.

The review team concluded that the economic impact would not be noticeable and would be beneficial, with the exception of property tax revenues to the Martin School District, which would be noticeable and beneficial, but would not substantially alter current property tax levels in the Martin School District.

Infrastructure and Community Service Impacts

Traffic

Workforce access to the Martin site would occur through SR-710 coming from the east and the west. The review team estimated the current LOS (Level of Service) of these roads at two FDOT traffic-monitoring sites based on the peak hour directional traffic and FDOT LOS

(19) To the extent that some of the expenditures would be made outside Okeechobee County, and assuming the sales surtax rates are unchanged, the total sales surtax collected would be smaller.
(20) $3,412 million (FLDFS 2013-TN3392).
(21) FLDOE 2013-TN3299
(22) FLDFS 2013-TN3392

thresholds. Peak hour directional traffic information was obtained from FDOT Florida Traffic Online (FDOT 2013-TN3558) and consists of the AADT at each traffic-monitoring site, a Standard Peak Hour Factor (K) and a Directional Distribution Factor (D). The multiplication of these three elements (AADT × K × D) provides an estimate of the current peak hour directional traffic volume. The LOS was determined comparing this peak hour directional traffic volume with the maximum thresholds for each LOS in Table 9 (areas less than 5,000 population) of FDOTs Generalized Service Volume Tables (FDOT 2013-TN3297). Based on this procedure, the LOS at both traffic-monitoring sites is B. To estimate the project impact on traffic LOS during the project's peak workforce building period, the review team followed a methodology similar to that described in Section 4.4: The peak workforce of 3983 construction and operation workers were divided into two shifts, with 70 percent assigned to shift 1 (6:00 a.m. to 4:30 p.m.) and 30 percent to shift 2 (5:00 p.m. to 3:00 a.m.). The hour of peak commute would be 4:30 p.m. to 5:30 p.m. The review team also assumed up to 36 trucks per hour. The project-related directional traffic during the peak commute hour would be 2,824 vehicles (70 percent × 3,983 + 36). The review team assumed that half of the project-related traffic would come from each direction, east and west.[23] Results of this analysis are presented in Table 9-15 below. The additional building traffic would drop the LOS classification at both traffic-monitoring sites to F. The proposed widening of SR-710 would bring the LOS classification to a C.

Table 9-15. Peak Workforce Traffic LOS Analysis for the Martin Site

Traffic-Monitoring Site	Baseline Peak Hour Directional Traffic	Baseline LOS	Distribution of Project-Related Peak Traffic	Added Peak Hour Directional Traffic	Peak Hour Directional Traffic with Project	LOS with Project
SR-710 west of site	276	B	0.50	1,412	1,688	F (C)[a]
SR-710 east of site	364	B	0.50	1,412	1,776	F (C)[a]

(a) LOS classification with widening of SR 710

Source: Review team calculations based on FDOT 2013-TN3297 and FDOT 2013-TN3558

FPL estimated the total onsite operations workforce to be 806 workers. If access of this workforce to the Martin site were distributed among the two directions equally, the LOS at each of the two monitoring sites would drop to C.

Based on the above analysis, the review team concludes that the impact of building and operation of the proposed nuclear reactors at the Martin site would be noticeable during building, although not destabilizing, after widening of SR-710.

Recreation

The Martin site is located within 2 mi from Lake Okeechobee and the Lake Okeechobee Scenic Trail that circles the lake. The lake is used for boating, fishing, and duck hunting, and the scenic trail is used for hiking and bird watching (Palm Beach County 2013-TN3298). The DuPuis Wildlife and Environmental Area is located just south of the Martin site. During building, access to these sites from some directions could be affected by increased traffic. Other parks and

(23) Based on U.S. Census Bureau commuter patterns (USCB 2011-TN4078) it was not possible to determine the likely direction of outgoing project-related traffic.

recreational areas exist within the county. The influx of project-related population to the four-county area would increase the number of local users of recreational facilities. Because the in-migrating population would be less than 1 percent of the local population, the review team expects the impact on current recreational infrastructure to be negligible.

Housing

The review team estimates that 2,789 construction and operation workers would migrate into the four-county area, and each of these workers would need a place to live. Based on American Community Survey 2008–2012 5-Year estimates, within the four-county area, there are 896,705 housing units of which 195,413 are vacant (21.8 percent). This includes housing that is designated as seasonal, recreational, or occasional use (USCB 2012-TN4089). The review team estimates that, in absolute numbers, the available housing would be sufficient to house the construction workforce. The in-migrating construction and operation workforce would occupy no more than 1.5 percent of vacant housing units in the four-county area. FPL estimated that approximately 806 workers would be needed for operation of two nuclear power facilities at the Martin site, and the review team assumed that 70 percent of these workers (565) would relocate from outside the region and would settle in the four-county area. Based on these assumptions, the entire operations workforce would occupy no more than 0.3 percent of vacant housing units in the four counties. The review team concludes that impact on housing would be minor.

Public Services

In-migrating construction workers and plant operations staff would also likely affect local municipal water, wastewater-treatment facilities, police and fire-protection services and other public services in the region. These impacts would be expected to be in proportion with the demographic impacts experienced in the region. In-migration to the four-county area would represent an estimated 0.4 percent of the local population (less during operations). The review team concludes that impact on public services would be minor.

Education

Based on data for the 2011-2012 school year, there are approximately 238,373 full-time equivalent students in public schools in the four-county area(FLDOE 2013-TN3299).[24] The review team estimated that 2,789 construction and operation workers would migrate into the area, and that 1,960 workers would bring their families. Based on an estimate of 0.8 school-aged children per family (Malhotra and Manninen 1981-TN1430), an estimated 1,568 (1,960 × 0.8) school-aged children would be migrating into the four-county area. This would yield a 0.7 percent increase in the student population. During operations, the review team assumed that 565 operation workers and their families would relocate from outside the region. This would include an estimated 452 (565 × 0.8) children in the PK-12 school range. This influx of students would increase the student population in the four-county area by 0.2 percent. The review team concludes that the impact on education would be minor.

(24) FTE is a measure of enrollment based on the number of full-time students that it would take to fill the number of classes offered.

Based on the information provided by FPL (2014-TN4058) and the review team's independent analysis, the review team concludes that the overall infrastructure and community service impacts of building activities and operations at the Martin site would be minor except for noticeable, but not destabilizing, adverse impacts on traffic.

Cumulative Impacts

In addition to the socioeconomic impacts from building and operation of the proposed project at the Martin site, the cumulative analysis also considers other past, present, and reasonably foreseeable future actions that could have socioeconomic impacts.

The socioeconomic impacts of past and present actions in the affected area are largely captured by the current baseline conditions used for analysis above of project impacts. For example, the impacts of past and present actions on the demography and economy of the area are largely captured by current baseline data on population, employment, and tax revenues and are incorporated in the baseline and trend assessments of the RIMS II multipliers.

Reasonably foreseeable future actions are listed in Table 9-11. Several of these future actions would be expected to have cumulative socioeconomic impacts with the proposed project at the Martin site. The proposed Floridian Natural Gas Storage Facility in Martin County would be located at Indiantown, 3 mi east of the proposed Martin site on SR-710. The construction would likely generate added traffic on SR-710. During construction it would also generate an estimated 1,000 jobs in Martin County during peak employment. An estimated 250 jobs would be supported statewide during operations (Stronge et al. 2007-TN3302). Other proposed projects that would generate employment and earnings during construction and operations include the Florida Southeast Connection pipelines proposed through Highlands, Okeechobee and Martin Counties (construction 2016-2017; FSC 2014-TN3301), and various proposed CERP water projects. The Herbert Hoover Dike Rehabilitation Project and Dam Safety Modification Study will likely also generate some local expenditures in the affected area.

Summary Statement

The cumulative impact of the projects identified above with the proposed project at the Martin site would depend largely on the timing of construction. In particular, cumulative impacts on traffic along SR-710 could add to the adverse impact that would be expected from the proposed project on the Martin site. Other potential cumulative impacts that would be beneficial include increased employment and earnings during construction and operations. Based on the location of the identified future projects and their magnitudes, the cumulative socioeconomic impacts would be expected to be SMALL and adverse, with the exception of MODERATE adverse physical impacts on aesthetics and traffic; and MODERATE and beneficial impacts of property tax revenues to the Martin School District and MODERATE and beneficial impacts on road quality near the Martin site. Traffic impacts on SR-710 could add to the already MODERATE impacts of the proposed project on the Martin site to the point of making them LARGE, depending on the timing of construction. Building and operating two new nuclear units at the Martin alternative site would be a significant contributor to the adverse impacts that are greater than SMALL.

9.3.3.6 Environmental Justice

The following impact analysis includes impacts from building activities and operations. The analysis also considers other past, present, and reasonably foreseeable future actions that affect EJ, including other Federal and non-Federal projects listed in Table 9-11.

The 2008–2012 American Community Survey census block groups were used to identify minority and low-income population distributions in the area (USCB 2012-TN4098). The census data for Florida characterizes 15.9 percent of the population as Black; 0.3 percent as American Indian or Alaskan Native; 2.5 percent as Asian; 0.1 percent as Native Hawaiian or other Pacific Islander; 2.6 percent as other single minorities; 2.2 percent as multiracial; 22.5 percent as Hispanic ethnicity; and 42.2 percent as aggregate minority. There are 1,098 block groups within 50 mi of the Martin site. Following the criteria described in Section 2.6.1, Black minority populations exist in 151 block groups; American Indian or Alaskan Native minority populations exist in 2 block groups; Asian minority populations exist in 3 block groups; other race minority populations exist in 11 block groups; multiracial minority populations exist in 2 block groups; ethnic Hispanic minority populations exist in 116 block groups; and aggregate minority populations exist in 323 block groups. There are no block groups containing Native Hawaiian or other Pacific Islander minority populations within 50 mi of the Martin site. The locations of the aggregate minority populations within 50 mi of the Martin site are shown in Figure 9-13. The locations of Hispanic minority populations and Black minority populations within the 50 mi of the Martin site are shown in Figure 9-14 and Figure 9-15, respectively.

The USCB data characterize 15.3 percent of Florida residents as low-income (USCB 2012-TN4098). Out of a possible 1,098 block groups, 108 block groups contain low-income populations. The locations of the low-income populations within 50 mi of the Martin site are shown in Figure 9-16.

The analyses of impacts of building and operating new nuclear reactors at the Martin site identified noticeable adverse impacts on land use, terrestrial and wetland ecosystems, aesthetics, and traffic. The review team did not identify any special pathways through which any impacts would disproportionately affect EJ populations of interest. Therefore, the review team concluded there would be no disproportionately high and adverse impacts on EJ populations of interest.

The NRC's EJ methodology includes an assessment of affected populations of particular interest or with unusual circumstances, such as minority communities that are exceptionally dependent on subsistence resources or identifiable in compact locations (e.g., Native American reservations) and those that have a high density of minority or low-income groups. Based on a literature research, the review team did not identify high-density minority or low-income presence in the proximity of the site, or any differentiated subsistence consumption of natural resources by EJ populations of interest.

Cumulative Impacts

In addition to the EJ impacts from building and operations of the proposed project at the Martin site, the cumulative analysis also considers other past, present, and reasonably foreseeable future actions that could have EJ impacts. Based on a literature review of past and present actions in the affected area, and based on the reasonably foreseeable actions listed in Table 9-11, the review team found no evidence that the cumulative effects would disproportionately impact EJ populations of interest.

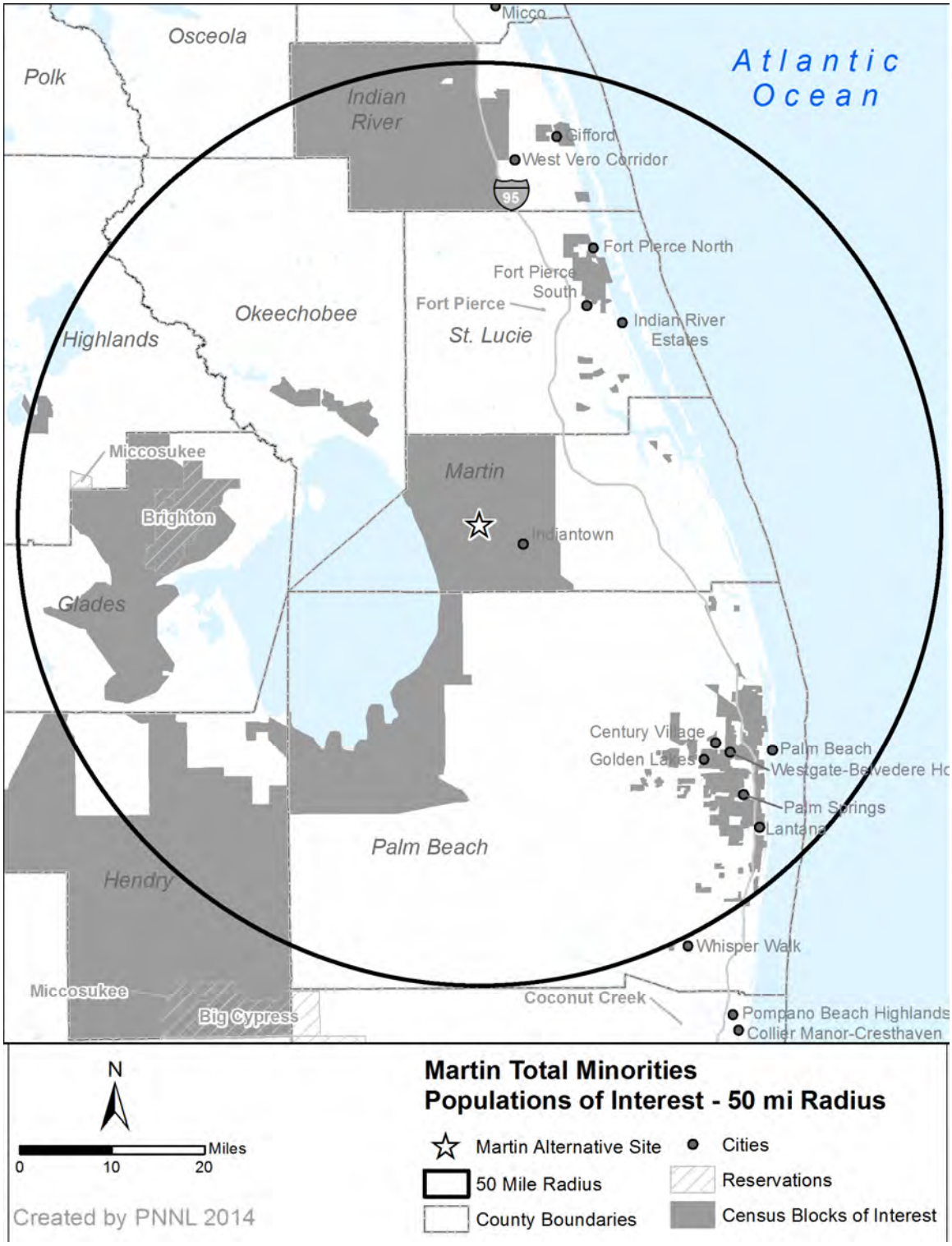

Figure 9-13. Aggregate Minority Populations in Block Groups that Meet the Environmental Justice Selection Criteria within 50 mi of the Martin Alternative Site

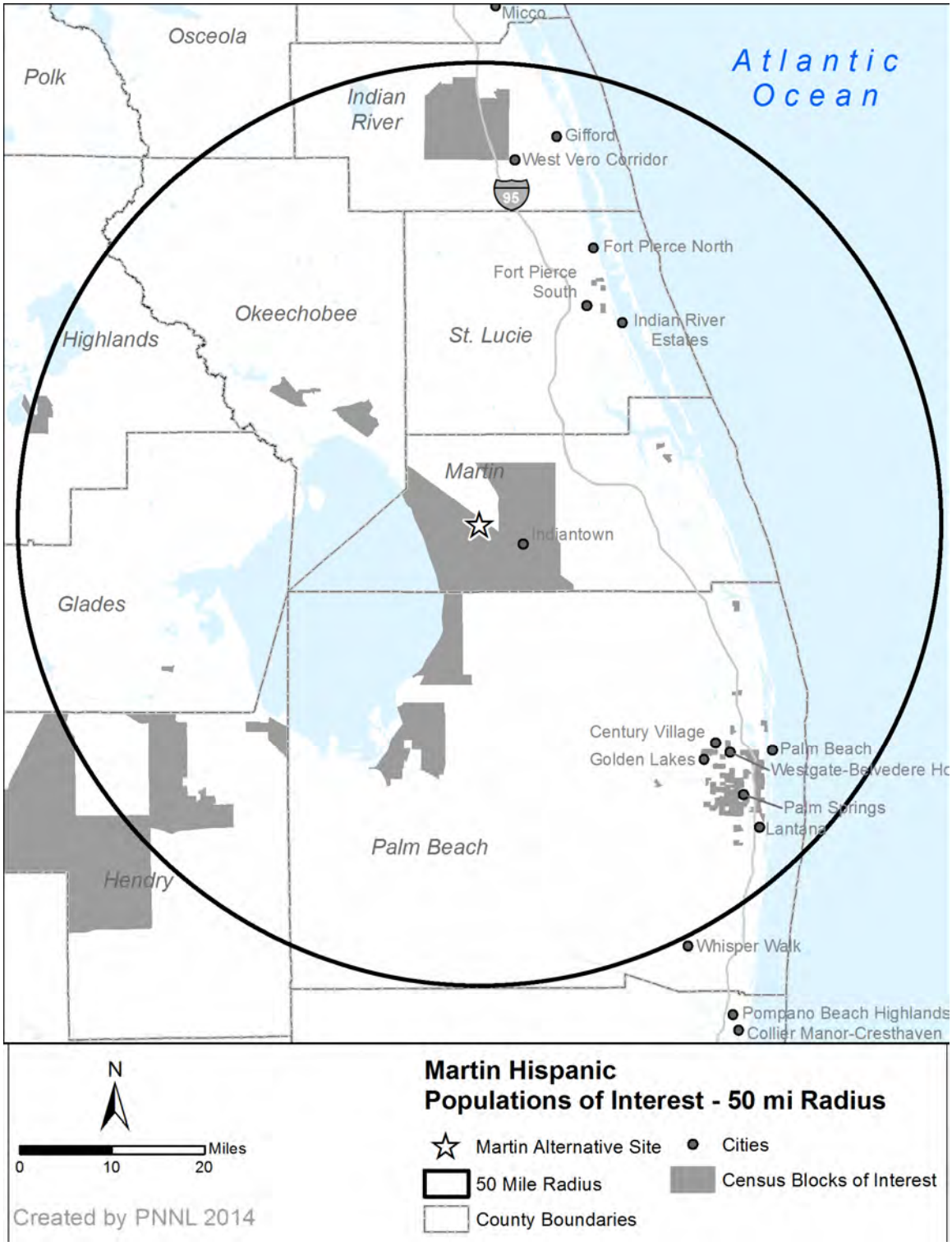

Figure 9-14. Hispanic Populations in Block Groups that Meet the Environmental Justice Selection Criteria within 50 mi of the Martin Alternative Site

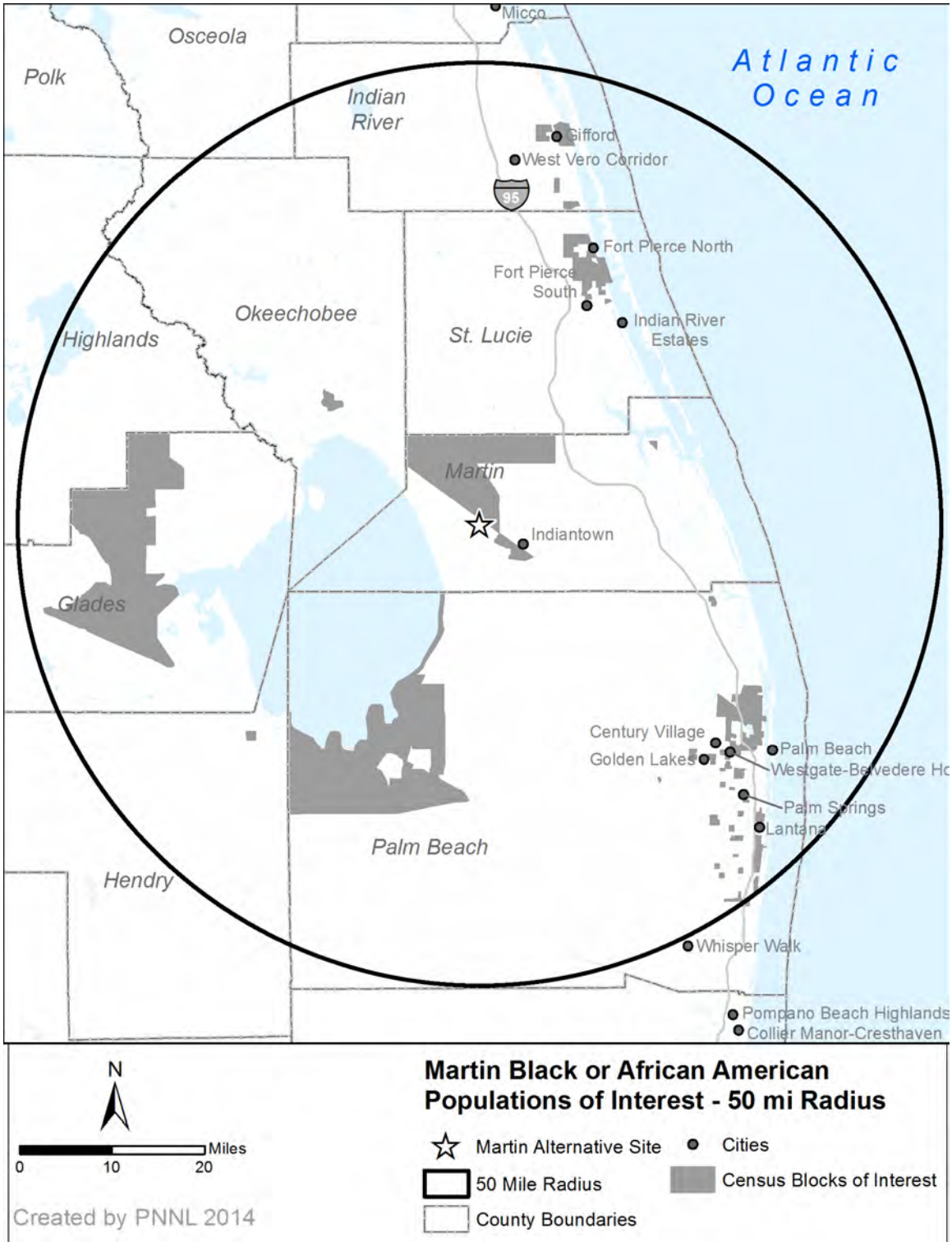

Figure 9-15. African American Populations in Block Groups that Meet the Environmental Justice Selection Criteria within 50 mi of the Martin Alternative Site

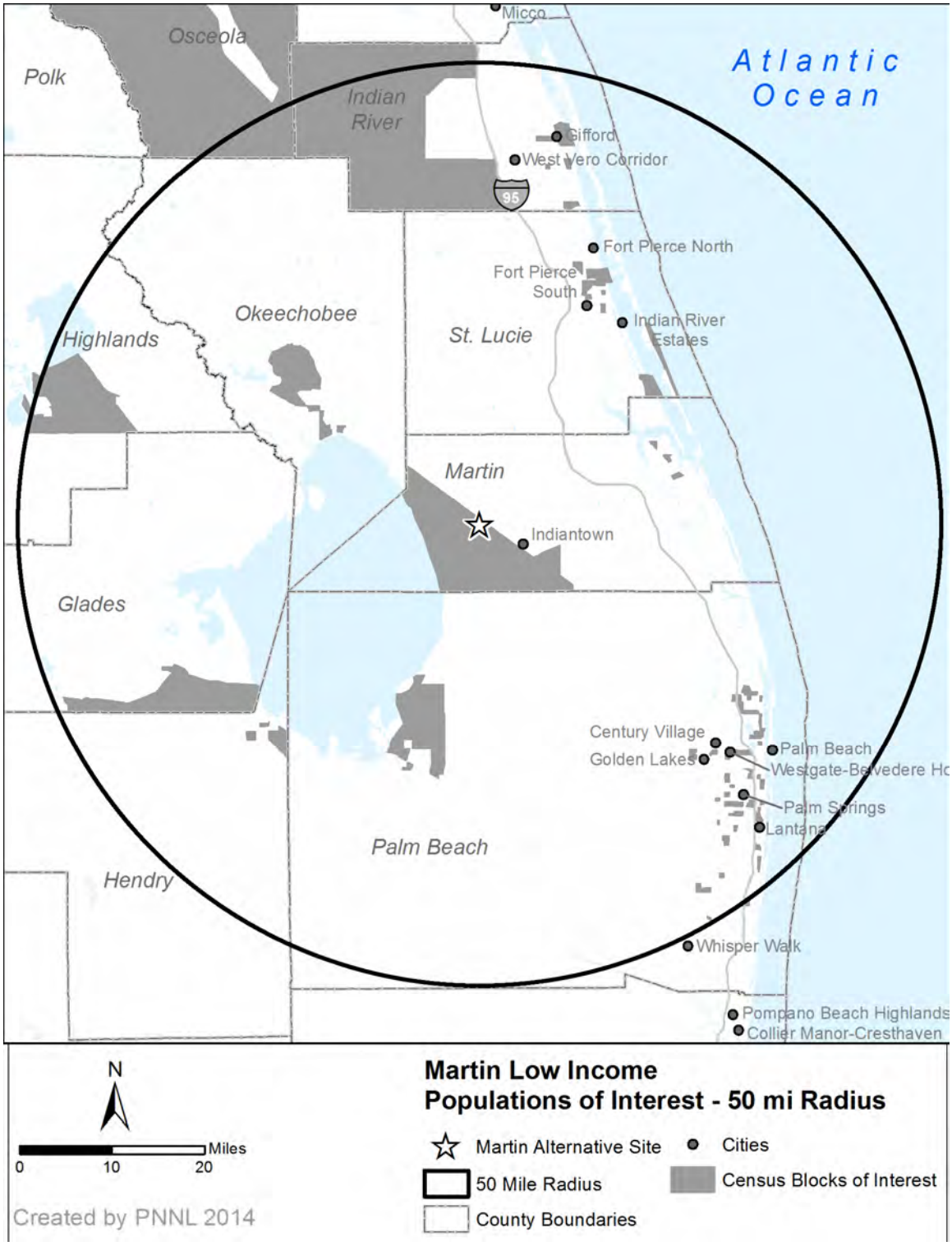

Figure 9-16. Low-Income Populations in Block Groups that Meet the Environmental Justice Selection Criteria within 50 mi of the Martin Alternative Site

9.3.3.7 Historic and Cultural Resources

The following cumulative impact analysis addresses building and operating two new nuclear power-generating units at the Martin site. The analysis also considers other past, present, and reasonably foreseeable future actions that could affect cultural resources, including the other Federal and non-Federal projects listed in Table 9-11. For the analysis of cultural impacts at the Martin site, the geographic area of interest is considered to be the APE that would be defined for this site. This includes the direct effects APE, defined as the area physically affected by the site-development and operation activities at the site and within transmission line corridors. The indirect effects APE is defined as the area visually affected and includes an additional 0.5 mi radius APE around the transmission line corridors and a 1 mi radius APE around the cooling towers.

Reconnaissance activities in a cultural resource review have particular meaning. Typically, they include preliminary field investigations to confirm the presence or absence of cultural resources. However, in developing this EIS, the review team relied upon reconnaissance-level information to perform its alternative site evaluation in accordance with ESRP 9.3 (NRC 2000-TN614). Reconnaissance-level information consists of data that are readily available from agencies and other public sources. It can also include information obtained through visits to the site area. The following information was used to identify the historic and cultural resources at the Martin site:

- NRC Alternative Sites Visit, July 2010 (NRC 2010-TN3304)
- FPL ER Revision 6 (FPL 2014-TN4058)
- Florida Historical Markers program (FDHR 2014-TN3876)
- National Register of Historic Places database (NPS 2014-TN3880).

The approximately 11,300 ac Martin site is an FPL-owned property located in predominantly forested land, scattered wetlands, and agricultural land. The site has been developed for power generation and contains five fossil-fule–fired power units, occupying 300 ac, and a 6,800 ac water reservoir. A solar unit was recently constructed (FPL 2014-TN4058). Historically, the Martin site and vicinity were largely undeveloped and likely contained intact archaeological sites associated with the past 10,000 years of human settlement. Over time, the area has been heavily disturbed by impacts related to agricultural and industrial development.

A search of the National Register shows that one significant historic property, the Seminole Inn in Indiantown, is located within 10 mi of the Martin site (FPL 2014-TN4058; NPS 2014-TN3880). A total of 100 properties was found in the four counties in the vicinity of the Martin site, consisting of Martin, Palm Beach, St. Lucie, and Okeechobee Counties. A National Register search of the indirect effects APE for the proposed transmission line corridor shows that only the single property noted above, the Seminole Inn, occurs within the area. The property lies approximately 4 mi to the east of the proposed transmission line route. However, the proposed transmission line follows an existing transmission line corridor in this area and any impacts caused by the addition of a new transmission line would be negligible.

A search of the Florida Historical Markers Program (FDHR 2014-TN3876) revealed that there are six historic markers in Martin County, but none are found within 10 mi of the Martin site. One marker, for the Jupiter Indiantown Road, is located just outside Indiantown, about 4 mi from the transmission line corridor. In addition, there is a known archaeological resource within the Barley Barber Swamp adjacent to the plant property, but the area is preserved as a nature area and will not be directly affected.

In 1989, FPL conducted detailed cultural resources studies for an expansion of the Coal Gasification/Combined-Cycle facility located on the Martin site (FPL 2014-TN4058). Approximately 3,300 ac of FPL's existing plant property were assessed. However, any additional property required for the new nuclear generating units was not surveyed as part of the 1989 study. The study included a review of the Florida Master Site Files, and examination of historical and archaeological literature, historical records, maps, and photographs. Areas identified as archaeologically sensitive were systematically surveyed in the field. The research revealed that no archaeological sites have been recorded in the 3,300 ac study area for that project, and the archaeological survey did not identify any new resources.

Reconnaissance-level information indicates that there are no known historic properties located within surveyed portions of the existing Martin plant. However, any additional land that would be acquired for the project has not been surveyed for archaeological or historical resources. Further, reconnaissance-level information shows that there are historic properties in the general vicinity of the site, including archaeological resources nearby and historic resources in the broader region.

Building Impacts

To accommodate the building of two nuclear generating units and associated facilities at the Martin site, FPL estimates that the total area of land that would be disturbed would be approximately 362 ac for the facility footprint. In addition, a 39.3 mi long paved road and a 4.3 mi long railroad spur would need to be constructed through predominantly agricultural or undeveloped land (FPL 2014-TN4058). A portion of SR-710 would need to be widened, and 21.7 ac would be disturbed for pipeline corridors and associated facilities (FPL 2014-TN4058). If the Martin site were chosen for the proposed project, identification of cultural resources would be accomplished through additional cultural resource surveys and consultation with the SHPO, Tribes, and interested parties. The results would be used in the site-planning process to address cultural resources impacts. If significant cultural resources were identified by these surveys, the review team assumes that FPL would use the same protective measures used at the Turkey Point site, and therefore the impacts would be minimal. If direct effects on significant cultural resources could not be avoided, land-clearing, excavation, and grading activities could potentially destabilize important attributes of historic and cultural resources.

Section 9.3.3.1 describes the transmission line corridors, which will extend for a distance of 31 mi following extant transmission line corridors for the existing Martin plant. FPL has stated that consideration would be given to sensitive environmental and built resources in determining a route for the transmission lines (FPL 2014-TN4058). If the Martin site were chosen for the proposed project, the review team assumes that FPL would conduct its transmission line related cultural resource surveys and procedures in a manner similar to that for the Turkey Point site.

In addition, the review team assumes that the State of Florida's final Conditions of Certification (State of Florida 2014-TN3637) regarding transmission line siting and building activities would also apply, and therefore impacts would be minimal. If direct effects on significant cultural resources could not be avoided, land-clearing, excavation, and grading activities could potentially destabilize important attributes of historic cultural resources. Similarly, both the transmission lines and nuclear power-generating units could indirectly affect cultural and historic resources through visual impacts on the setting of the resources.

Operations Impacts

Impacts on historic and cultural resources from operation of two new nuclear generating units at the Martin site include those associated with the operation of new units and maintenance of transmission lines. The review team assumes that the same procedures developed by FPL for the Turkey Point site, as well as the State of Florida's final Conditions of Certification, would be used for onsite and offsite maintenance activities. Consequently, the incremental effects of the maintenance of transmission line corridors and operation of the two new units and associated impacts on the cultural resources would be negligible for the direct and indirect effects APEs.

Cumulative Impacts

Past actions in the geographic area of interest that have similarly affected historic and cultural resources include rural, agricultural, and industrial development and associated activities such as road construction. Table 9-11 lists past, present, and reasonably foreseeable projects and other actions that may contribute to cumulative impacts on historic and cultural resources in the geographic area of interest. Projects from Table 9-11 that may fall within the geographic area of interest for cultural resources include the Florida Gas Transmission Expansion project, the Florida Natural Gas Storage Facility, the FPL Martin Next-Generation Solar Energy Center, various water-storage and water-treatment projects, the Lake Point Mine project, and future urbanization. These projects may significantly affect historic and cultural resources in a manner similar to those associated with the building and operation of two new nuclear generating units.

Long linear projects such as new or expanded roads and pipelines may intersect the proposed transmission line corridors. Because cultural resources can likely be avoided by long linear projects, impacts on cultural resources would likely be minimal. If building associated with such activities results in significant alterations of cultural resources in the transmission line corridors, either physical or visual, then cumulative impacts on cultural and historic resources would be greater.

Cultural resources are nonrenewable. Therefore, the impact of the destruction of cultural resources is cumulative. Based on the information provided by FPL and the review team's independent evaluation, the review team concludes that the cumulative impacts from building and operating two new nuclear generating units on the Martin site would be SMALL. This impact-level determination is based on reconnaissance-level information and reflects the fact that there are no known cultural resources on the proposed site. Although the proposed transmission line would extend approximately 31 mi, it would follow an existing transmission line corridor and would only incrementally add to potential visual impacts on cultural resources. The assessment also assumes that, if the Martin site were to be developed, cultural resource

surveys and evaluations would be conducted and FPL, in consultation with SHPO, Tribes, and interested parties, would assess and resolve any adverse effects of the undertaking. If cultural or historic resources are present, and if there are adverse effects on those resources, the project could result in greater cumulative impacts.

9.3.3.8 Air-Quality Impacts

The following impact analysis includes impacts from building activities and operations. The analysis also considers other past, present, and reasonably foreseeable actions that affect air quality, including other Federal and non-Federal projects listed in Table 9-11. As described in Section 9.3.3, the Martin site area includes five fossil-fuel–fired (gas and oil) power units; there are no current nuclear facilities at the site. The geographic area of interest for the Martin site is Martin County, which is in the Southeast Florida Intrastate Air Quality Control Region (40 CFR 81.49) (TN255).

Sections 4.7 and 5.7 discuss air-quality impacts during building and operation. The emissions related to building and operating a nuclear power plant at the Martin alternative site would be similar to those at the Turkey Point site. The air-quality attainment status for Martin County, as set forth in 40 CFR Part 81 (TN255), reflects the effects of past and present emissions from all pollutant sources in the region. Martin County is in attainment of all National Ambient Air Quality Standards.

As described in Chapters 4 and 5, the criteria pollutants from building and operation were found to have a SMALL impact on air quality. In Chapter 7, the cumulative impacts of criteria pollutants were evaluated and also determined to be SMALL to MODERATE. Reflecting on the projects listed in Table 9-11, the most significant of the facilities operating in the county are the five fossil-fuel–fired (oil and gas) units (Martin plant), with a combined 3,734 MW capacity, operating at the Martin site and a 330 MW coal-fired power plant (Indiantown Cogeneration) located 4 mi east of the Martin site. Emissions from power plants such as these are released through stacks and with significant momentum and buoyancy. In addition, a proposed liquefied natural-gas storage and vaporization facility (Florida Natural Gas Storage Facility) with designed storage capacity of eight billion cubic feet will operate at a distance of about 2 mi from the Martin site. Other industrial projects listed in Table 9-11 would likely have de minimis impacts. Given that these projects are subject to Clean Air Act permitting requirements, it is unlikely that the air quality in the region will degrade to the extent that the region would be in nonattainment of the National Ambient Air Quality Standards.

The air-quality impact from development of the Martin site would be local and temporary. The applicant would develop a dust-control plan that identifies specific measures to minimize fugitive dust emissions during building activities. The distance from building activities to the site boundary would be sufficient to generally avoid significant air-quality impacts. There are no land uses or projects in Table 9-11, including the aforementioned sources, that would have emissions during site development that would, in combination with emissions from the Martin site, result in degradation of air quality in the region. Emissions from operation of two new nuclear units at the Martin site would be intermittent and made at low levels with little or no vertical velocity, similar to operational impacts at the Turkey Point site, as discussed in Section 5.7. The air-quality impacts of the Martin fossil-fuel units are included in the baseline

air-quality status. The air-quality impacts of the Florida Natural Gas Storage Facility would be similar to the air-quality impacts of the natural-gas−fired power plant units discussed in Section 9.2.2.10, which would be noticeable but not destabilizing. The cumulative impacts from emissions of effluents from the Martin site and the aforementioned sources would be noticeable but not destabilizing.

The cumulative impacts of GHG emissions related to nuclear power are discussed in Section 7.6. The impacts of the emissions are not sensitive to location of the source. Consequently, the discussion in Section 7.6 is applicable to a nuclear power plant located at the Martin site. The review team concludes that the national and worldwide cumulative impacts of GHG emissions are noticeable but not destabilizing. The review team further concludes that the cumulative impacts would be noticeable but not destabilizing, with or without the GHG emissions of the two new nuclear units at the Martin site.

The review team concludes that cumulative impacts from other past, present, and reasonably foreseeable future actions on air-quality resources in the geographic areas of interest would be SMALL to MODERATE for criteria pollutants and MODERATE for GHG emissions. The incremental contribution of impacts on air-quality resources from building and operating two units at the Martin site would not be a significant contributor to the MODERATE impacts.

9.3.3.9 Nonradiological Health

The following analysis considers nonradiological health impacts from building and operating two new nuclear units at the Martin site. The analysis also includes past, present, and reasonably foreseeable future actions that could contribute to cumulative nonradiological health impacts on site workers (construction and operation workers) and members of the public, including other Federal and non-Federal projects and the projects listed in Table 9-11 within the geographic area of interest. Nonradiological health impacts at the Martin site are estimated based on information provided by FPL and the review team's independent evaluation. For the analysis of nonradiological health impacts at the Martin site, the geographic area of interest is the site and the immediate vicinity (~2 mi radius) and the associated road and transmission line corridors. This geographic area of interest is based on the localized nature of nonradiological health impacts and is expected to encompass all nonradiological health impacts.

Building activities with the potential to affect the health of members of the public and workers at the Martin site include exposure to dust and vehicle exhaust, occupational injuries, noise, and increased traffic associated with the transport of construction materials and personnel to and from the site. The operations-related activities that have the potential to affect the health of members of the public and workers include exposure to etiological (disease-causing) agents, noise, EMFs, occupational injuries, and impacts from the transport of workers to and from the site.

Building Impacts

Nonradiological health impacts on construction workers and members of the public from building two new nuclear units at the Martin site would be similar to those evaluated in Section 4.8 for the Turkey Point site. During the site-preparation and building phase, FPL would comply with applicable Federal and State regulations on air quality and noise (FPL 2014-TN4058). The

Martin site is located in a rural area, and building impacts would likely be negligible on the surrounding populations, which are classified as medium- and low-population areas. The incidence of construction worker accidents would be the same as that for the Turkey Point site. The review team concludes that nonradiological health impacts on construction workers and the public from building two new nuclear units and associated transmission lines at the Martin site would be minimal. Nonradiological health impacts associated with traffic accidents during building activities at the Martin alternative site were evaluated in Section 4.8.3 and the review team concludes that the impacts would be minimal.

Operations Impacts

Nonradiological health impacts on operation workers and members of the public would include those associated with the operation of cooling towers and transmission lines as described in Section 5.8. Based on the configuration of the proposed new units at the Martin site (see Chapter 3 for detailed site layout description), etiological agents would not be an issue with regard to members of the public because cooling-tower blowdown would be discharged into deep-injection wells not into surface waters. Impacts on workers' health from occupational injuries, noise, and EMFs would be similar to those described in Section 5.8 for the Turkey Point site. Noise and EMF exposure would be monitored and controlled in accordance with applicable OSHA regulations. Although no detailed noise modeling has been performed for the Martin site, it is likely that noise impacts would be similar to those predicted for operations at the Turkey Point site. The effects of EMFs on human health would be controlled and minimized by conformance with National Electrical Safety Code criteria and adherence to the standards for transmission systems regulated by the FDEP.

The review team concludes that nonradiological health impacts on workers and the public from operating two new nuclear units and associated transmission lines at the Martin site would be minimal. Impacts associated with traffic accidents during operations at the Martin alternative site were evaluated in Section 5.8.6 and the review team concludes that the impacts would be minimal.

Cumulative Impacts

The past and present project that is within the geographic area of interest that could affect nonradiological human health in a way similar to the building of two nuclear units at the Martin site identified in Table 9-11 is a combined natural-gas/oil and solar power-generating station adjacent to the proposed Martin site, as well as various transportation (roads, traffic, pedestrian) and mining/quarry projects that have occurred and are ongoing throughout the region.

Reasonably foreseeable projects that could affect nonradiological human health in a way similar to the building of two nuclear units at the Martin site identified in Table 9-11 include various transportation (roads, traffic, pedestrian) and mining/quarry projects that are planned throughout the region.

Summary Statement

Impacts on nonradiological health from building and operation of two new units at the Martin site are estimated based in the information provided by FPL and the review team's independent

evaluation. Although some future activities in the geographical area of interest could affect nonradiological health in ways similar to the building and operation of two new units at the Martin site and associated offsite facilities, those impacts would be localized and managed through adherence to existing regulatory requirements. The review team concludes that nonradiological health impacts on workers and the public resulting from the building of two new nuclear units and associated road and transmission lines at the Martin site would be minimal. The review team expects that the nonradiological health impacts on the operations employees and the public of two new nuclear units at the Martin site would be minimal. Finally, the review team concludes that cumulative impacts on nonradiological health from past, present, and reasonably foreseeable actions in the geographic area of interest would be SMALL.

9.3.3.10 Radiological Impacts of Normal Operations

The following impact analysis includes impacts from building activities and operations. The analysis also considers other past, present, and reasonably foreseeable actions that affect radiological health, including other Federal and non-Federal projects listed in Table 9-11. As described in Section 9.3.3, Martin is a fossil-fuel power plant and a solar power plant site; there are currently no nuclear facilities on the site. The geographic area of interest is the area within a 50 mi radius of the Martin site. St. Lucie Units 1 and 2 (i.e., two nuclear power plants) are the only major facilities within this geographic area of interest that potentially affect radiological health. In addition, there are likely to be medical, industrial, and research facilities within 50 mi of the Martin site that use radioactive materials.

The radiological impacts of building and operating the two proposed Westinghouse AP1000 nuclear power units at the Martin site include doses from direct radiation and liquid and gaseous radioactive effluents. These pathways would result in low doses to people and biota offsite that would be well below regulatory limits. These impacts are expected to be similar to those estimated for the Turkey Point site.

The radiological impacts of St. Lucie Units 1 and 2 include doses from direct radiation and liquid and gaseous radioactive effluents. These pathways result in low doses to people and biota offsite that are well below regulatory limits as demonstrated by the ongoing radiological environmental monitoring program conducted around St. Lucie Units 1 and 2. The NRC staff concludes that the dose from direct radiation and effluents from hospitals and industrial facilities that use radioactive material would be an insignificant contribution to the cumulative impact around the Martin site. This conclusion is based on data from the radiological environmental monitoring programs conducted around currently operating nuclear power plants.

Based on the information provided by FPL and the NRC staff's independent analysis, the NRC staff concludes that the cumulative radiological impacts from building and operating the two proposed Westinghouse AP1000 nuclear power units and other existing and planned projects and actions in the geographic area of interest around the Martin site would be SMALL.

9.3.3.11 Postulated Accidents

The following impact analysis includes radiological impacts from postulated accidents from the operation of two nuclear units at the Martin alternative site. The analysis also considers other past, present, and reasonably foreseeable future actions that affect radiological health from

postulated accidents, including other Federal and non-Federal projects and the projects listed in Table 9-11. As described in Section 9.3.3, the Martin site is a brownfield site with existing solar power and fossil-fuel facilities. There are currently no nuclear facilities at the site. The geographic area of interest considers all existing and proposed nuclear power plants that have the potential to increase the probability-weighted consequences (i.e., risks) from a severe accident at any location within 50 mi of the Martin alternative site. Facilities potentially affecting radiological accident risk within this geographic area of interest are the existing two units of St. Lucie Units 1 and 2.

As described in Section 5.11.1, the NRC staff concludes that the environmental consequences of DBAs at the Turkey Point site would be minimal for AP1000 reactors. DBAs are addressed specifically to demonstrate that a reactor design is robust enough to meet NRC safety criteria. The environmental consequences of DBAs depend on the plant design and the atmospheric dispersion. The AP1000 design is independent of site conditions and the differences in meteorology of the Martin alternative and Turkey Point sites are not significant with regard to the conditions that are important to assessing DBAs. Therefore, the NRC staff concludes that the environmental consequences of DBAs at the Martin alternative site would be minimal.

With the lower population density and land-use values for the Martin alternative site, the NRC staff expects the risks from a severe accident for an AP1000 reactor located at the Martin alternative site to be similar to or lower than those analyzed for the proposed Turkey Point site. The risks for the proposed Turkey Point site were presented in Tables 5-19 and 5-20 and are well below the median value for current-generation reactors. In addition, as discussed in Section 5.11.2, estimates of average individual early fatality and latent cancer fatality risks are well below the Commission's safety goals (51 FR 30028) (TN594). For existing plants within the geographic area of interest (St. Lucie Units 1 and 2), the Commission has determined that the probability-weighted consequences of severe accidents are small (10 CFR Part 51, Appendix B, Table B-1) (TN250). On this basis, the NRC staff concludes that the cumulative risks from severe accidents at any location within 50 mi of the Martin alternative site would be SMALL.

9.3.4 Okeechobee 2 Site

This section covers the review team’s evaluation of the potential environmental impacts of siting a new two-unit nuclear power plant at the Okeechobee 2 alternative site in central Florida. The site is located in a rural area in Okeechobee County east of the Kissimmee River and north of Lake Okeechobee. Okeechobee 2 is a greenfield site not currently owned by FPL (2014-TN4058) The location of the Okeechobee 2 site is shown in Figure 9-17.

The Okeechobee site is a 3,000 ac undeveloped greenfield site. The majority of the site is currently used for agriculture and contains a lot of pasture for cattle and dairy farms as well as citrus fields. Topography does not vary considerably over the site (FPL 2014-TN4058).

FPL assumed the facility footprint (Figure 9-18) that would include the power units, support buildings, switchyard, storage areas, stormwater-retention ponds, and other structures would require 362 ac. Building at the Okeechobee site would also require the creation of a transmission line corridor of approximately 38 mi, a 9.3 mi access road (112.3 ac), installation of 3.9 mi of railway (46.6 ac), and an intake/makeup pipeline (22.5 ac). The area permanently affected by these facilities and infrastructure (except the transmission line) is approximately

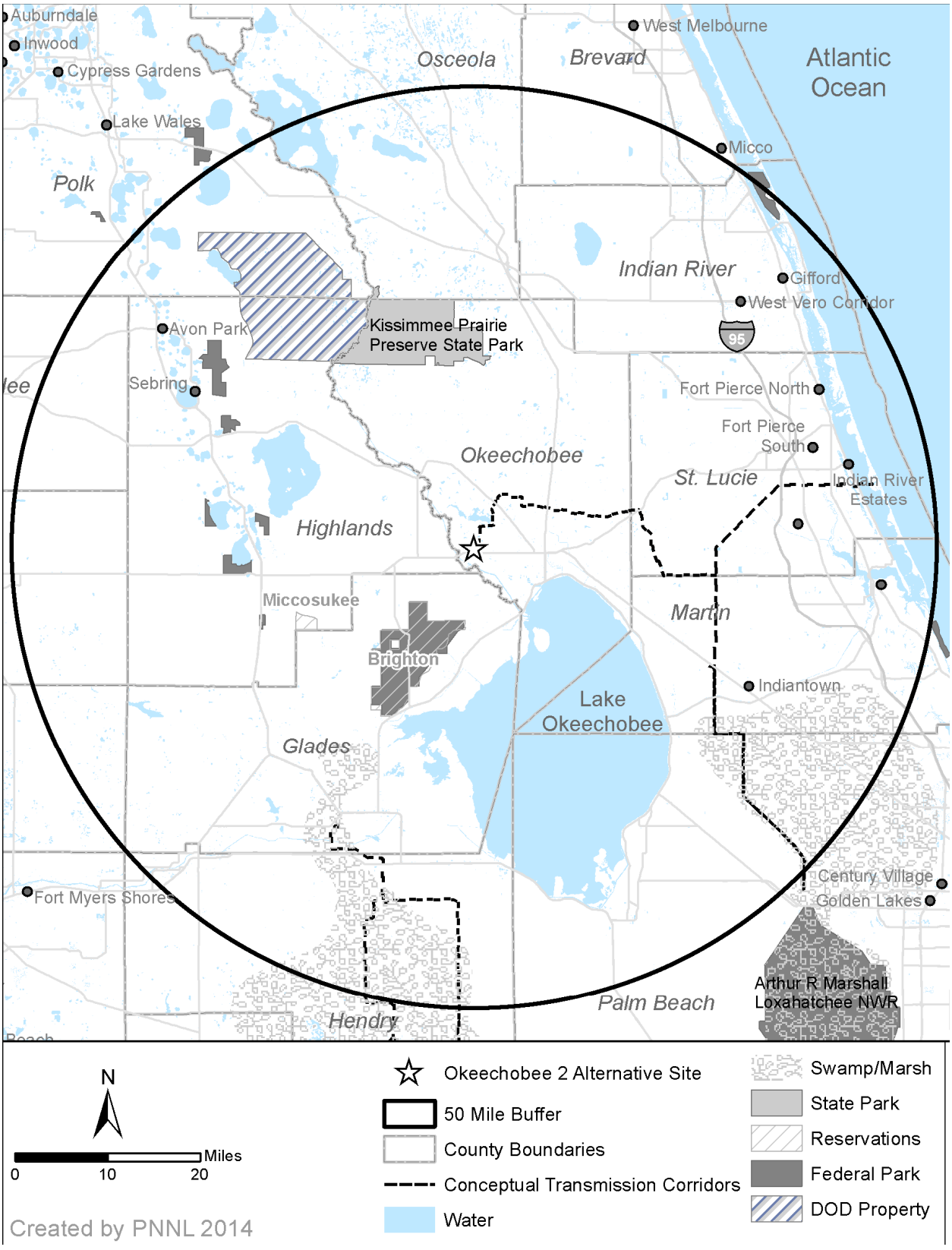

Figure 9-17. Okeechobee 2 Site Region

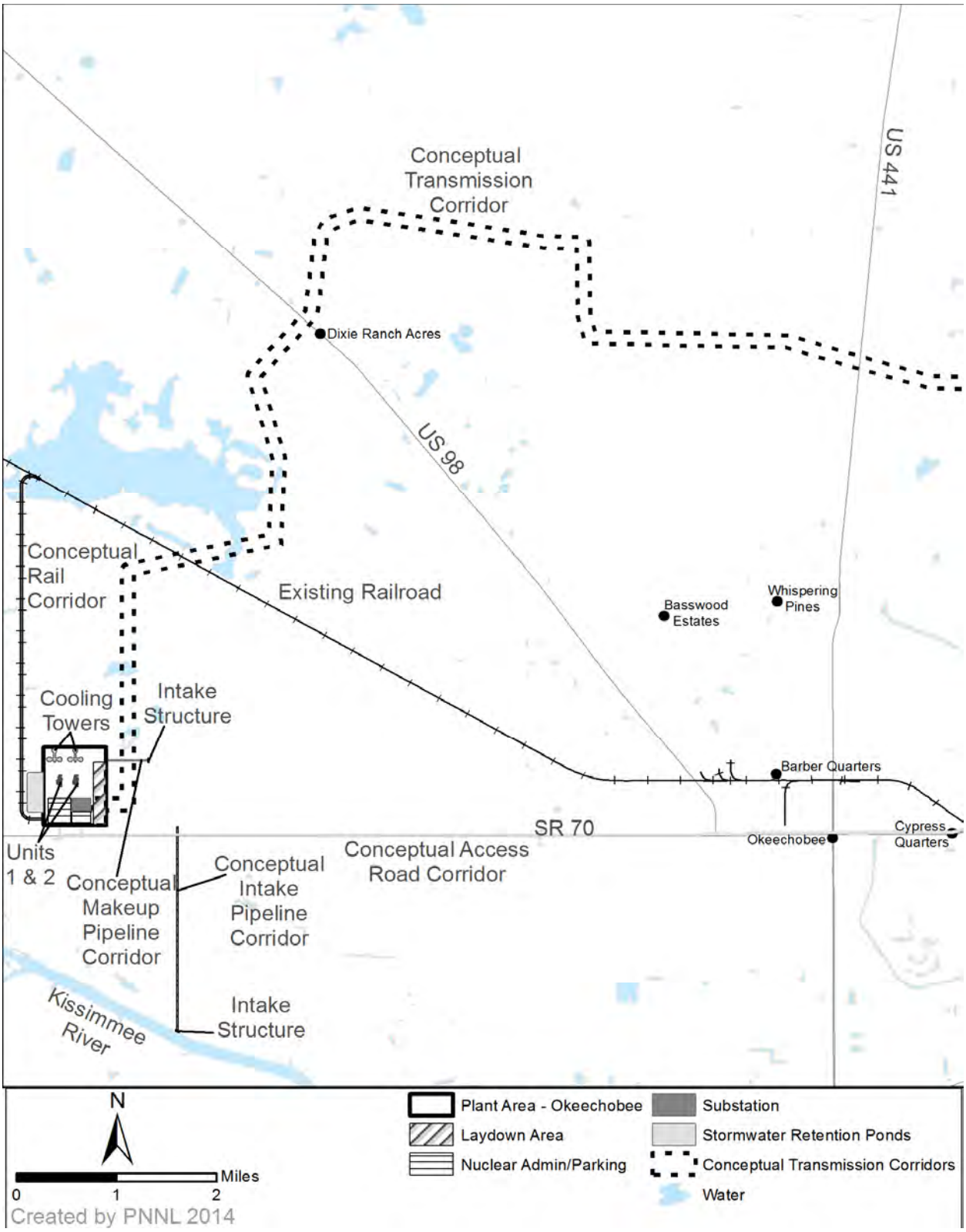

Figure 9-18. Okeechobee 2 Site Footprint

502 ac. The conceptual transmission line corridor would occupy an additional 3,022 ac. Additional area (up to several hundred acres) would be temporarily disturbed for activities such as laydown areas, a batch plant, and for fill and spoil deposition (FPL 2014-TN4058).

As discussed in Section 9.3.1.7, the review team considered an alternative configuration of the cooling system that FPL proposed.

The following sections include a cumulative impact assessment conducted for each major resource area. The specific resources and components that could be affected by the incremental effects of the proposed action if implemented at the Okeechobee 2 site and other actions in the same geographic area were considered. This assessment includes the impacts of NRC-authorized construction and operations and impacts of preconstruction activities. Also included in the assessment are past, present, and reasonably foreseeable future Federal, non-Federal, and private actions that could have meaningful cumulative impacts when considered together with the proposed action if implemented at the Okeechobee 2 site. Other actions and projects considered in this cumulative analysis are described in Table 9-16.

The geographic area of interest for cumulative impacts considers all existing and proposed nuclear power plants that have the potential to increase the probability-weighted consequences (i.e., risks) from a severe accident at any location within 50 mi of the Okeechobee 2 site. An accident at a nuclear plant within 100 mi of the Okeechobee 2 site could increase this risk. The St. Lucie nuclear plant is within 50 mi of the Okeechobee 2 site and is included in Table 9-16. Other nuclear plants in Florida, Alabama, and Georgia are more than 100 mi from the Okeechobee 2 site and are therefore not included in the cumulative impact analysis.

Table 9-16. Past, Present, and Reasonably Foreseeable Projects and Other Actions in the Vicinity of the Okeechobee 2 Site

Project Name	Summary of Project	Location	Status
Energy Projects			
St. Lucie	Two 3,020 MW(t) nuclear power reactors	43 mi E of the Okeechobee alternative site	Operational, Units 1 and 2 underwent license renewal in 2003. Units 1 and 2 completed 320 MW(t) power uprates in 2013 (NRC 2012-TN1668; FPL 2014-TN3360)
West County Energy Center	Three 1,250 MW natural-gas−powered units	50 mi SE of the Okeechobee alternative site	Operational (FDEP 2013-TN2965)
Martin	Approximately 4,300 MW from five units, 3 natural-gas and 2 oil units with a solar thermal facility generating supplemental steam	26 mi SE of the Okeechobee alternative site	Operational (FPL 2016-TN4579)
Indiantown Cogeneration Company	330 MW coal-fired power plant	29 mi SE of the Okeechobee alternative site	Operational (FDEP 2013-TN2967)

Table 9-16. (contd)

Project Name	Summary of Project	Location	Status
Okeelanta Cogeneration Facility	140 MW biomass power-generation facility	47 mi S of the Okeechobee alternative site	Operational (FDEP 2013-TN2968)
FPL pipeline	126 mi pipeline from Sabal Trail's Central Florida Hub to FPL's Martin Clean Energy Center	Throughout region	Proposed, construction set to begin 2016 (FPL 2014-TN2975)
Floridian Natural Gas Storage Company – Natural Gas Storage Facility	Storage of natural gas	29 mi SE of the Okeechobee alternative site	Proposed, FERC Order amending Certificate issued (FERC 2015-TN4599) with associated Environmental Assessment (FERC 2015-TN4600)
Southeastern Renewable Fuels Biorefinery and Cogeneration Plant	30 MW biofuel using leftover sweet sorghum stalk fiber	45 mi S of the Okeechobee alternative site	Proposed, final air permit issued by FDEP in 2010 (FDEP 2010-TN2970)
Treasure Coast Energy Center	300 MW natural-gas–fired power plant	35 mi E of the Okeechobee alternative site	Operational (FMPA 2014-TN3029)
INEOS New Planet Bioenergy Center	6.3 MW bioenergy facility	36 mi NE of the Okeechobee alternative site	Operational (EPA 2014-TN3032)
Okeechobee Landfill Energy	Waste-to-energy facility	16 mi NE of the Okeechobee alternative site	Operational (Waste Management 2014-TN3034)
Mining Projects			
Five Stone Mining	Stone/quarry mining	29 mi SE of the Okeechobee alternative site	Operational (EPA 2013-TN2959)
Daniel Shell Pit, Phase 6	Stone/quarry mining	4 mi SE of the Okeechobee alternative site	Operational (EPA 2013-TN2956)
E R Jahna Industries, Inc. – Ortona Mine	Stone/quarry mining	37 mi SW of the Okeechobee alternative site	Operational (EPA 2013-TN2958)
Florida Rock Industries/Fort Pierce	Stone/quarry mining	25 mi E of the Okeechobee alternative site	Operational (EPA 2014-TN3038)
Hammond Sand Mine	Sand/quarry mining	41 mi NE of the Okeechobee alternative site	Operational (EPA 2014-TN3044)
Various other mine	Stone/quarry mining	Throughout	Operational (FDEP 2010-

Table 9-16. (contd)

Project Name	Summary of Project	Location	Status
and quarry projects		region	TN2966)
Transportation Projects			
Various transportation projects	Road, traffic, pedestrian projects	Throughout region	Ongoing (FDOT 2014-TN4014)
Parks and Aquaculture Facilities			
DuPuis Wildlife and Environmental Area	Activities include bicycling, camping, hunting, fishing, and hiking	27 mi SE of the Okeechobee alternative site	Development likely limited within this area (FFWCC 2014-TN2977)
Okeechobee Battlefield State Park	Hiking, camping	9 mi SE of the Okeechobee alternative site	Development likely limited within this area (FDEP 2010-TN2971)
Archbold Biological Station	Ecological research station and preserve, organization owns and protects a 5,193 ac globally significant Florida scrub preserve located on the southern end of the Lake Wales Ridge	26 mi SW of the Okeechobee alternative site	Development likely limited within this area (Archbold Biological Station 2014-TN2954)
Lake Okeechobee	730 mi^2 freshwater lake, restoration and protection plan	7-37 mi S and SW of the Okeechobee alternative site	Ongoing, Florida Legislature in 2007 expanded the Lake Okeechobee Protection Act (SFWMD 2014-TN2988)
Savannas Preserve State Park	Activities include bicycling, boating, horseback riding, picnicking, fishing, and hiking	38 mi E of the Okeechobee alternative site	Development likely limited within this area (Florida State Parks 2014-TN3050)
Fort Pierce Inlet State Park	Activities include bicycling, camping, boating, swimming, picnicking, fishing, and hiking	41 mi NE of the Okeechobee alternative site	Development likely limited within this area (Florida State Parks 2014-TN3053)
Pepper Beach State Recreation Area	Activities include swimming, picnicking, fishing, and hiking	41 mi NE of the Okeechobee alternative site	Development likely limited within this area (St. Lucie County 2014-TN3054)
St. Sebastian River Preserve State Park	Activities include bicycling, camping, boating, picnicking, fishing, and hiking	42 mi NE of the Okeechobee alternative site	Development likely limited within this area (Florida State Parks 2014-TN3055)
Hobe Sound National Wildlife	Activities include fishing, and hiking	49 mi NE of the Okeechobee	Development likely limited within this area (FWS 2013-

Table 9-16. (contd)

Project Name	Summary of Project	Location	Status
Refuge		alternative site	TN3056)
Kissimmee Prairie Preserve State Park	Activities include bicycling, horseback riding, camping, wildlife viewing, and hiking	21 mi NW of the Okeechobee alternative site	Development likely limited within this area (Florida State Parks 2014-TN3196)
Other State nature preserves and wildlife management areas	Public recreational activities	Throughout region	Development likely limited within these areas (FFWCC 2014-TN2981)
Everglades Ecosystem Restoration and/or Comprehensive Everglades Restoration Plan Projects (DOI 2016-TN4589)			
Indian River Lagoon -South	Project purpose is to improve surface-water management in the C-23/C-24, C-25, and C-44 basins for habitat improvement in the Saint Lucie River Estuary and southern portions of the Indian River Lagoon.	41 mi NE of the Okeechobee alternative site	Proposed, project in preconstruction, engineering and design phase (USACE and SFWMD 2014-TN3013)
Everglades Agricultural Area Storage Reservoirs	The purpose of this project is to improve the timing of environmental deliveries to the Water Conservation Areas, including reducing damaging flood releases from the Everglades Agricultural Area to the Water Conservation Areas.	Throughout region	Proposed, Final Project Implementation Report submitted 2012 (USACE and SFWMD 2014-TN3011)
Lake Okeechobee Aquifer Storage and Recovery	A series of aquifer storage and recovery wells adjacent to Lake Okeechobee	6 mi SE of the Okeechobee alternative site	Proposed, project in preconstruction, engineering and design phase (USACE and SFWMD 2014-TN3014)
Lake Okeechobee Watershed Project	Project to increase aquatic and wildlife habitat, regulate extreme highs and lows in lake staging, reduce phosphorus loading, and reduce damaging releases to the	Throughout Okeechobee County	Proposed, project in preconstruction, engineering and design phase (USACE and SFWMD 2014-TN3015)

Table 9-16. (contd)

Project Name	Summary of Project	Location	Status
	surrounding estuaries		
Melaleuca eradication and other exotic plants	The project includes (1) upgrading and retrofitting the current quarantine facility in Gainesville, and (2) large-scale rearing of approved biological control organisms for release at multiple sites within the South Florida ecosystem to control Melaleuca, Brazilian pepper, Australian pine, and Old World climbing fern.	Throughout region	Operational, facility completed in 2013 (USACE and SFWMD 2014-TN3020)
Palm Beach County Agriculture Reserve Aquifer Storage and Recovery	Supplement water supplies for central and southern Palm Beach County by capturing and storing excess water currently discharged to the Lake Worth Lagoon.	35 mi SE of the Okeechobee alternative site	Proposed, project in preconstruction, engineering and design phase (USACE and SFWMD 2014-TN3019)
Herbert Hoover Dike Major Rehabilitation Project	Rehabilitation Project and Dam Safety Modification Study	3-40 mi S of the Okeechobee alternative site	Proposed – Environmental Assessment and FONSI issued in 2015 (USACE 2015-TN4598) Draft Environmental Report issued (DOI 2016-TN4589)
Comprehensive Shoreline Stabilization Project in Palm Beach County	Discharge fill for the purpose of shoreline stabilization	Shoreline of Palm Beach County	USACE submitted Notice of Intent in 2013 (78 FR 40128) (TN3059); EIS completed (CB&I 2014-TN4015)
Kissimmee River Restoration	When restoration is completed in 2017, more than 40 mi^2 of river-floodplain ecosystem will be restored, including almost 20,000 ac of wetlands and 44 mi of historic river channel.	Along Kissimmee River	Ongoing (USACE 2014-TN3061; DOI 2016-TN4589)
Other Actions/Projects			
Atlantic Sugar Association	Sugar manufacturing	41 mi SE of the Okeechobee alternative site	Operational (FDEP 2013-TN2964)

Table 9-16. (contd)

Project Name	Summary of Project	Location	Status
Southern Gardens Citrus Processing Corp.	Food production/distribution	37 mi S of the Okeechobee alternative site	Operational (FDEP 2013-TN2969)
United States Sugar Corporation Clewiston	Sugar manufacturing	35 mi S of the Okeechobee alternative site	Operational (EPA 2014-TN2963)
Harbor Branch Oceanographic Institute	Oceanic Science and Research	41 mi NE of the Okeechobee alternative site	Operational (EPA 2014-TN3071)
Pratt & Whitney	Aircraft engine and engine parts manufacturing	45 mi SE of the Okeechobee alternative site	Operational (EPA 2014-TN3062)
Maverick Boat Company	Fiberglass boat manufacturing	39 mi NE of the Okeechobee alternative site	Operational (EPA 2014-TN3063)
Tropicana Products, Inc.	Citrus and animal feed	34 mi NE of the Okeechobee alternative site	Operational (EPA 2014-TN3068)
S2 Yachts, Inc.	Fiberglass boat manufacturing	39 mi NE of the Okeechobee alternative site	Operational (EPA 2013-TN3069)
Twin Vee, Inc.	Fiberglass boat manufacturing	39 mi NE of the Okeechobee alternative site	Operational (EPA 2013-TN3070)
Avon Park Air Force Range	Military training facility	25 mi NW of the Okeechobee alternative site	Operational (APAFR 2014-TN3195)
Various wastewater-treatment plant facilities	Sewage treatment	Throughout region	Operational
Various hospitals using nuclear material	Medical and other industrial isotopes	Throughout region	Ongoing
Various water/ flood-management projects	Water and flood management	Throughout region	Ongoing (USACE 2012-TN1133)
Future urbanization	Construction of housing units and associated commercial buildings; roads, bridges, and rail; construction of water- and/or wastewater-treatment and distribution facilities and associated	Throughout region	Construction would occur in the future, as described in State and local land-use planning documents

Table 9-16. (contd)

Project Name	Summary of Project	Location	Status
	pipelines, as described in local land-use planning documents.		

9.3.4.1 Land Use

The following analysis includes land-use impacts from building activities and operations. The analysis also considers other past, present, and reasonably foreseeable future actions that affect land use, including other Federal and non-Federal projects listed in Table 9-16. For the analysis of land-use impacts at the Okeechobee 2 site and the area within the transmission line corridors, the review team determined that a 10 mi radius, similar to that used for the proposed Turkey Point plant site, would encompass an effective geographic area of interest for cumulative impact assessment for land use. It would include the site and associated facilities and the city of Okeechobee 8 mi to the east. In evaluating the land-use impacts of using the Okeechobee 2 site, the review team used in addition to the project application, readily obtainable data from the Internet or published sources, including aerial photographs of the site and vicinity, USDA soils information, local zoning and planning documents, and FLUCFCS data. Impacts from both building and station operation are discussed.

Building and Operation Impacts

Okeechobee County is a rural county, largely devoted to agriculture and other rural land uses. Existing land uses in the vicinity of the Okeechobee 2 alternative site consist predominantly of agriculture. The nearest community is Okeechobee (2004 population under 5,500) (Okeechobee 2011-TN3308), the county seat of Okeechobee County, and the only incorporated city in Okeechobee County. The larger region is primarily devoted to agriculture, with scattered small rural communities. The closest population center with more than 25,000 population is Port St. Lucie, 80 mi to the east. The Okeechobee 2 alternative site is located approximately 2 mi east of the Kissimmee River and 7.6 mi northwest of Lake Okeechobee (Okeechobee 2011-TN3308).

Existing land uses at the Okeechobee 2 site consist of agriculture (FPL 2014-TN4058). No commercial mineral resources are identified in the site and vicinity (Calver 1956-TN3752; Spencer 1993-TN3753). No substantial areas of developed land uses occur on or within the vicinity of the site. Recreational areas, including the River Bluff Recreational Vehicle and Fishing Resort, are located to the west along the Kissimmee River. The Okeechobee County Comprehensive Plan identifies future land use on the FLUM (Okeechobee County 2012-TN3347) at and in the vicinity of the Okeechobee 2 alternative site as “Rural Estate” (1 unit per 5 ac) south of SR-70 and “Agriculture” north of SR-70.

A Rural Activity Center, the River Oaks Rural Activity Center, is identified on the Okeechobee County FLUM near the Okeechobee alternative site. The Okeechobee County Comprehensive Plan Future Land Use Element defines a Rural Activity Center as follows (Okeechobee County 2009-TN3348):

> Policy L1.4: **Rural Activity Center**: Rural Activity Centers accommodate low densities of development outside of the Urban Residential Mixed Use area. Public supply water and sewer facilities generally are not available, nor are they anticipated to be available during the planning period. Where appropriate or required, however, a developer may provide a package treatment plant or otherwise provide for adequate public supply potable water and sewage facilities. A Rural Activity Center generally acknowledges existing communities or subdivisions, and provides decentralized job creation and economic opportunities. A rural activity center can provide for self-supporting communities so as to reduce dependence on the one existing urban area in the County for all employment opportunities and goods and services. Accordingly, Rural Activity Centers allow for existing and future agricultural and residential uses, as well as for recreational, public, neighborhood commercial and light industrial uses that support or complement agricultural uses or residential and community development and that provide employment or economic opportunities. Specific locations of Rural Activity Centers are shown on the Future Land Use Map series and are intended to separate urban from non-urban uses. Additional Rural Activity Centers shall require an amendment to the Future Land Use Map series. The land uses and intensities of development permissible within a Rural Activity Center must meet the requirements of concurrency.
>
> A Rural Activity Center provides for agricultural, recreational, residential, neighborhood commercial and certain light industrial uses, subject to compatibility and buffering criteria provided in local land development regulations. Neighborhood commercial uses and, where permissible, light industrial uses, shall constitute no more than the greater of 30 acres or 5 percent of the total area of a Rural Activity Center; shall not exceed a floor area ratio of 1.0; and shall not exceed impervious surface coverage of 70 percent. Subject to density and intensity criteria as established by this Policy.

The Okeechobee County Comprehensive Plan provides for the following for the River Oaks Rural Activity Center:

> **River Oaks (J):** Residential development not to exceed a density of 1 unit per gross acre, agricultural, recreational and public uses.

The River Oaks Rural Activity Center would encompass the existing River Oaks development, through which roadways associated with the Okeechobee 2 alternative site would run, and for that reason, use of the Okeechobee 2 alternative site for a power plant may not be compatible with the Okeechobee County FLUM. For the other areas designated for rural residential land uses in the vicinity of the alternative site, the power plant use could be compatible, based on site design, but would represent a change in land use for the site and vicinity.

None of the soils on the plant site are considered by USDA to be Prime farmlands (USDA 2014-TN3349). Most of the soils in the vicinity of the plant site are not considered by USDA to be Prime farmlands, but small areas of soils in the vicinity are considered to be Unique farmlands

(USDA 2014-TN3350). Unique farmland is defined in Section 2(c) of the Farmland Protection Policy Act (7 U.S.C. § 4201 et seq.) (TN708) as "land, other than Prime farmland, that has combined conditions to produce sustained high quality and high yields of specialty crops, such as citrus, nuts, fruits, and vegetables when properly managed." Therefore, no Prime farmland soils and only a minimal amount of Unique farmland soils would be lost. No part of the site or vicinity falls within the Coastal Zone (FPL 2014-TN4058). As FPL states in its ER (FPL 2014-TN4058) and as shown on the Okeechobee County FIRM map Panel 175 of 275 dated February 4, 1981, portions of the plant site fall within the 100-year flood zone, and as FPL states in its ER (FPL 2014-TN4058) some areas would require unspecified amounts of fill.

Building and operation of the project at the Okeechobee 2 alternative site would result in the conversion of existing land uses, including approximately 149 ac from agriculture (on non-Prime farmlands) to power-generation uses as shown in Table 9-17 below. The new plant would also convert approximately 354 ac of other undeveloped lands to power-generation use. Roadways would run through approximately 40 ac of existing developed lands associated with the existing River Oaks housing and airport development (AirNav 2014-TN3309). The total land conversion on the site would be approximately 543 ac.

Table 9-17. Okeechobee 2 Alternative Site Land-Use Impacts (acres)

	Agricultural Lands (FLUCFCS 200 Land Use Series)	Urban Developed Lands (other than roads and pipelines)	Other Non-Agricultural Lands (all other FLUCFCS designations)	Total
Plant Site	45	0	275	320
Access Roads	50	40	22	112
Rail Corridor	35	0	12	47
Intake Pipeline Corridor	16	0	2	19
Makeup Pipeline Corridor	3	0	0.4	4
Stormwater-Retention Ponds	0	0	42	42
Total[(a)]	149	40	354	543
Transmission Line Corridor	2,431	0	592	3,022
Grand Total	2,580	40	945	3,566

(a) Totals may not add due to rounding

Sources: FPL 2011-TN59 and FPL 2014-TN4058

Additional land-use impacts include possible additional growth and land conversions in the vicinity to accommodate new workers and services (induced development). Because the workforce would be dispersed over larger geographic areas in the labor supply region, the impacts from land conversion for residential and commercial buildings induced by new workers relocating to the local area can be absorbed in the wider region. Therefore, the review team concludes that such impacts would be minimal.

Approximately 38 mi of new transmission lines would have to be built to serve the plant. FPL states in its application (FPL 2014-TN4058) that some of the transmission lines would pass through the Coastal Zone. Approximately 3,022 ac of land would be at least temporarily affected. Of this land, approximately 2,431 ac are agricultural land, and the remainder is

primarily open lands and roadways. The agricultural land within the transmission line corridors would be converted from agricultural use to transmission line use, although FPL states in its ER (FPL 2014-TN4058) that agriculture could continue within and along the transmission line rights-of-way.

Under the Florida Site Certification Application process explained in Chapter 4.1, the State approves a corridor and the applicant chooses a specific right-of-way within the approved corridor. The objective of this process, as stated in the electrical power plant and transmission line statute (Fla. Stat. 29-403.501 2011-TN1068) is "that the location of transmission line corridors and the construction, operation, and maintenance of electric transmission lines produce minimal adverse effects on the environment and public health, safety, and welfare" and "to fully balance the need for transmission lines with the broad interests of the public in order to effect a reasonable balance between the need for the facility as a means of providing reliable, economical, and efficient electric energy and the impact on the public and the environment resulting from the location of the transmission line corridor and the construction, operation, and maintenance of the transmission lines." FPL states in its application that, in its development of the conceptual transmission line corridor for the Okeechobee 2 alternative site, it attempted to select corridors that would allow collocation with existing transmission line corridors and avoided populated areas or residential land uses to some extent (FPL 2014-TN4058). The State certification review process also includes a determination of land-use consistency with local land-use plans and zoning ordinances (Fla. Stat. 29-403.50665-TN1470).

The review team concludes that the land-use impacts from building and operating two new nuclear units at the Okeechobee 2 alternative site would noticeably change the predominantly rural and agricultural character of the surrounding landscape and potentially result in conflicts with nearby rural residential and recreational areas, especially those associated with the River Oaks Rural Activity Center.

Cumulative Impacts

The review team expects that the principal contribution to cumulative land-use impacts in the geographic area of interest defined for the Okeechobee 2 site would be from the two subject nuclear units. There are no other reasonably foreseeable projects in the geographic area of interest with the potential to substantially contribute to cumulative land-use impacts. The Okeechobee County FLUM designates the land surrounding the Okeechobee 2 site for activities typical of rural areas. Other linear projects are proposed for lands near the proposed conceptual corridors for the transmission lines, including the Florida Gas Transmission Phase VIII Expansion Project. However, the review team expects that these corridors would have only a minimal cumulative land-use impact.

Summary Statement

Based on the information provided by FPL and the review team's independent review, the review team concludes that the cumulative land-use impacts of building and operating the power plant at the Okeechobee 2 alternative site would be MODERATE. This conclusion primarily reflects the fact that plans do not call for large-scale establishment of industrial or urban land uses in the area surrounding the Okeechobee 2 site. Building and operating the

proposed nuclear units at the Okeechobee 2 site would be a significant, and the principal, contributor to these impacts.

9.3.4.2 Water Use and Quality

The following impact analysis includes impacts from building and operating two new nuclear units at the Okeechobee 2 site. The analysis also considers other past, present, and reasonably foreseeable future actions that affect water use and quality, including the other Federal and non-Federal projects listed in Table 9-16. The Okeechobee 2 site is located in rural Okeechobee County in Florida near the Kissimmee River, which flows into Lake Okeechobee.

The geographic area of interest for surface water at the Okeechobee 2 site is the Kissimmee-Okeechobee-Everglades watershed because this is the resource that would be affected if the proposed project were located at the Okeechobee 2 site. The Kissimmee-Okeechobee-Everglades watershed includes an area of about 9,000 mi^2 (McPherson and Halley 1996-TN98). For groundwater, the ROI includes (1) the surficial aquifer and the Upper Floridan aquifer at the site, (2) the APPZ of the Middle Floridan aquifer upgradient and downgradient of the site for water withdrawals, and (3) and the Boulder Zone of the Lower Floridan aquifer upgradient and downgradient of the site for disposal of blowdown water.

Building Impacts

Water use for building activities at the Okeechobee 2 site would be comparable to proposed water use for building activities for the Turkey Point site. During building, the peak water use is estimated to be 565 gpm (0.8 Mgd) (see Table 3-4). The review team assumes that water for building the two units at the Okeechobee 2 site would come from a combination of surface water and groundwater. Surface water from the Kissimmee River may be available for building purposes during times of high river flows. The peak water-use rate of 0.8 Mgd during the building phase is inconsequential when compared to the historic average monthly flow in the Kissimmee River; the water use rate is less than 1 percent of the river discharge for even the lowest month reported (January 1963). Surface water from onsite stormwater ponds and groundwater from excavation dewatering may also be used, when available, for building purposes. Groundwater from the surficial aquifer would be used for building purposes when excess surface water is not available. The SFWMD would regulate any use of surface or shallow groundwater for plant construction.

The review team concludes that the impact of using surface-water and groundwater for building the proposed units at the Okeechobee 2 site would be minimal for the following reasons:

- Withdrawal is inconsequential compared to the water resources in the Lake Okeechobee watershed.
- Any use of surface water or shallow groundwater would be regulated by SFWMD and limited to time periods when there would not be a negative impact on the Lake Okeechobee system or shallow aquifers.
- Water use for building would be limited to the building period and the peak use of 0.8 Mgd is much less than the average 46.51 Mgd groundwater withdrawal rate reported for Okeechobee County in 2005 (Marella 2009-TN1521).

The review team assumes that the impact of dewatering the excavations needed for building two units at the site would be managed through the installation of diaphragm walls and grouting as proposed for the Turkey Point site. Therefore, because groundwater withdrawal caused by dewatering would be controlled, the review team determined that there would be little or no impact on groundwater resources.

Surface-water quality would potentially be affected by surface-water stormwater runoff during site preparation and the building of the facilities. The FDEP would require FPL to develop an erosion and sediment control plan before initiation of site-disturbance activities (SWPPP) (FPL 2014-TN4058).

The plans would identify BMPs to control the impacts on surface-water quality caused by stormwater runoff. The review team anticipates that FPL would construct new detention/infiltration ponds and drainage ditches to control delivery of sediment from the disturbed area to onsite waterbodies. Sediment carried with stormwater from the disturbed area would settle in the detention ponds and the stormwater would infiltrate into the shallow aquifer. Implementation of BMPs should minimize impacts on surface waterbodies near the Okeechobee 2 site. Therefore, the surface-water−quality impacts near the Okeechobee 2 site would be temporary and minimal.

While building new nuclear units at the Okeechobee 2 site, groundwater quality may be affected by leaching of spilled effluents into the subsurface. The review team assumes that the BMPs FPL has proposed for the Turkey Point site would be in place during building activities and therefore the review team concludes that any spills would be quickly detected and remediated. In addition, groundwater impacts would be limited to the duration of these activities, and therefore, would be temporary. The review team reviewed the general BMPs that could be expected to be required at such a site (State of Florida 2014-TN3637). Because any spills related to building activities would be quickly remediated under BMPs, and the activities would be temporary, the review team concludes that the groundwater-quality impacts on the surficial aquifer from building at the Okeechobee 2 site would be minimal.

Wastewater streams from building activities could be injected into the Boulder Zone of the Lower Floridan aquifer as planned at Turkey Point (FPL 2014-TN4058). Construction and operation of the disposal wells would be performed under the conditions of a UIC permit issued by the FDEP, with the objective of protecting water quality within the APPZ and overlying aquifers.

Operations Impacts

FPL (2014-TN4058) indicates that the water needed to operate two units would be approximately 50,000 gpm or 72.7 Mgd. As indicated in Chapter 3, evaporative losses from cooling two units would be approximately 28,800 gpm (41.5 Mgd).

The review team assumed that the two units at the Okeechobee 2 site would primarily use brackish groundwater from the APPZ within the Avon Park formation for makeup cooling water. This relatively permeable zone is considered part of the Middle Floridan aquifer and is more than 1,000 ft below the ground surface near the Okeechobee 2 site. The SFWMD has informed the NRC that consumptive use of surface water from Lake Okeechobee or its tributaries would be limited (SFWMD 2012-TN3814). Use of water from the Lake Okeechobee or the Kissimmee

River would also have to avoid any negative impact on restoration projects including the Kissimmee River Restoration Project. Surface water could potentially be used only at times of excess surface-water flow that typically occur during the wet season.

The APPZ aquifer is not generally used because of the salinity of its water (FPL 2013-TN3052). Therefore, current impacts of using this water for power production are minor. Because brackish or saline groundwater is not in demand, use of this resource would not result in water-use conflicts. However, groundwater in the Middle Floridan aquifer at this site is a potential source of brackish water for desalinization. If demand for desalinization source water increases, water for the plant may be obtained from deeper, more saline formations.

Blowdown discharge and other wastewater streams would be pumped into the Boulder Zone of the Lower Floridan aquifer. The Boulder Zone is isolated from the APPZ by low-permeability units. Additional low-permeability confining units separate the APPZ from the overlying Upper Floridan aquifer. Construction and operation of the disposal wells would be performed under the conditions of a UIC permit issued by the FDEP.

As indicated in Chapter 3, the consumptive water use due to evaporative losses from cooling two units would be approximately 28,800 gpm (41.5 Mgd). However, the review team assumed that surface water would only be consumed during periods of excess flow, thereby precluding water-use conflicts.

During the operation of two new nuclear units at the Okeechobee 2 site, impacts on surface-water quality would be minimal because wastes would be injected into the Boulder Zone and not released to the surface water. FPL has also indicated it would capture rainfall runoff to use in the cooling-water system (FPL 2013-TN3052), thereby minimizing the amount of discharge to surface water from stormwater runoff. The FDEP would require FPL to develop a SWPPP (FPL 2014-TN4058). These plans would identify measures to be used to control stormwater runoff. All discharges to surface waterbodies would be required to comply with limits established by FDEP in a NPDES permit.

During the operation of the two units at the Okeechobee 2 site, impacts on groundwater quality could result from potential spills. Spills that might affect the quality of groundwater would be prevented and mitigated by BMPs. Like the proposed site, any wastewater at this inland alternative site would be combined with cooling-tower blowdown and discharged into the Boulder Zone with no loss of beneficial uses of the water resource.

Cumulative Impacts

In addition to water-use and water-quality impacts from building and operations activities, cumulative analysis considers past, present, and reasonably foreseeable future actions that affect the same water resources.

For the cumulative analysis of impacts on surface water and groundwater at the Okeechobee 2 site, the geographic area of interest is the same as what was considered for building and operational impacts, and was defined earlier in this section.

Actions that have past, present, and future potential impacts on water supply and water quality near the Okeechobee 2 site include existing agriculture and existing and future urbanization in the region.

Cumulative Impacts on Water Use

The impacts of the other projects listed in Table 9-16 are considered in the analysis included above or would have little or no adverse impact on surface-water use. The projects believed to have little impact are excluded from the analysis either because they are too distant from the Okeechobee 2 site, use relatively little or no surface water, or have little or no discharge to surface water. Some projects (for example park and forest management) are ongoing, and changes in their operations that would have large impacts on surface-water use appear unlikely.

In 2000, the Florida Legislature passed the Lake Okeechobee Protection Act to establish a restoration and protection program for the lake (SFWMD et al. 2011-TN3087; SFWMD 2010-TN3086). Part of the focus of this act was to restore the natural hydrology of the system after years of altering the natural drainage around the lake to permit development of the land and to reduce flood damage. The State of Florida and the Federal government are spending hundreds of millions of dollars to restore the Lake Okeechobee and other water resources in the watershed; therefore, the review team concluded that the cumulative impact on surface-water use would be MODERATE.

Surface-water use during the building and operation of two units at the Okeechobee 2 site would consist of occasional water use for building and operations. As discussed above, surface water would only be withdrawn during periods of excess flow, such as storm runoff. Therefore, the review team concluded that building and operating the proposed units at the Okeechobee 2 site would not be a significant contributor to the MODERATE impacts on surface-water use.

As stated above, the review team assumed that any use of shallow groundwater to build the units at the Okeechobee 2 site would be regulated by the SFWMD. If this source is not available in sufficient quantity for building activities, brackish groundwater from the APPZ could be used for some building activities. Groundwater impacts from dewatering would be controlled with diaphragm walls and grouting. Brackish groundwater from the APPZ would be used to operate the plant except when excess surface water is available. The APPZ aquifer is not generally used because of the salinity of its water (FPL 2013-TN3052). Because brackish or saline groundwater is not in demand, use of this resource would not result in water-use conflicts.

The impacts of the other projects listed in Table 9-16 are considered elsewhere in this analysis or else would have little or no adverse impact on groundwater use. The projects believed to have little impact are excluded from the analysis either because they are too distant from the Okeechobee 2 site, or use relatively little or no groundwater. Some projects (for example park and forest management) are ongoing, and changes in their operations that would have large impacts on groundwater use appear unlikely. Therefore, the review team concludes that cumulative impacts on groundwater use would be SMALL.

Cumulative Impacts on Water Quality

Point and non-point discharges have affected the surface-water quality of the Lake Okeechobee watershed and the Kissimmee River upstream and downstream of the site. Water-quality information presented above for the impacts of building and operating the proposed new units at the Okeechobee 2 site would also apply to evaluation of cumulative impacts. The Kissimmee River appears on Florida's list of impaired waters because of the presence of nutrients, fecal coliform, depressed dissolved oxygen, copper, and mercury in fish tissue (FDEP 2014-TN4139). Lake Okeechobee has been the target of extensive efforts to reduce nutrient loading and improve water quality (SFWMD et al. 2011-TN3087). Therefore, the review team concluded that the cumulative impact on surface-water quality of the receiving waterbody would be MODERATE. During the operation of two new nuclear units at the Okeechobee 2 site, impacts on surface-water quality from the units would be minimal because plant discharges would be injected into the Boulder Zone and not released to the surface water. The State of Florida requires an applicant to develop a SWPPP (FPL 2014-TN4058) and all discharges to surface waterbodies would be required to comply with limits established by FDEP in a NPDES permit. Such permits are designed to protect water quality. The SWPPP would identify measures to be used to control stormwater runoff (FPL 2014-TN4058).

The review team concluded that building and operating the proposed units at the Okeechobee 2 site would not be a significant contributor to the MODERATE impacts on surface-water quality, because industrial and wastewater discharges from the proposed units would be discharged directly to the Boulder Zone and any stormwater runoff from the site during operations would be managed in compliance with the SWPPP (FPL 2014-TN4058).

The APPZ aquifer is not generally used due to the salinity of the water (FPL 2013-TN3052). Because brackish or saline groundwater is not in demand, use of this resource would not result in water-use conflicts. The review team also concludes that with the implementation of BMPs, the impacts on shallow groundwater quality from building and operating two new nuclear units at the Okeechobee 2 site would likely be minimal. Therefore, the cumulative impact on groundwater quality would be SMALL. The impacts of other projects listed in Table 9-16 are either considered in the analysis included above or would have little or no impact on surface-water and groundwater quality.

9.3.4.3 Terrestrial and Wetland Resources

The following section addresses potential impacts on terrestrial resources from siting two new nuclear units on the Okeechobee 2 site and a conceptual transmission line corridor. A new corridor would have to be built crossing Okeechobee and St. Lucie Counties and would tie into an existing corridor that crosses Martin and Palm Beach Counties. Most of the Okeechobee 2 site has been disturbed and is primarily used for pasture. Primary land-cover classes include improved pasture, unimproved pasture, woodland pasture, wet prairie, freshwater marsh, mixed wetland hardwoods, and citrus groves. These major land-cover classes compose most of the proposed footprint for the plant, access road, rail corridor, and pipeline corridor as well as most of the new portion of the conceptual transmission line corridor (FPL 2011-TN59).

Information from the FWS indicates Okeechobee County hosts 11 terrestrial species listed as Federally endangered or threatened. Additional listed species occur in St. Lucie, Martin, and

Palm Beach Counties through which the transmission line would pass. Surveys were not conducted at the Okeechobee 2 site or within conceptual transmission line corridors to determine the presence and distribution of listed species. To develop Table 9-18, the review team determined the likelihood of occurrence of listed species based on the habitat preferences of each species and the land-cover types expected. Habitat preferences for Audubon's crested caracara, the Florida grasshopper sparrow, Everglade snail kite, Florida scrub jay, ivory-billed woodpecker, red-cockaded woodpecker, wood stork, whooping crane, Florida panther, and eastern indigo snake were discussed in the Glades alternative site section. Therefore only Florida bonneted bat (*Eumpos floridanus*) habitat preferences are discussed below.

Table 9-18. Federally Listed Terrestrial Species that May Occur on the Okeechobee 2 Site or within the Conceptual Transmission Line Corridor

Scientific Name	Common Name	Federal Status
Birds		
Polyborus plancus audubonii	Audubon's crested caracara	Threatened
Ammodramus savannarum floridanus	Florida grasshopper sparrow	Endangered
Rostrhamus sociabilis plumbeus	Everglade snail kite	Endangered
Aphelocoma coerulescens	Florida scrub jay	Threatened
Campephilus principalis	Ivory-billed woodpecker	Endangered
Picoides borealis	Red-cockaded woodpecker	Endangered
Mycteria americana	Wood stork	Threatened
Grus americana	Whooping crane	Endangered
Dendroica kirdlandii	Kirtland's warbler[(a)]	Endangered
Charadrius melodus	Piping plover[(a)]	Threatened
Calidris canutus rufa	Red knot[(a)]	Threatened
Mammals		
Eumops floridanus	Florida bonneted bat	Endangered
Puma concolor coryi	Florida panther	Endangered
Peromyscus polionotus niveiventris	Southeastern beach mouse[(a)]	Threatened
Reptiles		
Drymarchon corais couperi	Eastern indigo snake	Threatened
Invertebrates		
Cyclargus thomasi bethunebakeri	Miami blue[(a)]	Endangered
Strymon acis bartrami	Bartram's scrub-hairstreak[(a)]	Endangered
Anaea troglodyte floridalis	Florida leafwing[(a)]	Endangered
Plants		
Jacquemontia reclinata	Beach jacquemontia[(a)]	Endangered
Asimina tetramera	Four-petal pawpaw[(a)]	Endangered
Cucurbita okeechobeensis ssp. okeechobeensis	Okeechobee gourd[(a)]	Endangered
Polygala smallii	Tiny polygala[(a)]	Endangered
Cladonia perforata	Florida perforate cladonia[(a)]	Endangered

(a) Additional listed species occurring in Palm Beach County (FWS 2014-TN3759).

Relatively little is known about habitat preferences of the Florida bonneted bat. This bat species roosts in both natural and artificial structures including hollow trees, palm leaves, rock crevices, and artificial bat houses (78 FR 61004) (TN2659). They forage for flying insects high over freshwater wetlands, streams, and ponds. They are generally associated with pinelands, but have been observed in forested, suburban, and urban landscapes in South Florida.

Recreationally important species observed on the nearby Kissimmee River Public Use Area and expected to occur on the Okeechobee 2 site include white-tailed deer, feral hog, raccoon, turkey, opossum (*Didelphis virginiana*), gray squirrel (*Sciurus carolinensis*), armadillo (*Dasypus novemcinctus*), beaver (*Castor canadensis*), coyote, bobcat, mourning dove, and bobwhite quail (FFWCC 2014-TN3004). Numerous waterfowl species would also be expected to occur in suitable habitats on the Okeechobee 2 site.

Building Impacts

Typical impacts from building nuclear units include permanent and temporary habitat loss from development, habitat fragmentation and degradation, disturbance and displacement of individuals, exposure of wildlife to increased noise levels and human presence, and increased risk of vehicle collision mortality. The conversion of fully developed and stable plant communities to earlier successional communities dominated by lower growing vegetation during development of linear transmission or pipeline corridors often results in a high degree of habitat fragmentation within the landscape.

FPL assumed a 362 ac area within the Okeechobee 2 site for evaluating potential impacts of building two new nuclear power reactors and associated stormwater ponds and other infrastructure plus an additional 3,000 ac for a cooling-water storage reservoir (FPL 2014-TN4058). The review team determined, however, that cooling water could be obtained from groundwater beneath the Okeechobee 2 site and that the cooling-water storage reservoir was unnecessary. FPL stated offsite facilities and development would also be required to construct and operate nuclear power plants at the Okeechobee 2 site. These include a 9.3 mi access road, 3.9 mi rail line, and pipeline corridors connecting the Kissimmee River to the site. The access road would add approximately 112 ac to the project footprint, the rail line would add approximately 47 ac, and the intake/makeup pipeline corridors would add approximately 23 ac. Because impacts from the plant area, access road, rail line, pipeline corridors, and stormwater-retention ponds result in permanent habitat loss they are discussed first.

Plant Facilities

If the plant facilities, access road, rail line, and pipelines were built within the proposed footprint, FPL estimated 543 ac would be affected (Table 9-19). Most of the affected habitat consists of wet prairie, improved pasture, and freshwater marsh (FPL 2011-TN59).

Table 9-19. Acreage within the Conceptual Footprint at the Okeechobee 2 Site

FLUCFCS Code	Description	Site and Non-Transmission (ac)	Transmission (ac)
200-series	Agriculture	190	2,431
300-series	Uplands	5	22
400-series	Forest	1	25
500-600 series	Water and Wetlands	306	545
100, 700, and 800 series	Developed	40	0
Total		542	3,023

Source: FPL 2011-TN59

Surveys of the occurrence, abundance, and distribution of Federally listed species have not been performed for the Okeechobee 2 site. Most of the listed species that occur in Okeechobee County could potentially occur on the Okeechobee 2 site, because suitable habitats are likely present. The exception is the ivory-billed woodpecker because there are no large tracts of old-growth forested wetlands present. The Federally listed species that could be affected most by the building of two nuclear plants at the Okeechobee 2 site are Audubon's crested caracara, Florida grasshopper sparrow, and the whooping crane because of the loss of a combined 403 ac of wet prairie and improved pasture. However, the Florida grasshopper sparrow is only known to occur in Okeechobee County at the Kissimmee Prairie Preserve State Park approximately 20 mi north of the Okeechobee 2 site, so this species may not be affected by habitat loss at the site (FWS 2008-TN2516). Loss of freshwater wetlands could reduce foraging habitat for the wood stork because the Okeechobee 2 site lies within the core foraging area of an active wood stork colony (FWS 2014-TN3732). Loss of freshwater wetlands could also reduce the amount of habitat available to the Everglade snail kite, whooping crane, and the Florida bonneted bat. Dry prairies in the vicinity are interspersed with oak and could be suitable habitat for the Florida scrub jay, but only 2.1 ac of dry prairie would be lost (FPL 2011-TN59). Eastern indigo snakes are habitat generalists, are widely distributed, and likely occur on the Okeechobee 2 site. They would be prone to increased mortality from land clearing and increased traffic during construction and operation. As with use of the Turkey Point site, mitigation requirements by the FFWCC, including staff awareness training and reporting, would minimize negative impacts on the eastern indigo snake. Habitat loss would also affect local populations of wildlife expected to occur within the region in suitable habitat that are not Federally listed. However, these effects are not expected to be noticeable and would not destabilize even local populations of any of these animals.

Transmission Lines and Access Roads

FPL assumed a new 38 mi long conceptual transmission line corridor from the Okeechobee 2 site to an existing corridor would be necessary to service power plants at the Okeechobee 2 site. FPL estimated this corridor would occupy 3,022 ac of additional land (Table 9-19). The conceptual transmission line corridor is dominated by pasture cover; over half is improved pasture, which covers 1,611 ac. Unimproved pasture covers an additional 302 ac, and woodland pastures cover another 281 ac. The sum of these pasturelands is almost 73 percent of the corridor. The remaining area includes additional uplands as well as wetlands. Uplands that are currently used for agriculture include 122 ac of citrus groves, 79 ac of field crops, and 36 ac of dairies. Undeveloped uplands within the corridor include 22 ac of dry prairie, 17 ac of live oak forest, 10 ac of hydric pine flatwoods, 6 ac of hardwood-coniferous forest, 2 ac of pine flatwoods, and a minor amount shrub and brushland. Wetland cover within the corridor includes 196 ac of freshwater marsh, 91 ac of wet prairie, 50 ac of mixed forested wetlands, 13 ac of cypress, and minor amounts of small waterways (ditches and streams). Impacts of the transmission line corridor on habitat are mostly alteration and fragmentation. Trees could be removed from as much as 560 ac of forest cover within the corridor and replaced with low-growing vegetation, including 244 ac of various forested wetland cover types (FPL 2011-TN59).

Because the conceptual transmission line corridor passes through a portion of St. Lucie, Martin, and Palm Beach Counties as well as Okeechobee County, the review team also considered impacts on Federally listed species and those species proposed for Federal listing known to

occur in any of these counties. The piping plover, red knot, Florida grasshopper sparrow, southeastern beach mouse, Miami blue butterfly, Bartram's scrub-hairstreak butterfly (*Strymon acis bartrami*), Florida leafwing butterfly (*Anaea troglodyte floridalis*), beach jacquemontia, Florida perforate cladonia, four-petal pawpaw, tiny polygala, and the Florida prairie-clover are not expected to occur near the conceptual transmission line corridor and would not be affected.

Although a substantial portion of the conceptual transmission line corridor is likely suitable habitat for Audubon's crested caracara, the installation and operation of transmission lines would not result in the permanent loss of all of the pasturelands that could provide habitat for this species. Habitat within the footprint of the tower pads and access road would be permanently lost but represents a small portion of the actual corridor. The likelihood of non-native plants being accidentally introduced would also increase and could result in habitat alteration. Approximately 196 ac of the corridor would be freshwater marsh, the primary habitat for the Everglade snail kite and whooping crane that is also used by wood storks (FPL 2011-TN59). Building a transmission line and access road through marsh habitat could lower habitat value by altering surface-water flow and increasing potential erosion. Removal of trees from the corridor could reduce nest sites within the freshwater marsh habitat for these three species. Elimination of trees from the live oak cover would measurably degrade the value of oak habitat to the Florida scrub jay, but this would only affect 17 ac (FPL 2011-TN59). The removal of trees from 18 ac of hardwood-coniferous forest, hydric pine flatwoods, and pine flatwoods could also lower the value of these habitats for the red-cockaded woodpecker. Removal of trees from the landscape could also result in less roosting habitat for the Florida bonneted bat. The Corbett substation is located southeast of Lake Okeechobee within a FWS Florida panther management zone. The landscape immediately around the substation and toward Lake Okeechobee appears to be used almost exclusively for agriculture. The installation of transmission lines here would likely not fragment potential panther habitat because the land-cover information within the corridor indicated it would not pass through the DuPuis Wildlife and Environmental Area, J.W. Corbett Wildlife Management Area, or the Arthur R. Marshall Loxahatchee National Wildlife Refuge. The eastern indigo snake inhabits many upland habitats. Conversion of habitats from forest to low-growing vegetation would not necessarily decrease habitat suitability for this species, and increased heterogeneity within the landscape may actually increase habitat quality. FPL stated field surveys would be conducted for Federally listed and State-protected species as part of the permitting process before any preconstruction activities would occur at the Okeechobee 2 site (FPL 2014-TN4058). Site-preparation activities would be conducted in accordance with all Federal and State regulations, permit conditions, and BMPs, including the use of directed drainage ditches and silt fencing. Acreage within the conceptual transmission line corridor was minimized to the extent possible by using the most direct route while avoiding areas with important resources and high biological value. FPL also stated that any wetland functions affected within the transmission line corridor would be replaced or restored.

Operations Impacts

Operation of two nuclear units at the Okeechobee 2 site would create noise, fogging and dissolved solid deposition from cooling towers, runoff from increased impermeable surfaces, light pollution, and increased vehicle collision mortality for local wildlife populations. Operation of transmission lines could increase the risk of bird collision and electrocution mortality.

The review team assumed the facility configuration would be similar to building at the Turkey Point site. Operational noise from the cooling towers may displace individual animals from the immediate vicinity of the cooling towers. Salinity within cooling water obtained from groundwater beneath the Okeechobee 2 site is assumed by the staff to be equal to that of seawater. Vapor leaving a cooling tower contains dissolved solids including salt, and some vegetation can be sensitive to salt deposition. The review team also assumed salt deposition from cooling-tower drift at the Okeechobee 2 site would be similar in scale and intensity to deposition at the Turkey Point site. Most of the salt would likely be deposited on developed land near the cooling towers, and concentrations as high as 10 kg/ha/mo that have resulted in observable effects on sensitive plant species could be expected as far as 1.25 mi from the cooling towers. Unlike Turkey Point, the Okeechobee 2 site is located inland, and vegetation growing there would not be expected to be as tolerant to atmospheric-deposited salt. Some sensitive vegetation could be affected by salt drift, but the spatial extent would be limited and the humidity and frequent rainfall typical of South Florida would quickly dissipate salt deposited in the landscape and prevent salt accumulation to levels that could be harmful.

The creation of impermeable surfaces and a stormwater runoff management system at the Okeechobee 2 site would likely result in changes in the surface-water flow pattern. Increases or decreases in the amount and timing of flow could result in changes in vegetative cover but would be limited to areas immediately surrounding developed areas. There is little relief at the site, so the potential for erosion and siltation of surrounding wetlands would be low. However, pollutants could be transported by runoff into the surrounding wetlands.

Light pollution during facility operation could affect wildlife residing on or migrating through the Okeechobee site. Design criteria could include minimization of upward lighting, turning off unnecessary lighting between 11 p.m. and sunrise, and luminary selection and mounting to provide light only where needed (FPL 2014-TN4058). If these actions are taken, the review team expects that impacts from light pollution on wildlife would be minimal.

Whooping cranes, wood storks, and Audubon's crested caracaras have been killed by electric utility structures in Florida (FPL 2011-TN1283) and may be particularly prone to collision and electrocution mortality. A nonmigratory population of endangered whooping cranes has been established at the Kissimmee Prairie in central Florida approximately 20 mi north of the Okeechobee 2 site (58 FR 5647) (TN3324). This population is officially designated as an experimental nonessential population. The Chassahowitzka National Wildlife Refuge approximately 140 mi northwest of the Okeechobee 2 site also supports migratory whooping cranes during the winter. Whooping cranes travel long distances and the conceptual transmission line corridor supporting the Okeechobee 2 site contains suitable whooping crane habitat. Transmission lines connecting the site to the Corbett substation in Palm Beach County would have to pass through core foraging areas of multiple wood stork nesting colonies (FWS 2014-TN3732). However, like the whooping crane, the risk of collision and electrocution mortality for the wood stork increases if transmission lines are operated within their range and there is suitable habitat within the transmission right-of-way. The level of risk is commensurate with the location of the transmission lines and wood stork nesting colonies, foraging habitat, and travel corridors. The review team assumed the FWS would regulate wire installation near wood stork colonies, foraging habitat, and flight corridors as it would at the Turkey Point site, but it

could still affect local wood stork and snail kite populations. Operational effects on other important species would be minimal.

EMFs are unlike other agents that have an adverse impact (e.g., toxic chemicals and ionizing radiation) in that dramatic acute effects cannot be demonstrated and long-term effects, if they exist, are subtle (NRC 2013-TN2654). A careful review of biological and physical studies of EMFs did not reveal consistent evidence linking harmful effects with field exposures (NRC 2013-TN2654). The impacts of EMFs on terrestrial flora and fauna are of small significance at operating nuclear power plants, including transmission systems with variable numbers of power lines and lines energized at levels less than 765 kV (NRC 2013-TN2654). Since 1997, more than a dozen studies have been published that looked at cancer in animals that were exposed to EMFs for all or most of their lives (Moulder 2005-TN1329). These studies have found no evidence that EMFs cause any specific types of cancer in rats or mice (Moulder 2005-TN1329). Therefore, the incremental EMF impact posed by operation of existing transmission lines and the addition of new lines for two new nuclear units would be negligible at the Okeechobee 2 alternative site.

Transmission line corridor vegetation-management activities (cutting and herbicide application) and related impacts on floodplains and wetlands in transmission line corridors are of minor significance at operating nuclear power plants, including those with transmission line corridors of variable widths (NRC 2013-TN2654). Consequently, the incremental effects of transmission line corridor maintenance and associated impacts on floodplains and wetlands for two new nuclear units would be negligible at the Okeechobee 2 site.

Cumulative Impacts

The geographic area of interest for the assessment of the potential cumulative impacts of building and operating a new reactor at the Okeechobee 2 site and other past, present, and reasonably foreseeable future actions on terrestrial resources and wetlands is defined as being the 50 mi radius around the Okeechobee 2 site. A list of past, present, and reasonable foreseeable actions within 50 mi of the Okeechobee 2 site is presented in Table 9-16. This list includes a variety of energy-production projects, mining, manufacturing, transportation and infrastructure-development projects, set-aside areas for recreation and conservation, CERP-related projects, and other miscellaneous activities that could affect terrestrial and wetland resources.

Past land use in South Florida, especially agriculture and more recently urbanization, has greatly affected the distribution and abundance of unfragmented plant and wildlife habitats still remaining. Development and urbanization of higher elevation lands has further reduced the amount of valuable upland habitats remaining in the landscape. Ditching and draining created more dry land, reducing the amount of wetlands available as habitat and fragmenting the natural landscape. The continued operation and maintenance of existing facilities would likely not exacerbate the current situation with respect to terrestrial and wetland ecosystems. Mining activities have the potential to expand their footprint and development in general on the landscape, as does continued human population growth in South Florida. Lands set aside for recreation and conservation provide buffers against development, provide habitat for plants and animals, and serve to preserve the ecosystem remaining in South Florida. Projects that

continue to incrementally reverse changes in land cover due to man-made changes in surface-water flow, including CERP-related activities, would continue to benefit the terrestrial and wetland ecology of the region.

As described in Chapter 7, terrestrial and wetland environments in South Florida may also be affected by continued population growth and related development. The overall impact from past, present, and reasonably foreseeable future activities on regional terrestrial and wetland ecology is substantial.

Summary Statement

Fragmentation and loss of natural habitats from agriculture and urbanization have changed and will continue to change the ecology of South Florida. Although much of the landscape around the Okeechobee 2 site has already been converted to pastures, the Okeechobee 2 site is still dominated by wetland habitats. Habitats of significant ecological value in South Florida that would be affected by the construction and operation of new nuclear units at the Okeechobee 2 site include freshwater marsh, wet prairie, and bay swamp. Based on the information provided by FPL and the review team's independent evaluation, the review team concludes that the cumulative impacts on terrestrial and wetland resources of building and operating two new nuclear units at the Okeechobee 2 alternative site, including impacts attributable to permanent conversion of habitat for the facility footprint as well as operation of the cooling tower and transmission lines, would be MODERATE. The incremental effect of the building and operation of two new nuclear units at the Okeechobee 2 site would be a significant contributor to this impact primarily because of the impacts on wetlands and intact upland habitat.

9.3.4.4 Aquatic Resources

What follows is an assessment of the potential impacts on aquatic resources that may occur if the two nuclear units described in FPL (2014-TN4058) were constructed and operated at the Okeechobee 2 site. Based on a review of potential cooling-water sources discussed in Section 9.3.4.2, the review team assumes no cooling ponds or reverse osmosis facilities would be required for the Okeechobee 2 site.

Okeechobee 2 is a 3,000 ac site located in Okeechobee County approximately 8 mi west of the town of Okeechobee (Figure 9-17). The property is not owned by FPL, and is currently used to support cattle and dairy operations, and citrus production. The Kissimmee River is 2 mi west of the site, and Lake Okeechobee is approximately 8 mi southeast. As described by FPL, the proposed facility would occupy approximately 362 ac, and the conceptual transmission line corridor would extend 38 mi and encompass approximately 3,022 ac. The site would also require approximately 112 ac for access roads, 47 ac for a rail line, and 23 ac for a pipeline extending from the plant to the Kissimmee, where cooling water would be withdrawn from a surface-water intake during high-flow events. Groundwater would be used for reactor cooling at other times. Several hundred additional acres may be required to support construction activities, including laydown areas, batch plants, and fill or spoil areas.

As described elsewhere in this EIS, South Florida has undergone significant development and channelization to enable development and industry. Beginning in the 1960s and early 1970s,

the Kissimmee River was channelized, two-thirds of its floodplain was drained, and excavation of the canal and spoils disposal destroyed one-third of the river channel. These actions degraded the natural environment, significantly affected ecosystem function, and resulted in declines of waterfowl, wading birds, and fish. Subsequently, restoration actions by the USACE and others are occurring, with the goal of reestablishing the river's historical hydrological patterns, creating more natural fluctuations of water levels, and enhancing fish and wildlife habitat.

Commercial and Recreational Species

Given its hydrological connection to Lake Okeechobee, aquatic species found in the Kissimmee River in the vicinity of the Okeechobee 2 site will likely be similar to those found in the lake. Thus, aquatic species in the Kissimmee River would likely include smaller bait fish and larger piscivores, including crappie, catfish, and bream, which have recreational and commercial importance. As described above, the goal of current and future restoration actions is to reestablish the river's natural hydrologic patterns to enhance aquatic resource populations.

Important Species

Based on the hydraulic connections described above, the important species present in Lake Okeechobee are likely present in the portion of the Kissimmee River near the lake. These would include a variety of forage fish like Threadfin Shad and Inland Silversides, and larger predators like the Largemouth Bass and Black Crappie (USACE 2013-TN2847; Zhang and Sharfstein 2013-TN2894). Important species are similar to those listed for Glades in Section 9.3.2.4.

Non-Native or Nuisance Species

As noted in the above summaries for the Glades and Martin sites, Lake Okeechobee and the connecting canal and river systems contain a variety of non-native and nuisance species. Many of these species would likely be present in the Kissimmee River near the Okeechobee 2 site.

Federally and State-Listed Species and Critical Habitats

Based on an FNAI search conducted by the review team, the only Federal and State-listed species likely to occur near the Okeechobee 2 site are the American alligator and the Florida manatee (FNAI 2013-TN2901). As described in Section 2.4.2, American alligators are found in swamps, rivers, streams, lakes, and ponds throughout the southeastern United States where fresh or brackish water is present. Florida manatee are found in shallow rivers, bays, estuaries and coastal waters, and have been observed in Lake Okeechobee. No designated critical habitat for either species is found near the Okeechobee 2 site, but the manatee consultation area includes Lake Okeechobee (FWS 2003-TN2916).

Construction Impacts

Based on information provided by FPL, the 362 ac required for the plant would primarily affect the existing farmland and agriculture present in the area. Some existing drainage ditches that support a seasonal population of some of the fish species listed above may be adversely

affected. Construction of the surface-water intake on the Kissimmee River may result in short-term increases in water turbidity, and some disturbance of the shoreline area. Impacts would be temporary, largely mitigable, and minor. Construction of the surface-water intake on the Kissimmee River would result in temporary displacement of aquatic biota in the immediate area, and likely short-term increases in water turbidity. Construction of water pipelines would likely occur in previously disturbed areas, or locations where aquatic resources are not present. Construction of the proposed transmission lines would affect approximately 3,022 ac that would include previously disturbed areas, existing rights-of-way, forests, and agricultural land. FPL has indicated field surveys for Federally or State-listed species would be conducted prior to construction at the site or within transmission line corridors. Impacts would be the same as those described for the Glades site in Section 9.3.2.4.

Operations Impacts

As described in Section 9.3.4.2, the review team assumes groundwater would be the primary source of cooling water, with supplemental water from Lake Okeechobee or the Kissimmee River being available intermittently when excess surface water is available, typically during the wet season. Thus, the effects of impingement and entrainment of aquatic biota would be reduced. Assuming the intake conforms to current EPA standards, through-screen velocities are expected to be protective of the aquatic environment and any impingement or entrainment that does occur should not result in noticeable changes in aquatic biota species composition or abundance. It is assumed impingement and entrainment of biota from the river would not result in a noticeable impact on aquatic resources. Because cooling-tower blowdown would be discharged into the Boulder Zone of the Lower Floridan aquifer, surface-water resources would not be adversely affected. There is no available information about biological communities that may be present in Bounder Zone formations near the Okeechobee 2 site, so it is not possible to determine whether a complete exposure pathway is present or assess potential biological effects. Thus, the potential risk of chemical exposure to aquatic resources resulting from the discharge of cooling-tower blowdown cannot be determined

Based on an NRC assessment of a similar cooling system proposed at the Levy site in western Florida using brackish saltwater for cooling-tower makeup water (NRC 2012-TN1976), cooling-tower drift impacts on aquatic resources would likely be minimal, because deposition would be expected to occur primarily on plant property or adjacent agricultural lands**.** Impacts would be the same as those described for the Glades site in Section 9.3.2.4. No detectable increase in surface-water salinity resulting from salt-drift deposition is anticipated.

Cumulative Impacts

Table 9-16 summarizes the past, present, and reasonably foreseeable projects and other actions in the vicinity of the Okeechobee 2 site. As previously noted, these activities include existing and proposed energy projects, rock-mining activities, transportation projects, parks and aquaculture facilities, and restoration activities funded by CERP or others. Existing or potential energy projects near the Okeechobee 2 site include one nuclear plant (St. Lucie), and a variety of others using fossil fuels, biofuels, or solar technologies. The area also supports numerous general aviation airports that may require limited expansion in response to population increases. Rock mining also occurs within 50 mi of the Okeechobee 2 site and is expected to continue.

This area of South Florida also includes dozens of parks, scenic trails, wildlife refuges, preserves, and environmental areas, which protect natural resources and provide a variety of recreational opportunities. This area will also benefit from a variety of existing or proposed restoration projects that focus on improving surface-water management and water quality, and those enhancing efforts to control invasive species. Ongoing restoration projects on the Kissimmee River north of the Okeechobee 2 site will provide a positive cumulative effect by restoring natural river flow and function that benefit aquatic and terrestrial resources.

In addition to the projects described above that may result in negative, positive, or neutral cumulative impacts on aquatic biota, this part of South Florida will continue to experience increased population growth and development. Overall the review team concludes that the cumulative impacts on aquatic resources in the vicinity of the Okeechobee 2 site would be MODERATE.

Summary Statement

Based on a review of the information provided by FPL and the review team's independent assessment, it is likely the construction and operation of a nuclear power-generating station, as described above for the Okeechobee 2 site, would contribute only minimally to the cumulative effects likely to occur in that portion of South Florida. Although the construction of nuclear units at the Okeechobee 2 site would affect existing agricultural and farm land, adverse effects on aquatic resources would be unlikely. Construction of the surface-water intake on the Kissimmee River may result in temporary, localized impacts that would not adversely affect aquatic resources in the river. The use of water from the Kissimmee River during high-flow events may relieve some of the flooding concerns associated with Lake Okeechobee and the connecting canals, and result in lower discharges into these systems to maintain lake level and protect the Herbert Hoover dike system. Some impingement and entrainment losses are expected, but assuming a closed-cycle cooling system and compliance with the EPA's 316(b) Phase I requirements for intake structures (66 FR 65256) (TN243), the intake is considered protective of aquatic life and the anticipated impacts due to impingement and entrainment are considered minimal. Furthermore, the intakes would likely be only operated intermittently throughout the year when surface water is available. Impingement or entrainment that does occur should not result in noticeable changes in aquatic biota species composition or abundance. Thus, the review team concludes that the cumulative impacts of building and operatiing two new nuclear reactors at the Okeechobee 2 site, combined with the other past, present, or reasonably foreseeable activities on aquatic resources would be MODERATE, but building and operating two new nuclear units at the Okeechobee 2 site would not be a significant contributor to the MODERATE impact.

9.3.4.5 Socioeconomics

The following impact analysis includes impacts from building activities and operations. The analysis also considers other past, present, and reasonably foreseeable future actions that affect socioeconomics, including other Federal and non-Federal projects listed in Table 9-16. For the analysis of socioeconomic impacts at the Okeechobee 2 site, the geographic area of interest is considered to be the 50 mi region centered on the Okeechobee 2 site with special consideration of Okeechobee, Glades, Highlands, Palm Beach, Indian River, Martin and St.

Lucie Counties because that is where the review team expects socioeconomic impacts to be the greatest. In evaluating the socioeconomic impacts of site development and operation at the Okeechobee 2 site near Okeechobee in Okeechobee County, the review team used readily obtainable data from the Internet or published sources. Impacts from both building and station operation are discussed.

Physical Impacts

People who work or live around the site would be exposed to noise, fugitive dust, and gaseous emissions from building and operations activities. Noise, dust, and air-pollution emissions generated within the boundaries of the Okeechobee 2 site would be expected to be similar to those at the Turkey Point site. Because the surrounding site is rural and sparsely populated and because noise and air-pollution impacts are attenuated by distance, members of the surrounding population exposed would be relatively few and the impacts would be expected to be negligible. Best practices and applicable regulations would be expected to protect building workers and personnel working onsite. Truck and vehicle traffic related to building and operations would generate noise, fugitive dust, and gaseous emissions offsite. In addition, offsite structures include a transmission line and intake/makeup pipelines (FPL 2014-TN4058). Because the area affected by offsite structures and traffic would also be rural and sparsely populated and because FPL would be expected to implement a dust-control plan similar to that for the Turkey Point site, noise and air-pollution impacts from these offsite activities would be expected to be minor.

Based on FPL's conceptual site layout for the Okeechobee 2 site (FPL 2011-TN59) and on aerial photography, there is one structure within the boundaries of the proposed site. There are also pastures that would be lost. Offsite project-related building activities include widening of 9.3 mi of SR-70 and a 3.9 mi railway. The impact on road quality based on any road improvements made by the applicant to facilitate project-related traffic would only affect a small population base, and therefore that impact would be minor and beneficial. Other offsite project-related building activities include a 38 mi transmission line and intake/makeup pipelines (FPL 2014-TN4058). The conceptual design of these activities routes them, to the extent possible, along existing rights-of-way and avoids populated areas and residences (FPL 2014-TN4058). The physical impacts on existing structures and crops within the proposed site and offsite areas for supporting infrastructure would be minor.

The area around the site is relatively flat, sparsely populated, and is used mainly as farmland. Building would use cranes (which could exceed 400 ft in height) and would alter the regional viewscape. Construction of the transmission lines would pose similar impacts. The power plant and water-intake facilities would likely be visible from several angles and contrast highly with the present viewscape. Building and operation would noticeably alter the aesthetics of the area. Because of the sparse population, the negative impact would likely not interfere with the daily routine of local public around the Okeechobee 2 site and would not destabilize the aesthetic characteristics of the area.

Based on the information provided by FPL (2014-TN4058) and the review team's independent analysis, the review team concludes that the overall physical impacts of building activities and operations would be minor and adverse, with the exceptions of noticeable but not destabilizing

adverse impacts on aesthetics and minor and beneficial impacts on road quality near the Okeechobee 2 site.

Demography

The Okeechobee 2 site is located in Okeechobee County, 1.5 mi west of Okeechobee (2012 population 5,632) and 30 mi west of Port St. Lucie (2012 population 163,748), the closest population center with more than 25,000 residents (FPL 2014-TN4058; USCB 2012-TN4098). The population distribution within and around the Okeechobee 2 site is typically rural with low population densities. There are 14 counties within the 50 mi area, but the review team estimates the areas in which workers would most likely live and from which they would commute are within Okeechobee, St. Lucie, Palm Beach, Highlands, Indian River, Martin, Glades, Broward and Miami-Dade Counties, based on current commuter patterns.(25) For the purposes of assessing potential socioeconomics impacts, the review team excluded Broward and Miami-Dade Counties as potential areas of residence for construction and operation workers: these two counties are outside of the 50 mi region at driving distances approaching 2 hours or more and would be less likely to accommodate workers than closer communities. Because the population of Broward and Miami-Dade Counties would be over 60 percent of the population of the nine counties together, the impacts would be distorted by the inclusion of Broward and Miami-Dade Counties in the potential area of residence. The remainder of the analysis focuses on the seven-county area of Okeechobee, St. Lucie, Palm Beach, Highlands, Indian River, Martin, and Glades.

FPL estimated the peak number of workers during building would be 3,983, including 33 operation workers. The review team assumed that the share of construction and operation workers relocating from outside the seven-county area would be 66 percent of the estimated peak number of workers. This assumption was reached by using the assumption made for the proposed Turkey Point site as a reference and assuming that the share of workers that would come from outside the region is inversely proportional to the population of the region.(26) As in Section 4.4, 70 percent of the construction workforce and 100 percent of the operation workforce that moved into the area were assumed to bring their families. Based on these assumptions, a peak of 2,607 construction and 22 operation workers would relocate to the area during the project construction phase, and 1,847 of these workers would bring their families. Based on an average household size of 3.25 people, the total increase in population attributable to the peak total workforce at the Okeechobee 2 site would be 6,036 people. An influx of 6,036 people represents a 0.3 percent increase in the seven-county 2012 population of 2,038,496.

FPL estimated the total onsite operations workforce to be 806 workers. As explained above, the review team assumed that 66 percent of these workers (532) would relocate from outside the

(25) Over 80 percent of the workers in Okeechobee County currently reside in one of these nine counties (USCB 2011-TN4078).

(26) The proposed Turkey Point site analysis assumed 50 percent of the peak workers would come from outside the 50 mi region and that 83.3 percent of those would reside in Miami-Dade County; i.e., 41.65 percent (0.5 × 0.833) of the peak workers would migrate into Miami-Dade County. Because the population of the seven-county area is approximately 81 percent of that of Miami-Dade County (USCB 2012-TN4098), the review team assumed the share of peak workers migrating into the seven-county area would be 1-(0.81 × 0.4165) ≈ 66 percent.

seven-county area. For this analysis, the review team assumed that 100 percent of operation workers who relocate would bring their families. Based on an average household size of 3.25 people, the total population increase attributable to project operations is 1,729 (532 × 3.25) people. This represents less than a 0.1 percent increase in the seven-county area.

The review team concluded that the impact on local demography would not be noticeable.

Economic Impacts on the Community

Economy

FPL estimated the peak number of workers during building would be 3,983, including 33 operation workers. Employment of 3,983 construction and operation workers would have positive economic impacts in the seven-county area. Based on a multiplier of 1.6260 jobs (direct and indirect) for every construction job and 2.4679 for every operation job, 3,983 new construction and operation jobs would create 2,522 indirect jobs, for a total of 6,505 new jobs in the seven-county area during peak employment (3,950 × 1.6260 + 33 × 2.4679) (FPL 2011-TN56).[27] This represents a 0.7 percent increase in the total employment in the seven-county area.[28] Peak employment would last 1 month and the average employment generated during the 10-year building period would be about half of that of peak employment. This added employment would generate added earnings to the economy of the seven-county area, but the added employment and earnings would not be noticeable to most of those living or working in the area.

An estimated 806 workers would be required for the operation of two nuclear power facilities. Based on a multiplier of 2.4679 jobs (direct and indirect) for every operations job at the new units (FPL 2011-TN56), an influx of 806 workers would create 1,183 indirect jobs for a total of 1,989 new jobs in the region. This represents a 0.2 percent increase in the total employment in the seven-county area. This added employment would also generate added earnings to the economy of the seven-county area, but the added employment and earnings would not be noticeable to most of those living or working in the area.

Taxes

State corporate income taxes and sales and use taxes paid at the Okeechobee 2 site during construction and operations of the proposed units would be similar to those paid by the same units at the proposed Turkey Point site. As discussed in Sections 4.4 and 5.4, State taxes paid by the proposed units would not exceed 2 percent of the annual collected State corporate income and sales and use taxes. The impact would be minor and beneficial. County sales surtax rates in the seven-county area for the 2014 calendar year are zero percent for Martin and Palm Beach Counties, one-half percent for St. Lucie, and 1 percent for the remaining four counties (FDOR 2014-TN3393). County surtax collections from the proposed units would be highest during construction when annual expenses related to the proposed units would be estimated to reach up to $1.56 billion (Section 4.4). A 1 percent sales surtax would generate

(27) Multipliers are for a four-county area (excluding Martin, Indian River, and Palm Beach Counties) and are used as an approximation.
(28) Employment of 892,793 (BLS 2013-TN4085).

$15.6 million in revenues for the seven-county area.[29] This would correspond to less than 1 percent of total county revenues in the seven-county area for 2014.[30] The impact would be minor and beneficial. County and school district governments in Florida may levy taxes up to 10 mills each (1 percent) in property taxes (FDOR 2012-TN459). If the value of property taxes for the two nuclear reactors at the Okeechobee site were the same as the value estimated for Units 6 and 7 at the Turkey Point site in Section 5.4.3.2, FPL would pay $20 million in property taxes to the Okeechobee School District and $20 million to Okeechobee County. These payments would correspond to 46.6 percent of the Okeechobee School District 2011-2012 total revenues ($20 million compared $42.9 million)[31] and 42.6 percent the Okeechobee County 2011-2012 total revenues ($20 million compared to $46.9 million).[32] Because property taxes paid to school districts are reallocated through Florida's Education Finance Program, the benefit to the Okeechobee School District would be diluted to some extent, and the exact amount distributed to each school district is not known at this time. Because of the value of project-related property tax payments relative to current property taxes, the review team considers the impacts on tax revenues to both the Okeechobee School District and Okeechobee County to be substantial and beneficial.

The review team concluded that the economic impact would not be noticeable and would be beneficial, with the exception of property tax revenues to Okeechobee County and to the Okeechobee School District, which would be beneficial and substantially alter current property tax levels in Okeechobee County and the Okeechobee School District.

Infrastructure and Community Service Impacts

Traffic

Workforce access to the Okeechobee 2 site would occur through SR-70 coming from the east and the west. The review team estimated the current LOS (Level of Service) of these roads at two FDOT traffic-monitoring sites based on the peak hour directional traffic and FDOT LOS thresholds. Peak hour directional traffic information was obtained from FDOT Florida Traffic Online (FDOT 2013-TN3558) and consists of the AADT at each traffic-monitoring site, a Standard Peak Hour Factor (K) and a Directional Distribution Factor (D). The multiplication of these three elements (AADT × K × D) provides an estimate of the current peak hour directional traffic volume. The LOS was determined comparing this peak hour directional traffic volume with the maximum thresholds for each LOS in Table 9 (areas less than 5,000 population) of FDOTs Generalized Service Volume Tables (FDOT 2013-TN3297). The review team used FDOT's 2011 LOS Reports by County (FDOT 2011-TN3557) to determine the correct classification of each road for the purposes of identification of the appropriate threshold in the Generalized Service Volume Tables (e.g., whether the road should be considered highway or a freeway; whether the area should be considered rural developed or rural undeveloped). Based on this procedure, the LOS at both traffic-monitoring sites would be B. To estimate the project

(29) To the extent that some of the expenditures would be made in Martin, Palm Beach, and St. Lucie Counties, and assuming the sales surtax rates are unchanged, the total sales surtax collected would be smaller.
(30) $3412 million (FLDFS 2013-TN3392).
(31) FLDOE 2012-TN3391.
(32) FDOR 2014-TN3393.

impact on traffic LOS during the project's peak workforce building period, the review team followed a methodology similar to that described in Section 4.4: The peak workforce of 3,983 construction and operation workers was divided into two shifts; 70 percent were assigned to shift 1 (6:00 a.m. to 4:30 p.m.) and 30 percent to shift 2 (5:00 p.m. to 3:00 a.m.). The hour of peak commute would be 4:30 p.m. to 5:30 p.m. The review team also assumed up to 36 trucks per hour. The project-related directional traffic during the peak commute hour would be 2,824 vehicles (70 percent × 3,983 + 36). The review team assumed that half of the project-related traffic would come from each direction, east and west.(33) The results of this analysis are presented in Table 9-20. The additional building traffic would drop the LOS classification at both traffic-monitoring sites to F. The proposed widening of SR-70 would bring the LOS classification to a C.

Table 9-20. Peak Workforce Traffic LOS Analysis for the Okeechobee 2 Site

Traffic-Monitoring Site	Baseline Peak Hour Directional Traffic	Baseline LOS	Distribution of Project-Related Peak Traffic	Added Peak Hour Directional Traffic	Peak hour Directional Traffic with Project	LOS with Project
SR-70 west of site	246	B	0.50	1,412	1,658	F (C)[a]
SR-70 east of site	393	B	0.50	1,412	1,805	F (C)[a]

(a) LOS classification after widening of SR-70.

Source: Review team calculations based on FDOT 2011-TN3557; FDOT 2013-TN3558; and USCB 2011-TN4078

FPL estimated the total onsite operations workforce to be 806 workers. If access of this workforce to the Okeechobee 2 site were distributed among the two directions equally, the LOS at each of the two monitoring sites would drop to C.

Based on the above analysis, the review team concludes that the impact of the building and operations of the proposed nuclear reactors at the Okeechobee 2 site would be noticeable during building, although not destabilizing, after widening of SR-70.

Recreation

The Okeechobee 2 site is located approximately 4 mi from Lake Okeechobee and the Lake Okeechobee Scenic Trail that circles the lake. The lake is used for boating, fishing, and duck hunting, and the scenic trail is used for hiking and bird watching (Palm Beach County 2013-TN3298). The Taylor Creek/Nubbins Slough Water Conservation Area is located approximately 2 mi from the site. To the east, several recreational areas exist at approximately 2 mi along the Kissimmee River. During building, access to these sites from some directions could be affected by increased traffic. Other parks and recreational areas exist within the county. The influx of project-related population to the seven-county area would increase the number of local users of recreational facilities. Because the in-migrating population would be less than 1 percent of the local population, the review team expects the impact on current recreational infrastructure to be negligible.

(33) Based on U.S. Census Bureau commuter patterns (USCB 2011-TN4078) it was not possible to determine the likely direction of outgoing project-related traffic.

Housing

The review team estimates that 2,629 construction and operation workers would migrate into the seven-county area, and each of these workers would need a place to live. Based on American Community Survey 2008–2012 5-Year estimates, within the seven-county area there are 1,035,416 housing units of which 232,194 are vacant (22.4 percent). This includes housing that is designated as seasonal, recreational, or occasional use (USCB 2012-TN4089). The review team estimates that, in absolute numbers, the available housing would be sufficient to house the construction workforce. The in-migrating construction and operation workforce would occupy no more than 1.2 percent of vacant housing units in the seven-county area. FPL estimated that approximately 806 workers would be needed for operation of two nuclear power facilities at the Okeechobee 2 site, and the review team assumed that 66 percent of these workers (532) would relocate from outside the region and would settle in the seven-county area. Based on these assumptions, the entire operations workforce would occupy no more than 0.3 percent of vacant housing units in the seven counties. The review team concludes that impact on housing would be minor.

Public Services

In-migrating construction workers and plant operations staff would also likely affect local municipal water, wastewater-treatment facilities, police, fire-protection services, and other public services in the region. These impacts would be expected to be in proportion with the demographic impacts experienced in the region. In-migration to the seven-county area would represent an estimated 0.3 percent of the local population (less during operations). The review team concludes that the impact on public services would be minor.

Education

Based on data for the 2011-2012 school year, there are approximately 269,566 full-time equivalent students in public schools in the seven-county area (FLDOE 2013-TN3299).(34) The review team estimated that 2,629 construction and operation workers would migrate into the area, and that 1,847 workers would bring their families. Based on an estimate of 0.8 school-aged children per family (Malhotra and Manninen 1981-TN1430), an estimated 1,478 (1,847 × 0.8) school-aged children would be migrating into the seven-county area. This would yield a 0.5 percent increase in the student population. During operations, the review team assumed that 532 operation workers and their families would relocate from outside the region. This would include an estimated 426 (532 × 0.8) children in the PK-12 school range. This influx of students would increase the student population in the seven-county area by 0.2 percent. The review team concludes that the impact on education would be minor.

Based on the information provided by FPL (2014-TN4058) and the review team's independent analysis, the review team concludes that the overall infrastructure and community service impacts of building activities and operations at the Okeechobee 2 site would be minor except for noticeable, but not destabilizing, adverse impacts on traffic.

(34) FTE is a measure of enrollment based on the number of full-time students that it would take to fill the number of classes offered.

Cumulative Impacts

In addition to the socioeconomic impacts from building and operations of the proposed project at the Okeechobee 2 site, the cumulative analysis also considers other past, present, and reasonably foreseeable future actions that could have socioeconomic impacts.

The socioeconomic impacts of past and present actions in the affected area are largely captured by the current baseline conditions used for analysis above of project impacts. For example, the impacts of past and present actions on the demography and economy of the area are largely captured by current baseline data on population, employment, and tax revenues and are incorporated in the baseline and trend assessments of the RIMS II multipliers.

Reasonably foreseeable future actions are listed in Table 9-16. Future actions that would be expected to have cumulative socioeconomic impacts with the proposed project at the Okeechobee 2 site would be several that would generate additional employment and earnings in the area. These include the Herbert Hoover Dike Rehabilitation Project and Dam Safety Modification Study, the Florida Southeast Connection pipelines proposed through Highlands, Okeechobee and Martin Counties (construction 2016-2017; FSC 2014-TN3301), the Floridian Natural Gas Storage Facility in Martin County, and various proposed CERP water projects.

Based on the location of the identified future projects and their magnitudes, the cumulative socioeconomic impacts of the projects identified above with the proposed project at the Okeechobee 2 site would be expected to be SMALL and adverse, with the exception of MODERATE and adverse impacts on aesthetics and traffic; SMALL and beneficial physical impacts on road quality; and LARGE and beneficial impacts of property tax revenues to Okeechobee County and to the Okeechobee School District. Building and operating two new nuclear units at the Okeechobee 2 alternative site would be a significant contributor to the MODERATE adverse impacts.

9.3.4.6 Environmental Justice

The following impact analysis includes impacts from building activities and operations. The analysis also considers other past, present, and reasonably foreseeable future actions that impact EJ, including other Federal and non-Federal projects listed in Table 9-16.

The 2008–2012 American Community Survey block groups were used to identify minority and low-income population distributions in the area (USCB 2012-TN4098). The census data for Florida characterizes 15.9 percent of the population as Black; 0.3 percent as American Indian or Alaskan Native; 2.5 percent as Asian; 0.1 percent as Native Hawaiian or other Pacific Islander; 2.6 percent as other single minorities; 2.2 percent as multiracial; 22.5 percent as Hispanic ethnicity; and 42.2 percent as aggregate minority. There are 526 block groups within 50 mi of the Okeechobee 2 site. Following the criteria described in Section 2.6.1, Black minority populations exist in 57 block groups; American Indian or Alaskan Native minority populations exist in 2 block groups; other race minority populations exist in 12 block groups; multiracial minority populations exist in 2 block groups; Hispanic ethnicity minority populations exist in 38 block groups; and aggregate minority populations exist in 116 block groups. There are no block groups containing Asian minority populations or Native Hawaiian or other Pacific Islander

minority populations within 50 mi of the Okeechobee 2 site. The Brighton Seminole Indian Reservation is approximately 10 mi southwest of the Okeechobee 2 site. The locations of the minority populations within 50 mi of the Okeechobee 2 site and the Brighton Seminole Indian Reservation are shown in Figure 9-19. The locations of Hispanic minority populations and Black minority populations within the 50 mi of the Okeechobee 2 site are shown in Figure 9-20 and Figure 9-21, respectively.

The USCB data characterize 15.3 percent of Florida residents as low income (USCB 2012-TN4098). Out of a possible 526 block groups, 69 block groups contain low-income populations. The locations of the low-income populations within 50 mi of the Okeechobee 2 site are shown in Figure 9-22.

The analyses of the impacts of building and operating new nuclear reactors at the Okeechobee 2 site identified noticeable impacts on land use, terrestrial and wetland ecosystems, aesthetics, and traffic. The review team did not identify any special pathways through which these noticeable impacts would disproportionately affect EJ populations of interest. Therefore, the review team concluded there would be no disproportionately high and adverse impacts on EJ populations of interest.

The NRC's EJ methodology includes an assessment of affected populations of particular interest or with unusual circumstances, such as minority communities that are exceptionally dependent on subsistence resources or identifiable in compact locations (e.g., Native American reservations) and those that have a high density of minority or low-income groups. Based on a literature research, the review team did not identify high-density minority or low-income presence in the proximity of the site, nor differentiated subsistence consumption of natural resources by EJ populations of interest.

Cumulative Impacts

In addition to the EJ impacts from building and operations of the proposed project at the Okeechobee 2 site, the cumulative analysis also considers other past, present, and reasonably foreseeable future actions that could have EJ impacts. Based on a literature review of past and present actions in the affected area, and based on the reasonably foreseeable actions listed in Table 9-16, the review team found no evidence that the cumulative effects would disproportionately affect EJ populations of interest.

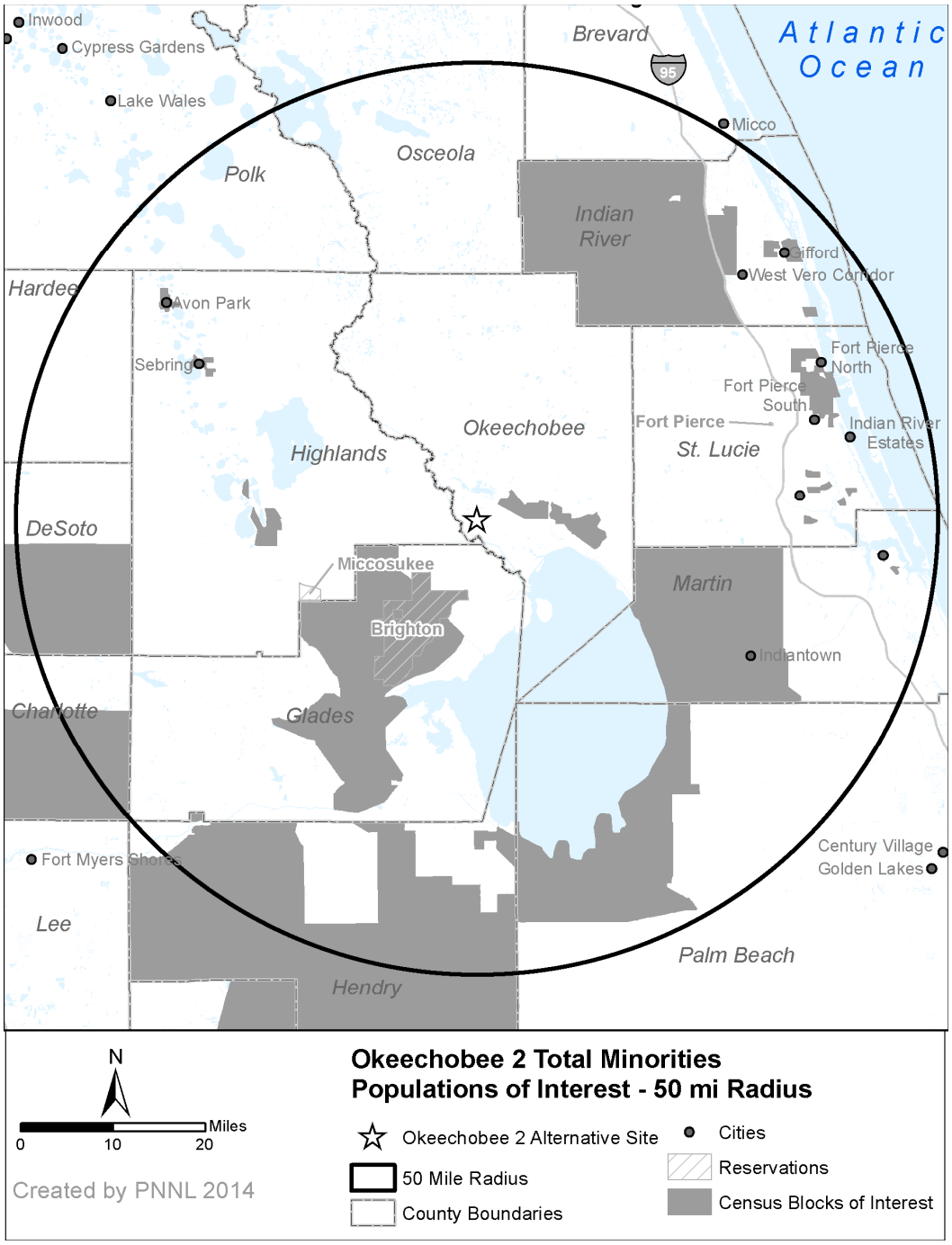

Figure 9-19. Aggregate Minority Populations in Block Groups that Meet the Environmental Justice Selection Criteria within 50 mi of the Okeechobee 2 Alternative Site

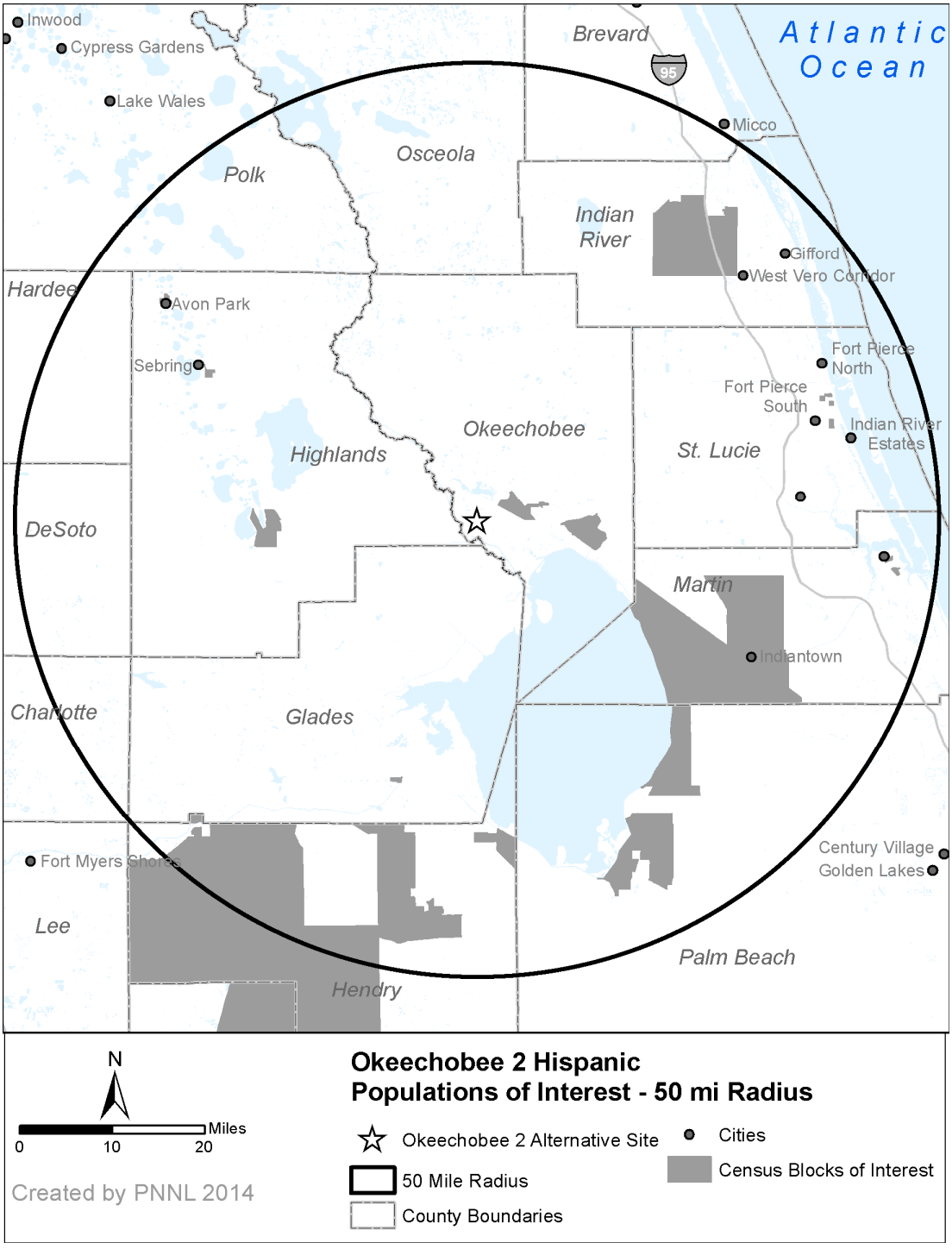

Figure 9-20. Hispanic Populations in Block Groups that Meet the Environmental Justice Selection Criteria within 50 mi of the Okeechobee 2 Alternative Site

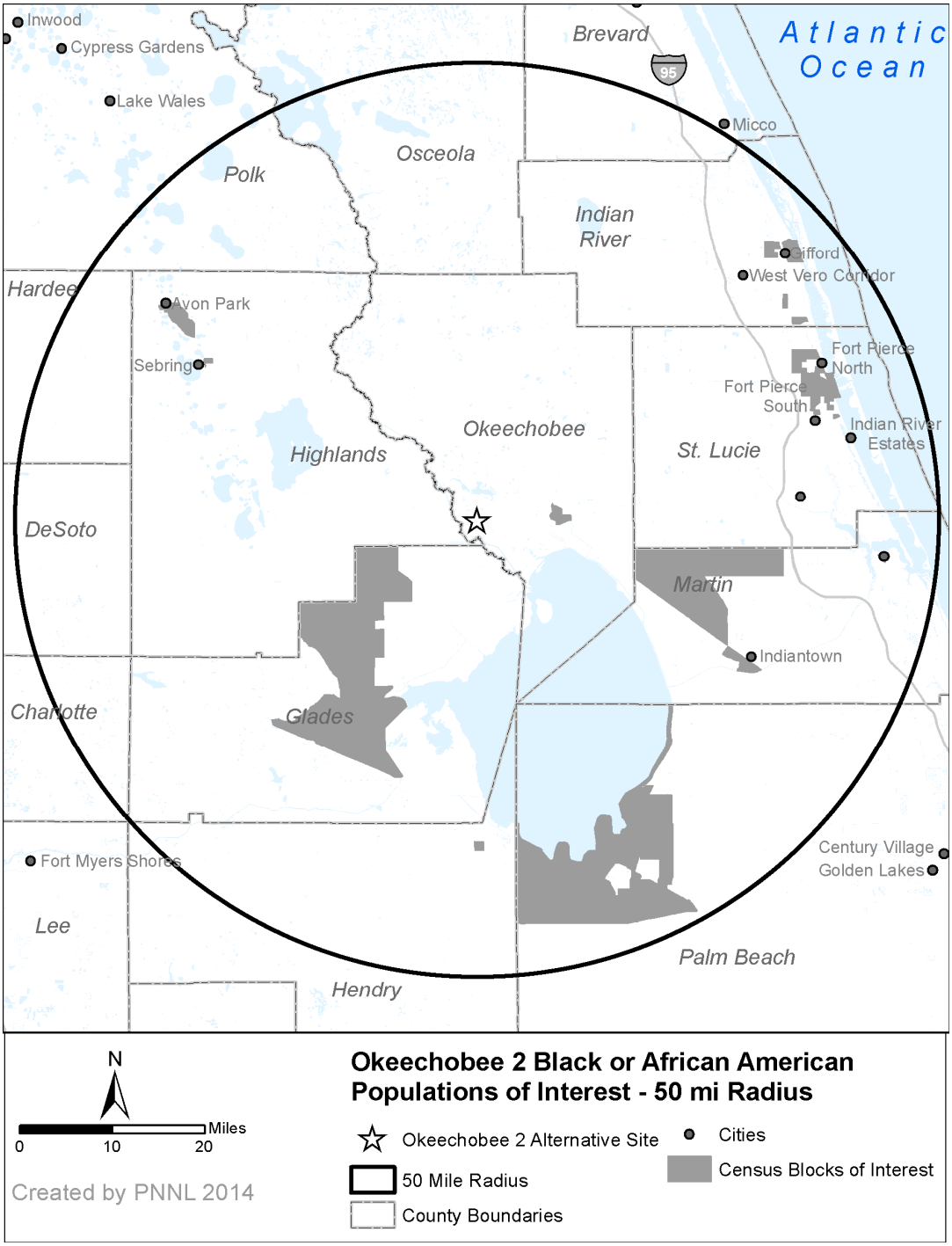

Figure 9-21. African American Populations in Block Groups that Meet the Environmental Justice Selection Criteria within 50 mi of the Okeechobee 2 Alternative Site

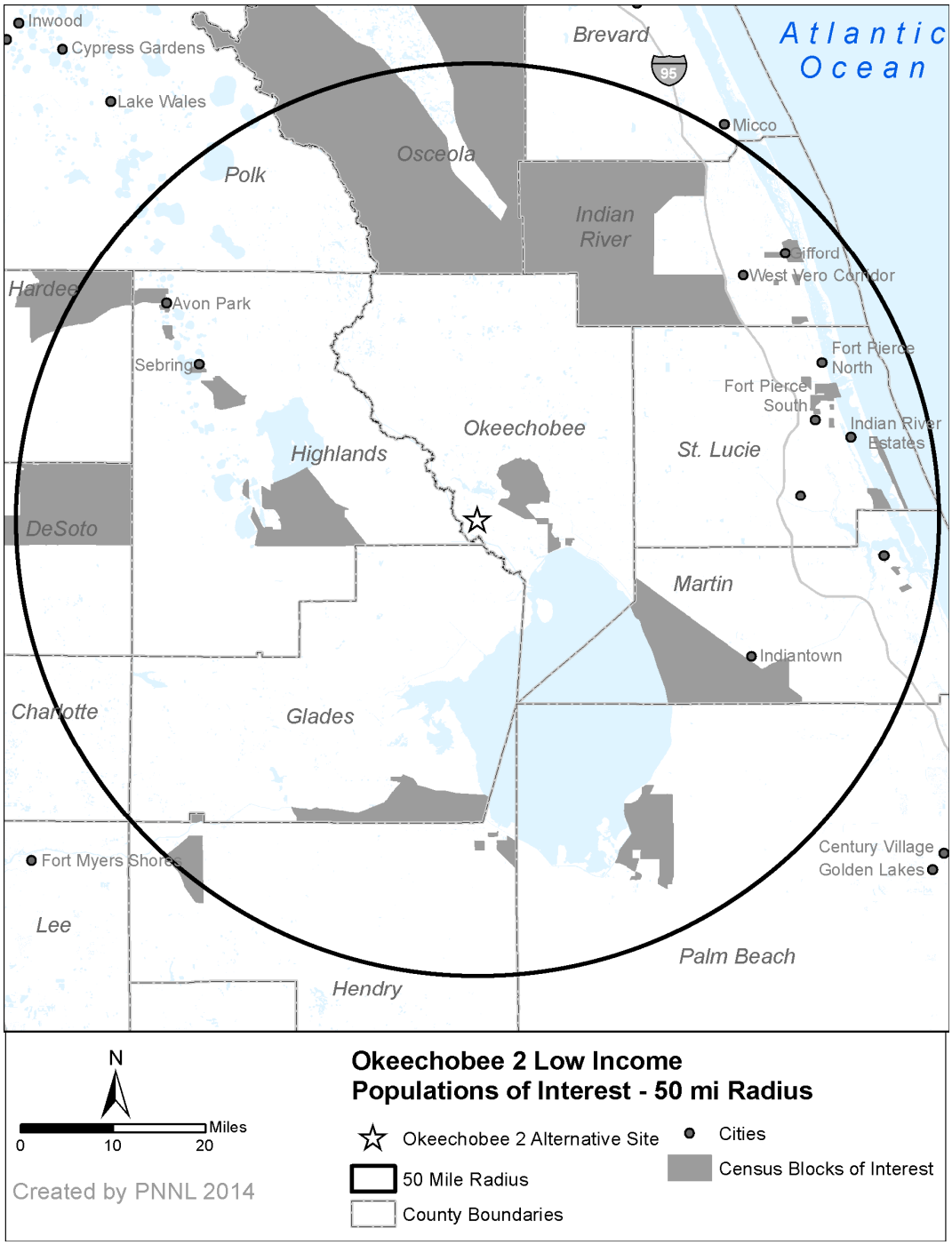

Figure 9-22. Low-Income Populations in Block Groups that Meet the Environmental Justice Selection Criteria within 50 mi of the Okeechobee 2 Alternative Site

9.3.4.7 Historic and Cultural Resources

The following cumulative impact analysis addresses building and operating two new nuclear generating units at the Okeechobee 2 site. The analysis also considers other past, present, and reasonably foreseeable future actions that could affect cultural resources, including the other Federal and non-Federal projects listed in Table 9-16. For the analysis of cultural impacts at the

Okeechobee 2 site, the geographic area of interest is considered to be the APE that would be defined for this site. This includes the direct effects APE, defined as the area physically affected by the site-development and operation activities at the site and within transmission line corridors. The indirect effects APE is defined as the area visually affected and includes an additional 0.5 mi radius APE around the transmission line corridors and a 1 mi radius APE around the cooling towers.

Reconnaissance activities in a cultural resource review have particular meaning. Typically, the activities include preliminary field investigations to confirm the presence or absence of cultural resources. However, in developing this EIS, the review team relied upon reconnaissance-level information to perform its alternative site evaluation in accordance with ESRP 9.3 (NRC 2000-TN614). Reconnaissance-level information consists of data that are readily available from agencies and other public sources. It can also include information obtained through visits to the site area. The following information was used to identify the historic and cultural resources at the Okeechobee 2 site:

- NRC Alternative Sites Visit, July 2010 (NRC 2010-TN3304)
- FPL ER Revision 6 (FPL 2014-TN4058)
- Florida Historical Markers Program (FDHR 2014-TN3877)
- National Register of Historic Places database (NPS 2014-TN3881).

The approximately 3,000 ac Okeechobee 2 site occurs in predominantly agricultural land that is used for cattle, dairy, and citrus operations. Historically, the Okeechobee 2 site and vicinity were largely undeveloped and likely contained intact archaeological sites associated with the past 10,000 years of human settlement. Over time, the area has been disturbed by low-impact development including agriculture, roadways, and low-density rural development. A search of the National Register shows that two significant historic properties are located within 10 mi of the Okeechobee 2 site (FPL 2014-TN4058; NPS 2014-TN3881), as well as several archaeological resources. The two historic properties are the Freedman-Raulerson House and the Okeechobee Battlefield site. The Okeechobee Battlefield is also a National Historic Landmark. A total of 34 properties were found in the four counties in the vicinity of the Okeechobee 2 site (Okeechobee, Glades, Highlands, and St. Lucie Counties). A National Register search of the indirect effects APE for the transmission lines shows that, while no properties are recorded within the APE, these same two historic properties, the Freedman-Raulerson House and the Okeechobee Battlefield site, are located roughly 4 mi and 7 mi to the south, respectively, from the corridor. In addition, the Brighton Seminole Indian Reservation is located roughly 7 mi to the south of the Okeechobee 2 site.

A search of the Florida Historical Markers Program (FDHR 2014-TN3877) by the review team revealed that there is one historic marker in Okeechobee County—a marker near the courthouse in the city of Okeechobee commemorating the founding of the county. The marker is not near the Okeechobee 2 site.

While there are no known historic properties located within the direct effects APE of the Okeechobee 2 site, reconnaissance-level information shows that there are historic properties in the general vicinity of the site, including potentially significant archaeological resources associated with Lake Okeechobee. No archaeological or architectural surveys have been conducted at the Okeechobee 2 site, and locating the nuclear plants there would require formal

cultural resources survey and consultation with SHPO, Tribes, and other interested parties. If any significant cultural, historic, or archaeological resources are identified, those resources could be adversely affected and appropriate mitigation measures would need to be put in place before construction and operation.

Building Impacts

To accommodate the building of two nuclear units and associated facilities at the Okeechobee 2 site, FPL estimates that the total area of land that would be disturbed would be approximately 362 ac for the facility. In addition, a 9.3 mi long road and a 3.9 mi long railroad spur would need to be constructed in the predominantly agricultural land. A portion of SR-70 would need to be widened. An additional 22.5 ac would be disturbed for pipelines and associated facilities (FPL 2014-TN4058). If the Okeechobee 2 site were chosen for the proposed project, identification of cultural resources would be accomplished through additional cultural resource surveys and consultation with the SHPO, Tribes, and interested parties. The results would be used in the site-planning process to address cultural resources impacts. If significant cultural resources were identified by these surveys, the review team assumes that FPL would use the same protective measures used at the Turkey Point site, and therefore the impacts would be minimal. If direct effects on significant cultural resources could not be avoided, land-clearing, excavation, and grading activities could potentially destabilize important attributes of historic and cultural resources.

There are no existing transmission line corridors connecting to the Okeechobee 2 site. Section 9.3.4.1 describes the proposed transmission line corridors, which would consist of new transmission lines extending a total of 38 mi before connecting to an existing network. FPL has stated that consideration would be given to sensitive environmental and built resources in determining a route for the transmission lines (FPL 2014-TN4058), but visual impacts from transmission lines may result in significant alterations to the visual setting of cultural and historic resources within the geographic area of interest, particularly in undeveloped portions of the project area around the nuclear power-generating facility and around the transmission lines in the vicinity of the city of Okeechobee. These indirect effects would be particularly noticeable given that the setting around the Okeechobee 2 site is largely undeveloped, without existing industrial development. If the Okeechobee 2 site were chosen for the proposed project, the review team assumes that FPL would conduct its transmission line−related cultural resource surveys and procedures in a manner similar to that for the Turkey Point site. In addition, the review team assumes that the State of Florida's Final Order on Certification (State of Florida 2014-TN3637) regarding transmission line siting and building activities would also apply, and therefore impacts would be minimal. If direct effects on significant cultural resources could not be avoided, land-clearing, excavation, and grading activities could potentially destabilize important attributes of historic cultural resources. Similarly, both the transmission lines and nuclear power-generating units could indirectly effect cultural and historic resources through visual impacts on the setting of the resources.

Operations Impacts

Impacts on historic and cultural resources from operation of two new nuclear generating units at the Okeechobee 2 site include those associated with the operation of new units and maintenance of transmission lines. The review team assumes that the same procedures

developed by FPL for the Turkey Point site, as well as the State of Florida's Final Order on Certification, would be used for onsite and offsite maintenance activities. Consequently, the incremental effects of the maintenance of transmission line corridors and operation of the two new units and associated impacts on the cultural resources would be negligible for the direct and indirect effects APEs. However, the indirect visual impacts would continue throughout the life of the transmission lines.

Cumulative Impacts

Past actions in the geographic area of interest that have similarly affected historic and cultural resources include rural and agricultural development and activities associated with these land-disturbing activities such as road development. Table 9-16 lists past, present, and reasonably foreseeable projects and other actions that may contribute to cumulative impacts on historic and cultural resources in the geographic area of interest. Projects from Table 9-16 that are relevant to the cultural resources cumulative analysis include the Florida Gas Transmission project, the Highlands Ethanol Facility, the Lake Okeechobee Watershed project, and future urbanization, such as new or expanded roads.

Long linear projects such as new or expanded roads, pipelines, and railway lines may intersect the proposed transmission line corridors. Because cultural resources can likely be avoided by long linear projects, impacts on cultural resources would likely be minimal. If building associated with such activities results in significant alterations of cultural resources in the transmission line corridors, either physical or visual, then cumulative impacts on cultural and historic resources would be greater.

Cultural resources are nonrenewable. Therefore, the impact of the destruction of cultural resources is cumulative. Based on the information provided by FPL and the review team's independent evaluation, the review team concludes that the cumulative impacts from building and operating two new nuclear generating units on the Okeechobee 2 site would be MODERATE. The impacts of building and operating the project at the Okeechobee 2 site would be a significant contributor to the MODERATE impact due primarily to indirect viewshed impacts from the nuclear power-generating plant and transmission lines on historic properties, though direct impacts could occur as well. This impact-level determination is based on reconnaissance-level information and reflects the fact that there are no known cultural resources on the proposed site. It also assumes that, if the Okeechobee 2 site were to be developed, cultural resource surveys and evaluations would be conducted and FPL, in consultation with SHPO, Tribes, and interested parties, would assess and resolve any adverse effects of the undertaking. If cultural or historic resources are present, and if there are adverse effects on those resources, the project could result in greater cumulative impacts.

9.3.4.8 Air-Quality Impacts

The following impact analysis includes impacts from building activities and operations. The analysis also considers other past, present, and reasonably foreseeable actions that affect air quality, including other Federal and non-Federal projects listed in Table 9-16. As described in Section 9.3.4, Okeechobee 2 is a greenfield site; there are currently no nuclear facilities on the site. The geographic area of interest for the Okeechobee 2 site is Okeechobee County, which is in the Southeast Florida Intrastate Air Quality Control Region (40 CFR 81.49) (TN255).

Sections 4.7 and 5.7 discuss air-quality impacts during building and operation. The emissions related to building and operating a nuclear power plant at the Okeechobee 2 alternative site would be similar to those at the Turkey Point site. The air-quality attainment status for Okeechobee County, as set forth in 40 CFR Part 81 (TN255), reflects the effects of past and present emissions from all pollutant sources in the region. Okeechobee County is in attainment of all National Ambient Air Quality Standards.

As described in Chapters 4 and 5, the criteria pollutants from building and operation were found to have a SMALL impact on air quality. In Chapter 7, the cumulative impacts of criteria pollutants were evaluated and also determined to be SMALL to MODERATE. Reflecting on the projects listed in Table 9-16, the most significant is the nearby proposed landfill gas-to-energy project (Okeechobee Landfill) because of its proximity to the Okeechobee 2 site. Emissions from a facility such as this are released through stacks and with significant momentum and buoyancy. Other industrial projects listed in Table 9-16 would likely have de minimis impacts due to their distance from the site. Given that these projects are subject to Clean Air Act permitting requirements, it is unlikely that the air quality in the region would degrade to the extent that the region would be in nonattainment of the National Ambient Air Quality Standards.

The air-quality impact from development of the Okeechobee 2 site would be local and temporary. The applicant would develop a dust-control plan that identifies specific measures to minimize fugitive dust emissions during building activities. The distance from building activities to the site boundary would be sufficient to generally avoid significant air-quality impacts. There are no land uses or projects in Table 9-16, including the aforementioned source, that would have emissions during site development that would, in combination with emissions from the Okeechobee 2 site, result in degradation of air quality in the region. Emissions from operation of two new nuclear units at the Okeechobee 2 site would be intermittent and made at low levels with little or no vertical velocity, similar to operational impacts at the Turkey Point site as discussed in Section 5.7. The air-quality impacts of the Okeechobee Landfill Gas-to-Energy project would be similar to the air-quality impacts of a landfill gas facility discussed in Section 9.2.2.8, which would be noticeable but not destabilizing. The cumulative impacts from emissions of effluents from the Okeechobee 2 site and the aforementioned source would be noticeable but not destabilizing.

The cumulative impacts of GHG emissions related to nuclear power are discussed in Section 7.6. The impacts of the emissions are not sensitive to the location of the source. Consequently, the discussion in Section 7.6 is applicable to a nuclear power plant located at the Okeechobee 2 site. The review team concludes that the national and worldwide cumulative impacts of GHG emissions are noticeable but not destabilizing. The review team further concludes that the cumulative impacts would be noticeable but not destabilizing, with or without the GHG emissions of two new nuclear units at the Okeechobee 2 site.

The review team concludes that cumulative impacts from other past, present, and reasonably foreseeable future actions on air-quality resources in the geographic areas of interest would be SMALL to MODERATE for criteria pollutants and MODERATE for GHG emissions. The incremental contribution of impacts on air-quality resources from building and operating two units at the Okeechobee 2 site would not be a significant contributor to the MODERATE impacts for GHG emissions.

9.3.4.9 Nonradiological Health

The following analysis considers nonradiological health impacts from building and operating two new nuclear units at the Okeechobee 2 site. The analysis also includes past, present, and reasonably foreseeable future actions that could contribute to cumulative nonradiological health impacts on site workers (construction and operation workers) and members of the public, including other Federal and non-Federal projects and the projects listed in Table 9-16 within the geographic area of interest. Nonradiological health impacts at the Okeechobee 2 site are estimated based on information provided by FPL and the review team's independent evaluation. For the analysis of nonradiological health impacts at the Okeechobee 2 site, the geographic area of interest is the site and the immediate vicinity (~2 mi radius) and the associated road and transmission line corridors. This geographic area of interest is based on the localized nature of nonradiological health impacts and is expected to encompass all nonradiological health impacts.

Building activities with the potential to affect the health of members of the public and workers at the Okeechobee 2 site include exposure to dust and vehicle exhaust, occupational injuries, noise, and increased traffic associated with the transport of construction materials and personnel to and from the site. The operations-related activities that have the potential to affect the health of members of the public and workers include exposure to etiological (disease-causing) agents, noise, EMFs, occupational injuries, and impacts from the transport of workers to and from the site.

Building Impacts

Nonradiological health impacts on construction workers and members of the public from building two new nuclear units at the Okeechobee 2 site would be similar to those evaluated in Section 4.8 for the Turkey Point site. During the site-preparation and building phase, FPL would comply with applicable Federal and State regulations on air quality and noise (FPL 2014-TN4058). The Okeechobee 2 site is a greenfield site located in a rural area, and building impacts would likely be negligible on the surrounding area, which is classified as a medium- and low-population area. The incidence of construction worker accidents would be the same as that for the Turkey Point site.

The review team concludes that nonradiological health impacts on construction workers and the public from building two new nuclear units and associated transmission lines at the Okeechobee 2 site would be minimal. Nonradiological health impacts associated with traffic accidents during building activities at the Okeechobee 2 alternative site were evaluated in Section 4.8.3 and the review team concludes that the impacts would be minimal.

Operations Impacts

Nonradiological health impacts on operation workers and members of the public would include those associated with the operation of cooling towers and transmission lines as described in Section 5.8. Based on the configuration of the proposed new units at the Okeechobee 2 site (see Chapter 3 for a detailed site layout description), etiological agents would not be an issue with regard to members of the public because cooling-tower blowdown would be discharged into deep-injection wells not into surface waters. Impacts on workers' health from occupational injuries, noise, and EMFs would be similar to those described in Section 5.8 for the Turkey Point site. Noise and EMF exposure would be monitored and controlled in accordance with

applicable OSHA regulations. Although no detailed noise modeling has been performed for the Okeechobee 2 site, it is likely that noise impacts would be similar to those predicted for operations at the Turkey Point site. The effects of EMFs on human health would be controlled and minimized by conformance with National Electrical Safety Code criteria and adherence to the standards for transmission systems regulated by the FDEP.

The review team concludes that nonradiological health impacts on workers and the public from operating two new nuclear units and associated transmission lines at the Okeechobee 2 site would be minimal. Impacts associated with traffic accidents during operations at the Okeechobee 2 alternative site were evaluated in Section 5.8.6 and the review team concludes that the impacts would be minimal.

Cumulative Impacts

There are no past or present projects identified in Table 9-16 within the geographic area of interest that could affect nonradiological human health in a way similar to the building of two nuclear units at the Okeechobee 2 site. All of the projects that could apply are more than 10 mi from the Okeechobee 2 site.

Reasonably foreseeable projects in Table 9-16 that could affect nonradiological human health in a way similar to the building of two nuclear units at the Okeechobee 2 site include various transportation (roads, traffic, pedestrian) and mining/quarry projects that are planned throughout the region.

There are no past, present, or reasonably foreseeable projects planned within the geographic area of interest that would affect nonradiological human health in a way similar to operating two nuclear units at the Okeechobee 2 site.

The review team concludes that the cumulative impacts on nonradiological health from building and operating two new nuclear units and associated road and transmission lines at the Okeechobee 2 site would be minimal.

Summary Statement

Impacts on nonradiological health from building and operation of two new units at the Okeechobee 2 site are estimated based on the information provided by FPL and the review team's independent evaluation. Although there could be some future activities in the geographical area of interest that could affect nonradiological health in ways similar to the building and operation of two new units at the Okeechobee 2 site and associated offsite facilities, those impacts would be localized and managed through adherence to existing regulatory requirements. The review team concludes that nonradiological health impacts on workers and the public resulting from the building of two new nuclear units and associated road and transmission lines at the Okeechobee 2 site would be minimal. The review team expects that the nonradiological health impacts on the operations employees and the public of two new nuclear units at the Okeechobee 2 site would be minimal. Finally, the review team concludes that cumulative impacts on nonradiological health from past, present, and reasonably foreseeable actions in the geographic area of interest would be SMALL.

9.3.4.10 Radiological Impacts of Normal Operations

The following impact analysis includes impacts from building activities and operations. The analysis also considers other past, present, and reasonably foreseeable actions that affect radiological health, including other Federal and non-Federal projects listed in Table 9-16. As described in Section 9.3.4, Okeechobee 2 is a greenfield site; there are currently no nuclear facilities on the site. The geographic area of interest is the area within a 50 mi radius of the Okeechobee 2 site. St. Lucie Units 1 and 2 (i.e., two nuclear power plants) are the only major facilities within this geographic area of interest that potentially affect radiological health within the 50 mi radius of the Okeechobee 2 site. In addition, there are likely to be medical, industrial, and research facilities within 50 mi of the Okeechobee 2 site that use radioactive materials.

The radiological impacts of building and operating the two proposed Westinghouse AP1000 nuclear power units at the Okeechobee 2 site include doses from direct radiation and liquid and gaseous radioactive effluents. These pathways would result in low doses to people and biota offsite that would be well below regulatory limits. These impacts are expected to be similar to those estimated for the Turkey Point site.

The radiological impacts of St. Lucie Units 1 and 2 include doses from direct radiation and liquid and gaseous radioactive effluents. These pathways result in low doses to people and biota offsite that are well below regulatory limits as demonstrated by the ongoing radiological environmental monitoring program conducted around St. Lucie Units 1 and 2. The NRC staff concludes that the dose from direct radiation and effluents from hospitals and industrial facilities that use radioactive material would be an insignificant contribution to the cumulative impact around the Okeechobee 2 site. This conclusion is based on data from the radiological environmental monitoring programs conducted around currently operating nuclear power plants.

Based on the information provided by FPL and the NRC staff's independent analysis, the NRC staff concludes that the cumulative radiological impacts from building and operating the two proposed Westinghouse AP1000 nuclear power units and other existing and planned projects and actions in the geographic area of interest around the Okeechobee 2 site would be SMALL.

9.3.4.11 Postulated Accidents

The following impact analysis includes radiological impacts from postulated accidents from the operation of two nuclear units at the Okeechobee 2 alternative site. The analysis also considers other past, present, and reasonably foreseeable actions that affect radiological health from postulated accidents, including other Federal and non-Federal projects and the projects listed in Table 9-16. As described in Section 9.3.4, the Okeechobee 2 site is a greenfield site; there are currently no nuclear facilities at the site. The geographic area of interest considers all existing and proposed nuclear power plants that have the potential to increase the probability-weighted consequences (i.e., risks) from a severe accident at any location within 50 mi of the Okeechobee 2 alternative site. Facilities potentially affecting radiological accident risk within this geographic area of interest are the existing two units of St. Lucie, Units 1 and 2.

As described in Section 5.11.1, the NRC staff concludes that the environmental consequences of DBAs at the Turkey Point site would be minimal for AP1000 reactors. DBAs are addressed specifically to demonstrate that a reactor design is robust enough to meet NRC safety criteria. The environmental consequences of DBAs depend on the plant design and the atmospheric

dispersion. The AP1000 design is independent of site conditions and the differences in meteorology of the Okeechobee 2 alternative and Turkey Point sites are not significant with regard to the conditions that are important to assessing DBAs. Therefore, the NRC staff concludes that the environmental consequences of DBAs at the Okeechobee 2 alternative site would be minimal.

With a lower population density and land-use values for the Okeechobee 2 alternative site, the NRC staff expects the risks from a severe accident for an AP1000 reactor located at the Okeechobee 2 alternative site to be similar to or lower than those analyzed for the proposed Turkey Point site. The risks for the proposed Turkey Point site were presented in Tables 5-19 and 5-20 and are well below the median value for current-generation reactors. In addition, as discussed in Section 5.11.2, estimates of average individual early fatality and latent cancer fatality risks are well below the Commission's safety goals (51 FR 30028) (TN594). For existing plants within the geographic area of interest (St. Lucie Units 1 and 2), the Commission has determined that the probability-weighted consequences of severe accidents are small (10 CFR Part 51 [TN250], Appendix B, Table B-1). On this basis, the NRC staff concludes that the cumulative risks from severe accidents at any location within 50 mi of the Okeechobee 2 alternative site would be SMALL.

9.3.5 St. Lucie Site

This section covers the review team's evaluation of the potential environmental impacts of siting a new two-unit nuclear power plant at the St. Lucie alternative site on the eastern coast of central Florida. The site is bordered by the Atlantic Ocean to the east and the Indian River Lagoon to the west. The nearest municipalities are Fort Pierce, approximately 7 mi northwest; Port St. Lucie, approximately 4.5 mi to the west; and Stuart, approximately 8 mi to the south. The nominal site elevation is 0 to 5 ft above sea level, which falls within the 100-year floodplain. The 1,130 ac St. Lucie site is an FPL-owned nuclear power-generation station on Hutchinson Island in St. Lucie County. St. Lucie Units 1 and 2 and associated support facilities occupy less than half of the 1,130 ac site (FPL 2014-TN4058). The location of the St. Lucie site is shown in Figure 9-23.

FPL assumed the facility footprint, including the power units, support buildings, switchyard, storage areas, stormwater-retention ponds, and other structures, would require an estimated 357 ac. Building at the St. Lucie site would also require the creation of a transmission line corridor of approximately 63 mi (2,187 ac), widening of 22 mi of SR-A1A (266.8 ac [a two-lane roadway parallel to the dunes on the barrier island]), a heavy-haul road 0.5 mi (6.3 ac), and an intake/makeup pipeline (10.5 ac) (Figure 9-24). Additional area would be temporarily disturbed for activities such as laydown areas, a batch plant, and for fill and spoil deposition (FPL 2014-TN4058).

The following sections include a cumulative impact assessment conducted for each major resource area. The specific resources and components that could be affected by the incremental effects of the proposed action if implemented at the St. Lucie site and other actions in the same geographic area were considered. This assessment includes the impacts of NRC-authorized construction and operations and impacts of preconstruction activities. Also included in the assessment are past, present, and reasonably foreseeable future Federal, non-Federal, and private actions that could have meaningful cumulative impacts when considered together

with the proposed action if implemented at the St. Lucie site. Other actions and projects considered in this cumulative analysis are described in Table 9-21.

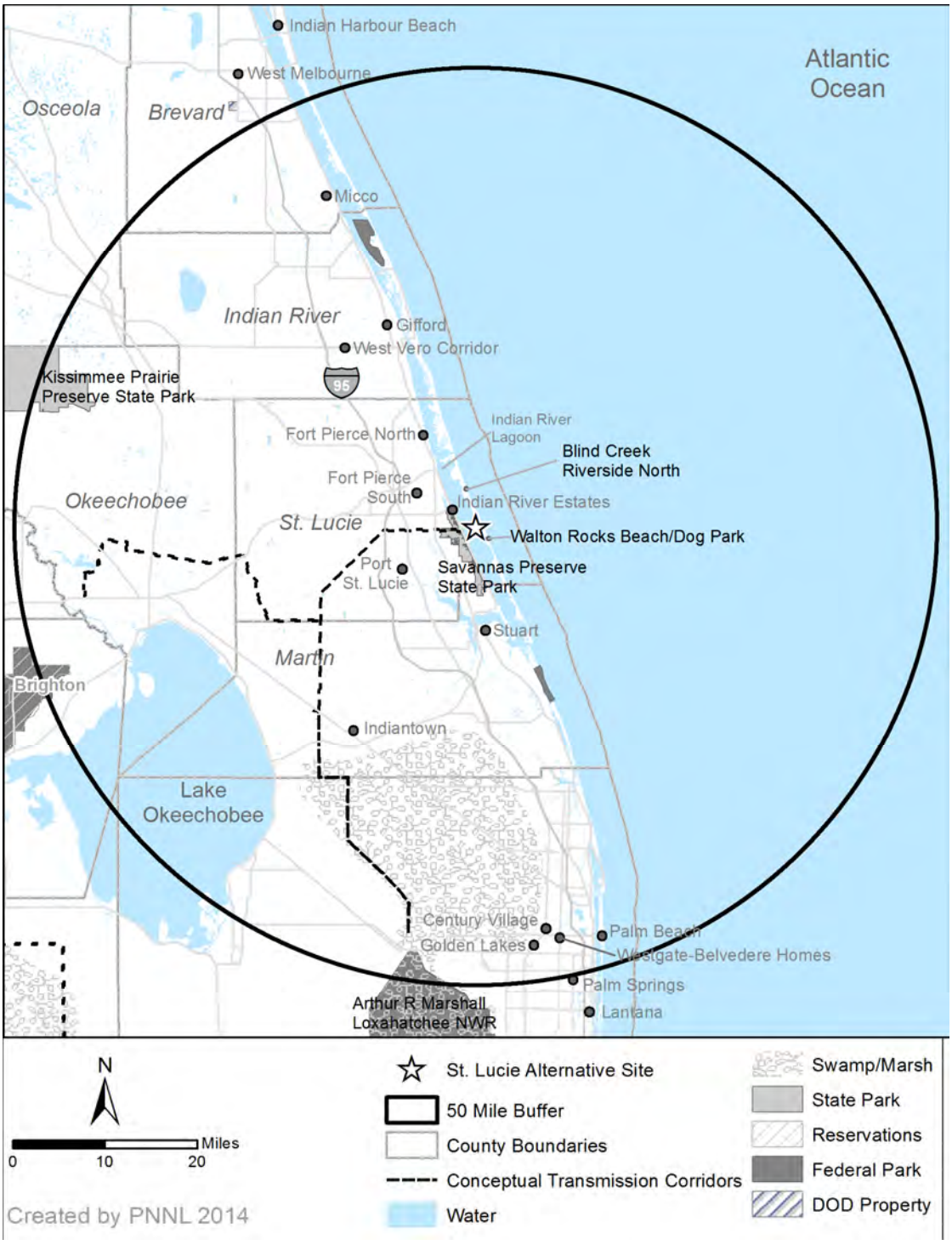

Figure 9-23. St. Lucie Site Region

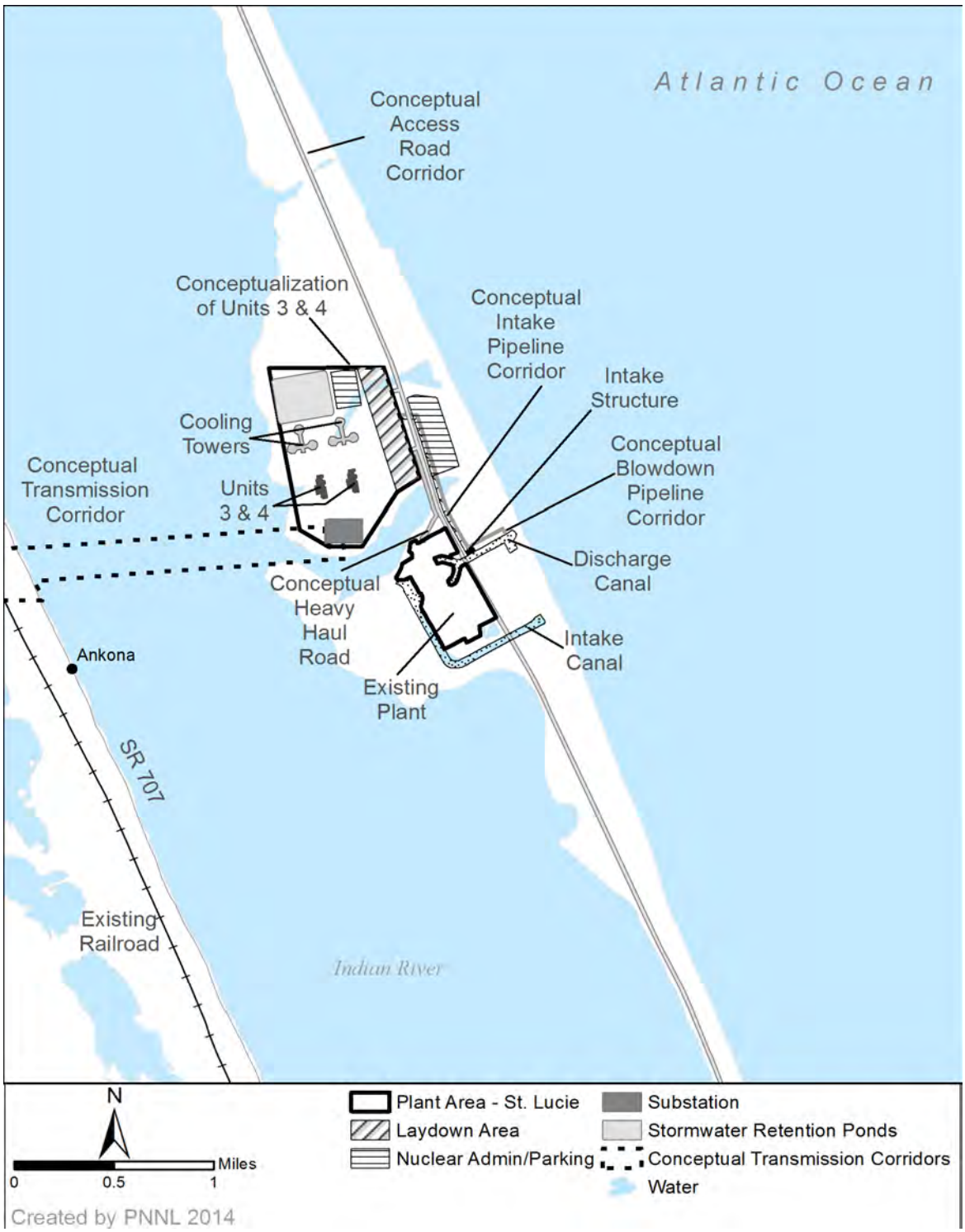

Figure 9-24. St. Lucie Site Footprint

Table 9-21. Past, Present, and Reasonably Foreseeable Projects and Other Actions in the Vicinity of the St. Lucie Site

Project Name	Summary of Project	Location	Status
Energy Projects			
St. Lucie	Two 3,020 MW(t) nuclear power reactors	Adjacent	Operational, Units 1 and 2 underwent license renewal in 2003. Units 1 and 2 completed 320 MW(t) power uprates in 2013 (NRC 2012-TN1668; FPL 2014-TN3360)
West County Energy Center	Three 1,250 MW natural-gas−powered units	28 mi SW of the St. Lucie alternative site	Operational (FDEP 2013-TN2965)
Martin	Approximately 4,300 MW from 5 units, 3 natural-gas and 2 oil units with a solar thermal facility generating supplemental steam	28 mi SW of the St. Lucie alternative site	Operational (FPL 2016-TN4579)
Indiantown Cogeneration Company	330 MW coal-power plant	26 mi SW of the St. Lucie alternative site	Operational (FDEP 2013-TN2967)
FPL pipeline	126 mi pipeline from Sabal Trail's Central Florida Hub to FPL's Martin Clean Energy Center	Throughout region	Proposed, construction set to begin 2016 (FPL 2014-TN2975)
Floridian Natural Gas Storage Company – Natural Gas Storage Facility	Storage of natural gas	26 mi SW of the St. Lucie alternative site	Proposed, FERC Order amending Certificate issued (FERC 2015-TN4599) with associated Environmental Assessment (FERC 2015-TN4600)
Treasure Coast Energy Center	300 MW natural-gas power plant	9 mi SW of the St. Lucie alternative site	Operational (FMPA 2014-TN3029)
INEOS New Planet Bioenergy Center	6.3 MW bioenergy facility	22 mi NW of the St. Lucie alternative site	Operational (EPA 2014-TN3032)
Riviera Beach Energy Center	1,250 MW gas-fired plant	41 mi S of the St. Lucie alternative site	Operational, completed in 2014 (FPL 2014-TN3360)
Okeechobee Landfill Energy	Waste-to-energy facility	27 mi W of the St. Lucie alternative site	Operational (Waste Management 2014-TN3034)
Sea Gen St. Lucie Project	A generation farm containing 20 to 40 submerged SeaGen twin rotor machine generating units having a total installed capacity of 20 to 40 MW	Offshore of St. Lucie County	Proposed, preliminary permit submitted to FERC in 2004. (69 FR 61829) (TN3097)

Table 9-21. (contd)

Project Name	Summary of Project	Location	Status
Mining Projects			
Five Stone Mining	Stone/quarry mining	35 mi SW of the St. Lucie alternative site	Operational (EPA 2013-TN2959)
Daniel Shell Pit, Phase 6	Stone/quarry mining	41 mi W of the St. Lucie alternative site	Operational (EPA 2013-TN2956)
Florida Rock Industries/Fort Pierce	Stone/quarry mining	18 mi W of the St. Lucie alternative site	Operational (EPA 2014-TN3038)
Hammond Sand Mine	Sand/quarry mining	29 mi NW of the St. Lucie alternative site	Operational (EPA 2014-TN3044)
Various other mine and quarry projects	Stone/quarry mining	Throughout region	Operational (FDEP 2010-TN2966)
Transportation Projects			
Various transportation projects	Road, traffic, pedestrian projects	Throughout region	Ongoing (FDOT 2012-TN1132)
Parks and Aquaculture Facilities			
DuPuis Wildlife and Environmental Area	Activities include bicycling, camping, hunting, fishing, and hiking	33 mi SW of the St. Lucie alternative site	Development likely limited within this area (FFWCC 2014-TN2977)
Okeechobee Battlefield State Park	Hiking, camping	35 mi SW of the St. Lucie alternative site	Development likely limited within this area (FDEP 2010-TN2971)
Lake Okeechobee	730 mi^2 freshwater lake, restoration and protection plan	31−54 mi SW of the St. Lucie alternative site	Ongoing, Florida Legislature in 2007 expanded the Lake Okeechobee Protection Act (SFWMD 2014-TN2988)
Johnathan Dickinson State Park	Activities include bicycling, camping, boating, horseback riding, picnicking, fishing, and hiking	23 mi S of the St. Lucie alternative site	Development likely limited within this area (Florida State Parks 2014-TN3048)
Savannas Preserve State Park	Activities include bicycling, boating, horseback riding, picnicking, fishing, and hiking	2 mi W of the St. Lucie alternative site	Development likely limited within this area (Florida State Parks 2014-TN3050)
Fort Pierce Inlet State Park	Activities include bicycling, camping, boating, swimming, picnicking, fishing, and hiking	10 mi N of the St. Lucie alternative site	Development likely limited within this area (Florida State Parks 2014-TN3053)
Pepper Beach State Recreation Area	Activities include swimming,	11 mi N of the St. Lucie alternative site	Development likely limited within this area (St. Lucie County 2014-

Table 9-21. (contd)

Project Name	Summary of Project	Location	Status
	picnicking, fishing, and hiking		TN3054)
St. Sebastian River Preserve State Park	Activities include bicycling, camping, boating, picnicking, fishing, and hiking	34 mi NW of the St. Lucie alternative site	Development likely limited within this area (Florida State Parks 2014-TN3055)
Hobe Sound National Wildlife Refuge	Activities include fishing, and hiking	16−26 mi NW of the St. Lucie alternative site	Development likely limited within this area (FWS 2013-TN3056)
John D. Macarthur Beach State Park	Activities include boating, swimming, picnicking, fishing, and hiking	38 mi NW of the St. Lucie alternative site	Development likely limited within this area (Florida State Parks 2014-TN3057)
Peanut Island Park	Activities include boating, picnicking, fishing, and hiking	41 mi NW of the St. Lucie alternative site	Development likely limited within this area (Palm Beach County 2014-TN3058)
Blue Cypress Conservation Area	Activities include boating, fishing, and wildlife viewing	37 mi NW of the St. Lucie alternative site	Development likely limited within this area (SJRWMD 2014-TN3100)
Pelican Island National Wildlife Refuge	Activities include boating, fishing, and wildlife viewing	33 mi NW of the St. Lucie alternative site	Development likely limited within this area (FWS 2011-TN3101)
Sebastian Inlet State Park	Activities include boating, swimming, picnicking, fishing, bicycling, camping, surfing, wildlife viewing, and hiking	37 mi N of the St. Lucie alternative site	Development likely limited within this area (Florida State Parks 2014-TN3102)
Archie Carr National Wildlife Refuge	Activities include Hiking, fishing, and wildlife viewing	40−50 mi N of the St. Lucie alternative site	Development likely limited within this area (FWS 2011-TN3103)
Indian River Lagoon Preserve State Park	Activities include hiking, swimming, picnicking, fishing, bicycling, and wildlife viewing	43 mi N of the St. Lucie alternative site	Development likely limited within this area (FDEP 2014-TN3104)
Other State nature preserves and wildlife management areas	Public recreational activities	Throughout region	Development likely limited within these areas (FFWCC 2014-TN2981)
Everglades Ecosystem Restoration and/or Comprehensive Everglades Restoration Plan Projects (DOI 2016-TN4589**)**			
Indian River Lagoon – South	Project purpose is to improve surface-	16 mi SW of the St. Lucie alternative site	Proposed, project in preconstruction, engineering and

Table 9-21. (contd)

Project Name	Summary of Project	Location	Status
	water management in the C-23/C-24, C-25, and C-44 basins for habitat improvement in the Saint Lucie River Estuary and southern portions of the Indian River Lagoon.		design phase (USACE and SFWMD 2014-TN3013)
Everglades Agricultural Area Storage Reservoirs	The purpose of this project is to improve the timing of environmental deliveries to the Water Conservation Areas, including reducing damaging flood releases from the Everglades Agricultural Area to the Water Conservation Areas.	Throughout region	Proposed, Final Project Implementation Report submitted 2012 (USACE and SFWMD 2014-TN3011)
Lake Okeechobee Aquifer Storage and Recovery	A series of aquifer storage and recovery wells adjacent to Lake Okeechobee	30 mi SW of the St. Lucie alternative site	Proposed, project in preconstruction, engineering and design phase (USACE and SFWMD 2014-TN3014)
Lake Okeechobee Watershed Project	Project to increase aquatic and wildlife habitat, regulate extreme highs and lows in lake staging, reduce phosphorus loading and reduce damaging releases to the surrounding estuaries.	Throughout Okeechobee County	Proposed, project in preconstruction, engineering and design phase (USACE and SFWMD 2014-TN3015)
Melaleuca eradication and other exotic plants	The project includes (1) upgrading and retrofitting the current quarantine	Throughout region	Operational, facility completed in 2013 (USACE and SFWMD 2014-TN3020)

Table 9-21. (contd)

Project Name	Summary of Project	Location	Status
	facility in Gainesville, and (2) large-scale rearing of approved biological control organisms for release at multiple sites within the South Florida ecosystem to control Melaleuca, Brazilian pepper, Australian pine, and Old World climbing fern.		
Palm Beach County Agriculture Reserve Aquifer Storage and Recovery	Supplement water supplies for central and southern Palm Beach County by capturing and storing excess water currently discharged to the Lake Worth Lagoon.	Palm Beach County	Proposed, project in preconstruction, engineering and design phase (USACE and SFWMD 2014-TN3019)
Herbert Hoover Dike Major Rehabilitation Project	Rehabilitation Project and Dam Safety Modification Study	30−60 mi W of the St. Lucie alternative site	Proposed - Environmental Assessment and FONSI issued in 2015 (USACE 2015-TN4598), Draft Environmental Report issued (DOI 2016-TN4589)
Comprehensive Shoreline Stabilization Project in Palm Beach County	Discharge fill for the purpose of shoreline stabilization	Shoreline of Palm Beach County	USACE submitted Notice of Intent in 2013 (78 FR 40128) (TN3059); EIS completed (CB&I 2014-TN4015)
Lake Worth Inlet Project	Deepening and widening of the Lake Worth Inlet	41 mi S of the St. Lucie alternative site	USACE developed integrated feasibility report in 2013 (USACE 2014-TN4016)
Kissimmee River Restoration	When restoration is completed in 2017, more than 40 mi^2 of river-floodplain ecosystem will be restored, including almost 20,000 ac of wetlands and 44	Along Kissimmee River	Ongoing (USACE 2014-TN3061; DOI 2016-TN4589)

Table 9-21. (contd)

Project Name	Summary of Project	Location	Status
	mi of historic river channel.		
Other Actions/Projects			
Harbor Branch Oceanographic Institute	Oceanic Science and Research	15 mi N of the St. Lucie alternative site	Operational (EPA 2014-TN3071)
Pratt & Whitney	Aircraft engine and engine parts manufacturing	30 mi SW of the St. Lucie alternative site	Operational (EPA 2014-TN3062)
Maverick Boat Company	Fiberglass boat manufacturing	12 mi N of the St. Lucie alternative site	Operational (EPA 2014-TN3063)
Tropicana Products, Inc.	Citrus and animal feed	10 mi W of the St. Lucie alternative site	Operational (EPA 2014-TN3068)
S2 Yachts, Inc.	Fiberglass boat manufacturing	12 mi N of the St. Lucie alternative site	Operational (EPA 2013-TN3069)
Twin Vee, Inc.	Fiberglass boat manufacturing	7 mi N of the St. Lucie alternative site	Operational (EPA 2013-TN3070)
Various wastewater-treatment plant facilities	Sewage treatment	Throughout region	Operational
Various hospitals using nuclear material	Medical and other industrial isotopes	Throughout region	Ongoing
Various water/flood-management projects	Water and flood management	Throughout region	Ongoing (USACE 2012-TN1133)
Future urbanization	Construction of housing units and associated commercial buildings; roads, bridges, and rail; construction of water-treatment and/or wastewater-treatment and distribution facilities and associated pipelines, as described in local land-use planning documents	Throughout region	Construction would occur in the future, as described in State and local land-use planning documents

The geographic area of interest for cumulative impacts considers all existing and proposed nuclear power plants that have the potential to increase the probability-weighted consequences (i.e., risks) from a severe accident at any location within 50 mi of the St. Lucie site (Figure 9-23). An accident at a nuclear plant within 100 mi of the St. Lucie site could increase this risk. Other nuclear plants in Florida, Alabama, and Georgia are more than 100 mi from the St. Lucie site and are therefore not included in the cumulative impact analysis.

9.3.5.1 Land Use

The following analysis includes land-use impacts from building activities and operations. The analysis also considers other past, present, and reasonably foreseeable future actions that affect land use, including other Federal and non-Federal projects listed in Table 9-21. For the analysis of land-use impacts at the St. Lucie site and the area within the transmission line corridors, the review team determined that a 10 mi radius, similar to that used for the proposed Turkey Point plant site, would encompass an effective geographic area of interest for cumulative impact assessment for land use, because it would include the site and associated facilities and the nearby urban area surrounding the city of Port St. Lucie. In evaluating the land-use impacts of using the St. Lucie site, the review team used, in addition to the project application, readily obtainable data from the Internet or published sources, including aerial photographs of the site and vicinity, USDA soils information, local zoning and planning documents, and FLUCFCS data. Impacts from both building and station operation are discussed.

Building and Operations Impacts

The St. Lucie alternative site is the site of an existing nuclear power-generating station situated on a barrier island. Approximately 103.8 ac of the alternative plant site are currently devoted to developed uses associated with the existing electrical power-generation facility. FPL states in its application (FPL 2014-TN4058) that the undeveloped land area at the St. Lucie alternative site is adequate for construction and operation of another power plant, but that there would be site-planning constraints related to the site being located on a long and narrow island. In addition, widening of SR-A1A would be required, and as stated in Section 9.3.5.5, the conceptual design route of the access road and widening of SR-A1A would lead to the displacement of approximately 202 structures, based on aerial view of rooftops (FPL 2011-TN59). Thus, the road widening would have land-use impacts that would be noticeable and would alter considerably the physical attributes of the residential neighborhoods they cross.

Existing land uses in the vicinity of the St. Lucie alternative site, in addition to developed areas of the city of Port St. Lucie, consist predominantly of water, because it is adjacent to the Atlantic Ocean and Indian River Lagoon, mangrove swamps, and many State and Federal parks and preserves. The St. Lucie alternative site is located within the Coastal Zone (FPL 2014-TN4058). The closest population center with more than 25,000 population are Port St. Lucie, 4.5 mi to the west and Fort Pierce 7 mi northwest (FPL 2014-TN4058).

No soils classified as Prime or Unique farmlands are found at the site, which is situated on a barrier island. Areas in agriculture in the vicinity of the site are classified as Unique farmlands (USDA 2014-TN3354; USDA 2014-TN3355). No commercial mineral resources are identified in the site and vicinity (Calver 1956-TN3752; Spencer 1993-TN3753). Many wildlife management areas and recreational areas are located in the vicinity of the alternative site, including the

Savannas Preserve State Park, which is a 5,400 ac freshwater marsh preserve and park that includes multi-use recreational areas (Florida State Parks 2014-TN3050); Blind Creek Riverside North, a 50 ac wetland preserve on Indian River Lagoon (St. Lucie County 2014-TN4017); and Walton Rocks Beach/Dog Park, a 24 ac public park at the beach with multi-use recreational facilities (St. Lucie County 2014-TN4017).

The alternative site is located within the 100-year flood zone (St. Lucie County 2010-TN4020), and FPL states (FPL 2014-TN4058) that development of the site would require approximately 15 ft of fill to bring the site to 20 ft msl. The review team believes that such extensive fill could substantially alter localized coastal flooding patterns. The effect could be exacerbated by the substantial loss of tidal wetlands.

The St. Lucie County Comprehensive Plan Future Land Use Element refers to the St. Lucie alternative site as follows: "…two miles of oceanfront property are owned by the Florida Power & Light Company, and are to be maintained in their present natural state in conjunction with the operation of the St. Lucie Power Plant facilities." The Comprehensive Plan designates the site as Transportation/Utilities (T/U) and states that "the purpose of this district is to recognize the Transportation or Utility use of property."

Therefore, use of the St. Lucie alternative site for a power plant could be considered to be compatible with the St. Lucie County Comprehensive Plan designations for the site, if it did not interfere with the preservation of the oceanfront area identified by the Comprehensive Plan in a natural state. The review team expects that, if built in accordance with FPL's present concept, the project would not interfere with ongoing preservation of the oceanfront area in a mostly natural state.

St. Lucie County zoning for the alternative plant site and some area to the north and south is U, Utilities. The St. Lucie County zoning code describes this zone as follows:

> U UTILITIES
>
> Purpose. The purpose of this district is to provide and protect an environment suitable for utilities, transportation, and communication facilities, together with such other uses as may be compatible with utility, transportation, and communication facility surroundings

The zoning designation for the lands to the north and south of the industrially zoned lands is R/C, Residential/Conservation. The St. Lucie County zoning code describes this zone as follows:

> R/C RESIDENTIAL/CONSERVATION.
>
> Purpose. The purpose of this district is to provide and protect an environment suitable for single-family dwellings at a maximum gross density of one (1) dwelling unit per five (5) gross acres, together with such other uses as may be necessary for and compatible with low density residential surroundings.

Therefore, the use of the St. Lucie alternative site for a power plant would be compatible with the zoning for the site and nearby lands.

Building and operation of the project at the St. Lucie site would result in the conversion of approximately 536 ac of undeveloped land to power-generation uses (Table 9-22). It would also require the reuse of approximately 104 ac of existing developed land, for a total land commitment of approximately 640 ac for the new plant.

Table 9-22. St. Lucie Alternative Site Land-Use Impacts (Acres)

	Agricultural Lands (FLUCFCS 200 Land Use Series)	Urban Developed Lands (other than roads and pipelines)[a]	All Other non-Agricultural Lands (all other FLUCFCS designations)	Total
Plant Site	0	0	320	320
Access Roads	0	104	163	267
Rail Corridor	0	0.2	6	6
Intake Pipeline Corridor	0	0	4	4
Makeup Pipeline Corridor	0	0.1	6	6
Stormwater-Retention Ponds	0	0	37	37
Total[b]	0	104	536	640
Transmission Line Corridor	507	20	2,167	2,187
Grand Total	507	124	2,704	2,827

(a) Includes power-generation uses
(b) Totals may not add due to rounding

Sources: FPL 2011-TN59 and FPL 2014-TN4058

Additional land-use impacts include possible additional growth and land conversions in the vicinity to accommodate new workers and services. Because the alternative site is located near the urban area of Port St. Lucie and other urban and suburban areas along the coast, and the workforce would be dispersed over larger geographic areas in the labor supply region, the impacts from land conversion for residential and commercial buildings induced by new workers relocating to the local area could be absorbed in the wider region. Therefore, the review team concludes that such impacts would be minimal.

Approximately 63 mi of new transmission system infrastructure would have to be built to serve the plant. Given the location of the alternative site, and as FPL states in its ER (FPL 2014-TN4058), the transmission lines would pass through the Coastal Zone. Approximately 2,187 ac of land would be at least temporarily affected. Of this land, approximately 507 ac are in agricultural uses, 20 ac are currently devoted to urban uses, including electrical power generation, and the remainder is primarily open lands and roadways. The agricultural land within the transmission line corridors would be converted from agricultural use to transmission line use, although FPL states in its ER (FPL 2014-TN4058) that agriculture could continue within and along the transmission line rights-of-way. The land uses along the conceptual corridors for new transmission lines to serve the St. Lucie alternative site are identified in Table 9-22.

Under the Florida Site Certification Application process explained in Chapter 4.1, the State approves a corridor and the applicant chooses a specific right-of-way within the approved corridor. The objective of this process, as stated in the electrical power plant and transmission line statute (FDEP 2013-TN2629) is “that the location of transmission line corridors and the construction, operation, and maintenance of electric transmission lines produce minimal adverse effects on the environment and public health, safety, and welfare” and “to fully balance

the need for transmission lines with the broad interests of the public in order to effect a reasonable balance between the need for the facility as a means of providing reliable, economical, and efficient electric energy and the impact on the public and the environment resulting from the location of the transmission line corridor and the construction, operation, and maintenance of the transmission lines." FPL states in its application that, in its development of the conceptual transmission line corridor for the St. Lucie alternative site, it attempted to select corridors that would allow collocation with existing transmission line corridors and avoided populated areas or residential land uses to some extent (FPL 2014-TN4058). The State certification review process also includes a determination of land-use consistency with local land-use plans and zoning ordinances (Fla. Stat. 29-403.50665-TN1470).

The review team concludes that the land-use impacts from building and operating two new nuclear units at the St. Lucie alternative site would be noticeable, but not destabilizing.

Cumulative Impacts

Within the geographic area of interest, the only reasonably foreseeable activities shown on Table 9-21 that would have the potential to affect cumulative land-use impacts is future urbanization. The existing St. Lucie Units 1 and 2 contribute to the cumulative land-use impacts.

In the area affected by the transmission lines, other linear projects are proposed, including the Florida Gas Transmission Phase VIII Expansion Project, as shown in Table 9-21. The review team expects that these corridors, if combined with building and operating the proposed transmission lines for nuclear plants at the St. Lucie site, would have a minimal cumulative land-use impact on the local area.

Summary Statement

Based on the information provided by FPL and the review team's independent review, the review team concludes that the cumulative land-use impacts of building and operating the power plant at the St. Lucie alternative site would be MODERATE. This conclusion primarily reflects the project's use of the St. Lucie alternative site, specifically the extensive modification needed to a narrow barrier island setting subject to coastal flooding and the potential for site-planning constraints related to a major industrial development on a long and narrow island. The conclusion also reflects the need to widen a 22 mi segment of SR-A1A, a two-lane roadway parallel to the dunes on the barrier island, to provide access for building and operation of the subject nuclear plant. Past, present, and reasonably foreseeable urban development in relative confined yet environmentally sensitive barrier island setting also contribute to the MODERATE conclusion. The incremental effect of building and operating the new nuclear units at the St. Lucie site would however be a significant contributor to the MODERATE conclusion.

9.3.5.2 Water Use and Quality

The following impact analysis includes impacts from building activities and operations. The analysis also considers other past, present, and reasonably foreseeable future actions that could affect water use and quality, including the other Federal and non-Federal projects listed in Table 9-21. The St. Lucie site is located on Hutchinson Island in St. Lucie County.

The geographic area of interest for surface water at the St. Lucie site includes the Atlantic Ocean, Indian River watershed and the small watershed on Hutchinson Island in the vicinity of the site and for groundwater, the surficial aquifer at the site and the Upper Floridan aquifer within 20 mi of the site. These regions are of interest because they represent the water resource potentially affected by building and operating the proposed project at the St. Lucie site.

Building Impacts

Consistent with the proposed water use at the Turkey Point site, the review team assumed that no surface water would be used to build the units at the St. Lucie site. Therefore, the review team determined that there would be no impacts on surface-water use. Water for building activities would be obtained from the City of Fort Pierce and the Fort Pierce Utilities Authority. Potable water for service uses (totaling 131,500 gpd) at St. Lucie Units 1 and 2 currently comes from this source (FPL 2014-TN4058). The Fort Pierce Utilities Authority draws water from 41 wells completed in the surficial aquifer and 9 wells completed in the Floridan aquifer. The utilities authority has a water-use permit from the SFWMD district to withdraw up to 21.13 Mgd of groundwater (FPUA 2013-TN2978).

Groundwater use for building activities at the St. Lucie site would be similar to the proposed water use for building activities for the Turkey Point site. During building, water use is estimated to be 565 gpm (0.8 Mgd) (see Table 3-4). This would represent approximately 3 percent of the current capacity of the Fort Pierce Utilities Authority water-supply system.

Surface-water quality would most likely be affected by surface-water runoff during site preparation and the building of the facilities. The FDEP would require FPL to develop an erosion and sediment control plan and a SWPPP (FPL 2014-TN4058). These plans would be developed before initiation of site-disturbance activities and would identify measures to be used during site-preparation activities to mitigate erosion and control stormwater runoff (FPL 2014-TN4058).

The plans would identify BMPs to control the impacts of stormwater runoff. The review team anticipates that FPL would construct new detention/infiltration ponds and drainage ditches to control delivery of sediment from the disturbed area to onsite waterbodies. Sediment carried with stormwater from the disturbed area would settle in the detention ponds and the stormwater would infiltrate into the shallow aquifer. Implementation of BMPs should minimize impacts on surface waterbodies near the St. Lucie site. Therefore, the surface-water-quality impacts near the St. Lucie site would be temporary and minimal.

While building new nuclear units at the St. Lucie site, groundwater quality may be affected by leaching of spilled effluents into the subsurface. The review team assumes that the BMPs FPL has proposed for the Turkey Point site would be in place during building activities and therefore the review team concludes that any spills would be quickly detected and remediated. In addition, groundwater impacts would be limited to the duration of these activities, and therefore, would be temporary. The review team reviewed the general BMPs that could be expected to be required at such a site (State of Florida 2014-TN3637). Because any spills related to building activities would be quickly remediated under BMPs, and the activities would be temporary, the review team concludes that the groundwater-quality impacts from building at the St. Lucie site would be minimal.

Operations Impacts

FPL has indicated that a closed-cycle cooling system would be used for new units at the St. Lucie site. The system would use cooling towers with the makeup water coming from the Atlantic Ocean and blowdown water being returned to the Atlantic Ocean. The review team assumed that the makeup-water withdrawal rate and the blowdown discharge rate would be the same as that at the Turkey Point site when the proposed units at that site were operating on the backup water system, specifically 86,400 gpm (124 Mgd) and 58,922 gpm (85 Mgd), respectively.

Because the Atlantic Ocean is a virtually unlimited source of water, the review team determined that the use of Atlantic Ocean waters for cooling the additional units at the St. Lucie site would have a minimal impact. Therefore, the impact on surface-water resources due to plant use during operations would not be noticeable.

During operations of the new units at the St. Lucie site, potable water and water for service uses would come from the City of Fort Pierce and the Fort Pierce Utilities Authority. The review team assumed that the water consumed for the two new units would be equivalent to the amount used at the existing plants or 131,500 gpd. As mentioned above, this water comes from groundwater wells and the anticipated consumption is approximately 0.6 percent of the current authorized withdrawal for the Fort Pierce system. Therefore, the impact on groundwater resources due to plant use during operations would not be noticeable.

During the operation of the additional units at the St. Lucie site, impacts on surface-water quality could result from stormwater runoff, discharges of treated sanitary and other wastewater, and blowdown from cooling towers into the Atlantic Ocean. The FDEP would require FPL to develop a SWPPP (FPL 2014-TN4058). The plan would identify measures to be used to control stormwater runoff (FPL 2014-TN4058). The blowdown would be regulated by FDEP pursuant to 40 CFR Part 423 (TN253), and all discharges would be required to comply with limits established by FDEP in an NPDES permit.

During the operation of the additional units at the St. Lucie site, impacts on groundwater quality could result from accidental spills. Because BMPs would be used to quickly remediate spills and no intentional discharge to groundwater would occur, the review team concludes that the groundwater-quality impacts from operation of the additional units at the St. Lucie site would be minimal.

Cumulative Impacts

In addition to water-use and water-quality impacts from building and operations activities, cumulative analysis considers past, present, and reasonably foreseeable future actions that affect the same water resources.

The geographic area of interest for surface water includes the Atlantic Ocean in the vicinity of the St. Lucie site. The geographic area of interest for groundwater includes the surficial aquifer and the Upper Floridan aquifer in the region. These areas are of interest because they represent the water resource potentially affected by building and operating the additional units at the St. Lucie site. Key actions that have past, present, and future potential impacts on water

supply and water quality near the St. Lucie site include the operation and decommissioning of the existing units at the St. Lucie site and existing and future urbanization in the region.

Cumulative Impacts on Water Use

The only surface-water−use impacts of building and operating the additional units at this site are the water demands occurring during operation. Because the Atlantic is a virtually unlimited source of water supply compared to the makeup-water requirements for additional units at the site and the makeup-water requirements for the other units at the St. Lucie site the review team determined that the use of water from the Atlantic Ocean would have essentially no impact on surface-water use. Therefore, the review team concludes that cumulative impacts on surface-water use would be SMALL.

Groundwater supplied by the City of Fort Pierce and the Fort Pierce Utilities Authority would be used during the building and operation of additional units at the St. Lucie site. Groundwater would continue to be used by the existing units at the site for potable and service-water systems. There is increasing demand for potable water in St. Lucie County because of continuing development, population growth, and urbanization. Most of the population growth is occurring along the coast and the I-95 corridor. To meet this demand, the County plans to build additional water-treatment plants (St. Lucie County 2010-TN4020). Most of the potable water in the area has historically come from the surficial aquifer. However, brackish water from the deeper Floridan aquifer is now being withdrawn and desalinated to provide additional supplies of potable water. As mentioned above, the City of Fort Pierce and the Fort Pierce Utilities Authority currently have permits to withdraw 21.13 Mgd. Water use at the St. Lucie site while operating Units 1 and 2 (131,500 gpd or 0.13 Mgd) and building the two proposed units (565 gpm or 0.81 Mgd) would be 0.94 Mgd. This is less than 4.4 percent of the permitted withdrawal for the Fort Pierce Utilities Authority. Groundwater use with the existing and new units operating would be 263,000 gpd (0.26 Mgd), which is approximately 1 percent of the permitted withdrawal for the Fort Pierce Utilities Authority. Therefore, the review team concludes that cumulative impacts on groundwater use would be SMALL. The impacts of other projects listed in Table 9-21 are either considered in the analysis included above or would have little or no impact on surface-water and groundwater use.

Cumulative Impacts on Water Quality

As described above, the impacts from building and operating two additional units at the St. Lucie site on surface-water quality would be minimal. Other present and reasonably foreseeable future actions in the geographic area of interest of the St. Lucie site include the operation of existing units at the site. The areal extent of the influence of these facilities on water quality is small, and the influence of these facilities would be limited to Hutchinson Island. The FDEP, under the Clean Air Act Section 305(b) (33 U.S.C. § 1251 et seq.) (TN662), prepares a statewide Water Quality Inventory. The FDEP also identifies impaired waterbodies during this process and lists them on the Clean Water Act 303(d) list impaired and threatened waters.

The Atlantic Ocean in areas of southern Florida has been listed on the 303(d) list as impaired because of the presence of mercury in fish, bacteria in shellfish, and fecal coliform. Therefore,

the review team concludes that past and present actions in the region have noticeably affected the water quality adversely. Based on its evaluation, the review team concludes that the cumulative surface-water−quality impacts would be MODERATE. Building and operating the proposed units at the St. Lucie alternative site would not be a significant contributor to these impacts on surface-water quality, because industrial and wastewater discharges from the proposed units would comply with NPDES permit limitations and any stormwater runoff from the site during operations would comply with the SWPPP (FPL 2014-TN4058). Like many areas of southeast Florida, groundwater quality in St. Lucie County has been affected by saltwater intrusion from the Atlantic because of (1) the channeling of surface runoff to the ocean through drainage canals, and (2) the pumping of groundwater. The water quality of the surficial aquifer in some areas of the county has also been degraded by the infiltration of brackish water used for irrigation (St. Lucie County 2010-TN4020). However, these issues are being addressed by service providers and local agencies, and would not make the cumulative impacts on groundwater greater than small. The review team also concludes that with the implementation of BMPs, the impacts on groundwater quality from building and operating two additional units at the St. Lucie site would likely be minimal, and therefore, the cumulative impact on groundwater quality would be SMALL. The impacts of other projects listed in Table 9-21 are either considered in the analysis included above or would have little or no impact on surface-water and groundwater quality.

9.3.5.3 Terrestrial and Wetland Resources

The following section addresses potential impacts on terrestrial and wetland resources from siting two new nuclear units at the St. Lucie site in South Florida and within a conceptual transmission line corridor, which begins in St. Lucie County and passes through portions of Martin and Palm Beach Counties. The St. Lucie site is an 1,130 ac site that already contains two operating nuclear power units. It is located on Hutchinson Island formed by the Atlantic Ocean to the east and the Indian River Lagoon to the west. The site lies within the 100-year floodplain and, other than sand dunes, topography does not vary considerably over the site (FPL 2014-TN4058).

Information from the FWS indicates St. Lucie County hosts multiple terrestrial species that are listed as Federally endangered or threatened (Table 9-23). Surveys were conducted in the past at the St. Lucie site in conjunction with license renewal activities (NRC 2003-TN3152). Although the eastern indigo snake was not observed on the site, it has been observed on Hutchinson Island and suitable habitat is present within site boundaries so it was assumed to be present. Wood storks have also been occasionally observed at the site (NRC 2003-TN3152). The Florida scrub jay is known to inhabit the existing transmission line corridor near Savannas State Preserve (on the mainland west of Hutchinson Island) and Audubon's crested caracara and the Everglade snail kite are suspected to occur there as well (NRC 2003-TN3152). Habitat preferences for all of the species except the fragrant prickly-apple (*Cereus eriphorus* var. *fragrans*) were discussed in previous alternative site sections, so habitat preferences for only this species are discussed here. The fragrant prickly-apple is a tree cactus that grows in coastal hammocks along the east side of the Atlantic Coastal Ridge (FWS 1999-TN136). It was listed as potentially occurring within the existing transmission line corridor (NRC 2003-TN3152) and is confirmed to occur in only 10 locations, 9 of which are in the Savannas Preserve State Park immediately across the Indian River Lagoon from the St. Lucie site (FWS 2010-TN3049).

Although it is not known to occur on Hutchinson Island, future management actions call for surveys for it on the south part of the island. The four-petal pawpaw may also occur within the existing transmission line corridor (NRC 2003-TN3152).

Table 9-23. Federally Listed Terrestrial Species that May Occur on the St. Lucie Site or within the Conceptual Transmission Line Corridor

Scientific Name	Common Name	Federal Status
Birds		
Polyborus plancus audubonii	Audubon's crested caracara	Threatened
Rostrhamus sociabilis plumbeus	Everglade snail kite	Endangered
Aphelocoma coerulescens	Florida scrub jay	Threatened
Campephilus principalis	Ivory-billed woodpecker	Endangered
Dendroica kirtlandii	Kirtland's warbler	Endangered
Charadrius melodus	Piping plover	Threatened
Picoides borealis	Red-cockaded woodpecker	Endangered
Calidris canutus rufa	Red knot[(a)]	Threatened
Mycteria americana	Wood stork	Threatened
Grus americana	Whooping crane	Endangered
Mammals		
Puma concolor coryi	Florida panther	Endangered
Peromyscus polionotus niveiventris	Southeastern beach mouse	Threatened
Reptiles		
Drymarchon corais couperi	Eastern indigo snake	Threatened
Invertebrates		
Cyclargus thomasi bethunebakeri	Miami blue	Endangered
Strymon acis bartrami	Bartram's scrub-hairstreak[(a)]	Endangered
Anaea troglodyte floridalis	Florida leafwing[(a)]	Endangered
Plants		
Cereus eriphorus var. *fragrans*	Fragrant prickly-apple	Endangered
Decerandra immaculate	Lakela's mint	Endangered
Polygala smallii	Tiny polygala	Endangered
Jacquemontia reclinata	Beach jacquemontia[(a)]	Endangered
Asimina tetramera	Four-petal pawpaw[(a)]	Endangered
Cucurbita okeechobeensis ssp. okeechobeensis	Okeechobee gourd[(a)]	Endangered

(a) Additional listed species occurring in Martin and/or Palm Beach County (FWS 2014-TN3731; FWS 2014-TN3759).

Source: FWS Natural Resources of Concern Information, Planning, and Conservation System Website (FWS 2014-TN3762).

FPL assumed the facility footprint, which would include the power units, support buildings, switchyard, storage areas, parking areas, water intake and discharge canals, and other structures, would require approximately 357 ac, mostly on the west side of SR-A1A (Table 9-22). Building at the St. Lucie site would also require approximately 267 ac to widen a stretch of SR-A1A, 6.3 ac for a heavy-haul road from the barge slip, and 10.5 ac for

intake/blowdown pipeline corridors. There is no current rail access to the St. Lucie site, but rail access would not be needed. Additional acreage would be temporarily required for laydown areas, a batch plant, and spoil deposition.

The conceptual transmission line corridor was assumed to be 63 mi long to connect the St. Lucie site with the Corbett substation in Palm Beach County. This corridor would vary from approximately 200−660 ft in width and require an additional 2,187 ac of land.

The following sections describe a cumulative impact assessment conducted for terrestrial and wetland resources. The review team assessed the specific resources that could be affected by the incremental effects of the proposed action if it were sited at the St. Lucie site as well as other actions in the same geographic area. This assessment includes the impacts from building activities and operations. Also included are other past, present, and reasonably foreseeable future Federal, non-Federal, and private actions that could have meaningful cumulative impacts along with the proposed action. Other actions and projects considered in this cumulative analysis are described in Table 9-21.

Most of the St. Lucie site that would be developed for new nuclear units is classified as either wetlands or previously developed lands. Mangrove swamp is the most abundant wetland type and the most predominant land cover found on the site. Embayments within the Indian River Lagoon are also a prominent land cover. Significant amounts of previously developed lands are also present. Land cover within the conceptual transmission line corridor differs from the site and includes more uplands than wetlands as well as lands used for agriculture.

Building Impacts

FPL estimated that 2,827 ac of land would be affected if two new nuclear units were built at the St. Lucie site (Table 9-24). Preconstruction and construction activities would include clearing, grading, excavation, and spoil deposition and dewatering. Typical impacts from nuclear unit preconstruction and construction to terrestrial resources and wetlands include permanent and temporary habitat loss from development, habitat fragmentation and degradation, disturbance and displacement of individual wildlife, and increased risk of vehicle collision mortality to local wildlife populations. The conversion of fully developed and stable plant communities to earlier successional communities dominated by lower growing vegetation during development of linear transmission or pipeline corridors often results in a high degree of habitat fragmentation within the landscape. FPL included 2,187 ac of land within a conceptual transmission line corridor, including 1,525 ac of uplands and 684 ac of wetlands (FPL 2011-TN59). The conceptual transmission line corridor includes approximately 392 ac of dry prairie, 261 ac of pine flatwoods, and lesser amounts of shrub and brushland, mixed rangeland, hydric pine flatwoods, palmetto prairie, and woodland pasture. Wetlands within the conceptual transmission line corridor include approximately 283 ac of freshwater marsh, 157 ac of embayments, 78 ac of wet prairie, 63 ac of mixed wetland hardwoods, 41 ac of coastal scrub, 32 ac of emergent aquatic vegetation, and 15 ac of mangrove swamp. Impacts from transmission line corridor development and operation on habitat are mostly from alteration and fragmentation rather than complete and permanent loss and are discussed in a separate section below.

Table 9-24. Acreage within the Conceptual Footprint at the St. Lucie Site

FLUCFCS Code	Description	Site and Non-Transmission (ac)	Transmission (ac)
200-series	Agriculture	0	507
300-series	Uplands	8	643
400-series	Forest	35	311
500-600 series	Water and Wetlands	478	684
100, 700, and 800 series	Developed	120	42
Total[(a)]		640	2,187

(a) The review team acknowledges a discrepancy of approximately 23 ac in the terrestrial versus land-use figures and has determined that this discrepancy is inconsequential to the analyses and conclusions.

Source: FPL 2011-TN59

Plant Facilities

If the nuclear power units, access road, rail line, and pipeline were built within the proposed footprint, an estimated total of 640 ac would be affected (Table 9-24). Much of the area within the St. Lucie conceptual footprint is currently classified as mangrove swamp (FPL 2011-TN59). FPL anticipated 246 ac of mangrove swamp would be permanently developed by building within the plant area, and an additional 110 ac would be permanently developed by widening SR-A1A. Other wetlands affected include embayments and coastal scrub. The sum of lost wetland habitat from development of the plant area, immediate surrounding area, and the SR-A1A corridor is approximately 478 ac. Approximately 39 ac of upland habitat would also be permanently lost, including 21 ac of upland hardwood forest and minor amounts of cabbage palm, dry prairie, and areas of non-native tree cover. Preconstruction activities would be conducted in accordance with all Federal and State regulations, permit conditions, and BMPs, including the use of directed drainage ditches and silt fencing. Acreage within the conceptual transmission line corridor was minimized to the extent possible by using the most direct route while avoiding areas with important resources and high biological value. FPL also stated that any wetland functions affected within the transmission line corridor would be replaced or restored (FPL 2014-TN4058).

The supplement for relicensing of the existing St. Lucie Nuclear Power Plant did not report the occurrence of Federally listed species on the site (NRC 2003-TN3152). The distribution and abundance of species on the site are however unknown, and there may still be some Federally listed threatened or endangered species onsite (FPL 2014-TN3792). No part of Hutchinson Island has been designated as critical habitat for any listed species, but much of the island including the St. Lucie site is located within the core foraging area of two nearby wood stork colonies, so loss of shallow-water habitats could reduce forage available to wood storks. The loss of mangrove swamps and embayments could eliminate stopover habitat used by the red knot during migration. Loss of upland habitats containing gopher tortoise (*Gopherus polyphemus*) burrows could eliminate eastern indigo snake habitat. The southeastern beach mouse (*Peromyscus polionotus niveiventris*) occurs in sand dune habitat. Although sand dune habitat is present at the St. Lucie site on the east side of SR-A1A and elsewhere on Hutchinson Island, the southeastern beach mouse is not known to occur anywhere on Hutchinson Island

and may have been locally extirpated (NRC 2003-TN3152). The nearest known population is at Fort Pierce Inlet State Park located roughly 9 mi north across Fort Pierce Inlet on North Hutchinson Island (FWS 2008-TN3073). The unique setting and habitats on a barrier island would preclude most of the other Federally listed species known to occur in St. Lucie County from actually occurring at the St. Lucie site or being noticeably affected by proposed actions at the site or immediate vicinity. However, impacts from the development and operation of a transmission line corridor could affect listed species.

Transmission Lines and Access Roads

Field surveys dated 2001 report the occurrence or expected occurrence of certain Federally listed species in the transmission line corridor for those units but not on the site (NRC 2003-TN3152). The new units may use this existing transmission line corridor. Approximately 720 ac of habitat potentially suitable for Audubon's crested caracara is contained within the conceptual transmission line corridor. Habitats preferred by the Everglade snail kite total almost 315 ac within the corridor. Approximately 169 ac of scrub habitat is also within the corridor. The Florida scrub jay thrives in scrub habitat, but it is not known whether the potentially affected scrub habitats also contain oak that is favored by this bird species. Kirtland's warbler uses scrub habitat in Florida, and the alteration of scrub within the corridor could result in less available habitat. Loss and degradation of mangroves, freshwater marsh, and embayments within the conceptual corridor could reduce the amount of migratory stopover habitat for the red knot. Wet prairie and freshwater marsh habitats frequented by whooping cranes total approximately 361 ac. Wood stork nesting colonies are located along the North Fork of the St. Lucie River and at Sewall's Point, approximately 7 mi southwest and 11 mi south-southeast from the St. Lucie site. Approximately 402 ac of land cover suitable for wood stork foraging exists within the conceptual transmission line corridor, and an unknown portion of this would lie within the 18.6 mi core foraging area of both of these colonies and possibly others (FWS 2010-TN3080). A considerable amount of upland cover would also be suitable for the eastern indigo snake, including more than 1,000 ac within the conceptual transmission line corridor. The existing corridor passes through portions of a red-cockaded woodpecker occurrence area (FWS 2014-TN3734). The removal of trees from a portion of the 544 ac of forested land cover within the corridor could result in the loss of red-cockaded woodpecker habitat. Changes in habitats within the conceptual transmission line corridor, including ground clearing, elimination of woody vegetation, and planting and maintenance of low-growing vegetation such as grass, would affect the habitat suitability of these areas to the aforementioned Federally listed species and could increase the likelihood of non-native plants being accidentally introduced.

Because the conceptual transmission line corridor also passes through Martin County and a portion of Palm Beach County, the review team also considered impacts on additional Federally listed species and those species proposed for Federal listing known to occur in those counties. Bartram's hairstreak, the Florida leafwing, Florida perforate cladonia, Florida prairie-clover, four-petal pawpaw, and Okeechobee gourd would not be affected by the transmission line. Either they do not occur in the vicinity, or the habitats that they prefer are not represented in land-cover information FPL stated could be affected.

Increased traffic on transmission access roads could also contribute to the spread of non-native plant or animal species within these habitats. Increased traffic could also increase the risk of

vehicle strike mortality to the eastern indigo snake. The snake would be prone to increased mortality from off-road vehicle use during land clearing and increased traffic during construction and operation. As with construction and operation at the Turkey Point site, mitigation requirements by the FFWCC including staff awareness training and reporting would minimize negative impacts on the eastern indigo snake. Habitat fragmentation and loss would also affect local populations of plants and wildlife expected to occur within the region in suitable habitat that are not Federally listed. However, these effects are not expected to be noticeable and would not destabilize even local populations of any of these animals. Additional Federally listed species not expected to be affected are the ivory-billed woodpecker, Miami blue butterfly, Florida panther, fragrant prickly-apple, Lakela's mint, and tiny polygala. The St. Lucie site lies outside all designated management zones for the Florida panther. The Corbett substation is approximately 2 mi inside of the outermost management zone, and habitats between the substation and the zone boundary are either already developed or highly fragmented. Locations at which all of the other species are known to occur would not be affected.

Operations Impacts

Operation of two nuclear units at the St. Lucie site would create noise, fogging and dissolved solid deposition from cooling towers, runoff from increased impermeable surfaces, light pollution, and increased vehicle collision mortality to local wildlife populations. Operation of transmission lines could increase the risk of bird collision and electrocution mortality.

Operational noise from the cooling towers may displace individual animals from the immediate vicinity of the cooling towers. Salinity levels within cooling water would be equal to seawater. Vapor leaving a cooling tower contains dissolved solids including salt, and some vegetation can be sensitive to salt deposition. The review team assumed salt deposition from cooling-tower drift at the St. Lucie site would be similar in scale and intensity to deposition at the Turkey Point site. Most of the salt would likely be deposited on developed land near the cooling towers, and concentrations as high as 10 kg/ha/mo that have resulted in observable effects to sensitive plant species could be expected as far as 1.25 mi from the cooling towers. Like the Turkey Point site, the St. Lucie site is a coastal site and the vegetation in the vicinity would already be adapted to a high-salt environment, so the effects from additional salt deposition from the cooling towers on vegetation would likely not be noticeable beyond the boundaries of the site.

The creation of impermeable surfaces and a stormwater runoff management system at the St. Lucie site would likely result in changes in surface-water flow patterns into the Indian River Lagoon. Increases or decreases in the amount and timing of flow could result in changes in vegetative cover but would be limited to areas immediately surrounding developed areas. Erosion and sedimentation of wetlands could result during facility building activities. Pollutants could also be transported by runoff into the surrounding wetlands. BMPs would be expected to be followed with respect to protecting wetlands.

Light pollution during facility operation could affect wildlife residing on or migrating through the St. Lucie site. The St. Lucie site already has operating power units and the incremental increase in light would not be expected to noticeable alter local wildlife distribution or abundance.

EMFs are unlike other agents that have an adverse impact (e.g., toxic chemicals and ionizing radiation) in that dramatic acute effects cannot be demonstrated and long-term effects, if they exist, are subtle (NRC 2013-TN2654). A careful review of biological and physical studies of EMFs did not reveal consistent evidence linking harmful effects with field exposures (NRC 2013-TN2654). The impacts of EMFs on terrestrial flora and fauna are of small significance at operating nuclear power plants, including transmission systems with variable numbers of power lines and lines energized at levels less than 765 kV (NRC 2013-TN2654). Since 1997, more than a dozen published studies have looked at cancer in animals that were exposed to EMFs for all or most of their lives (Moulder 2005-TN1329). These studies have found no evidence that EMFs cause any specific types of cancer in rats or mice (Moulder 2005-TN1329). Therefore, the incremental EMF impact posed by operation of existing transmission lines and the addition of new lines for two new nuclear units would be negligible at the St. Lucie alternative site.

Transmission line corridor vegetation-management activities (cutting and herbicide application) and related impacts on floodplains and wetlands in transmission line corridors are of minor significance at operating nuclear power plants, including those with transmission line corridors of variable widths (NRC 2013-TN2654). The presence of overhead wires above and guy wires within habitat potentially suitable for the whooping crane, wood stork, Audubon's crested caracara, and the Everglade snail kite could increase their risk of electrocution and collision mortality. The existing transmission line corridor from the St. Lucie site exits the site westward across the Indian River Lagoon, then turns south and eventually southeast to the Corbett substation. The wood stork colony at Sewall's Point lies southwest between the St. Lucie site and the Corbett substation, but if the conceptual corridor follows the existing path, wires would not pass within approximately 5 mi of an existing wood stork colony. Transmission lines connecting the St. Lucie site to the Corbett substation would pass through core foraging areas of multiple wood stork colonies (FWS 2014-TN3732). The risk of collision and electrocution mortality for the wood stork increases if transmission lines are operated within their range and there is suitable habitat within the transmission right-of-way. The level of risk is commensurate with the location of the transmission lines and wood stork nesting colonies, foraging habitat, and travel corridors. The review team assumed the FWS would regulate wire installation in proximity to wood stork colonies, foraging habitat, flight corridors (Section 9.3.2.3), and important snail kite habitats as it does at the Turkey Point site, but wire installation could still affect local wood stork, whooping crane, crested caracara, and snail kite populations. Operational effects on other important species would be minimal.

Cumulative Impacts

The geographic area of interest for the assessment of the potential cumulative impacts of building and operating a new reactor at the St. Lucie site and other past, present, and reasonably foreseeable future actions on terrestrial resources and wetlands is defined as the 50 mi radius around the St. Lucie site. A list of past, present, and reasonably foreseeable actions within 50 mi of the St. Lucie site is presented in Table 9-21. This list includes a variety of energy-production projects, mining, manufacturing, infrastructure-development projects, set-aside areas for recreation and conservation, CERP-related projects, and other water-management actions. Other miscellaneous activities that could affect terrestrial and wetland resources in the region include the creation of the 2,700 ac stormwater-treatment area 1E.

Past land use in South Florida, especially agriculture and more recently urbanization, has greatly affected the distribution and abundance of unfragmented plant and wildlife habitats still remaining. Development and urbanization of higher elevation lands has drastically reduced the amount of pine flatwoods, coastal scrub, and other remaining upland habitat. Ditching and draining created more dry land, reducing the amount of wetlands available as habitat. The continued operation and maintenance of existing facilities would likely not exacerbate the current situation with respect to terrestrial and wetland ecosystems. Numerous mining projects exist in the vicinity, and expansion of these as well as the creation of the Lake Point Mine has the potential to increase their footprint and development in general on the landscape, as does continued human population growth in South Florida. Lands set aside for recreation and conservation would continue to provide buffers against development, provide habitat for plants and animals, and serve to preserve the remaining ecosystem of South Florida. Projects that incrementally reverse changes in land cover due to man-made changes in surface-water flow, including CERP-related activities, would also continue to benefit both terrestrial and wetland ecology of the region.

As described in Chapter 7, terrestrial and wetland environments in South Florida have been affected by continued population growth and related development. The overall impact from past, present, and reasonably foreseeable future activities on regional terrestrial and wetland ecology is substantial.

Summary Statement

The loss of more than 600 ac of habitat, much of it mangrove forest, on the ecologically sensitive barrier island containing the St. Lucie site would be noticeable. Furthermore, the building and operation of a 63 mi long transmission line corridor to service two new units at the St. Lucie site would produce noticeable impacts on terrestrial ecological resources and wetlands both on the barrier island and on the mainland landscape to the west. Approximately 482 ac of wetland habitats including more than 400 ac of mangrove swamp and smaller areas of freshwater marsh would be permanently lost to build the transmission line. FPL included over 2,187 ac of land within a 63 mi long conceptual transmission line corridor that was 200−660 ft wide. The corridor contained 986 ac of uplands as well as 607 ac of forested cover. These figures do not account for uplands that have been developed or are currently used for agriculture or pasture. Although the entire corridor would not be developed and all lands would not be lost as habitat, some portion would be lost to pole installation, road development, or altered to low-growing vegetation. Habitats of significant ecological value in South Florida that could be affected include mangrove swamp, freshwater marsh, herbaceous prairie, and pine flatwoods. Impacts on Federally listed terrestrial species and their habitats would be noticeable and would require mitigation.

Based on the information provided by FPL and the review team's independent evaluation, the review team concludes that the cumulative impacts on terrestrial and wetland resources of building and operating two new nuclear units at the St. Lucie alternative site, including impacts attributable to permanent conversion of habitat for the facility footprint as well as operation of the cooling tower and transmission lines would be MODERATE. The incremental effect of the building and operation of two new nuclear units at the St. Lucie site would be a significant

contributor to this impact, primarily because of effects on mangroves and the proposed transmission line corridor impacts on forest habitat.

9.3.5.4 Aquatic Resources

What follows is an assessment of the potential impacts on aquatic resources that may occur if the two nuclear units described by FPL (2014-TN4058) were constructed and operated at the St. Lucie alternative site. It is also assumed the existing infrastructure at the St. Lucie site, including the intake and discharge structures systems and components used by the existing nuclear units at this location, would have sufficient excess capacity to support two additional closed-cycle cooling units. Unless otherwise noted, the information presented in this section was obtained from FPL's ER, Revision 6 (FPL 2014-TN4058).

The St. Lucie alternative site is an 1,130 ac industrial site owned by FPL and located on Hutchinson Island in St. Lucie County, Florida (Figure 9-24). The site currently supports two operating nuclear units that were relicensed in 2003 for an additional 20 years of operation after completion and publication of a supplemental EIS by the NRC (2003-TN3152). The site is situated between two major aquatic ecosystems: the Atlantic Ocean to the east and the Indian River Lagoon to the west. The site is approximately 7 mi southeast of Fort Pierce, and 4 mi east of the city of St. Lucie, and is situated on the west side of SR-A1A. Two county parks with beach access (Blind Creek Pass Park and Walton Rocks Park) are within the St. Lucie Units 1 and 2 property boundary. The Indian River Lagoon to the west of the St. Lucie site is a long, shallow estuary that extends along the central east coast of Florida. Near the St. Lucie site, the lagoon is approximately 7,200 ft wide. The Jensen Beach to Jupiter Island Aquatic Preserve is adjacent to the site. To the east, the ocean floor is composed of unconsolidated sediment containing quartz and calcareous sand, and shell fragments. Water depths approximately 1 mi from shore are less than 40 ft. A complete description of the existing units is found in NRC (2003-TN3152). The existing Units 1 and 2 use a once-through cooling-water system that withdraws from and discharges into the Atlantic Ocean via offshore intake and discharge structures. The plant can withdraw water for station cooling from the Indian River Lagoon via Big Mud Creek under emergency conditions (NRC 2003-TN3152). For the purpose of this review, it is assumed that water for the closed-cycle cooling system proposed for the new reactors would use the existing intake and discharge canals that support Units 1 and 2. The review team also assumes the facility footprint would require 357 ac, and the conceptual transmission line corridor to support the new units would be 63 mi long and occupy 2,187 ac.

As described in NUREG–1437, Supplement 11 (NRC 2003-TN3152), extensive environmental studies were conducted in the Atlantic Ocean and the Indian River Lagoon near the St. Lucie site prior to construction and operation of Units 1 and 2. What follows is a brief description of the information presented by the NRC (2003-TN3152) and more recent studies conducted by FPL, as described in ER Revision 6 (FPL 2014-TN4058).

Commercial and Recreational Species

Based on the information presented by the NRC (2003-TN3152), invertebrate species with commercial or recreational value present in the Atlantic Ocean in the vicinity of St. Lucie included the Atlantic calico scallop (*Argopecten gibbus*), various shrimp of the family Penaeidae, and the blue crab (*Callinectes sapidus*). These species were generally collected infrequently

and in small numbers. Fish species with commercial or recreational value included the Bluefish (*Pomatomus saltatrix*), Spanish Mackerel (*Scomberomorus maculatus*), and King Mackerel (*Scomberomorus cavalla*). These species are highly migratory, spawn in coastal waters from late summer into winter (depending on species), and migrate northward along the East Coast during the warmer season. Recreationally important fish species present near the St. Lucie site included Ladyfish (*Elops saurus*), Common Snook (*Centropomus undecimalis*), and various billfish species. As reported by FPL (2014-TN4058), tilefish (*Caulolatilus* spp.) and Swordfish (*Xiphias gladius*) are also present near the St. Lucie site.

Important Species

Atlantic Ocean

Extensive environmental baseline studies conducted at Atlantic Ocean sites near St. Lucie included surveys of zooplankton, phytoplankton, benthic invertebrates, and fish communities. The results of some of these studies are described in detail by the NRC (2003-TN3152), and additional discussion is provided by FPL (2014-TN4058). Initial baseline monitoring established that there were three subtidal microhabitats near the plant: shallow beach terrace, offshore shoal, with a deep trough between the two. These microhabitats contained different sediment compositions, which influence invertebrate and fish abundance and diversity. Phytoplankton communities were dominated by diatoms; zooplankton communities were generally dominated by copepods and reflected species that spend their entire lifecycle in the water column. Baseline data described 127 species of arthropods and nearly 300 species of mollusks. As described above, the calico scallop, blue crab, and a variety of shrimp were of commercial value. Baseline studies also identified more than 900 taxa of benthic macroinvertebrates in ocean waters near St. Lucie. Fish sampling methods during baseline studies included bottom trawls and beach seines. Bottom trawls during early baseline studies were generally ineffective, catching fewer than 40 fish during one eight-month sampling effort. Beach seines collected over 11,500 fish in November 1971, and Cuban and Longnose Anchovies (*Anchoa cubana* and *A. nasuta*) dominated the samples. As noted by the NRC (2003-TN3152), offshore fish communities were generally transitional assemblages of temperate and tropical forms. To avoid affecting species attracted to reef structures, FPL sited the intake and discharge structures for St. Lucie Unit 1 and 2 in areas where reef systems were not present.

Indian River Lagoon

As described by the NRC (2003-TN3152), environmental studies were conducted in the Indian River Lagoon from the late 1960s to the 1980s near the site of St. Lucie Units 1 and 2. This portion of the estuary contains extensive growths of manatee grass (*Syringodium filiforme*) that supports a variety of species, including amphipods, shrimp, isopods, crab, and juvenile fish. A diverse assemblage of fish species are present in the area, including Red Drum, Spotted Seatrout, Common Snook, Sheepshead Minnows, and Gray Snapper.

Essential Fish Habitats

A variety of managed species under the jurisdiction of the South Atlantic Fishery Management Council (SAFMC) are present near the St. Lucie site (Table 9-25). Although there is no designated essential fish habitat (EFH) for Coastal Marine Pelagics near the St. Lucie site,

SAFMC has identified habitats of particular concern (HAPCs) in the Atlantic Ocean and Indian River Lagoon near the site. Coral/Coral Reef EFH is identified in the Atlantic Ocean near the site, and HAPC is designated in ocean and lagoon areas near the site. Snapper-Grouper EFH and HAPC are present in both waterbodies, and Spiny Lobster EFH is also present at both locations. Shrimp EFH is designated in both Atlantic and Indian River Lagoon areas near the site, and HAPC is designated in the Indian River Lagoon.

Table 9-25. Essential Fish Habitat and Habitat Areas of Particular Concern Present near the St. Lucie Site

	Atlantic Ocean		Indian River Lagoon	
Applicable Fishery Management Plan	**EFH**	**HAPC**	**EFH**	**HAPC**
Coastal Marine Pelagic	No	Yes	No	Yes
Coral/Coral Reef	Yes	Yes	No	Yes
Snapper/Grouper	Yes	Yes	Yes	Yes
Spiny Lobster	Yes	No	Yes	No
Shrimp	Yes	No	Yes	Yes

Source: SAFMC EFH Viewer (SAFMC 2014-TN2946)

Non-Native or Nuisance Species

Non-native or nuisance species that have been observed in the Indian River Lagoon near St. Lucie include the Brown Hoplo (*Hoplosternum littorale)* and green mussel (*Perna viridis*) (FISP 2009-TN3064). In addition, the FFWCC has identified the Lionfish (*Pterois volitans*), which is known to occur along the coast of Florida, as a threat to saltwater fish and wildlife (FFWCC 2014-TN3065).

Federally and State-Listed Species and Critical Habitats

Federal or State-listed species and Species of Concern that could be present near the St. Lucie site are listed in Table 9-26. Large whales are known to occur along the coast of South Florida, and may, on occasion, occur close to the St. Lucie facility. The five species of sea turtles listed in Table 9-26 have been reported on Hutchinson Island, where the loggerhead sea turtle is the most common. As described by the NRC (2003-TN3152), between 5,000 and 8,000 loggerhead nests have been reported on Hutchinson Island. Green and leatherback turtle nests have also been documented on the island. FPL (2014-TN4058) indicated Kemp's ridley and hawksbill sea turtle nests have not been reported near St. Lucie. The discovery of a Smalltooth Sawfish in the St. Lucie intake canal on May 16, 2005, during the course of normal sea turtle netting activities prompted the development of a biological assessment that was submitted to National Marine Fisheries Service (NMFS) in November 2005 (FPL 2005-TN3156). A biological assessment related to sea turtle capture during normal operations at St. Lucie was developed by the NRC in 2007 (NRC 2007-TN3074) and consultation with NMFS was concluded and a biological opinion was issued on March 24, 2016 (NMFS 2016-TN4778). The NRC also provided an EFH assessment in 2012 related to the power uprate proposed by FPL for Units 1 and 2 (NRC 2012-TN3155). Additional information about the operation of St. Lucie Units 1 and 2 may be found in FPL (2014-TN3917).

Table 9-26. Federally or State-Listed Species and Species of Concern Likely to Occur at or near the St. Lucie Site

Common Name	Scientific Name	Classification	Federal Designation	State Designation
Sei whale	*Balaenoptera borealis*	Mammal	Endangered[a]	Endangered[a]
Finback whale	*Balaenoptera phusalus*	Mammal	Endangered[a]	Endangered[a]
North Atlantic right whale	*Eubalaena glacialis*	Mammal	Endangered[a]	Endangered[a]
Humpback whale	*Megaptera novaeaniae*	Mammal	Endangered[a]	Endangered[a]
Sperm whale	*Physetercatodon*	Mammal	Endangered[a]	Endangered[a]
Florida manatee	*Trichechus manatus latirostris*	Mammal	Endangered[b]	Endangered[b]
Green sea turtle	*Chelonia mydas*	Reptile	Endangered[b]	Endangered[b]
Hawksbill sea turtle	*Eretmochlys imbricata*	Reptile	Endangered[b]	Endangered[b]
Kemp's ridley sea turtle	*Lepidochelys kempii*	Reptile	Endangered[b]	Endangered[b]
Loggerhead sea turtle	*Caretta caretta*	Reptile	Endangered[b]	Endangered[b]
Leatherback sea turtle	*Dermochelys coriacea*	Reptile	Endangered[b]	Endangered[b]
American alligator	*Alligator mississippiensis*	Reptile	Threatened[c] SOA[d]	Threatened[c] SOA[d]
Smalltooth Sawfish	*Pristis pectinata*	Fish	Endangered[c]	Endangered[c]
Mangrove Rivulus	*Rivulus marmoratus*	Fish	Species of Concern[b]	Species of Special Concern[b]
Johnson's Seagrass	*Halophila johnsonii*	Plant	Threatened[a]	-

(a) ML031360705, St. Lucie Relicensing SEIS (NRC 2003-TN3152)
(b) FNAI 2013-TN3066
(c) FFWCC 2013-TN3075
(d) SOA = similarity of appearance to American crocodile

Building Impacts

Based on the information provided by FPL, a total of 357 ac would be required for the main power plant site, and an additional 2,187 ac would be required to support transmission lines. The facility footprint would primarily affect mangrove swamp habitat, resulting in a permanent loss of resource. Transmission line construction would likely affect existing agricultural activities, and would likely require water crossings that could temporarily affect aquatic resources during tower construction. Because the review team assumes that the existing intake and discharge canal structures used by St. Lucie Units 1 and 2 would support the cooling of the new units, building impacts on nearshore areas would be greatly reduced, and would likely be primarily associated with stormwater management that would be mitigated through BMPs and compliance with NPDES permits. As noted by FPL, Coastal Zone Management certification would be required, given the proximity of the St. Lucie site to the Atlantic Ocean. Building activities would be mainly confined to the western portions of the existing site and are not expected to affect nesting turtles or turtle movements in the Atlantic or Indian River Lagoon. FPL has indicated field surveys for Federally or State-listed species would be conducted prior to building activities at the site or within transmission line corridors.

Operations Impacts

Assuming the cooling systems used at the St. Lucie site for the new reactors would be similar to those described in Section 3.4.5 for proposed Units 6 and 7 at Turkey Point when saltwater is used, the maximum water withdrawal rate would be approximately 86,400 gpm and the maximum blowdown discharge would be approximately 58,922 gpm. The existing St. Lucie Units 1 and 2 once-through cooling system requires between 800,000 to 1,120,000 gpm, depending on condenser cleanliness (NRC 2003-TN3152), and these units received license renewals by the NRC on November 2, 2003 (NRC 2013-TN3079). The recent extended power uprate granted in 2012 for these units increased water discharge temperatures by approximately 3°C, but did not increase flow (NRC 2012-TN3153). Comparing the maximum water withdrawal rate for the proposed to units to the range of once-through water flow for the existing units shows the new units would increase the existing intake flow rate by between 7.7 and 10.8 percent. This would likely result in some increase in impingement and entrainment losses related to the existing intake. Blowdown contributions to the existing discharge canal and outfall would represent increases in flow rates ranging from approximately 5 to 7 percent, depending on actual water flow of the Unit 1 and 2 cooling system. Blowdown discharges may contribute to both discharge water temperature and contaminant load, and would be subject to NPDES permitting. Assuming a closed-cycle cooling system and compliance with the EPA's 316(b) Phase I requirements for intake structures (66 FR 65256) (TN243), the intake is considered protective of aquatic life. The review team considers the anticipated impacts of impingement and entrainment to be minimal.

Also, operation of the cooling towers may increase nearby salt deposition. The effects of additional salt deposition are likely to not be significant for surface-water habitats near the area, because the salt content of the air is already high at this coastal location and biota are preadapted to high salt depositional rates.

Operational impacts associated with the St. Lucie site after Unit 1 and 2 license expiration (2036 and 2043, respectively) would likely decrease, because intake and discharge water volumes through the existing infrastructure would be significantly reduced when once-through cooling is no longer required. The review team assumed FPL would obtain a revised NPDES permit at that time for continued operation of the new units.

Cumulative Impacts

Table 9-21 presents past, present, and reasonably foreseeable projects and other actions in the vicinity of the St. Lucie alternative site. As described in previous sections, a variety of energy, transportation, mining, and infrastructure improvement projects are occurring or may occur. These projects may place increasing demands on groundwater and surface-water resources, temporarily or permanently alter wetland and surface-water habitats, or require additional protection from storm events or sea-level rise in the coming decades. Table 9-21 also provides a list of parks and preserves that will continue to exist during that time, providing protected habitat for terrestrial and aquatic biota, and recreational opportunities for residents of South Florida and visiting tourists. It is expected that limited development will occur near these protected areas, providing an overall positive cumulative ecological benefit. In addition, a variety of restoration projects currently under way or planned are intended to restore historical

hydrologic connectivity, enhance habitats that promote species diversity, improve water quality and water management, and control exotic or invasive species that threaten native plants and biota.

As discussed in Section 7.3.2, aquatic environments in this region of South Florida may also be affected by continued population growth. Overall, the review team concludes that the cumulative impacts on aquatic resources in the vicinity of the St. Lucie site would be SMALL to MODERATE.

Summary Statement

Based on a review of the information provided by FPL and its independent assessment, the review team concludes that the operation of two nuclear units at the St. Lucie site, in addition to the existing units, would contribute minimally to adverse cumulative effects on aquatic resources. The presence of two new units would result in some detectable increases in impingement and entrainment, but would not result in a noticeable change in aquatic resources. Cooling-tower blowdown would contribute minimally to water temperature or contaminant levels of water discharged into the Atlantic Ocean, and would be regulated via an NPDES permit. Thus, the review team concludes that the cumulative impacts of the building and operation of two new nuclear reactors at the St. Lucie site, combined with the other past, present, or reasonably foreseeable activities on aquatic resources would be SMALL to MODERATE. Building and operating two new nuclear units at the St. Lucie site would not be a significant contributor to the MODERATE impact.

9.3.5.5 Socioeconomics

The following impact analysis includes impacts from building activities and operations. The analysis also considers other past, present, and reasonably foreseeable future actions that affect socioeconomics, including other Federal and non-Federal projects listed in Table 9-21. For the analysis of socioeconomic impacts at the St. Lucie site, the geographic area of interest is considered to be the 50 mi region centered on the St. Lucie site with special consideration of St. Lucie, Martin, Indian River, and Palm Beach Counties, because that is where the review team expects socioeconomic impacts to be the greatest. In evaluating the socioeconomic impacts of site development and operation at the St. Lucie site near Port St. Lucie in St. Lucie County, the review team used readily obtainable data from the Internet or published sources.

Physical Impacts

People who work or live around the St. Lucie site would be exposed to noise, fugitive dust and gaseous emissions from building and operations activities. Noise, dust, and air-pollution emissions generated within the boundaries of the St. Lucie site would be expected to be similar to those for the Turkey Point site. The two closest residential areas lie to the west and south of the proposed location. The first is approximately 1.5 mi west of the proposed site across the Indian River Lagoon, and the second is approximately 2 mi south of the proposed site boundary. Because noise and air-pollution impacts are attenuated by distance, the noise and air-pollution impacts would be minor. Best practices and applicable regulations would be expected to protect building workers and personnel working onsite. Offsite structures include widening of a

transmission line, and intake/makeup pipelines (FPL 2014-TN4058). Building of these offsite structures would generate noise, fugitive dust, and gaseous emissions. The impact would be temporary and best practices would minimize the impacts on the public. Truck and vehicle traffic related to building and operations would also generate noise, fugitive dust, and gaseous emissions offsite. Vehicle traffic would be concentrated during the commute hours of the day. Truck traffic would be up to 36 trucks per hour during the building period and would traverse urban residential areas to the north and south of the site. The review team expects best practices to keep emissions within regulations, which would result in minor impacts on the community.

The St. Lucie site is owned by FPL. Offsite project-related building activities include the widening of a 22 mi long portion of SR-A1A and a 0.5 mi heavy-haul road connecting the barge access location to the project site (FPL 2014-TN4058). The conceptual design route of the access road and widening of SR-A1A would lead to the displacement of approximately 202 structures, based on aerial view of rooftops (FPL 2011-TN59). Such displacement would constitute a noticeable and destabilizing adverse impact on buildings in the St. Lucie area. While other physical impact analyses in this EIS consider only the impacts of changes in road quality, the new roads near the St. Lucie site would alter considerably the demographic characteristics of the residential neighborhoods they cross. Therefore, the review team must also consider the demographic impacts caused by the relocation of over two hundred households. The physical impacts from road quality changes would be noticeable and beneficial near the St. Lucie site. The demographic impacts from those roads are discussed below under *Demography*.

Other offsite project-related activities include, a 63 mi transmission line and intake/makeup pipelines. The new nuclear plants would be visible from the surrounding area, including recreational areas next to the site and the residential areas on the coast across from the Indian River Lagoon. However, because of the distance from the residential areas, and because of the already existing nuclear plants on the St. Lucie site, the new nuclear plants would not contrast with current viewscape, which would result in minor impacts on the community.

Based on the information provided by FPL (2014-TN4058) and the review team's independent analysis, the review team concludes that the overall physical impacts of building activities would be minor, with the exceptions of noticeable and destabilizing adverse impacts on buildings, a noticeable and beneficial impact on road quality, and minor adverse impacts for all other physical impact categories at the St. Lucie site.

Demography

The St. Lucie site is located in St. Lucie County, 4.5 mi east of Port St. Lucie (2012 population 163,748) the closest population center with more than 25,000 residents (FPL 2014-TN4058; USCB 2012-TN4098). Fort Pierce, also with a population larger than 25,000, is 7 mi northwest of the site (2012 population 42,350; USCB 2012-TN4098). There are 10 counties within the 50 mi area, but the review team estimates the areas in which workers would most likely live and from which they would commute are within St. Lucie, Martin, Indian River, and Palm Beach

Counties, based on current commuter patterns of the FPL staff working on the existing St. Lucie nuclear power Units 1 and 2.[35]

FPL estimated the peak number of workers during building would be 3,983, including 33 operation workers. The review team assumed that the share of construction and operation workers relocating from outside the four-county area would be 69 percent of the estimated peak number of workers. This assumption was reached by using the assumption made for the proposed Turkey Point site as a reference and assuming that the share of workers that would come from outside the region is inversely proportional to the population of the region.[36] As stated in Section 4.4, 70 percent of the construction workforce and 100 percent of the operations workforce that moved to the area were assumed to bring their families. Based on these assumptions, a peak of 2,726 construction and 23 operation workers would relocate to the area during the project building phase, and 1,932 of these workers would bring their families. Based on an average household size of 3.25 people, the total increase in population attributable to the peak total workforce at the St. Lucie site would be 6,279 people. An influx of 6,279 people represents a 0.3 percent increase in the four-county 2012 population of 1,887,031.

FPL estimated the total onsite operations workforce to be 806 workers, and that 69 percent of these workers (557) would relocate from outside the four-county area. For this analysis, the review team assumed that 100 percent of operation workers who relocate would bring their families. Based on an average household size of 3.25 people, the total population increase attributable to project operations would be 1,811 (557 × 3.25) people. This represents less than a 0.1 percent increase in the four-county area.

Building and operations would require widening SR-A1A and would displace an approximate 202 structures located north of the site, approaching the town of Fort Pierce, and south of the site, approaching the town of Stuart (FPL 2014-TN4058). The presence of high-density dwellings suggests the number of households displaced would be considerably larger, because many buildings would house more than one household. Residential displacements would noticeably alter the affected residential neighborhoods.

The review team concluded that the impact on local demographic resources would not be noticeable and would be minor, except for the impact on the displaced residents along SR-A1A, which would have a noticeable and destabilizing effect on a substantial number of households.

(35) Approximately 97 percent of the workforce of these power units lives in this four-county area (FPL 2014-TN4058).

(36) The proposed Turkey Point site analysis assumed 50 percent of the peak workers would come from outside the 50 mi region and that 83.3 percent of those would reside in Miami-Dade County, i.e., 41.65 percent (0.5 × 0.833) of the peak workers would migrate into Miami-Dade County. Because the population of the four-county area is approximately 75 percent of that of Miami-Dade County (USCB 2012-TN4098), the review team assumed the share of peak workers migrating into the four-county area would be 1-(0.75 × 0.4165) ≈ 69 percent.

Economic Impacts on the Community

Economy

FPL estimated the peak number of workers during building would be 3,983, including 33 operation workers. Employment of 3,983 construction and operation workers would have positive economic impacts in the four-county area. Based on a multiplier of 1.7136 jobs (direct and indirect) for every construction job and 2.2500 for every operation job, 3,983 new construction and operation jobs would create 2,860 indirect jobs, for a total of 6,843 new jobs in the four-county area during peak employment (3,950 × 1.7136 + 33 × 2.2500) (FPL 2011-TN56). This represents a 0.8 percent increase in the total employment in the four-county area.[37] Peak employment would last 1 month and the average employment generated during the 10-year building period would be about half of that of peak employment. This added employment would generate added earnings to the economy of the four-county area, but the added employment and earnings would not be noticeable to most of those living or working in the area.

An estimated 806 workers would be required for the operation of two nuclear power facilities. Based on a multiplier of 2.2500 jobs (direct and indirect) for every operations job at the new units (FPL 2011-TN56), an influx of 806 workers would create 1,008 indirect jobs for a total of 1,814 new jobs in the region. This represents a 0.2 percent increase in the total employment in the four-county area. This added employment would also generate added earnings to the economy of the four-county area, but the added employment and earnings would not be noticeable to most of those living or working in the area.

Taxes

State corporate income taxes and sales and use taxes paid at the St. Lucie site during construction and operations of the proposed units would be similar to those paid by the same units at the proposed Turkey Point site. As discussed in Sections 4.4 and 5.4, State taxes paid by the proposed units would not exceed 2 percent of the annual collected State corporate income and sales and use taxes. The impact would be minor and beneficial. County sales surtax rates in the four-county area for the 2013 calendar year were zero percent for Martin and Palm Beach Counties, one-half percent for St. Lucie, and 1 percent for Indian River County (FDOR 2014-TN3393). County surtax collections from the proposed units would be highest during construction when annual expenses related to the proposed units would be estimated to reach up to $1.56 billion (Section 4.4). A 1 percent sales surtax would generate $15.6 million in revenues for the four-county area.[38] This would correspond to less than 1 percent of total county revenues in the four-county area for 2014.[39] The impact would be minor and beneficial. County and school district governments in Florida may levy taxes up to 10 mills each (1 percent) in property taxes (FDOR 2012-TN459). If the value of property taxes for the two nuclear reactors at the St. Lucie site were the same as the value estimated for Units 6 and 7 at the

(37) Employment of 834,072 (BLS 2013-TN4085).
(38) To the extent that some of the expenditures would be made in Martin, Palm Beach, and St. Lucie Counties, and assuming the sales surtax rates are unchanged, the total sales surtax collected would be smaller.
(39) $3,598 million (FLDFS 2013-TN3392).

Turkey Point site in Section 5.4.3.2, FPL would pay $20 million in property taxes to the St. Lucie School District and $20 million to St. Lucie County. These payments would correspond to 7.6 percent the St. Lucie School District 2011-2012 total revenues ($20 million compared $262.5 million)(40) and 6.3 percent of the St. Lucie County 2011-2012 total revenues ($20 million compared to $320 million).(41) Because property taxes paid to school districts are reallocated through Florida's Education Finance Program, the benefit to the St. Lucie School District would be diluted to some extent, and the exact amount distributed to each school district is not known at this time. Because of the value of project-related property tax payments relative to current property taxes, the review team considers the impacts on tax revenues to both the St. Lucie School District and St. Lucie County to be minor and beneficial.

The review team concluded that the economic impact would not be noticeable and would be minor and beneficial.

Infrastructure and Community Service Impacts

Traffic

Workforce access to the St. Lucie site would occur via SR-A1A coming from the north and the south. The review team estimated the current LOS (Level of Service) of these roads at two FDOT traffic-monitoring sites based on the peak hour directional traffic and FDOT LOS thresholds. Peak hour directional traffic information was obtained from FDOT Florida Traffic Online (FDOT 2013-TN3558) and consists of the AADT at each traffic-monitoring site, a Standard Peak Hour Factor (K) and a Directional Distribution Factor (D). The multiplication of these three elements (AADT × K × D) provides an estimate of the current peak hour directional traffic volume. The LOS was determined comparing this peak hour directional traffic volume with the maximum thresholds for each LOS in Table 7 (urbanized areas) of FDOTs Generalized Service Volume Tables (FDOT 2013-TN3297). Based on this procedure, the LOS at both traffic-monitoring sites is C. To estimate the project impact on traffic LOS during the project's peak workforce building period, the review team followed a methodology similar to that described in Section 4.4: The peak workforce of 3,983 construction and operation workers was divided into two shifts, with 70 percent assigned to shift 1 (6:00 a.m. to 4:30 p.m.) and 30 percent to shift 2 (5:00 p.m. to 3:00 a.m.). The hour of peak commute would be 4:30 p.m. to 5:30 p.m. The review team also assumed up to 36 trucks per hour. The project-related directional traffic during the peak commute hour would be 2,824 vehicles (70 percent × 3,983 + 36). The review team assumed that half of the project-related traffic would come from each direction, north and south.(42) The results of this analysis are presented in Table 9-27 below. The additional building traffic would drop the LOS classification at both traffic-monitoring sites to F. Widening of SR-A1A would bring the LOS classification to a C north of the site and to a D south of the site.

(40) FLDOE 2013-TN3299
(41) FLDFS 2013-TN3392
(42) Based on U.S. Census Bureau commuter patterns (USCB 2011-TN4078) it was not possible to determine the likely direction of outgoing project-related traffic.

Table 9-27. Peak Workforce Traffic LOS Analysis for the St. Lucie Site

Traffic-Monitoring Site	Baseline Peak Hour Directional Traffic	Baseline LOS	Distribution of Project-Related Peak Traffic	Added Peak Hour Directional Traffic	Peak Hour Directional Traffic with Project	LOS with Project
SR-A1A north of site	562	C	0.50	1,412	1,974	F (C)[(a)]
SR-A1A south of site	811	C	0.50	1,412	2,223	F (D)[(a)]

(a) LOS classification after widening of SR-A1A

Source: Review team calculations based on FDOT 2013-TN3297 and FDOT 2013-TN3558

FPL estimated the total onsite operations workforce to be 806 workers. If access of this workforce to the St. Lucie site were distributed among the two directions equally, the LOS at traffic-monitoring site north of the St. Lucie site would drop to D, and the LOS at the traffic-monitoring site south of the St. Lucie site would drop to E. Widening of SR-A1A would bring the LOS classification to C north and south of the site.

Based on the above analysis, the review team concludes that the impact of the building and operations of the proposed nuclear reactors at the St. Lucie site would be noticeable during both building and operations, although not destabilizing, after widening of SR-A1A.

Recreation

Blind Creek Park, Big Mud Creek Park, and the stretch of lagoon designated as the Jensen Beach to Jupiter Inlet Aquatic Preserve are adjacent to the site. The Savannas Preserve State Park is located approximately 2 mi west of the site, across the lagoon. Other parks and recreational areas exist within the county. The influx of project-related population to the four-county area would increase the number of local users of recreational facilities. Because the in-migrating population would be less than 1 percent of the local population, the review team expects the impact on current recreational infrastructure to be negligible.

Housing

The review team estimates that 2,749 construction and operation workers would migrate into the four-county area, and each of these workers would need a place to live. Based on American Community Survey 2008−2012 5-Year estimates, within the four-county area, there are 954,759 housing units of which 208,508 are vacant (21.8 percent). This includes housing that is designated as seasonal, recreational, or occasional use (USCB 2012-TN4089). The review team estimates that, in absolute numbers, the available housing would be sufficient to house the construction workforce. The in-migrating construction and operations workforce would occupy no more than 1.4 percent of vacant housing units in the four-county area. FPL estimated that approximately 806 workers would be needed for operation of two nuclear power facilities at the St. Lucie site, and assumed that 69 percent of these workers (557) would relocate from outside the region and would settle in the four-county area. Based on these assumptions, the entire operations workforce would occupy no more than 0.3 percent of vacant housing units in the four counties. The review team concludes that impact on housing would be minor.

Public Services

In-migrating construction workers and plant operations staff would also likely affect local municipal water, wastewater-treatment facilities, police and fire-protection services, and other public services in the region. These impacts would be expected to be in proportion with the demographic impacts experienced in the region. In-migration to the four-county area would represent an estimated 0.3 percent of the local population (less during operations). The review team concludes that the impact on public services would be minor.

Education

Based on data for the 2011-2012 school year, there are approximately 249,523 full-time equivalent students in public schools in the four-county area[43] (FLDOE 2013-TN3299). The review team estimated that 2,749 construction and operation workers would migrate into the area, and that 1,932 workers would bring their families. Based on an estimate of 0.8 school-aged children per family (Malhotra and Manninen 1981-TN1430), an estimated 1,546 (1,932 × 0.8) school-aged children would be migrating into the four-county area. This would yield a 0.6 percent increase in the student population. During operations, the review team assumed that 557 operation workers and their families would relocate from outside the region. This would include an estimated 446 (557 × 0.8) children in the PK-12 school range. This influx of students would increase the student population in the four-county area by 0.2 percent. The review team concludes that the impact on education would be minor.

Based on the information provided by FPL (2014-TN4058) and the review team's independent analysis, the review team concludes that the overall infrastructure and community service impacts of building activities and operations at the St. Lucie site would be minor except for noticeable, but not destabilizing, adverse impacts on traffic.

Cumulative Impacts

In addition to the socioeconomic impacts from the building and operations of the proposed project at the St. Lucie site, the cumulative analysis also considers other past, present, and reasonably foreseeable future actions that could have socioeconomic impacts.

The socioeconomic impacts of past and present actions in the affected area are largely captured by the current baseline conditions used for analysis above of project impacts. For example, the impacts of past and present actions on the demography and economy of the area are largely captured by current baseline data on population, employment, and tax revenues.

Reasonably foreseeable future actions are listed in Table 9-21. Several of these future actions would be expected to have cumulative socioeconomic impacts with the proposed project at the St. Lucie site. Other proposed projects that would generate employment and earnings during construction and operations include the proposed Floridian Natural Gas Storage Facility in Martin County, the Florida Southeast Connection pipelines proposed through Highlands, Okeechobee and Martin Counties, the Riviera Beach Next-Generation Clean Energy Center in Palm Beach County and several CERP Projects.

(43) FTE is a measure of enrollment based on the number of full-time students that it would take to fill the number of classes offered.

Based on the location of the identified future projects and their magnitudes, the cumulative socioeconomic impacts of the projects identified above with the proposed project at the St. Lucie site would be expected to be SMALL and adverse, with the exception of MODERATE and adverse impacts on traffic, LARGE and adverse physical impacts on buildings, and a LARGE demographic impact on displaced residents due to the widening of SR-A1A. However, areas adjacent to the St. Lucie site would experience MODERATE beneficial impacts on road quality due to the wideing of SR-A1A near the St. Lucie site. Building and operating two new nuclear units at the St. Lucie alternative site would be a significant contributor to the adverse impacts that are greater than SMALL.

9.3.5.6 Environmental Justice

The following impact analysis includes impacts from building activities and operations. The analysis also considers other past, present, and reasonably foreseeable future actions that affect EJ, including other Federal and non-Federal projects listed in Table 9-21.

The 2008–2012 American Community Survey block groups were used to identify minority and low-income population distributions in the area (USCB 2012-TN4098). The census data for Florida characterizes 15.9 percent of the population as Black, 0.3 percent as American Indian or Alaskan Native; 2.5 percent as Asian, 0.1 percent as Native Hawaiian or other Pacific Islander, 2.6 percent as other single minorities, 2.2 percent as multiracial, 22.5 percent as Hispanic ethnicity; and 42.2 percent as aggregate minority. There are 801 block groups within 50 mi of the St. Lucie site. Following the criteria described in Section 2.6.1, Black minority populations exist in 103 block groups, American Indian or Alaskan Native minority populations exist in 2 block groups; Asian minority populations exist in 2 block groups; other race minority populations exist in 9 block groups; multiracial minority populations exist in 2 block groups; Hispanic ethnicity minority populations exist in 66 block groups; and aggregate minority populations exist in 207 block groups. There are no block groups containing Native Hawaiian or other Pacific Islander populations within 50 mi of the St. Lucie site. A portion of the Brighton Seminole Indian Reservation is 50 mi west-southwest of the St. Lucie site. The locations of the minority populations within 50 mi of the St. Lucie site and the Brighton Indian Reservation are shown in Figure 9-25. The locations of Hispanic minority populations and Black minority populations within the 50 mi of the St. Lucie site are shown in Figure 9-26 and Figure 9-27, respectively.

The USCB data characterize 15.3 percent of Florida households as low income (USCB 2012-TN4098). Out of a possible 801 block groups, 72 block groups contain low-income populations. The locations of the low-income populations within 50 mi of the St. Lucie site are shown in Figure 9-28.

The analyses of the impacts of building and operating new nuclear reactors at the St. Lucie site identified noticeable adverse impacts on land use, terrestrial and wetland ecosystems, and traffic, and substantial adverse impacts on buildings and people through displacements. The review team did not identify any special pathways through which any impacts would disproportionately affect EJ populations of interest. Therefore, the review team concluded there would be no disproportionately high and adverse impacts on EJ populations of interest.

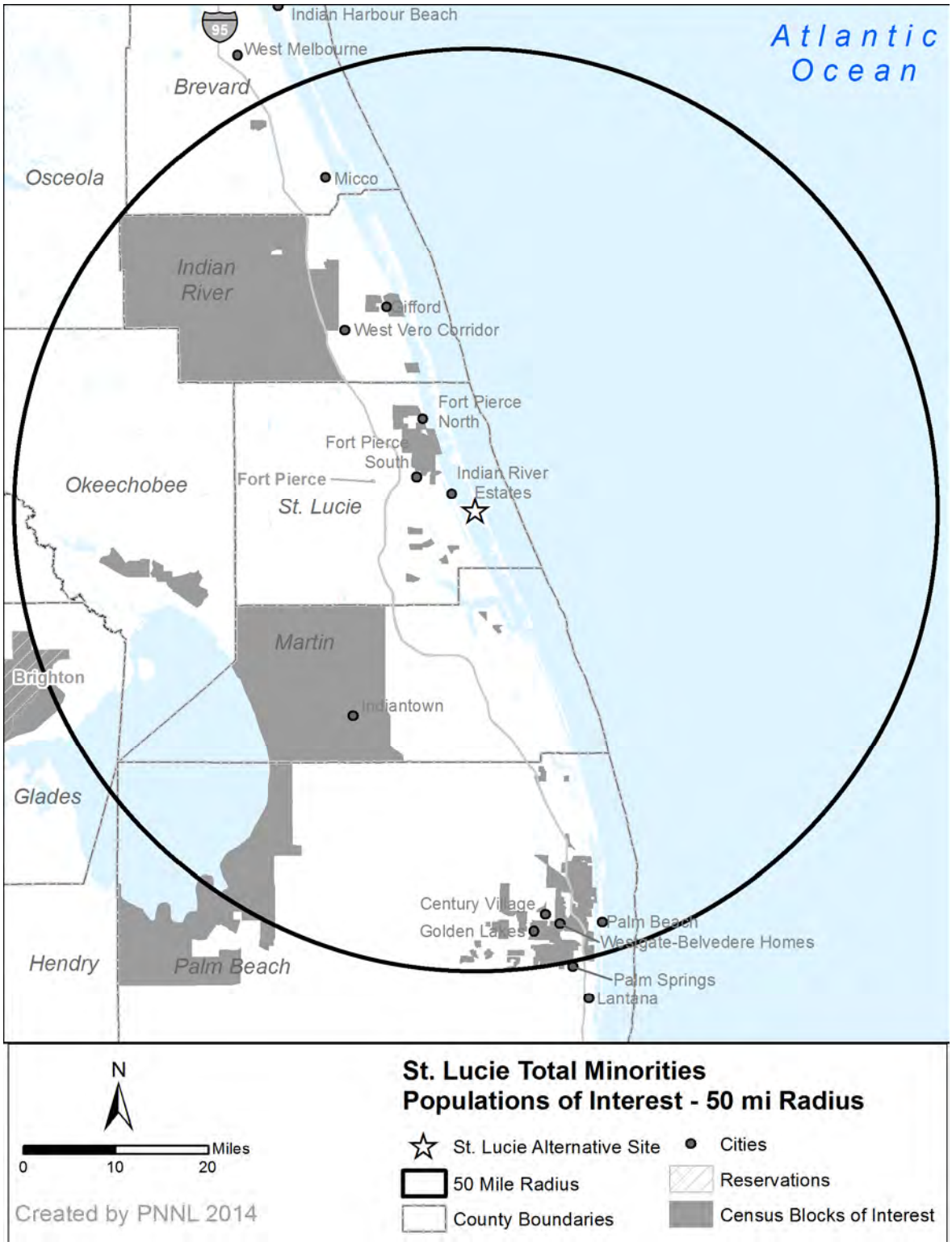

Figure 9-25. Aggregate Minority Populations in Block Groups that Meet the Environmental Justice Selection Criteria within 50 mi of the St. Lucie Alternative Site

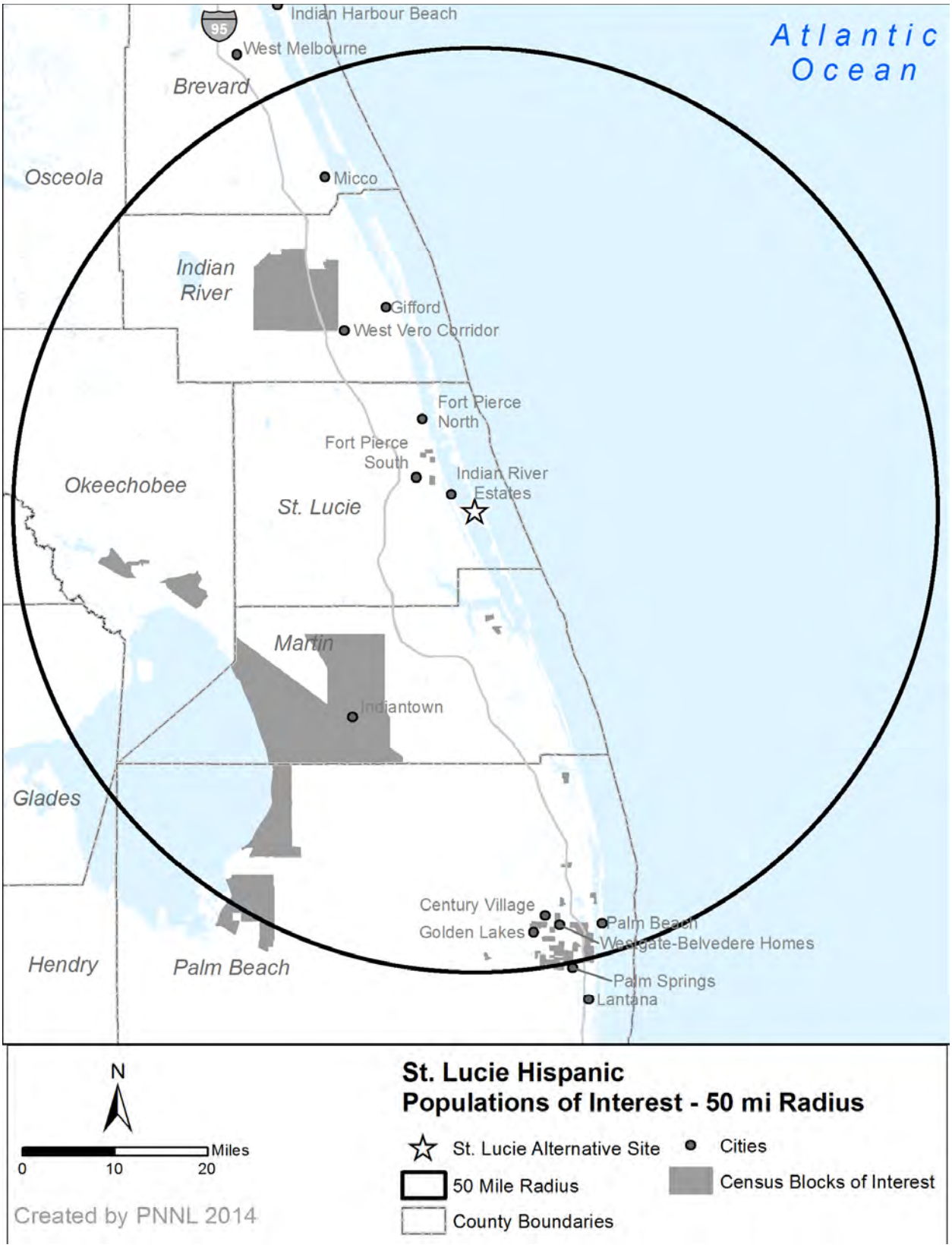

Figure 9-26. Hispanic Populations in Block Groups that Meet the Environmental Justice Selection Criteria within 50 mi of the St. Lucie Alternative Site

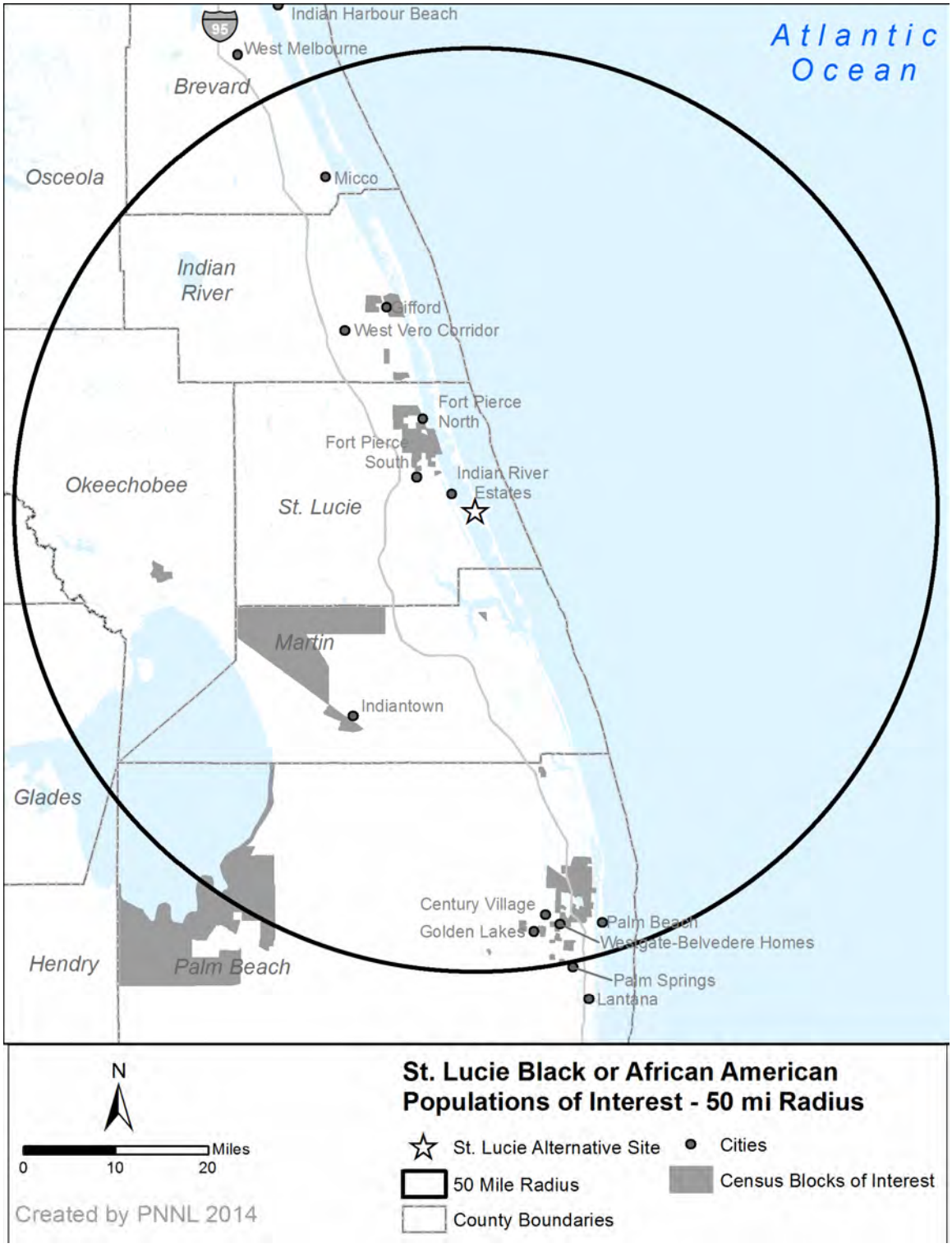

Figure 9-27. African American Populations in Block Groups that Meet the Environmental Justice Selection Criteria within 50 mi of the St. Lucie Alternative Site

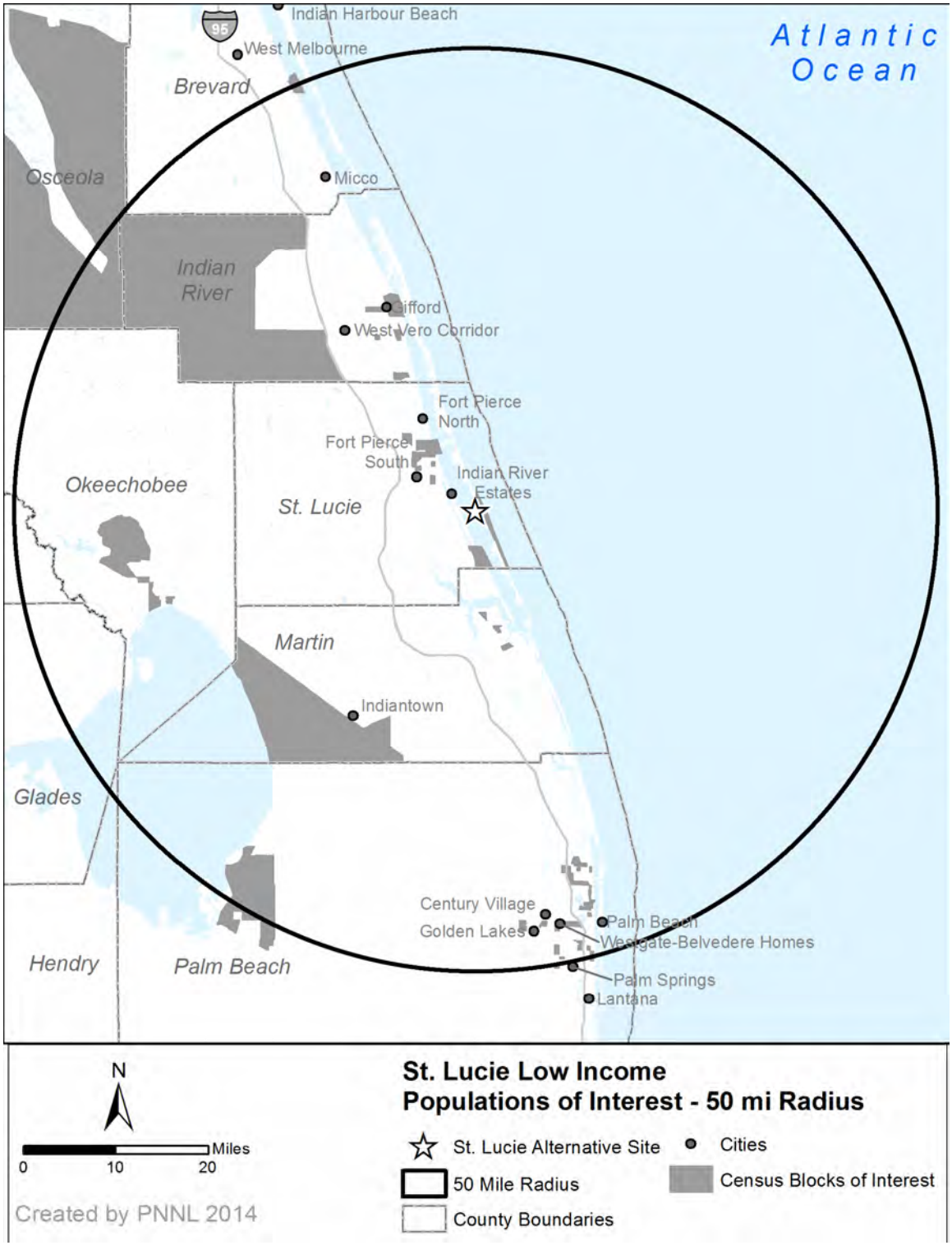

Figure 9-28. Low-Income Populations in Block Groups that Meet the Environmental Justice Selection Criteria within 50 mi of the St. Lucie Alternative Site

The NRC's EJ methodology includes an assessment of affected populations of particular interest or with unusual circumstances, such as minority communities that are exceptionally dependent on subsistence resources or identifiable in compact locations (e.g., Native American reservations) and those that have a high density of minority or low-income groups. Based on a literature research, the review team did not identify high-density minority or low-income presence in the proximity of the site, nor differentiated subsistence consumption of natural resources by EJ populations of interest.

Cumulative Impacts

In addition to the EJ impacts from building and operations of the proposed project at the St. Lucie site, the cumulative analysis also considers other past, present, and reasonably foreseeable future actions that could have EJ impacts. Based on a literature review of past and present actions in the affected area, and based on the reasonably foreseeable actions listed in Table 9-21, the review team found no evidence that the cumulative effects would disproportionately affect EJ populations of interest.

9.3.5.7 Historic and Cultural Resources

The following cumulative impact analysis addresses building and operating two new nuclear generating units at the St. Lucie site. The analysis also considers other past, present, and reasonably foreseeable future actions that could affect cultural resources, including other Federal and non-Federal projects and the projects listed in Table 9-21. For the analysis of cultural impacts at the St. Lucie site, the geographic area of interest is considered to be the APE that would be defined for this site. This includes the direct effects APE, defined as the area physically affected by the site-development and operation activities at the site and within transmission line corridors. The indirect effects APE is defined as the area visually affected and includes an additional 0.5 mi radius APE around the transmission line corridors and a 1 mi radius APE around the cooling towers.

Reconnaissance activities in a cultural resource review have particular meaning. Typically, they include preliminary field investigations to confirm the presence or absence of cultural resources. However, in developing this EIS, the review team relied upon reconnaissance-level information to perform its alternative site evaluation in accordance with ESRP 9.3 (NRC 2000-TN614). Reconnaissance-level information consists of data that are readily available from agencies and other public sources. It can also include information obtained through visits to the site area. The following information was used to identify the historic and cultural resources at the St. Lucie site:

- NRC Alternative Sites Visit, July 2010 (NRC 2010-TN3304)
- FPL ER Revision 6 (FPL 2014-TN4058)
- Florida Historical Markers Program (FDHR 2014-TN3878)
- National Register of Historic Places database (NPS 2014-TN3882).

The approximately 1,130 ac St. Lucie site is an FPL-owned property with an existing nuclear power-generation station, located adjacent to the shoreline and a lagoon on Hutchinson Island. Two county parks are located within the property. The two existing units occupy less than half of the site. Historically, the St. Lucie site and vicinity were largely undeveloped and likely

contained intact archaeological sites associated with human settlement dating back millennia. Over time, the area has been heavily disturbed by impacts related to industrial and urban development. In 2001, as part of the license renewal for the existing St. Lucie reactors, the Florida SHPO indicated that undeveloped portions of the plant site have a moderate to high probability for containing significant archaeological resources, particularly since there are known archaeological remains along the northern end of the facility property, approximately 1 mi from the St. Lucie site (FPL 2014-TN4058; NRC 2003-TN3152).

A search of the National Register shows that 15 significant historic properties are located within 10 mi of the St. Lucie site (FPL 2014-TN4058; NPS 2014-TN3882). None, however, occurs on Hutchinson Island, where the St. Lucie site is located. A total of 124 properties were found in the four counties in the vicinity of the St. Lucie site—St. Lucie, Palm Beach, Martin, and Indian River Counties.

A search of the Florida Historical Markers Program (FDHR 2014-TN3878) revealed that there is one historic marker in St. Lucie County—a marker in Fort Pierce commemorating the founding of the county and Fort Pierce, the county seat. The marker is not near the St. Lucie site.

A National Register search of the indirect effects APE for the proposed transmission line corridor shows that, while no historic properties occur within the APE, two fall within several miles (NPS 2014-TN3882). The Captain Hammond House, in White City, lies roughly 1 mi to the north of the transmission line corridor as it proceeds east from the St. Lucie site. The Seminole Inn, in Indiantown, lies approximately 4 mi to the east of the corridor as it passes southward through Martin County.

While reconnaissance-level information indicates that there are no known historic properties located within the physical APE of the new plant, reconnaissance-level information shows that historic properties within 10 mi of the site and within 1 mi of the transmission line corridor are listed in the National Register. From previous studies on plant property, archaeological resources are known to occur approximately 1 mi to the north of the site. That said, no archaeological or architectural surveys have been conducted at the St. Lucie site for the current project, and locating the nuclear plants there would require formal cultural resources survey and consultation with SHPO, Tribes, and other interested parties. If any significant cultural, historic, or archaeological resources were identified, appropriate mitigation measures would need to be put in place before construction and operation.

Building Impacts

To accommodate the building of two nuclear units and associated facilities at the St. Lucie site, FPL estimates that the total area of land that would be disturbed would be approximately 357 ac for the facility itself. Because the site is within the 100-year floodplain of the Indian River Lagoon, FPL assumed in its ER that it would be necessary to import fill material from offsite. In addition, a 0.5 mi long heavy-haul road would need to be constructed, and a 22 mi long portion of SR-A1A would need to be widened. Cooling water would be drawn from the Atlantic Ocean, adjacent to the property, and would require approximately 10.5 ac of disturbance for required facilities. If the St. Lucie site were chosen for the proposed project, identification of cultural resources would be accomplished through additional cultural resource surveys and consultation

with the SHPO, Tribes, and interested parties. The results would be used in the site-planning process to address cultural resources impacts. If significant cultural resources were identified by these surveys, the review team assumes that FPL would use the same protective measures used at the Turkey Point site, and therefore the impacts would be minimal. If direct effects on significant cultural resources could not be avoided, land-clearing, excavation, and grading activities could potentially destabilize important attributes of historic and cultural resources.

Section 9.3.5.1 describes the proposed transmission line corridors, which will extend for a distance of 63 mi, following existing corridors whenever possible. FPL has stated that consideration would be given to sensitive environmental and built resources in determining a route for the transmission lines (FPL 2014-TN4058), but visual impacts from transmission lines may result in significant alterations of the visual setting of cultural and historic resources within the geographic area of interest. Two properties listed in the National Register fall along the proposed transmission line corridor, though none occurs within the indirect effects APE. The Captain Hammond House lies roughly 1 mi from the transmission line corridor and the Seminole Inn lies roughly 4 mi from the corridor. In both of these areas, the proposed transmission line follows an existing transmission line corridor and any impacts stemming from the addition of another transmission line likely would be minor. If the St. Lucie site were chosen for the proposed project, the review team assumes that FPL would conduct its transmission line-related cultural resource surveys and procedures in a manner similar to that for the Turkey Point site. In addition, the review team assumes that the State of Florida's Final Order on Certification (State of Florida 2014-TN3637) regarding transmission line siting and building activities would also apply, and therefore impacts would be minimal. If direct effects on significant cultural resources could not be avoided, land-clearing, excavation, and grading activities could potentially destabilize important attributes of historic cultural resources. Similarly, both the transmission lines and nuclear power-generating units could indirectly affect cultural and historic resources through visual impacts on the setting of the resources. However, because the St. Lucie site is an existing power plant in an urban setting, and the transmission line corridor would follow an existing corridor where possible, construction of the new units at the St. Lucie site would not alter land use and likely would have a minimal impact on the industrial and urban character of the immediate area. While an estimated 202 structures would be displaced for the widening of SR-A1A, as discussed in Section. 9.3.5.5, none of these structures has been identified as a significant historic resource based on reconnaissance-level data.

Operations Impacts

Impacts on historic and cultural resources from the operation of two new nuclear power-generating units at the St. Lucie site include those associated with the operation of new units and maintenance of transmission lines. The review team assumes that the same procedures developed by FPL for the Turkey Point site, as well as the State of Florida's Final Order on Certification, would be used for onsite and offsite maintenance activities. Consequently, the incremental effects of the maintenance of transmission line corridors and operation of the two new units and associated impacts on the cultural resources would be negligible for the direct and indirect effects APEs.

Cumulative Impacts

Past actions in the geographic area of interest that have similarly affected historic and cultural resources include rural and agricultural development and activities associated with these land-disturbing activities such as road development. Table 9-21 lists past, present, and reasonably foreseeable projects and other actions that may contribute to cumulative impacts on historic and cultural resources in the geographic area of interest. Projects from Table 9-21 that are relevant to the cultural resources cumulative analysis include the High Speed Intercity Passenger Rail and future urbanization, such as new or expanded roads. These projects may significantly affect historic and cultural resources in a manner similar to those associated with the building and operation of two new nuclear power-generating units.

Long linear projects such as new or expanded roads and railway lines may intersect the proposed transmission line corridors. Because cultural resources can likely be avoided by long linear projects, impacts on cultural resources would likely be minimal. If building associated with such activities results in significant alterations of cultural resources in the transmission line corridors, either physical or visual, then cumulative impacts on cultural and historic resources would be greater.

Summary Statement

Cultural resources are nonrenewable. Therefore, the impact of the destruction of cultural resources is cumulative. Based on the information provided by FPL, and the review team's independent evaluation, the review team concludes that the cumulative impacts from building and operating two new nuclear generating units on the St. Lucie site would be SMALL. This impact-level determination is based on reconnaissance-level information and reflects the fact that there are no known cultural resources on the proposed site, and that the proposed transmission line corridor would follow an existing corridor, meaning indirect impacts on the visual setting would be negligible. It also assumes that, if the St. Lucie site were to be developed, cultural resource surveys and evaluations would be conducted and FPL, in consultation with SHPO, Tribes, and interested parties, would assess and resolve any adverse effects of the undertaking. If cultural or historic resources are present, including any of the buildings that would be removed by the widening of SR-A1A, and if there are adverse effects on those resources, the project could result in greater cumulative impacts.

9.3.5.8 Air Quality Impacts

The following impact analysis includes impacts from building activities and operations. The analysis also considers other past, present, and reasonably foreseeable actions that affect air quality, including other Federal and non-Federal projects listed in Table 9-21. As described in Section 9.3.5, the St. Lucie site area includes two current nuclear power plants—St. Lucie Units 1 and 2. The geographic area of interest for the St. Lucie site is St. Lucie County, which is in the Southeast Florida Intrastate Air Quality Control Region (40 CFR 81.49) (TN255).

Section 4.7 and 5.7 discuss air-quality impacts during building and operations. The emissions related to building and operating an additional nuclear power plant at the St. Lucie alternative site would be similar to those at the Turkey Point site. The air-quality attainment status for St. Lucie County, as set forth in 40 CFR Part 81 (TN255), reflects the effects of past and present

emissions from all pollutant sources in the region. St. Lucie County is in attainment of all National Ambient Air Quality Standards.

As described in Chapters 4 and 5, the criteria pollutants from building and operation were found to have a SMALL impact on air quality. In Chapter 7, the cumulative impacts of criteria pollutants were evaluated and also determined to be SMALL to MODERATE. Reflecting on the projects listed in Table 9-21 the most significant is the 300 MW natural-gas−fired plant (Florida Municipal Power – Treasure Coast Energy Center) operating 9 mi to the southwest of the St. Lucie alternative site. Emissions from power plants such as these are released through stacks and with significant momentum and buoyancy. Other industrial projects listed in Table 9-21 would likely have de minimis impacts because of their distance from the site. Given that these projects are subject to Clean Air Act permitting requirements, it is unlikely that the air quality in the region would degrade to the extent that the region would be in nonattainment of the National Ambient Air Quality Standards.

The air-quality impact from development of the St. Lucie site would be local and temporary. The applicant would develop a dust-control plan that identifies specific measures to minimize fugitive dust emissions during building activities. The distance from building activities to the site boundary would be sufficient to generally avoid significant air-quality impacts. There are no land uses or projects in Table 9-21, including the aforementioned sources, that would have emissions during site development that would, in combination with emissions from the St. Lucie site, result in degradation of air quality in the region. Emissions from operation of two new nuclear units at the St. Lucie site would be intermittent and made at low levels with little or no vertical velocity, similar to operational impacts at the Turkey Point site, as discussed in Section 5.7. The air-quality impacts of the Florida Municipal Power natural-gas−fired plant are included in the baseline air-quality status. The cumulative impacts from emissions of effluents from the St. Lucie site and the aforementioned sources would be noticeable but not destabilizing.

The cumulative impacts of GHG emissions related to nuclear power are discussed in Section 7.6. The impacts of the emissions are not sensitive to the location of the source. Consequently, the discussion in Section 7.6 is applicable to a nuclear power plant located at the St. Lucie site. The review team concludes that the national and worldwide cumulative impacts of GHG emissions are noticeable but not destabilizing. The review team further concludes that the cumulative impacts would be noticeable but not destabilizing, with or without the GHG emissions of two new nuclear units at the St. Lucie site.

The review team concludes that cumulative impacts from other past, present, and reasonably foreseeable future actions on air-quality resources in the geographic areas of interest would be SMALL to MODERATE for criteria pollutants and MODERATE for GHG emissions. The incremental contribution of impacts on air-quality resources from building and operating two units at the St. Lucie site would not be a significant contributor to the MODERATE impacts.

9.3.5.9 Nonradiological Health

The following analysis considers nonradiological health impacts from building and operating two new nuclear units at the St. Lucie site. The analysis also includes past, present, and reasonably foreseeable future actions that could contribute to cumulative nonradiological health impacts on site workers (construction and operation workers) and members of the public, including other

Federal and non-Federal projects and the projects listed in Table 9-21 that are within the geographic area of interest. Nonradiological health impacts at the St. Lucie site are estimated based on information provided by FPL and the review team's independent evaluation. For the analysis of nonradiological health impacts at the St. Lucie site, the geographic area of interest is the site and the immediate vicinity (~2 mi radius) and the associated road and transmission line corridors. This geographic area of interest is based on the localized nature of nonradiological health impacts and is expected to encompass all nonradiological health impacts.

Building activities that have the potential to affect the health of members of the public and workers at the St. Lucie site include exposure to dust and vehicle exhaust, occupational injuries, noise, and increased traffic associated with the transport of construction materials and personnel to and from the site. The operations-related activities that have the potential to affect the health of members of the public and workers include exposure to etiological (disease-causing) agents, noise, EMFs, occupational injuries, and impacts from the transport of workers to and from the site.

Building Impacts

Nonradiological health impacts on construction workers and members of the public from building two new nuclear units at the St. Lucie site would be similar to those evaluated in Section 4.8 for the Turkey Point site. During the site-preparation and building phase FPL would comply with applicable Federal and State regulations on air quality and noise (FPL 2014-TN4058). The St. Lucie site is located in the vicinity of residential and commercial area. The distance between the site activities and the nearest residences (Section 9.3.5.5) is great enough that there should be no nonradiological health impacts from building and operating the units. The incidence of construction worker accidents would be the same as that for the Turkey Point site.

The review team concludes that nonradiological health impacts on construction workers and the public from building two new nuclear units and associated transmission lines at the St. Lucie site would be minimal. Nonradiological health impacts associated with traffic accidents during building activities at the St. Lucie alternative site were evaluated in Section 4.8.3 and the review team concludes that the impacts would be minimal.

Operations Impacts

Nonradiological health impacts on operation workers and members of the public would include those associated with the operation of cooling towers and transmission lines. Based on the configuration of the proposed new unit at the St. Lucie site (see Section 9.3.5), etiological agents may increase in the thermal plume area. The blowdown would be regulated by FDEP pursuant to 40 CFR Part 423 (TN253), and all discharges would be required to comply with limits established by FDEP in an NPDES permit. Impacts on workers' health from occupational injuries, noise, and EMFs would be similar to those described in Section 5.8 for the Turkey Point site. Noise and EMF exposure would be monitored and controlled in accordance with applicable OSHA regulations. Although no detailed noise modeling has been performed for the St. Lucie site, it is likely that noise impacts would be similar to those predicted for operations at the Turkey Point site. Effects of EMFs on human health would be controlled and minimized by conformance with National Electrical Safety Code criteria and adherence to the standards for transmission systems regulated by the FDEP.

The review team concludes that nonradiological health impacts on workers and the public from operating two new nuclear units and associated transmission lines at the St. Lucie site would be minimal. Impacts associated with traffic accidents during operations at the St. Lucie alternative site were evaluated in Section 5.8.6 and the review team concludes that the impacts would be minimal.

Cumulative Impacts

The past project identified in Table 9-21 within the geographic area of interest that could affect nonradiological human health in a similar way to the building of two nuclear units at the St. Lucie site is the two existing nuclear power reactors located adjacent to the proposed St. Lucie alternative site. There are no current construction projects occurring within the geographical area of interest that would affect nonradiological human health in a way similar to the building of two new nuclear units.

Reasonably foreseeable projects identified in Table 9-21 that could affect nonradiological human health at the St. Lucie site include various transportation (roads, traffic, pedestrian) projects that are planned throughout the region.

The past and present project within the geographic area of interest that could affect nonradiological human health in a way similar to operating two nuclear units at the St. Lucie site that was identified in Table 9-21 is the two existing and operational nuclear power reactors located adjacent to the proposed St. Lucie alternative site. There are no reasonably foreseeable future projects planned within the geographic area of interest that would affect nonradiological human health in a way similar to the operation of two new nuclear units at the St. Lucie site.

The review team concludes that the cumulative impacts on nonradiological health from building and operating two new nuclear units and associated road and transmission lines at the St. Lucie site would be minimal.

Summary Statement

Impacts on nonradiological health from the building and operation of two new units at the St. Lucie site are estimated based on the information provided by FPL and the review team's independent evaluation. Although there could be some future activities in the geographical area of interest could affect nonradiological health in ways similar to the building and operation of two new units at the St. Lucie site and associated offsite facilities, those impacts would be localized and managed through adherence to existing regulatory requirements. The review team concludes that nonradiological health impacts on workers and the public resulting from the building of two new nuclear units and associated transmission lines at the St. Lucie site would be minimal. The review team expects that the nonradiological health impacts on the operations employees and the public of two new nuclear units at the St. Lucie site would be minimal. Finally, the review team concludes that cumulative impacts on nonradiological health from past, present, and reasonably foreseeable actions in the geographic area of interest would be SMALL.

9.3.5.10 Radiological Impacts of Normal Operations

The following impact analysis includes impacts from building activities and operations. The analysis also considers other past, present, and reasonably foreseeable actions that affect radiological health, including other Federal and non-Federal projects listed in Table 9-21. As described in Section 9.3.5, St. Lucie is a nuclear power plant site; St. Lucie 1 and 2 are currently the two nuclear facilities (i.e., nuclear power plants) on the site. The geographic area of interest is the area within a 50 mi radius of the St. Lucie site. St. Lucie Units 1 and 2 are the only major facilities within this geographic area of interest that potentially affect radiological health within the 50 mi radius of the St. Lucie site. However, there are likely to be medical, industrial, and research facilities within 50 mi of the St. Lucie site that use radioactive materials.

The radiological impacts of building and operating the two proposed Westinghouse AP1000 nuclear power units at the St. Lucie site include doses from direct radiation and liquid and gaseous radioactive effluents. These pathways would result in low doses to people and biota offsite that would be well below regulatory limits. These impacts are expected to be similar to those estimated for the Turkey Point site.

The radiological impacts of St. Lucie Units 1 and 2 include doses from direct radiation and liquid and gaseous radioactive effluents. These pathways result in low doses to people and biota offsite that are well below regulatory limits as demonstrated by the ongoing radiological environmental monitoring program conducted around St. Lucie Units 1 and 2. The NRC staff concludes that the dose from direct radiation and effluents from hospitals and industrial facilities that use radioactive material would be an insignificant contribution to the cumulative impacts around the St. Lucie site. This conclusion is based on data from the radiological environmental monitoring programs conducted around currently operating nuclear power plants.

Based on the information provided by FPL and the NRC staff's independent analysis, the NRC staff concludes that the cumulative radiological impacts from building and operating the two proposed Westinghouse AP1000 nuclear power units and other existing and planned projects and actions in the geographic area of interest around the St. Lucie site would be SMALL.

9.3.5.11 Postulated Accidents

The following impact analysis includes radiological impacts from postulated accidents from the operation of two nuclear units at the St. Lucie alternative site. The analysis also considers other past, present, and reasonably foreseeable actions that affect radiological health from postulated accidents, including other Federal and non-Federal projects and the projects listed in Table 9-21. As described in Section 9.3.5, the St. Lucie site is a brownfield site; two nuclear units are currently located at the site. The geographic area of interest considers all existing and proposed nuclear power plants that have the potential to increase the probability-weighted consequences (i.e., risks) from a severe accident at any location within 50 mi of the St. Lucie alternative site. Facilities potentially affecting radiological accident risk within this geographic area of interest are the existing two units—St. Lucie Units 1 and 2.

As described in Section 5.11.1, the NRC staff concludes that the environmental consequences of DBAs at the Turkey Point site would be minimal for AP1000 reactors. DBAs are addressed

specifically to demonstrate that a reactor design is robust enough to meet NRC safety criteria. The environmental consequences of DBAs depend on the plant design and the atmospheric dispersion. The AP1000 design is independent of site conditions and the meteorology of the St. Lucie alternative and Turkey Point sites are similar; therefore, the NRC staff concludes that the environmental consequences of DBAs at the St. Lucie alternative site would be minimal.

Because the meteorology, population density, and land values for the St. Lucie alternative site are similar to those of the proposed Turkey Point site, risks from a severe accident for an AP1000 reactor located at the St. Lucie alternative site are expected to be similar to those analyzed for the proposed Turkey Point site. The risks for the proposed Turkey Point site were presented in Tables 5-19 and 5-20 and are well below the median value for current-generation reactors. In addition, as discussed in Section 5.11.2, estimates of average individual early fatality and latent cancer fatality risks are well below the Commission's safety goals (51 FR 30028) (TN594). For existing plants within the geographic area of interest (St. Lucie Units 1 and 2), the Commission has determined that the probability-weighted consequences of severe accidents are small (10 CFR Part 51) (TN250), Appendix B, Table B-1). On this basis, the NRC staff concludes that the cumulative risks from severe accidents at any location within 50 mi of the St. Lucie alternative site would be SMALL.

9.3.6 Comparison of the Impacts of the Proposed Action and the Alternative Sites

This section summarizes the review team's characterization of the cumulative impacts related to locating a two-unit AP1000 nuclear power facility at the proposed Turkey Point site and at each alternative site. The four sites selected for detailed review as part of the alternative sites environmental analysis included the Glades site in Glades County, the Martin site in Martin County, the Okeechobee 2 site in Okeechobee County, and the St. Lucie site in St. Lucie County. Comparisons are made between the proposed site and alternatives to evaluate whether one of the alternative sites is environmentally preferable to the proposed site. The NRC's determination is independent of the USACE's determination under the 404 Guidelines of whether the Turkey Point site is the least environmentally damaging practical alternative (LEDPA). The USACE will conclude its analysis of both offsite and onsite alternatives in its Record of Decision. The need to compare the proposed site with alternative sites arises from the requirement in NEPA Section 102(2)(C)(iii) (42 U.S.C. § 4332 et seq.) (TN661) that EISs include an analysis of alternatives to the proposed action. The NRC criterion to be used in assessing whether a proposed site is to be rejected in favor of an alternative site is based on whether the alternative site is "obviously superior" to the site proposed by the applicant (NRC 1977-TN3867). An alternative site is "obviously superior" to the proposed site if it is "clearly and substantially" superior to the proposed site (NRC 1978-TN2636). The standard of obviously superior "...is designed to guarantee that a proposed site will not be rejected in favor of an alternate unless, on the basis of appropriate study, the Commission can be confident that such action is called for" (NECNP v. NRC 1978-TN2632).

The "obviously superior" test is appropriate for two reasons. First, the analysis performed by the NRC in evaluating alternative sites is necessarily imprecise. Key factors considered in the alternative site analysis, such as population distribution and density, hydrology, air quality, aquatic and terrestrial ecological resources, aesthetics, land use, and socioeconomics are difficult to quantify in common metrics. Given this difficulty, any evaluation of a particular site

must have a wide range of uncertainty. Second, the applicant's proposed site has been analyzed in detail, with the expectation that most of the adverse environmental impacts associated with the site have been identified. The alternative sites have not undergone a comparable level of detailed study. For these reasons, a proposed site may not be rejected in favor of an alternative site when the alternative site is marginally better than the proposed site, but only when it is obviously superior (NRC 1978-TN2636). NEPA does not require that a nuclear plant be constructed on the single best site for environmental purposes. Rather, "...all that NEPA requires is that alternative sites be considered and that the effects on the environment of building the plant at the alternative sites be carefully studied and factored into the ultimate decision" (NECNP v. NRC 1978-TN2632).

Section 9.3.6.1 discusses the process the review team used to compare cumulative impacts of the alternative sites to the proposed Turkey Point site and provides the final cumulative impact for each resource category. Cumulative impact levels from Chapter 7 (for the Turkey Point site), and the four alternative sites (from Sections 9.3.2 through 9.3.5) are listed in Table 9-28. Section 9.3.6.2 discusses the cumulative impacts of the proposed project located at the Turkey Point site and at the alternative sites as they relate to a determination of environmental preference or obvious superiority.

9.3.6.1 Comparison of Cumulative Impacts at the Proposed and Alternative Sites

The following section summarizes the review team's independent assessment of the proposed and alternative sites. The team characterized the expected cumulative environmental impacts of building and operating two new units at the Turkey Point site and alternative sites; these impacts are summarized by category in Table 9-28. Full explanations of the specific impact characterizations are provided cumulatively in Chapter 7 for the proposed site and in Sections 9.3.2, 9.3.3, 9.3.4, and 9.3.5 for each of the alternative sites. The review team's impact category levels are based on professional judgment, experience, and consideration of controls likely to be imposed under Federal, State, or local permits that would be acquired throughout the course of the COL application and review process. The considerations and assumptions were similarly applied at each of the alternative sites to provide a common basis for comparison. In the following discussion, the review team compares the impact levels between the proposed site and each alternative site.

The cumulative environmental impact areas listed in the table have been evaluated using the NRC's three-level standard of significance: SMALL, MODERATE, or LARGE. These levels were developed using CEQ guidelines and are set forth in the footnotes to Table B-1 of 10 CFR Part 51 (TN250), Subpart A, Appendix B:

- SMALL – Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.
- MODERATE – Environmental effects are sufficient to alter noticeably, but not to destabilize important attributes of the resource.
- LARGE – Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

Table 9-28. Comparison of Cumulative Impacts at the Turkey Point and Alternative Sites

Resource Category	Turkey Point Site	Glades	Martin	Okeechobee 2	St. Lucie
Land Use	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
Water-Related					
Surface-water use	SMALL	MODERATE	MODERATE	MODERATE	SMALL
Groundwater use	SMALL	SMALL	SMALL	SMALL	SMALL
Surface-water quality	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
Groundwater quality	SMALL	SMALL	SMALL	SMALL	SMALL
Ecology					
Terrestrial and wetland ecosystems	MODERATE to LARGE	MODERATE	MODERATE	MODERATE	MODERATE
Aquatic ecosystems	MODERATE	MODERATE	MODERATE	MODERATE	SMALL to MODERATE
Socioeconomics					
Physical impacts	SMALL adverse except for MODERATE beneficial impacts on road quality	MODERATE adverse to SMALL beneficial impacts on road quality	MODERATE adverse to MODERATE beneficial impacts on road quality	MODERATE adverse to SMALL beneficial impacts on road quality	LARGE adverse to MODERATE beneficial impacts on road quality
Demography	SMALL	SMALL	SMALL	SMALL	SMALL, except for LARGE residential displacement impacts
Economic impacts on the community	SMALL and beneficial	SMALL and beneficial, except for LARGE and beneficial property tax revenues for Glades County and School District	SMALL and beneficial, except for MODERATE and beneficial property tax revenues for Martin County and School District	SMALL and beneficial, except for LARGE and beneficial property tax revenues for Okeechobee County and School District	SMALL and beneficial
Infrastructure and community services	SMALL except for MODERATE adverse impacts on traffic.	SMALL except for MODERATE adverse impacts on traffic.	SMALL except for MODERATE adverse impacts on traffic.	SMALL except for MODERATE adverse impacts on traffic.	SMALL except for MODERATE adverse impacts on traffic.
Environmental Justice	None[(a)]	None[(a)]	None[(a)]	None[(a)]	None[(a)]
Historic and Cultural Resources	MODERATE	MODERATE	SMALL	MODERATE	SMALL
Air Quality					
Criteria pollutants	SMALL to MODERATE	SMALL	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE
Greenhouse gas emissions	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
Nonradiological Health	SMALL	SMALL	SMALL	SMALL	SMALL
Radiological Health	SMALL	SMALL	SMALL	SMALL	SMALL
Postulated Accidents	SMALL	SMALL	SMALL	SMALL	SMALL

(a) A determination of "NONE" for Environmental Justice analyses does not mean there are no adverse impacts on minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, the impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

9.3.6.2 Environmentally Preferable Sites

As shown in Table 9-28, the cumulative impacts of building and operating two new units at the proposed site and the alternative sites are characterized as SMALL for many resource areas. The resource areas for which the impact level at an alternative site is the same as that for the proposed site do not contribute to the alternative site being judged to be environmentally preferable to the proposed site. Therefore, these resource areas are not discussed further in determining whether an alternative site is environmentally preferable to the proposed site. The resource areas for which an alternative site has a different impact level than the proposed site are discussed further to determine whether an alternative site is environmentally preferable to the proposed site. Where there is a range of impacts for a resource, the upper value of the impacts is used for the comparison. In addition, for the cases in which the cumulative impacts for a resource are greater than SMALL, consideration is given to those cases in which the impacts of the project at the specific site do not make any significant contribution to the cumulative impact level. As shown in Table 9-28, there are some differences in impacts among the sites.

Glades Site

The cumulative impacts of building and operating two new nuclear units at the Glades site shown in Table 9-28 are similar to those for the Turkey Point site with six exceptions. The cumulative impacts for surface-water use are MODERATE at the Glades site, and SMALL at the Turkey Point site. However, building and operating new nuclear units at the Glades site would not be a significant contributor to the cumulative surface-water use impacts. Regarding the impacts on terrestrial ecology and wetlands, the impacts at the Glades site are shown as MODERATE, while the impacts at the Turkey Point site are shown as MODERATE to LARGE. However, the impacts directly attributable to the new plants at the Turkey Point site would be MODERATE. LARGE impacts, if they occur, would be as a result of impacts from other projects, and would occur regardless of whether Units 6 and 7 are built. Aesthetic impacts would be MODERATE at the Glades site because of the contrast with the surrounding environment, but they would be SMALL at the Turkey Point site. The post-construction physical impacts on road quality would be SMALL and beneficial at the Glades site but MODERATE and beneficial at the Turkey Point site. Regarding economic impacts on the community, the impacts at the Glades site are shown as SMALL and beneficial in the region, but LARGE and beneficial for the county and school district. For the Turkey Point site, the impacts are shown as SMALL and beneficial. The amount of taxes contributed by the new plants at the two sites would be the same and the difference occurs because the beginning tax base in Glades County is much smaller than in Miami-Dade County. Regarding the impacts of criteria pollutants, the impacts at the Glades site are shown as SMALL, while the impacts at the Turkey Point site are shown as SMALL to MODERATE. But the potential MODERATE impacts at the Turkey Point site are related to the existing gas-fired Unit 5, and are not related to the new nuclear units. Based on all of the information above, the NRC staff concludes that the differences between the two sites do not support a determination that the Glades site is environmentally preferable to the Turkey Point site. As discussed in Section 9.3.1.7, if it turns out that a water-storage reservoir would be required at the Glades site, then the impacts on some resources, particularly land use and terrestrial ecology, would be increased.

Martin Site

The cumulative impacts of building and operating two new nuclear units at the Martin site shown in Table 9-28 are similar to those for the Turkey Point site with six exceptions. The cumulative impacts for surface-water use are MODERATE at the Martin site, and SMALL at the Turkey Point site. However, building and operating new nuclear units at the Martin site would not be a significant contributor to the cumulative surface-water use impacts and, therefore, there is little real difference between these sites for this resource area. Regarding the impacts on terrestrial ecology and wetlands, the impacts at the Martin site are shown as MODERATE, while the impacts at the Turkey Point site are shown as MODERATE to LARGE. However, the impacts directly attributable to the new plants at the Turkey Point site would be MODERATE. LARGE impacts, if they occur, would be a result of impacts from other projects and would occur regardless of whether Units 6 and 7 are built. Aesthetic impacts would be MODERATE at the Martin site because of the contrast with the surrounding environment, but they would be SMALL at the Turkey Point site. Regarding economic impacts on the community, the impacts at the Martin site are shown as SMALL and beneficial in the region, but MODERATE and beneficial for the county and school district. For the Turkey Point site, the impacts are shown as SMALL and beneficial. The amount of taxes contributed by the new plants at the two sites would be the same and the difference occurs because the beginning tax base in Martin County is much smaller than in Miami-Dade County. The impacts of traffic at the Martin site are MODERATE to LARGE (depending on the timing of other projects in the area), while the impacts at the Turkey Point site are MODERATE. Finally, impacts on cultural and historic resources at the Turkey Point site are MODERATE because of visual impacts along the eastern corridor, while the impacts at the Martin site are SMALL because the new transmission lines are expected to follow the path of existing lines. Based on all of the information above, the NRC staff concludes that the differences between the two sites do not support a determination that the Martin site is environmentally preferable to the Turkey Point site. As discussed in Section 9.3.1.7, if it turns out that a water-storage reservoir would be required at the Martin site, then the impacts on some resources, particularly land use and terrestrial ecology, would be increased.

Okeechobee 2 Site

The cumulative impacts of building and operating two new nuclear units at the Okeechobee 2 site shown in Table 9-28 are similar to those for the Turkey Point site with five exceptions. The cumulative impacts for surface-water use are MODERATE at the Okeechobee 2 site, and SMALL at the Turkey Point site. However, building and operating new nuclear units at the Okeechobee 2 site would not be a significant contributor to the cumulative surface-water use impacts and, therefore, there is little real difference between these sites for this resource area. Regarding the impacts on terrestrial ecology and wetlands, the impacts at the Okeechobee 2 site are shown as MODERATE, while the impacts at the Turkey Point site are shown as MODERATE to LARGE. However, the impacts directly attributable to the new plants at the Turkey Point site would be MODERATE and would occur regardless of whether Units 6 and 7 are built. LARGE impacts, if they occur, would be a result of impacts from other projects. Aesthetic impacts would be MODERATE at the Okeechobee 2 site because of the contrast with the surrounding environment, but they would be SMALL at the Turkey Point site. The post-construction physical impacts on road quality would be SMALL and beneficial at the Okeechobee 2 site, but MODERATE and beneficial at the Turkey Point site. Regarding

economic impacts on the community, the impacts at the Okeechobee 2 site are shown as SMALL and beneficial in the region, but LARGE and beneficial for the county and school district. For the Turkey Point site, the impacts are shown as SMALL and beneficial. The amount of taxes contributed by the new plants at the two sites would be the same and the difference occurs because the beginning tax base in Okeechobee County is much smaller than in Miami-Dade County. Based on all of the information above, the NRC staff concludes that the differences between the two sites do not support a determination that the Okeechobee 2 site is environmentally preferable to the Turkey Point site. As discussed in Section 9.3.1.7, if it turns out that a water-storage reservoir would be required at the Okeechobee 2 site, then the impacts on some resources, particularly land use and terrestrial ecology, would be increased.

St. Lucie Site

The cumulative impacts of building and operating two new nuclear units at the St. Lucie site shown in Table 9-28 are similar to those for the Turkey Point site with five exceptions.

Regarding the impacts on terrestrial ecology and wetlands, the impacts at the St. Lucie site are shown as MODERATE, while the impacts at the Turkey Point site are shown as MODERATE to LARGE. However, the impacts directly attributable to the new plants at the Turkey Point site would be MODERATE and would occur regardless of whether Units 6 and 7 are built. LARGE impacts, if they occur, would be a result of impacts from other projects. Aquatic ecology impacts at the Turkey Point site would be MODERATE in comparison to the SMALL to MODERATE determination at St. Lucie. This primarily reflects the uncertainty related to the magnitude and extent of coastal environmental stressors that may occur in the future. All of the impacts that are greater than SMALL for these resource areas are a result of building and operating new units at these sites and so reflect a real difference in impacts. Regarding physical impacts on buildings, because of the extensive road widening on SR-A1A, impacts at the St. Lucie site would be LARGE and adverse, while there would be no similar impacts at the Turkey Point site. Regarding economic impacts on the community, the impacts at the St. Lucie site are shown as SMALL and beneficial in the region, but LARGE and beneficial for the county and school district. For the Turkey Point site, the impacts are shown as SMALL and beneficial. The amount of taxes contributed by the new plants at the two sites would be the same and the difference occurs because the beginning tax base in St. Lucie County is much smaller than in Miami-Dade County. Finally, the impacts on cultural and historic resources at the Turkey Point site are MODERATE because of visual impacts along the eastern corridor, while the impacts at the St. Lucie site are SMALL because the new transmission lines are expected to follow the path of existing lines. Based on all of the information above, the NRC staff concludes that the differences between the two sites do not support a determination that the St. Lucie site is environmentally preferable to the Turkey Point site.

9.3.6.3 Obviously Superior Sites

Because NRC staff determined that none of the alternative sites is environmentally preferable to the proposed site, none could be obviously superior, and no additional evaluations in that regard are required.

9.4 System Design Alternatives

The review team considered a variety of heat-dissipation systems and circulating-water system (CWS) alternatives. While other heat-dissipation systems and water systems are part of a nuclear power plant, the largest and most capable of causing environmental impacts is the CWS that cools and condenses the steam for the turbine generator. Other water systems, such as the service-water system, are much smaller than the CWS. As a result, the review team only considers alternative heat-dissipation and water-treatment systems for the CWS. The proposed CWS for Turkey Point Units 6 and 7 is a closed-cycle system that uses mechanical draft cooling towers for heat dissipation (FPL 2014-TN4058). The proposed system is discussed in detail in Chapter 3.

9.4.1 Heat-Dissipation Systems

About two-thirds of the heat from a commercial nuclear reactor is rejected as heat to the environment. The remaining one-third of the reactor-generated heat is converted into electricity. Normal heat-sink cooling systems transfer the rejected heat load into the atmosphere and/or nearby waterbodies, primarily as latent heat exchange (evaporating water) or sensible heat exchange (warmer air or water). Different heat-dissipation systems rely on different exchange processes. The following sections describe alternative heat-dissipation systems considered by the review team for proposed Turkey Point Units 6 and 7.

In its ER, FPL considered a range of CWS heat-dissipation systems, including a once-through cooling system and several closed-cycle cooling systems. In addition to the closed-cycle mechanical draft cooling towers selected, FPL considered natural draft cooling towers, once-through cooling into Biscayne Bay, cooling ponds, spray ponds, dry cooling towers, fan-assisted natural draft cooling towers, and a hybrid (combination wet-dry) cooling-tower system (FPL 2014-TN4058). In addition, the review team considered mechanical draft cooling towers with plume abatement.

9.4.1.1 Natural Draft Cooling Towers

Natural draft cooling towers, which use about the same amount of water as the proposed mechanical draft cooling towers, induce airflow up through large (e.g., 600 ft tall and 400 ft in diameter) towers by cascading warm water downward in the lower portion of the cooling tower. As heat transfers from the water to the air in the tower, the air becomes more buoyant and rises. This buoyant circulation induces more air to enter the tower through its open base. The environmental aspects of natural draft cooling towers and mechanical draft cooling towers are very similar (FPL 2014-TN4058). Because both rely on evaporation to dissipate the heat, water use is similar between natural and mechanical draft cooling towers; therefore, intake and discharge effects on aquatic biota would be similar. Notable differences include the fact that the natural draft cooling towers can be seen from a great distance and that the additional height increases the potential for avian collisions and bat collisions (NRC 2013-TN2654). It is unclear whether salt deposition from natural draft cooling towers would be greater than the deposition from mechanical draft cooling towers. However, the review team expects that all or most of the deposition would take place over nearby mangrove forests, which are adapted to high levels of sea spray. Therefore, the review team has determined that it is unlikely that the terrestrial impacts would be noticeably different.

Turkey Point Units 6 and 7 would be located adjacent to Biscayne National Park and natural draft cooling towers would impose a greater aesthetic impact. Also, the energy savings from using natural draft versus mechanical draft cooling towers are minimal. Therefore, the review team determined that natural draft cooling towers would not be an environmentally preferable alternative for the Turkey Point site.

9.4.1.2 Fan-Assisted Natural Draft Cooling Towers

Fan-assisted natural draft cooling towers are smaller than natural draft cooling towers but are designed to obtain a natural draft effect. The movement of air through the water being cooled is enhanced by fans arranged around the circumference of the cooling-tower shell. FPL indicates that for the Turkey Point site, fan-assisted natural draft cooling towers are a feasible alternative to the proposed design, although the power consumption to operate the towers would be higher and the noise levels generated would be slightly higher (FPL 2014-TN4058). Notable differences include the fact that the natural draft cooling towers can be seen from a greater distance and that the additional height increases the potential for avian collisions and bat collisions (NRC 1996-TN288). It is unclear whether salt deposition from fan-assisted natural draft cooling towers would be greater than the deposition from mechanical draft cooling towers. However, the review team expects that all or most of the deposition would take place over nearby mangrove forests, which are adapted to high levels of sea spray. Therefore the review team has determined that it is unlikely that the terrestrial impacts would be noticeably different. The review team concludes that, because the impacts of mechanical draft and fan-assisted natural draft cooling towers are similar, fan-assisted natural draft cooling towers would not be an environmentally preferable alternative for the Turkey Point site.

9.4.1.3 Once-Through Cooling

Once-through cooling systems withdraw water from the source waterbody and return virtually the same volume of water to the receiving waterbody at an elevated temperature. Typically the source waterbody and the receiving waterbody are the same body, and the intake and discharge structures are separated to limit recirculation. While there is essentially no consumptive use of water in a once-through heat-dissipation system, the elevated temperature of the receiving waterbody would result in some induced evaporative loss that decreases the net water supply. The elevated temperature can also adversely affect the biota of the receiving waterbody. The large intake flows would result in impingement and entrainment losses. Based on recent changes to implementation plans to meet Section 316(b) of the Clean Water Act (33 U.S.C. § 1344 et seq.) (TN1019), the review team has determined that once-through cooling systems for new nuclear reactors are unlikely to be permitted in the future, except in rare and unique situations.

If proposed Turkey Point Units 6 and 7 were to use once-through cooling with two AP1000 reactors, the review team determined that the water-supply needs for the two units would be approximately 1,700,000 gpm (FPL 2014-TN4058). FPL has determined that the only waterbody in the vicinity of Units 6 and 7 that could supply this quantity of water is Biscayne Bay, which is a National Park and has been designated as an aquatic preserve. For this reason, in addition to the Clean Water Act 316(b) considerations (33 U.S.C. § 1251 et seq.)

(TN662), the review team determined that once-through designs were not a feasible alternative design and eliminated them from further consideration as part of the Turkey Point Units 6 and 7 cooling system.

9.4.1.4 Cooling Pond

Existing Units 1 through 4 at the Turkey Point site use cooling canals to meet condenser cooling needs. The existing canals cover 5,900 ac. A pond approaching the size of the existing canals would be needed to support the proposed units (FPL 2014-TN4058). The dedication of an area of this size was weighed against the environmental impact from the selected design of the Turkey Point Units 6 and 7 cooling system. The review team determined that because of the impact of the loss of land and natural habitat, including designated critical habitat, associated with development of additional cooling ponds, a cooling system using a recirculating cooling pond was not an environmentally preferable alternative at the Turkey Point site.

9.4.1.5 Spray Ponds

Spray-pond cooling systems use manufactured ponds to cool water and enhance evaporative cooling by spraying water into the atmosphere. In addition to evaporation, heat transfer from the spray ponds to the atmosphere occurs through black-body radiation and conduction. A spray-pond system alternative was evaluated for cooling proposed Turkey Point Units 6 and 7, and it would require a 160 ac pond (FPL 2014-TN4058). Based on the additional land and natural habitat, including designated critical habitat, requirements to build the spray pond, and the possible impact from spray drift, the review team concludes that use of a spray pond would not be an environmentally preferable alternative for the Turkey Point site.

9.4.1.6 Dry Cooling Towers

Dry cooling towers have never been used to cool nuclear or fossil-fuel facilities of this size (i.e., approximately 2,400 MW(e). Dry cooling towers would eliminate virtually all water-related impacts from the cooling-system operation. No makeup water would be needed for cooling, and no blowdown water would be generated. This alternative could reduce water-use impacts. Dry cooling systems would be larger than the proposed cooling-tower systems, and would require more onsite land to accommodate the large dry cooling structures. Dry cooling systems can result in a significant loss of dependable electrical generation capacity, particularly during higher ambient temperature conditions, because the theoretical approach temperature is limited to the dry-bulb temperature and not the lower wet-bulb temperature. In other words, the temperature of the cooling water going back to the condenser can be no lower than the ambient air temperature. The review team determined that historical local air temperatures would result in the loss of generation at critical times of high demand for electricity due to the loss of sufficient condenser vacuum. The dry cooling-system design would not allow the plant to meet its stated goal as a baseload power source. Additional electrical losses occur with dry cooling because of the parasitic energy requirements of the large array of fans involved. This loss in generation efficiency translates into increased impacts on the fuel cycle. The review team therefore determined that building and operation of dry cooling towers would not be an environmentally preferable alternative for the Turkey Point site because of the loss of dependable electrical

generation capacity, particularly during higher ambient temperature conditions and reduced capacity, as well as inefficiencies in energy-production resulting in higher fuel-cycle impacts.

9.4.1.7 Combination Wet/Dry Cooling-Tower System

Combination wet/dry hybrid cooling towers have never been used to cool nuclear or fossil-fuel facilities of the size proposed by FPL (i.e., approximately 2,400 MW(e)). A mechanical draft wet/dry hybrid cooling-tower system uses both wet and dry cooling cells to limit consumption of cooling water, often with the added benefit of reducing plume visibility. Water used to cool the turbine generators generally passes first through the dry portion of the cooling tower where heat is removed by drawing air at ambient temperature over tubes through which the water is moving. Cooling water leaving the dry portion of the tower then passes through the wet tower where the water is sprayed into a moving air stream and additional heat is removed through evaporation and sensible heat transfer. When ambient air temperatures are low, the dry portion of these cooling towers may be sufficient to meet cooling needs. The use of the dry portion of the system would result in a loss in generating efficiency that would translate to increased impacts on the fuel cycle. As discussed in Chapter 5, the impacts of operating the proposed cooling system (mechanical draft tower) for aquatic ecology, water use, and water quality are SMALL. While a combination wet/dry cooling system would reduce water use, there would be an increase in fuel-cycle impacts because of the increased use of resources to generate electricity. Therefore, the review team concludes that the building and operation of a combined wet/dry cooling-tower system would not be an environmentally preferable alternative for the Turkey Point site.

9.4.1.8 Mechanical Draft Towers with Plume Abatement

Adding additional heat to a saturated cooling-tower exhaust, without adding additional water, would result in subsaturated water vapor. Subsaturated water vapor reduces the potential for a visible plume. The concept behind a mechanical draft cooling tower with plume abatement is similar to the wet/dry hybrid cooling system described above; the design parameters are focused on reducing the visual plume. Such designs may also result in slightly less consumptive water use. However, there is sufficient water at Turkey Point site for use of a mechanical draft cooling system without plume abatement. The aesthetic impacts at the Turkey Point site with a mechanical draft cooling tower without plume abatement were determined to be SMALL; therefore, a mechanical draft tower with plume abatement offers no significant advantage. These towers often have a larger footprint and require additional energy to operate, resulting in a net loss of energy available to meet the demand for power. For these reasons, the review team concludes that the building and operation of mechanical draft cooling towers with plume abatement would not be an environmentally preferable alternative for the Turkey Point site.

9.4.2 Circulating-Water Systems

The review team also evaluated alternatives to the proposed intakes and discharges for the normal heat-sink cooling system, based on the proposed heat-dissipation system water requirements. The capacity requirements of the intake and discharge system are defined by the proposed heat-dissipation system. For Turkey Point Units 6 and 7, the proposed heat-dissipation system is a closed-loop system that uses mechanical draft cooling towers for heat dissipation.

As indicated in Table 3-5, the maximum makeup water taken from the South District Wastewater Treatment Plant (SDWWTP) for two AP1000 units at the site would be 50,481 gpm (112 cfs) if reclaimed water is used (FPL 2014-TN4058) and the maximum makeup water withdrawn from radial collector wells would be 86,400 gpm (193 cfs) if saltwater is used (FPL 2014-TN4058).

9.4.2.1 Water Supplies

The proposed water supplies for Turkey Point Units 6 and 7 are described in detail in Chapter 3. Reclaimed water from the Miami-Dade Water and Sewer Department (MDWASD) would provide raw water to the CWSs of the proposed units under normal conditions. Saltwater obtained through radial collector wells with laterals extending beneath Biscayne Bay would provide raw water when water of sufficient quantity or quality is not available from the MDWASD (FPL 2014-TN4058). The impacts associated with the proposed water sources are discussed in Sections 4.2, 4.3, 5.2, and 5.3. As discussed in these sections, the overall impacts of the selected water-supply options would be SMALL.

Alternatives to the Primary Cooling-Water Supply

As mentioned above, reclaimed water from the MDWASD would provide raw water to the CWSs of the proposed units under normal conditions. In addition to the MDWASD, a broad range of water sources have been considered including marine sources, other surface-water sources, and groundwater sources.

Withdrawal of water from marine sources, including Biscayne Bay, Card Sound, and the Atlantic Ocean (including locations such as the barge-turning basin or Card Sound Canal), using conventional intake structures would result in some impingement and entrainment of aquatic species. In addition, activities associated with building a surface-water intake including dredging would also result in environmental disturbance and would be in conflict with Rule 62-4.242, “Antidegradation Permitting Requirements; Outstanding Florida Waters; Outstanding National Resource Waters; Equitable Abatement,” of the Florida Administrative Code (Fla. Admin. Code 62-4 -TN1084). As a result, the review team determined that these water sources are not environmentally preferable to the selected water source for the primary cooling-water supply.

Other surface-water sources, including the cooling canals of the industrial wastewater facility (IWF), and offsite sources such as a new freshwater reservoir were also considered. Withdrawal of cooling water from the cooling canals would induce groundwater from the Biscayne aquifer to flow into the cooling canals (FPL 2014-TN4058). In addition this would likely be considered to be in violation of Miami-Dade County Resolution Z-56-07, which requires that the operation of the proposed units does not withdraw any water from the Biscayne aquifer (Miami-Dade County 2007-TN1085). Use of fresh surface water from a new offsite reservoir or existing freshwater sources would likely have a greater environmental impact than the proposed alternative and is unlikely because SFWMD plans and Comprehensive Everglades Restoration Projects require use of freshwater for public water supply and environmental restoration. As a result it is unlikely that the required water volume would be permitted for industrial use.

Therefore, the review team determined that there were no alternative fresh surface-water sources that would be environmentally preferable to the proposed primary cooling-water source.

The review team considered several groundwater sources, including the Biscayne aquifer, the Upper Floridan aquifer, and the zone of the Lower Floridan aquifer that is commonly referred to as the Boulder Zone. Withdrawal of the large volumes of water needed to meet primary cooling-water needs for the proposed units from either the Biscayne aquifer or the Upper Floridan aquifer would certainly have an impact on water supply available to local users of these two resources and could potentially affect the quality of water in these aquifers. These impacts would exceed the impacts associated with the proposed primary cooling-water source and would be in violation of Miami-Dade County Resolution Z-56-07, which requires that the operation of the proposed units does not withdraw any water from the Biscayne aquifer or affect current users of the Floridan aquifer (Miami-Dade County 2007-TN1085).

The APPZ is a productive aquifer over 500 ft thick in some parts of Florida. However, the APPZ is thinner and less permeable near Turkey Point, where Reese and Richardson (2008-TN3436) show the APPZ being less than 100 ft thick and pinching out to the east. Therefore, the APPZ does not appear to be a viable option as a water source at the Turkey Point site.

The Boulder Zone is a zone of highly transmissive, cavernous limestone and dolomites located approximately 3,000 ft below land surface at the Turkey Point site. Water in the Boulder Zone has a salinity near that of seawater and approximately 37,000 mg/L total dissolved solids. FPL indicates that a well field would be constructed adjacent to the nuclear island if this alternative were selected (FPL 2014-TN4058).

The high transmissivities and cavernous nature of Boulder Zone indicate that 100 percent of the cooling-tower makeup water could be obtained from this source. No other withdrawals are made from this zone within 5 mi of the Turkey Point site, but this zone is used for wastewater disposal by the SDWWTP located 9 mi north of the site (FPL 2014-TN4058). Because FPL is planning to dispose of blowdown water to the Boulder Zone, sufficient separation between the deep-injection UIC wells and the withdrawal wells would need to be considered to prevent drawing the wastewater into the cooling-water intake wells. The construction of the pipelines needed to provide that separation and the disturbance of the land surface to construct either the UIC or withdrawal well field some distance from the site of Units 6 and 7 would have an environmental impact that would need to be considered. Use of the Boulder Zone as the primary water source would eliminate the environmental benefit of reducing direct ocean discharge that comes with the use of water from the MDWASD. Use of water from the Boulder Zone as the primary source of cooling water would be in violation of Miami-Dade County Resolution Z-56-07, which requires that the primary source of cooling water for the proposed units be reclaimed water from the MDWASD (Miami-Dade County 2007-TN1085). There is also a strong likelihood of recirculation occurring between the UIC wells used for disposal of blowdown and water-supply wells in the Boulder Zone and a likelihood of extracting water from the Boulder Zone containing contaminants injected through other UIC wells in the vicinity (FPL 2011-TN52). Withdrawal of water from either of these sources would be problematic for the cooling-water system. Therefore, the review team determined that there were no alternative groundwater sources that would be environmentally preferable to the proposed primary cooling-water source.

Alternatives to the Backup Cooling-Water Supply

As mentioned above, saltwater obtained through radial collector wells with laterals (horizontal collector lines) extending beneath Biscayne Bay would provide raw water when sufficient water is not available from the MDWASD. The review team considered a broad range of sources for water, including marine sources, other surface-water sources, and groundwater sources. Based on the analysis presented above for the primary cooling-water sources, the only sources identified for further consideration as backup water sources are the Boulder Zone and alternative locations for radial collector wells. Alternative locations of radial collector wells would require installation of a longer pipeline to transport cooling water to Units 6 and 7 with the associated environmental impacts. Neither of these options was identified by the review team as environmentally preferable to the use of radial collector wells as a backup water supply.

9.4.2.2 Intake Alternatives

The proposed systems to supply raw water for Turkey Point Units 6 and 7 are described in detail in Section 3.2.2.1. Reclaimed water from the MDWASD would provide raw water to the CWSs of the proposed units under normal conditions. Saltwater obtained through radial collector wells with laterals extending beneath Biscayne Bay would provide raw water when water of sufficient quality or quantity is not available from the MDWASD (FPL 2014-TN4058). These proposed raw water sources do not require cooling-water intake structures as defined by 40 CFR 125.83 (TN254). The environmental impacts of installing and operating these systems are discussed in Chapters 4 and 5.

Surface-Water Intake Structures

In addition to the radial collector well system selected by FPL, two alternative intake systems were considered: a shoreline intake structure and a passive offshore intake.

Shoreline Intake Structure

FPL identified the east bank of Card Sound Canal just south of the existing cooling canal system as a possible location for a conventional shoreline intake structure. The intake structure would be a conventional intake with a trash rack and traveling screens to keep material out of the pump forebays. The structure would include two forebays, each of which would contain three pumps. Two pumps from each set would supply water to one of the proposed units; the third pump in each bay would be on standby (FPL 2014-TN4058). Intake velocity would be less than 0.5 fps and the intake structure would have fish-return capability. The intake system would meet the requirements of Section 316(b) of the Clean Water Act related to impingement, entrainment, and aquatic monitoring (FPL 2014-TN4058). The structure would be approximately 60 ft wide and extend 50 ft back from the openings to Card Sound Canal (FPL 2014-TN4058). FPL indicates that excavation and installation of an intake structure at the Card Sound Canal location would affect wetlands (FPL 2014-TN4058).

Passive Offshore Intake

Generally, an offshore intake alternative has advantages if existing shoreline structures would conflict with a shoreline intake or if bathymetry or vegetation considerations make a shoreline intake less desirable. At the Turkey Point site, the conditions that would make an offshore intake advantageous in this way do not occur. However, the offshore intake design proposed by

FPL has certain advantages. FPL describes the proposed offshore intake system in the following way, “An alternate intake system on Card Sound Canal would consist of passive panel screens with polyhedron-shaped screens supported on a stainless steel frame and an air backwash unit. The polyhedron sides that are directed to the water surface are equipped with the screen panels made with special cling-free elements. The sides that are directed to the canal bed remain closed to avoid debris (sediment) ingress from the bed and for the optimum performance of air backwash. Air spray nozzles are arranged inside the polyhedron enabling a particularly effective screen backwash by pressurized air pulses” (FPL 2014-TN4058). Water would move from the offshore screen system to a wet well onshore that would house the pumps for pumping the water to proposed Turkey Point Units 6 and 7. The wet well structure would also contain the compressor for the air backwash system. The onshore structure associated with this intake design would be approximately the same size as the shoreline intake structure described above.

Environmental impacts from installation of the intakes and pipelines for the shoreline intake and the passive offshore intake would be equivalent because of the similar size of the onshore structure. Impacts on aquatic species due to entrainment and impingement may be less if the passive offshore intake were to be used, but in either case compliance with Section 316(b) of the Clean Water Act (33 U.S.C. § 1251 et seq.) (TN662) related to impingement, entrainment, and aquatic monitoring would result in minor impacts because of operation of either of these designs. The review team determined that neither of these intake designs would be environmentally preferable to the radial collector well system proposed by FPL because the land disturbance required for the radial collector well system is less than the land disturbance required to build the pipelines and intake structures associated with either the shoreline intake or the passive offshore intake located on Card Sound Canal.

9.4.2.3 Discharge Alternatives

FPL proposes to discharge blowdown from Turkey Point Units 6 and 7 to the Boulder Zone of the Lower Floridan aquifer through a series of UIC wells. A detailed description of the proposed discharge system is presented in Section 3.2.2.2. The impacts associated with the proposed discharge system are discussed in Sections 4.2, 4.3, 5.2, and 5.3. As discussed in these sections, the overall impacts of the deep-well injection discharge option would be SMALL.
A broad range of discharge alternatives for the cooling-water system have been considered, including discharge to the Atlantic Ocean, Biscayne Bay, Card Sound, the barge-turning basin, Card Sound Canal, the cooling canals of the IWF, rehydration of wetlands, and returning the water to the SDWWTP for disposal. Alternatives including discharge to the Atlantic Ocean, Biscayne Bay, and Card Sound are not considered environmentally preferable because of the anticipated environmental impacts of building and operating discharge facilities in these environments including the disturbance to the seafloor required to build the discharge facilities. In addition, Rule 62-4.242 of the Florida Administrative Code (Fla. Admin. Code 62-4 -TN1084) prohibits activities such as the dredging required to construct a shoreline or offshore diffuser that would degrade the water quality of Outstanding Florida Waters. Discharge to Card Sound Canal and the barge-turning basin are not considered environmentally preferable to the selected alternative because these waterbodies discharge directly to Card Sound or Biscayne Bay and the discharge of heated water to these waterbodies would likely have a greater environmental impact than the selected alternative. When saline water from the radial collector wells is used

for cooling, the blowdown water would also have a salinity higher than the receiving water, which would likely contribute to a higher environmental impact than the selected alternative. Blowdown water would likely not meet acceptance criteria for rehydration of wetlands or return of the water to the SDWWTP, especially when saltwater was being used as the source of cooling water (FPL 2014-TN4058).

Discharge of cooling water to the cooling canals of the IWF would contribute to existing concerns that hypersaline water from the cooling canals is degrading water quality in the Biscayne aquifer in the vicinity of the Turkey Point site. Therefore, the review team determined that there were no alternative discharge designs that would be environmentally preferable to the proposed discharge design.

9.4.2.4 Water Treatment

Both inflow and effluent water may require treatment to ensure that they meet plant water needs and effluent water standards. As described in Section 3.4.2.2, FPL proposes to add chemicals to plant water to meet appropriate water-quality process needs. Deep-injection well discharge would be subject to the provisions of the UIC Rule in 62-528 of the Florida Administrative Code (Fla. Admin. Code 62-528 -TN556) and the conditions of the UIC permit (FPL 2014-TN4058).

The largest chemical inputs are required to maintain the appropriate chemistry in the cooling towers to preclude biofouling. Mechanical treatment is generally not a viable option in cooling-tower designs. Other alternatives to preclude biofouling, such as ultraviolet treatment, are feasible, but would not eliminate the need for some chemical treatment. Chemical treatment is a reliable and well-established engineering practice that has been shown to provide minimal impacts in a variety of settings. The review team identified no environmentally preferable alternative to FPL's proposed chemical water treatment.

9.4.3 Summary Statement

The review team considered various alternative systems designs, including eight alternative heat-dissipation systems and multiple alternative intake, discharge, and water-supply systems. The review team identified no alternatives that were environmentally preferable to the proposed Turkey Point Units 6 and 7 plant systems design.

9.5 U.S. Army Corps of Engineers Alternatives Evaluation

The 404(b)(1) Guidelines (40 CFR Part 230) (TN427) require that no discharge of dredged or fill material into waters of the United States (including jurisdictional wetlands) shall be permitted if there is a practicable alternative that would have a less adverse impact on the aquatic environment, as long as the alternative does not have other significant adverse environmental consequences. An alternative is practicable if it is available and capable of being implemented after taking into consideration cost, existing technology, and logistics in light of overall project purposes. If it is otherwise a practicable alternative, an area not presently owned by the applicant that could reasonably be obtained, used, expanded, or managed in order to fulfill the basic purpose of the proposed activity may be considered. Thus, this analysis is necessary to determine which alternative is the LEDPA (least environmentally damaging practicable alternative) that meets the project purpose and need. Even if an applicant's proposed

alternative is determined to be the LEDPA, the USACE must still determine whether the LEDPA is contrary to the public interest. The USACE Public Interest Review, described in 33 CFR 320.4 (TN424) (and further discussed in Appendix I), directs the USACE to consider a number of factors in a balancing process to determine whether a proposed project is contrary to the public interest. A permit would not be issued for an alternative that is not the LEDPA, nor would a permit be issued for an activity that is determined to be contrary to the public interest. The USACE will conclude its Clean Water Act Section 404(b)(1) Guidelines and public interest analyses in its Record of Decision.

10.0 Conclusions and Recommendations

By letter dated June 30, 2009 (FPL 2009-TN1229), as supplemented by a letter dated August 7, 2009 (FPL 2009-TN1230), the Florida Power & Light Company (FPL) applied to the U.S. Nuclear Regulatory Commission (NRC or the Commission) for two combined construction permits and operating licenses (combined licenses or COLs) for the proposed Turkey Point Units 6 and 7 (COL application). The NRC review team's evaluation of the environmental impacts of the proposed action is based on the October 29, 2014 revision of the COL application (FPL 2014-TN4102), including the Environmental Report (ER) (FPL 2014-TN4058), responses to requests for additional information, and supplemental information. Documents supporting the review team's evaluation are listed as references where appropriate.

The site proposed by FPL for the two new nuclear units is the Turkey Point site in southeastern Miami-Dade County, Florida. The Turkey Point site is an approximately 9,460 ac site that includes five existing power plants. Units 1 and 2 have been operated as natural-gas/oil steam-generating units. Unit 2 was converted to operate in synchronous condenser mode. Unit 1 will be converted to operate in synchronous condenser mode in late 2016 (FPL 2016-TN4579). In the synchronous condenser mode, the generators help stabilize and optimize grid performance but do not generate power. Units 3 and 4 are nuclear pressurized water reactors, and Unit 5 is a natural-gas combined-cycle steam-generating unit. The proposed plant area is south of Turkey Point Units 3 and 4 on approximately 218 ac of the Turkey Point site property (FPL 2014-TN4058). The proposed Turkey Point Units 6 and 7 would be owned by FPL (2014-TN4058). With the exception of the transmission systems needed to route power from the proposed units, and the pipelines needed to bring reclaimed water to the Turkey Point site, all of the construction and operation related to proposed Turkey Point Units 6 and 7 would be completely within the confines of the Turkey Point site (FPL 2014-TN4058).

On June 30, 2009, the U.S. Army Corps of Engineers (USACE) received a Department of the Army (DA) permit application from FPL to construct the proposed Turkey Point Units 6 and 7, reclaimed-water facility, access roads, radial collector wells, pipelines, transmission lines, and other related infrastructure. The proposed work would result in the alteration of waters of the United States, including wetlands. The USACE is participating as a cooperating agency with the NRC in preparing this environmental impact statement (EIS). The USACE published a public notice of FPL's DA permit application on March 9, 2015. The USACE's consideration of public comments received in response to this public notice will be reflected in the public interest review and Clean Water Act (CWA) Section 404(b)(1) analysis in the USACE's Record of Decision.

On June 30, 2009, FPL submitted a Site Certification Application (SCA) to the State of Florida Department of Environmental Protection for the proposed Turkey Point Units 6 and 7 and ancillary facilities (FPL 2010-TN1231). The SCA process provides a Certification that encompasses all licenses and permits needed for affected Florida State, regional, and local agencies. It also includes any regulatory activity that would be applicable under these agencies' regulations for proposed Turkey Point Units 6 and 7 (FDEP 2013-TN2629). On May 19, 2014, the State of Florida issued final Conditions of Certification to FPL authorizing construction, operation, and maintenance of proposed Turkey Point Units 6 and 7 and associated facilities

(State of Florida 2014-TN3637). The final Conditions of Certification issued are binding and subject to the requirements listed in State of Florida (2014-TN3637). Although the opinion remands the Conditions of Certification to the Florida Siting Board for consideration of the possibility of burying a portion of the transmission lines and reconsideration of the specified mitigation measures, the NRC staff understands that the court's opinion is not yet final as of this writing (October 3, 2016). Accordingly, for the purposes of the FEIS evaluation of impacts, the NRC staff considers the transmission line route and conditions reviewed and approved by the Florida Siting Board as the most current information regarding the transmission line and associated potential mitigation measures. Even if the Conditions of Certification are revisited, the NRC staff considers it reasonable to expect that Conditions of Certification similar to or no less effective than those originally issued will be in place before construction and operation of the proposed units begins.

Section 102 of the National Environmental Policy Act of 1969, as amended (NEPA) (42 U.S.C. § 4321 et seq.) (TN661) directs that an EIS is required for a major Federal action that significantly affects the quality of the human environment. Section 102(2)(C) of NEPA requires that an EIS include information about the following:

- the environmental impact of the proposed action
- any adverse environmental effects that cannot be avoided should the proposal be implemented
- alternatives to the proposed action
- the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity
- irreversible and irretrievable commitments of resources that would be involved if the proposed action is implemented.

NRC has included regulatory provisions for meeting NEPA in Title 10 of the *Code of Federal Regulations* (CFR) Part 51. In 10 CFR 51.20 (TN250), the NRC requires preparation of an EIS for issuance of a COL. Subpart C of 10 CFR Part 52 (TN251) contains the NRC regulations related to applications for COL's.

The proposed actions related to the Units 6 and 7 application are (1) the NRC issuance of COLs for construction and operation of two new nuclear units at the Turkey Point site in Miami-Dade County, Florida, and (2) DA authorization pursuant to Section 404 of the Federal Water Pollution Control Act (Clean Water Act), as amended (33 U.S.C. § 1344) (TN662), Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403) (TN4768), and Section 14 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 408) (TN4769). The DA permit application requests authorization to discharge fill into approximately 1,000 ac of waters of the United States, including jurisdictional wetlands, to construct structures beneath navigable waters of the United States such as radial collector wells, and to expand the existing barge-unloading area in navigable waters of the United States. The environmental review described in this EIS was conducted by a review team consisting of NRC staff, its contractor's staff, and staff from the USACE. During the course of preparing this EIS, the review team reviewed the ER submitted by FPL (FPL 2014-TN4058) and supplemental documentation; consulted with Federal, State,

Tribal, and local agencies; and followed the guidance set forth in NUREG–1555, *Environmental Standard Review Plans* (NRC 2000-TN614), and NUREG–0800, *Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants* (NRC 2007-TN613). In addition, the NRC considered the public comments related to the environmental review received during the scoping process. The public comments are provided in Appendix D.

Included in this EIS are (1) the results of the NRC staff's analyses, which consider and weigh the environmental effects of the proposed action and of constructing and operating two new nuclear units at the Turkey Point site; (2) mitigation measures for reducing or avoiding adverse effects; (3) the environmental impacts of alternatives to the proposed action; and (4) the NRC staff's recommendation regarding the proposed action based on its environmental review. The COL application references a specific reactor design.

The USACE is a cooperating agency with the NRC, which is serving as the lead agency in the development of this EIS. The USACE has participated as a member of the review team. In carrying out its regulatory responsibilities, the USACE will complete an independent evaluation of the applicant's DA permit application to determine whether to issue, issue with modifications, or deny a DA permit for this project. This decision will be documented in the USACE's Record of Decision (ROD). The decision about whether to issue a DA permit will be based on an evaluation of the probable impacts, including cumulative impacts, of the proposed activity and its intended effect on the public interest. Evaluation of the probable impacts that the proposed activities may have on the public interest requires a careful weighing of all of the factors relevant in each particular case. A decision by the USACE to authorize this proposal, and if so, the conditions under which it will be allowed to occur, are therefore determined by the outcome of this general balancing process.

By acting as a cooperating agency on the development of the EIS, USACE plans to adopt the EIS in its ROD. The USACE will also include any additional information and analyses required to support its permit decision to issue the DA permit, deny the DA permit, or issue the DA permit with modifications. The USACE's role as a cooperating agency in the preparation of this EIS is to ensure to the maximum extent practicable that the information presented is adequate to fulfill the requirements of USACE regulations. The Clean Water Act, Section 404(b)(1) "Guidelines for Specification of Disposal Sites for Dredged or Fill Material" (40 CFR Part 230) (TN427), contains the substantive environmental criteria used by USACE in evaluating proposed discharges of dredged or fill material into waters of the United States. USACE's Public Interest Review (PIR) (33 CFR § 320.4) (TN424) directs the USACE to consider a number of factors as part of a balanced evaluation process in order to determine whether the proposed project is contrary to the public interest. USACE's Section 404(b)(1) analysis and PIR will be part of its ROD and will not be addressed in this EIS. The following general criteria are considered in the evaluation of every application:

- the relative extent of the public and private need for the proposed structure or work;
- where there are unresolved conflicts about resource use, the practicability of using practicable and reasonable alternative locations and methods to accomplish the objective of the proposed structure or work; and
- the extent and permanence of the beneficial and/or detrimental effects that the proposed structure or work is likely to have on the public and private uses to which the area is suited.

As part of the USACE public comment process, USACE published a public notice on March 9, 2015 to solicit comments from the public regarding FPL's DA permit application for proposed work at the Turkey Point site. The USACE's consideration of the public comments received in response to this public notice will be reflected in the PIR and CWA Section 404(b)(1) analysis in the USACE's ROD.

Environmental issues are evaluated using the three-level standard of significance—SMALL, MODERATE, or LARGE—developed by the NRC based on the Council on Environmental Quality (CEQ) guidelines (40 CFR 1508.27) (TN428). Table B-1 of 10 CFR Part 51 (TN250), Subpart A, Appendix B, provides the following definitions of the three significance levels:

> SMALL – Environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource.
>
> MODERATE – Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.
>
> LARGE – Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

Mitigation measures were considered for each environmental issue and are discussed in the appropriate sections. During its environmental review, the review team considered planned activities and actions that FPL indicates it and others would likely take if FPL receives the COLs. In addition, FPL provided estimates of the environmental impacts resulting from the building and operation of two new nuclear units on the Turkey Point site.

10.1 Impacts of the Proposed Action

In a final rule dated October 9, 2007 (72 FR 57416) (TN260), the Commission limited the definition of "construction" to those activities that fall within its regulatory authority (10 CFR 51.4) (TN250). Many of the activities undertaken to build a nuclear power plant do not have any effect on nuclear safety issues, are not within the NRC's licensing authority over nuclear power reactors and, therefore, are not part of the NRC action to license the plant Turkey Point Units 6 and 7. The activities associated with building the plant that are not within the purview of the NRC are grouped under the term "preconstruction." Preconstruction activities include clearing and grading, excavating, erection of support buildings and transmission lines, and other associated activities. To at least some extent, these activities would be necessary to build any thermal power plant. Because preconstruction activities are not part of the NRC action, their impacts are not reviewed as a direct effect of the NRC action. Rather, the impacts of the preconstruction activities are considered in the context of cumulative impacts. Although the preconstruction activities are not part of the NRC action, certain preconstruction activities require permits from the USACE, as well as other Federal, State, and local agencies.

Chapter 4 describes the relative magnitude of impacts related to preconstruction and construction activities and provides a summary of impacts in Table 4-19. Impacts associated with operation of the proposed facilities are discussed in Chapter 5 and are summarized in Table 5-24. Chapter 6 describes the impacts associated with the fuel cycle, transportation, and

decommissioning. Chapter 7 describes the impacts associated with preconstruction and construction activities and operation of Turkey Point Units 6 and 7 when considered along with the cumulative impacts of other past, present, and reasonably foreseeable future projects in the geographical region around the Turkey Point site.

10.2 Unavoidable Adverse Environmental Impacts

Section 102(2)(C)(ii) of NEPA (42 U.S.C. § 4321 et seq.) (TN661) requires that an EIS include information about any adverse environmental effects that cannot be avoided if the proposal is implemented. Unavoidable adverse environmental impacts are the potential impacts of the NRC and USACE actions that cannot be avoided and for which no practical means of mitigation are available.

The unavoidable adverse environmental impacts associated with the granting of the COLs for Turkey Point Units 6 and 7 would include impacts of both construction and operation.

10.2.1 Unavoidable Adverse Impacts during Construction and Preconstruction Activities

Chapter 4 discusses in detail the potential impacts from construction and preconstruction of the proposed Units 6 and 7 at the Turkey Point site and presents mitigation and controls intended to lessen the adverse impacts. Table 10-1 presents adverse impacts associated with construction and preconstruction activities on each of the resource areas evaluated in this EIS as well as the mitigation measures that would reduce the impacts. The impacts remaining after mitigation has been applied are identified in the table as the unavoidable adverse impacts. Unavoidable adverse impacts are the result of both construction and preconstruction activities, unless otherwise noted. The impact determinations in Table 10-1 are for the combined impacts of construction and preconstruction, but the impact determinations for NRC-regulated construction are the same for water use, water quality, aquatic ecology, socioeconomic and environmental justice, air quality, and nonradiological and radiological health resource areas. The impact determinations for preconstruction activities and NRC-related construction are different for land use, terrestrial and wetland ecosystems, and historic and cultural resources. For the impact determinations that differ for the NRC-regulated activities, the impacts from the NRC-regulated activities are discussed below the table.

The unavoidable adverse impacts are primarily attributable to preconstruction activities due to the initial land disturbance from clearing the land, land use, excavation, excavation dewatering, filling wetlands and waterways, adding impervious surfaces, and dredging. NRC-authorized construction activities partially contribute to most of the unavoidable adverse impacts. Approximately 585 ac within the Turkey Point Units 6 and 7 project boundary would be permanently disturbed. Areas disturbed to build these project features would be permanently converted to structures, pavement, and intensively maintained exterior grounds. These onsite disturbances would be in close proximity to, and visible from, portions of Biscayne National Park. Building and operating offsite facilities such as transmission lines, pipelines, and access roads would require the loss and fragmentation of mangrove forests, pine rocklands, and other natural habitats offsite, and these linear facilities could interfere with urban land uses adjacent to or traversed by the rights-of-way.

Table 10-1. Unavoidable Adverse Environmental Impacts from Construction and Preconstruction Activities

Resource Area	Impacts	Mitigation Measures	Unavoidable Adverse Impacts
Land Use	MODERATE (NRC-authorized construction impact level is SMALL)	Comply with requirements of applicable Federal, State, and local permits and the State final Conditions of Certification.	The project would require a permanent commitment (through decommissioning) of approximately 585 ac of land on the Turkey Point site. Additional areas of land offsite would be occupied by rights-of-way accommodating various pipelines, transmission lines, and access roads. Land uses not related to facility operation (e.g., agriculture) in the rights-of-way would be limited but not necessarily precluded.
Water Use	SMALL	Comply with requirements of applicable Federal, State, and local permits and the State final Conditions of Certification.	Limited withdrawal of small amounts of groundwater from the Biscayne aquifer from excavation dewatering when building the plants.
Water Quality	SMALL	Comply with requirements of applicable Federal, State, and local permits and the State final Conditions of Certification.	
Ecological (Terrestrial)	MODERATE (NRC-authorized construction impact level is SMALL)	Compensatory mitigation for unavoidable wetland impacts through Federally approved mitigation bank, in-lieu fee program, or permittee responsible mitigation. Additional mitigation measures tailored to specific species listed under the Endangered Species Act are expected to be required by the U.S. Fish and Wildlife Service.	Permanent loss of mangroves and other wetland habitats and pine rockland and other upland habitats, habitat fragmentation by pipelines and transmission lines, and increased mortality risk to certain listed species.
Ecological (Aquatic)	SMALL to MODERATE	Follow FPL and other agency protocols and requirements for protecting American crocodile, Smalltooth Sawfish, Nassau Grouper, manatees, and sea turtles.	Permanent loss of some onsite aquatic environments, some disturbance, and possible disturbance of manatees, Smalltooth Sawfish, Nassau Grouper, and sea turtles. 270 ac of permanent critical habitat loss and 211 ac that would be adversely affected for resident American crocodiles.

Table 10-1. (contd)

Resource Area	Impacts	Mitigation Measures	Unavoidable Adverse Impacts
Socioeconomics			
Physical Impacts	SMALL (adverse) to MODERATE (beneficial)	Physical impacts attenuate rapidly with distance, intervening foliage, and terrain. No mitigation beyond that identified by the applicant would be warranted.	All adverse physical impacts would be minor.
Demography	SMALL	Impacts would be minor and no mitigation would be warranted.	Minor impacts on the demographics of Miami-Dade County, and the communities of Homestead and Florida City.
Economic Impacts on Community	SMALL (beneficial)	None.	None.
Infrastructure and Community Services	SMALL (adverse) to MODERATE (beneficial)	Road improvements would mitigate but not eliminate adverse traffic-related impacts during construction. Those impacts would stop when construction is complete, so no further mitigation beyond that identified by the applicant would be warranted.	Noticeable but not destabilizing impacts on traffic near the plant during construction. All other infrastructure impacts would be minor.
Environmental Justice	NONE[(a)]	Mitigation would not be warranted, given the lack of environmental justice impacts.	There are no pathways by which minority or low-income populations would receive a disproportionately high and adverse impact.
Historic and Cultural Resources	MODERATE (NRC-authorized construction impact level is SMALL)	Construction-related impacts on cultural resources likely would consist of indirect visual impacts on historic built resources within the APEs for the transmission line corridors. The USACE would develop mitigation measures in consultation with the Florida (FL) SHPO. Further, in consultation between FPL and the FL SHPO, FPL has agreed to develop a work plan for additional cultural resources studies that are required for the transmission line	Based on NRC's evaluation, it is anticipated that there would be indirect visual impacts on National Register-eligible built resources in the transmission line corridor. Specific impacts are to be determined, based on USACE evaluation of impacts of transmission lines on cultural resources.

Table 10-1. (contd)

Resource Area	Impacts	Mitigation Measures	Unavoidable Adverse Impacts
		corridors and other offsite facilities. Prior to construction, FPL has also agreed to develop an unanticipated discovery plan for the treatment of cultural resources inadvertently discovered during construction or maintenance.	
Meteorology and Air Quality	SMALL	Implement a dust-control plan prior to site preparation. Obtain required air-quality permits.	None
Nonradiological Health	SMALL	Comply with Federal, State, and local regulations governing construction activities and construction vehicle emissions; comply with Federal and local noise-control ordinances; comply with Federal and State occupational safety and health regulations; and implement traffic management plan.	Dust emissions, noise, occupational injuries, traffic accidents.
Radiological Health	SMALL	Maintain doses to construction workers below NRC public dose limits.	Small doses to construction workers that would be less than NRC public dose limits.
Nonradioactive Waste	SMALL	Manage hazardous and nonhazardous solid wastes according to county, State, and Federal handling and transportation regulations; implement recycling and BMPs to minimize waste generation.	Minor decrease in available capacity of waste treatment and disposal facilities. Minor stormwater, wastewater, and atmospheric discharges.

APE = Area of Potential Effect
BMP = Best Management Practice
SHPO = State Historic Preservation Office.
SWPPP = Stormwater Pollution Prevention Plan.
(a) A determination of "NONE" for environmental justice analyses does not mean there are no adverse impacts on minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

Unavoidable adverse impacts on terrestrial resources and wetlands include permanent loss of wetlands and uplands. Both Federally and State-listed species would be affected, in addition to other important species such as wading birds. Transmission line construction would fragment

habitat and permanently affect pine rocklands that are designated as critical habitat for listed species. Preconstruction surveys would be conducted to determine final effects as well as to support appropriate minimization and avoidance activities.

Adverse impacts on aquatic resources are generally minor with exceptions of noticeable changes in the critical habitat of the American crocodile. Additional crocodile takes also could occur during preconstruction and construction. All other adverse impacts, such as noise and vibration affecting sea turtles, would likely be undetectable, temporary, or so minor that they would not noticeably alter the resource. Mitigation would be required by the State (State of Florida 2014-TN3637) and other Federal agencies.

Adverse socioeconomic impacts are generally minor for all categories, with the exceptions of noticeable but not destabilizing traffic-related impacts near the site (primarily at construction worker shift change). Traffic impacts without mitigation as described by the applicant would be destabilizing. The review team identified no pathways by which any minority or low-income populations would experience a disproportionately high and adverse impact, so there are no environmental justice impacts warranting mitigation.

Anticipated impacts on cultural resources would likely result from indirect visual impacts on above-ground resources within or within the vicinity of the transmission lines corridors. Because building of transmission lines is not an NRC-regulated activity, and because no cultural resources have been identified within the Units 6 and 7 plant area, impacts on historic and cultural resources from NRC-regulated activities would be small, and no mitigation beyond FPL's commitment to develop an unanticipated discoveries plan would be warranted.

Air-quality impacts include temporary degradation due to vehicle emissions and fugitive dust emissions during ground clearing, grading, excavation activities, and operation of other temporary sources. Fugitive dust from land disturbances and building activities would be mitigated by the dust-control plan.

10.2.2 Unavoidable Adverse Impacts during Operation

Chapter 5 provides a detailed discussion of the potential impacts from operation of proposed Units 6 and 7 at the Turkey Point site and presents anticipated mitigation and controls intended to lessen the adverse impacts. Table 10-2 presents the adverse impacts on each of the resource areas evaluated in this EIS associated with operation of the two proposed units, and the anticipated mitigation measures that would reduce the impacts. The impacts remaining after mitigation is applied are identified in the table as the unavoidable adverse impacts.

The unavoidable adverse impacts from operation for land use would be minimal and are associated with making land unavailable for other uses until after decommissioning of the two proposed units.

Unavoidable adverse impacts on land use resulting from operation of proposed Turkey Point Units 6 and 7 would be minimal because the land to be used for operations is land that has been previously disturbed and established for power-generation purposes and associated

activities. Operation and maintenance of permanent site-access roadways and pipelines would be compatible with the current land uses and would not affect any existing or planned land uses.

Operation and maintenance of transmission lines would also be generally compatible with the current land uses and would not substantially affect any existing or planned land uses. However, Miami-Dade County and cities within the county have raised issues related to the aesthetic compatibility of parts of the proposed new transmission lines with some urban areas. In addition, the National Park Service has raised compatibility questions regarding where parts of the proposed transmission lines would be situated adjacent to Everglades National Park.

Table 10-2. Unavoidable Adverse Environmental Impacts from Operation

Resource Area	Impacts	Mitigation Measures	Unavoidable Adverse Impacts
Land Use	MODERATE	Comply with requirements of applicable Federal, State, and local permits and the State final Conditions of Certification.	Transmission lines in urban areas and near the Everglades National Park could conflict with existing land uses. Onsite facilities would be in close proximity to Biscayne National Park.
Water Use	SMALL	Comply with requirements of applicable Federal, State, and local permits and the State final Conditions of Certification.	Additional demand for potable water from the Miami-Dade Water and Sewer Department. Limited withdrawal of small amounts of groundwater from the Biscayne aquifer when radial collector wells are operated.
Water Quality	SMALL	Comply with requirements of applicable Federal, State, and local permits and the State final Conditions of Certification.	Cooling-tower drift deposition of small amounts of chemical contaminants on portions of Biscayne Bay.
Ecological (Terrestrial)	MODERATE	Prescribed listed species-specific management. Transmission line marking and wood stork behavioral observation.	Right-of-way maintenance activities in or near wetlands and proposed critical habitat. Increased vehicle collision risk mortality to the Florida panther, vegetation-control effects on listed plants, and transmission system impacts on wood storks and Everglade snail kites.
Ecological (Aquatic)	SMALL	Comply with requirements, including those for protected species and habitats, of applicable Federal, State, and local permits and the State final Conditions of Certification.	During limited radial collector well operation, there would not be noticeable increases in salinity above normal background variation. Additional crocodile takes may occur, and cooling-tower drift deposition effects are expected to be minor.

Table 10-2. (contd)

Resource Area	Impacts	Mitigation Measures	Unavoidable Adverse Impacts
Socioeconomic			
Physical impacts	SMALL (adverse) to MODERATE (beneficial)	Physical impacts attenuate rapidly with distance, intervening foliage, and terrain. No mitigation beyond that which the applicant has identified is warranted.	All adverse physical impacts would be minor.
Demography	SMALL	Impacts would be minor and no mitigation would be warranted.	Minor impacts on the demographics of Miami-Dade County, and the communities of Homestead, and Florida City.
Economic Impacts on Community and Taxes	SMALL (beneficial)	None	None
Infrastructure and Community Services	SMALL (adverse) to MODERATE (beneficial)	Road improvements would mitigate but not eliminate adverse traffic-related impacts during operations.	All infrastructure and community service impacts would be minor during operations, except for noticeable impacts on traffic.
Environmental Justice	NONE[(a)]	Mitigation would not be warranted, given the lack of environmental justice impacts.	None. (There are no pathways by which minority or low-income people would receive a disproportionately high and adverse impact.)
Historic and Cultural	SMALL	Operation-related impacts on cultural resources likely would consist of inadvertent discoveries during maintenance activities. The USACE would develop mitigation measures in consultation with the FL SHPO. Further, in consultation between FPL and the FL SHPO, FPL has agreed to develop an unanticipated discovery plan for the treatment of cultural resources inadvertently discovered during construction or maintenance.	None

Table 10-2. (contd)

Resource Area	Impacts	Mitigation Measures	Unavoidable Adverse Impacts
Meteorology and Air Quality	SMALL	Compliance with Federal, State, and local air-quality permits and regulations.	Slight increases in certain criteria pollutants and greenhouse gas emissions due to plant auxiliary combustion equipment (e.g., standby diesel generators), and plumes and drift deposition from cooling towers.
Nonradiological Health	SMALL	Monitor chemical and etiological agents in cooling tower and condenser, maintain reclaimed water (i.e., tertiary) -treatment facility, use physical and administrative controls on exposure to cooling system discharge, comply with Federal and local noise regulations, comply with OSHA standards for Turkey Point operational workers, and transmission line design would be compliant with Electric Safety Code standards.	Cooling tower and pump noise, minor increases in the potential for occupational injuries and traffic accidents.
Radiological Health	SMALL	Doses to members of the public would be maintained below NRC and EPA standards; worker doses would be maintained below NRC limits and ALARA; doses to biota other than humans would be maintained below NCRP and IAEA guidelines.	Small radiation doses to members of the public, below NRC and EPA standards; ALARA doses to workers; and biota doses less than NCRP and IAEA guidelines.
Fuel cycle, Transportation, and Decommissioning	SMALL	Comply with the NRC and DOT regulations.	Small impacts from fuel cycle as presented in Table S-3, 10 CFR Part 51 (TN250). Small impacts from carbon dioxide, radon, and technetium-99. Small radiological doses that are within the NRC and DOT regulations for transportation of fuel and radioactive waste. Small impacts from decommissioning as presented in NUREG–0586 (NRC 2002-TN665).

Table 10-2. (contd)

Resource Area	Impacts	Mitigation Measures	Unavoidable Adverse Impacts
Nonradioactive Waste	SMALL	Manage all waste in compliance with applicable Federal, State, and local requirements. Implement recycling and waste minimization program.	Minor decrease in the available capacity of waste treatment and disposal facilities. Minor discharges to atmosphere and minor impacts on groundwater from UIC well discharges.

ALARA = as low as is reasonably achievable
DOT = U.S. Department of Transportation
EAB = exclusion area boundary
EPA = U.S. Environmental Protection Agency
IAEA = International Atomic Energy Agency
NCRP = National Council on Radiation Protection and Measurements
OSHA = Occupational Safety and Health Administration
SHPO = State Historic Preservation Office
SWPPP = Stormwater Pollution Prevention Plan
UIC = Underground Injection Control
(a) A determination of "NONE" for environmental justice analyses does not mean there are no adverse impacts on minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

Unavoidable, but small, adverse impacts on groundwater users would occur from additional demand for potable water from the Miami-Dade Water and Sewer Department (MDWASD). The increased demand would be about 1.5 Mgd based on normal use of 936 gpm with an occasional maximum use of 2,553 gpm for operating the proposed units (FPL 2014-TN4069). Nearly all of this water comes from the Biscayne aquifer in Miami-Dade County. Use of reclaimed water from the MDWASD for cooling makeup water would cause no new withdrawals from groundwater, so there would be no impact on groundwater users from the use of reclaimed water. Operation of the radial collector wells would also result in withdrawal of small amounts of groundwater from the Biscayne aquifer. However, based on the staff's evaluation of the reliability of the reclaimed-water system, the radial collector wells are expected to be used infrequently as a backup water supply and for durations much shorter than the 60 days allowed per year by the Florida Department of Environmental Protection final Conditions of Certification (State of Florida 2014-TN3637). Therefore, the impact on groundwater users would be minor.

Unavoidable adverse impacts on terrestrial ecology resources would include increased risks of bird collisions with structures and transmission lines—notably wood storks, Everglade snail kites, and wading birds. Other impacts of operations would include reduced wildlife use or avoidance of some habitats due to noise and disturbance, and vegetation-control effects on listed plants. Increased vehicle collision risk mortality to the Florida panther is anticipated. Post-construction research, monitoring, and mitigation would be conducted to determine final effects and to offset adverse impacts.

Adverse impacts on aquatic resources would be generally minor. However, additional crocodile takes could occur during operation. All other adverse impacts, such as cooling-tower drift deposition, are so minor that they would not create unsuitable aquatic habitat or noticeably

affect populations. Mitigation and monitoring would be required by State (State of Florida 2014-TN3637) and Federal agencies.

Adverse socioeconomic impacts during operations are generally minor for all categories, with the exceptions of a noticeable but not destabilizing impacts on traffic near the site. The review team identified no pathways by which any minority or low-income populations would experience a disproportionately high and adverse impact, so there would be no environmental justice impacts warranting mitigation.

Unavoidable adverse impacts from operation on cultural resources likely would involve the inadvertent discovery of cultural resources during maintenance activities. For other potential operation-related impacts, FPL has agreed to develop an unanticipated discovery plan for the treatment of cultural resources inadvertently discovered during construction or maintenance, thereby providing mitigation to avoid adverse impacts.

Air-quality impacts are expected to be negligible, and pollutants emitted during operations would be insignificant. Nonradiological and radiological health impacts would be minimal. Nonradiological health impacts on members of the public from operation, including etiological agents, noise, electromagnetic fields, occupational health, and transportation of materials and personnel would be minimal because FPL would apply controls and measures to ensure compliance with Federal and State regulations. Radiological doses to members of the public from operation of the proposed Turkey Point Units 6 and 7 would be below annual exposure limits set to protect the public. Doses to biota other than humans would be maintained below National Council on Radiation Protection and Measurements and International Atomic Energy Agency guidelines.

10.3 Relationship between Short-Term Uses and Long-Term Productivity of the Human Environment

Section 102(2)(C)(iv) of NEPA (42 U.S.C. § 4321 et seq.) (TN661) requires that an EIS include information about the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity.

The local use of the human environment by the proposed project can be summarized in terms of the unavoidable adverse environmental impacts of construction and operation and the irreversible and irretrievable commitments of resources. With the exception of the consumption of depletable resources as a result of plant construction and operation, these uses may be classified as short term. The principal benefit of the plant is represented by the production of electrical energy. The benefit of electricity production would be significantly greater than the benefits of agriculture or other probable uses for the site.

Most long-term impacts resulting from land-use preemption by plant structures can be eliminated by removing these structures or by converting them to other productive uses. Once the plants are shut down, they would be decommissioned according to NRC regulations. Once decommissioning is complete and the NRC licenses are terminated, the site would be available for other uses. The greatest adverse impact on productivity would result between plant closure

and the completion of decommissioning, when the land occupied by the plant structures would not be available for any other use.

The review team concludes that the positive long-term enhancement of regional productivity through the generation of electrical energy would outweigh any negative aspects of plant construction and operation as they affect the human environment.

10.4 Irreversible and Irretrievable Commitments of Resources

Section 102(2)(C)(v) of NEPA (42 U.S.C. § 4321 et seq.) (TN661) requires that an EIS include information about any irreversible and irretrievable commitments of resources that would occur if the proposed actions are implemented. The term "irreversible commitments of resources" refers to environmental resources that would be irreparably changed by the new units and that could not be restored at some later time to the resource's state before the relevant activities. "Irretrievable commitments of resources" refers to materials that would be used for or consumed by the new units in such a way that they could not, by practical means, be recycled or restored for other uses. The resources discussed in this section are the environmental resources discussed in Chapters 4, 5, and 6.

10.4.1 Irreversible Commitments of Resources

Irreversible commitments of environmental resources resulting from Turkey Point Units 6 and 7, in addition to the materials used for the nuclear fuel, are described below.

10.4.1.1 Land Use

Although the review team's analysis considers land uses attributable to Units 6 and 7 to be effectively permanent for the foreseeable time horizon, none of the land used for Units 6 and 7 is irreversibly committed because once the units cease operations and are decommissioned in accordance with NRC requirements, the land could be returned to other industrial and non-industrial uses.

10.4.1.2 Water Use

Because the water in the Biscayne aquifer is replenished by infiltration of precipitation, the withdrawals of groundwater from the aquifer are reversible.

10.4.1.3 Ecological Resources

Construction activities would cause temporary and long-term changes to both the aquatic and terrestrial biota at the plant site and facilities.

10.4.1.4 Socioeconomic Resources

The NRC staff expects no irreversible socioeconomic commitments would be made because resources would be reallocated for other purposes once the plant is decommissioned.

10.4.1.5 Historical and Cultural Resources

There are no known irreversible commitments of historical or cultural resources due to the building and operation of Turkey Point Units 6 and 7. Visual impacts could be reversed if the intrusive visual elements (e.g., transmission lines) were removed.

10.4.1.6 Air and Water

Dust and other emissions such as vehicle exhaust would be released to the air during construction and preconstruction. During operations, vehicle exhaust emissions would continue and other air pollutants and chemicals, including very low concentrations of radioactive gases and particulates, would be released from the facility to the air and surface water. The review team expects no irreversible commitment to air or water resources because all proposed releases at Turkey Point Units 6 and 7 would be made in accordance with duly issued permits.

10.4.2 Irretrievable Commitments of Resources

FPL states in Table 10.2-1 of its ER that construction of the proposed two new units at Turkey Point would involve 154,400 yd^3 of concrete, 20,000 T of rebar, 12,800 T of structural steel, 1.6 million feet of power cable, 460,000 ft of small (less than 3 in. in diameter) piping, and 136,000 ft of large bore piping (FPL 2014-TN4058). Construction would also use small quantities of aluminum, copper, other metals and alloys, and large quantities of quarry materials (nuclear and construction grade fill material, aggregate, sand, etc.). The review team expects that the use of construction materials in the quantities associated with those expected for Turkey Point Units 6 and 7, while irretrievable, would be of small consequence with respect to the availability of such resources.

The main resource that would be irretrievably committed during operation of the new nuclear units would be uranium, which FPL states would amount to about 25.35 T/yr, or 1,014 T over the life of the permit. The World Nuclear Association claims the world's known and recoverable stockpile of uranium is over 5.3 million tons (WNA 2012-TN1498). Given a current world-wide consumption of uranium of about 68,000 T/yr and known reserves, there is about 80 years' worth of uranium available. Therefore, the review team concludes that while irreversible, the consumption of uranium for the proposed Units 6 and 7 at Turkey Point would have a negligible impact on known reserves.

10.5 Alternative to the Proposed Actions

Alternatives to the proposed action are discussed in Chapter 9 of this EIS. Alternatives considered include the no-action alternative, energy alternatives that do not require additional generating capacity, energy production alternatives, system design alternatives, and alternative sites.

The no-action alternative, described in Section 9.1, refers to a scenario in which the NRC would deny the request for COLs or USACE would deny FPL's permit request. In either case, construction of the two new units would not proceed as proposed. If no other power plants were built or electrical power supply strategy was implemented to replace the proposed action, the electrical capacity to be provided by the project would not become available. In that case, the need for power would not be met, the benefits (electricity generation) associated with the

completed project would not occur, and the Florida Reliability Coordinating Council region would become vulnerable to grid instability, brownouts, and blackouts. Failure to supply the needed electricity would have significant adverse impacts within the region of interest and the staff expects that the Florida Public Service Commission would take steps to confirm that the need for power would be met.

Alternative energy sources are described in Section 9.2 of this EIS. Alternatives not involving additional generating capacity are described in Section 9.2.1. Alternatives requiring new generating capacity, including detailed analyses of coal-fired and natural-gas–fired alternatives, are provided in Section 9.2.2. Other energy sources, including renewable energy sources, are discussed in Section 9.2.3, and a combination of energy alternatives (involving a combination of fossil fuel and renewable energy generation sources) is discussed in Section 9.2.4. The review team concluded by comparative analysis presented in Section 9.2.5 that none of the alternative power production options are environmentally preferable to the proposed action.

Alternative sites are discussed in Section 9.3 of this EIS. Cumulative impacts in the vicinity of the Turkey Point site, including the proposed Turkey Point Units 6 and 7, are compared with the cumulative impacts from building and operating the same physical facilities and adequate support facilities at each of the alternative sites. Section 9.3.6 (Table 9-28) summarizes the NRC staff's characterization of cumulative impacts at the proposed and alternative sites. Based on this review, the NRC staff concludes that none of the alternative sites are environmentally preferable or obviously superior to the Turkey Point site. The NRC's determination is independent of USACE's determination of whether there is a least environmentally damaging practicable alternative pursuant to Clean Water Act Section 404(b)(1) Guidelines. USACE will conclude its analysis of both offsite and onsite alternatives in its ROD.

Alternative system designs, focusing on alternative cooling-system designs, are discussed in Section 9.4 of this EIS. The staff determined that none of the alternative system designs is environmentally preferable to the proposed design.

10.6 Benefit-Cost Balance

NEPA requires that all agencies of the Federal Government prepare detailed environmental statements on proposed major Federal actions that can significantly affect the quality of the human environment. A principal objective of NEPA is to require each Federal agency to consider, in its decision-making process, the environmental impacts of each proposed major action and the available alternative actions. In particular, Section 102 of NEPA (42 U.S.C. § 4321 et seq.) (TN661) requires all Federal agencies to the fullest extent possible:

> (B) identify and develop methods and procedures, in consultation with the Council on Environmental Quality established by Title II of this Act, which will insure that presently unquantified environmental amenities and values may be given appropriate consideration in decision making along with economic and technical considerations. (42 U.S.C. § 4321 et seq. [TN661]; CEQ 1997-TN452)

However, neither NEPA nor CEQ requires the costs and benefits of a proposed action be quantified in dollars or any other common metric.

The purpose of this section is not to identify and quantify all of the potential societal benefits of the proposed actions and compare these to the potential costs of the proposed actions. Instead, this section focuses on only those benefits and costs of such magnitude or importance that their inclusion in this analysis can inform the decision-making process. This section compiles and compares the pertinent analytical conclusions reached in earlier chapters of this EIS. It gathers all of the expected impacts from building and operations of the proposed Turkey Point Units 6 and 7 and aggregates them into two final categories: (1) the expected environmental and economic costs and (2) the expected benefits to be derived from approval of the proposed action. As such, costs and benefits include the costs and benefits of preconstruction activities and NRC-authorized construction and operations activities.

Although the analysis in this section is conceptually similar to a purely economic benefit-cost analysis, which determines the net present dollar value of a given project, the purpose of this section is to identify all potential societal benefits of the proposed actions and compare them to the potential internal (i.e., private) and external (i.e., societal) costs of the proposed actions. The purpose of this assessment is to generally inform the COL process by gathering and reviewing information that demonstrates the likelihood that the benefits of the proposed actions outweigh the aggregate costs.

Whether FPL is profitable and other similar issues are outside NRC's mission and authority and, thus, would not be considered in this EIS. Issues related to the financial qualifications of FPL, however, will be addressed in the NRC staff's Safety Evaluation Report. It is not possible to quantify and assign a value to all benefits and costs associated with the proposed action. This analysis, however, attempts to identify, quantify, and provide monetary values for benefits and costs when reasonable estimates are available.

Section 10.6.1 discusses the benefits associated with the proposed action. Section 10.6.2 discusses the costs associated with the proposed action. A summary of benefits is shown in Table 10-3. Section 10.6.3 provides a summary of the impact assessments, bringing previous sections together to establish a general impression of the relative magnitude of the proposed actions' costs and benefits.

10.6.1 Benefits

The most apparent benefit from a power plant is that it generates power and provides thousands of residential, commercial, and industrial consumers with electricity. Maintaining an adequate supply of electricity in any given region has social and economic importance because adequate electricity is the foundation for economic stability and growth and fundamental to maintaining our current standard of living. Because the focus of this EIS is on the proposed expansion of Turkey Point's generating capacity, this section focuses primarily on the relative benefits of the Turkey Point option rather than the broader, more generic benefits of electricity supply.

10.6.1.1 Societal Benefits

For the production of electricity to be beneficial to a society, there must be a corresponding demand, or "need for power," in the region. Chapter 8 defines and discusses the need for power in more detail. From a societal perspective, nuclear power offers two primary benefits relative to most other generating systems: (1) long-term price stability and (2) energy security through fuel diversity. These benefits are described in this subsection.

Table 10-3. Summary of the Benefits of the Proposed Action

Benefit Category	Description	Monetized Value or Impact Assessment
	Benefits	
Electricity generated	16,400,000 to 17,900,000 MWh/yr for the 40-year life of the plant (assuming capacity factors in the range of 85–93 percent).	
Generating capacity	2,200 MW(e) (two units at 1,100 MW(e) each).	
Employment	At peak employment, the review team estimates there would be 3,290 new workers moving into the local area and would generate economic activity that would support an additional 3,137 indirect jobs during the entire building period. Of the 806 operations workers, 671 would move into the local area and support an additional 1,456 indirect jobs in their communities.	
Fuel diversity and energy security	Nuclear power provides diversity to the FRCC inventory, which consists primarily of fossil-fuel-powered baseload generation. Reduces exposure to supply and price risk associated with reliance on any single fuel source.	
Tax revenues	FPL would pay corporate income taxes to the State of Florida upon operation of Turkey Point Units 6 and 7. In addition, the State and Miami-Dade County would collect sales and use taxes on locally purchased goods and services during construction and from construction and operations worker purchases. Finally, Units 6 and 7 would generate property taxes over the 40-year life of the plant, which would be paid to Miami-Dade County, the Miami-Dade Public School District and possibly to special taxing units.	Approximately $50 million in property taxes annually (Miami-Dade County would receive the majority of this tax revenue); $12.5 million in sales taxes statewide annually over a 12-year licensing and construction period.
Local economy	Building the two proposed units would require the short-term addition of up to 3,983 workers (3,950 construction workers and 33 operations workers) and a 40-year operations workforce of 806 workers. The increase in local indirect jobs created by the presence of these workers and the contribution of these workers to the tax base of Miami-Dade County and the local school district and communities would benefit the area economically and stimulate the economy of the region (see Sections 4.4.3.1 and 5.4.3.1).	806 operations workers and over 1,456 indirect jobs added over 40-year life of plant; $140 million income per year in the region during 40-year life of plant.
Price volatility	Nuclear power has the lowest portion of its variable cost attributed to fuel costs. In addition, nuclear fuel has the most stable long-term price. In combination, these characteristics would help stabilize the market price of electricity and mitigate future electricity price volatility.	
Electrical reliability	Nuclear power plants provide the most power per unit of any baseload unit and run at some of the highest capacity factors. These characteristics enhance the stability and reliability of the electricity supply.	

FRCC = Florida Reliability Coordinating Council

Long-Term Price Stability

Because of its relatively low and nonvolatile fuel costs, nuclear energy is a dependable generator of electricity that can provide electricity to the consumer at relatively stable prices over a long period of time. Unlike some other energy sources, nuclear energy is generally not subject to unreliable weather or climate conditions, unpredictable cost fluctuations, and is less dependent on potentially unstable foreign suppliers than other energy sources. Nuclear power plants are generally not subject to fuel price volatility like natural gas and oil power plants. In

addition, uranium fuel constitutes only 3 percent to 5 percent of the cost of a kilowatt-hour of nuclear-generated electricity. Doubling the price of uranium increases the cost of electricity by about 9 percent; while doubling the price of gas would add about 66 percent to the price of electricity, and doubling the cost of coal would add about 31 percent to the price of electricity (WNA 2014-TN4111).

Energy Security through Fuel Diversity

Currently, more than 70 percent of the electricity generated in the United States is generated with fossil-based technologies; thus, non-fossil-based generation, such as nuclear generation, is essential to maintaining diversity in the aggregate power-generation fuel mix (DOE/EIA 2006-TN718). Nuclear power contributes to the diverse U.S. energy mix, hedging the risk of shortages and price fluctuations for any one power-generation system and reducing the nation's dependence on imported fossil fuels.

A diverse fuel mix helps to protect consumers from contingencies such as fuel shortages or disruptions, price fluctuations, and changes in regulatory practices. FPL's 2006 fuel mix was made up of 50 percent natural gas, 21 percent nuclear power, and 18 percent coal (FPL 2014-TN4058). Chapter 8 of this EIS discusses the State of Florida's finding that a need exists for Units 6 and 7 as proposed by FPL. The proposed Turkey Point Units 6 and 7 would generate approximately 2,200 MW(e) net, which would help meet this baseload need in the region. Assuming a reasonably low capacity factor of 85 percent, the plant's average annual electrical energy generation would be about 16,400,000 MWh. A reasonably high-capacity factor of 93 percent would result in slightly more than 17,900,000 MWh of electricity.

10.6.1.2 Regional Benefits

Regional benefits of the proposed construction and operation of Units 6 and 7 include enhanced tax revenues, regional productivity, and community impacts.

Tax Revenue Benefits

As discussed in Section 4.4.3.2, the staff determined that the annual sales and use taxes for local purchases of nonexempt materials for use in the construction of Turkey Point Units 6 and 7 for the State of Florida and Miami-Dade County would be about $12.5 and $2.1 million, respectively. These revenues would not be expected to provide significant local revenues in the affected region. Florida does not collect income taxes.

As discussed in Section 5.4.3.2, the staff also determined that once both units become operational, Miami-Dade County would receive approximately $50 million in property tax revenues collected annually over the 40-year license period, and an additional $1.5 million to $2 million in sales and use taxes from FPL for operations related materials and supplies annually. This stream of revenue represents a less than 1 percent increase over recent Miami-Dade County total revenue levels.

Regional Productivity and Community Impacts

The new units would employ an operating workforce of 806, of whom 671 would reside in Miami-Dade County and support 1,456 indirect jobs (Section 5.4) within the local area that would be maintained throughout the life of the plant. The economic multiplier effect of the increased spending by the direct and indirect workforce created as a result of two new units

would increase the economic activity in the region, most noticeably in the communities near the proposed site. Sections 4.4.3.1 and 5.4.3.1 provide additional information about the economic impacts of constructing and operating proposed Turkey Point Units 6 and 7.

10.6.2 Costs

Internal costs to FPL of proposed Units 6 and 7 as well as external costs to the surrounding region and environment would be incurred during the construction, preconstruction, and operation of two new units at the site. A summary of the costs is shown in Table 10-4.

Table 10-4. Summary of the Costs of Preconstruction, Construction, and Operation

Cost Category	Description	Impact Assessment[a]
	Internal Costs[b]	
Overnight Cost of Construction[c]	$7.9 to $11.4 billion (2012$)	NA
Total Estimated Project Cost[c]	$12.8 to $18.7 billion (2012$)	NA
Operating cost	$743.8 to $994.7 million per year (8.3 to 11.1 cents per kWh levelized cost of electricity in 2007$. Includes fuel cost at about 0.7 cents per kWh)[d]	NA
Spent fuel management[e]	$8.9 million per year	NA
Decommissioning[f]	$8.9 to $17.9 million per year Approximately one- to two-tenths of one cent per kWh	NA
	External Costs	
Land use	Approximately 585 ac of land on a site already established for the purpose of accommodating electric generation facilities would be occupied on a long-term basis. Additional offsite lands would be occupied on a long-term basis as rights-of-way for transmission lines, pipelines, and access roads. While the land-use impacts from building the proposed facilities on the Turkey Point site would generally be minimal and compatible with FPL's existing and other reasonably foreseeable uses of property on the site, some of the proposed associated offsite work may noticeably affect adjoining land uses. In particular, new transmission lines built in the East corridor would traverse densely developed urban areas, and new transmission lines built in the West corridor come close to the eastern boundary of Everglades National Park.	MODERATE

Table 10-4. (contd)

Cost Category	Description	Impact Assessment[a]
Air quality	Emissions from diesel generators, auxiliary boilers and equipment, cooling towers, and vehicles to the air would have a small impact on workers and local residents. With the exception of the cooling towers, emissions sources would be operated intermittently. Emissions from all sources would be within Federal, State, and local air-quality limits. Negligible impacts of sulfur dioxide, nitrogen oxide, carbon monoxide, carbon dioxide, and particulate emissions relative to other baseload fossil-fired generation (see Sections 4.7 and 5.7).	SMALL
Terrestrial Ecology	Construction and preconstruction activities would noticeably affect wetlands, wildlife, and Federally and State-listed plant and animal species at the Turkey Point site, in the vicinity of the site, and at or in the vicinity of all associated offsite facilities. Operation of Units 6 and 7 may increase vehicle collision mortality to the Florida panther, vegetation-control effects on listed plants, and transmission system impacts on wood storks and Everglade snail kites.	MODERATE
Aquatic Ecology	Construction and preconstruction activities would result in permanent loss of and impact on critical habitat for the American crocodile; possible takes of American crocodile and may affect manatees, Smalltooth Sawfish, and sea turtles. During radial collector well operation salinity fluctuations at nearshore areas immediately north of the Turkey Point site would not be noticeable above normal background variation.	SMALL to MODERATE
Socioeconomics	Most adverse socioeconomic impacts from the proposed Units 6 and 7 would be minor, with the exception of traffic-related noticeable impacts during construction and operations.	SMALL to MODERATE
Environmental Justice	The review team identified no pathways by which a minority or low-income population would receive a disproportionately high and adverse impact	NONE[g]
Nonradioactive waste	Minor, localized, and temporary air emissions from construction equipment and temporary stationary sources. Creation of solid wastes, causing minor consumption of local or regional landfill space, offset by payment of tipping fees for waste disposal. Generation of small amounts of hazardous and mixed wastes leading to minor consumption of regional hazardous waste treatment or disposal capacity, offset by treatment, recycling, and disposal costs (see Sections 4.10 and 5.10)	SMALL

Table 10-4. (contd)

Cost Category	Description	Impact Assessment[(a)]
Uranium fuel cycle	Minor impacts distributed across multiple locations throughout the United States from the mining, milling, and enrichment of uranium, from fuel fabrication, from transportation of radioactive material, and from management of radioactive wastes (see Chapter 6).	SMALL
Historic and cultural resources	Construction of offsite transmission lines would result in potential visual impacts on National Register-eligible built resources, including buildings and historic districts. The impact of operation would be SMALL	MODERATE
Health impacts (nonradiological and radiological)	Radiological doses and nonradiological health hazards to the public and occupational workers would be monitored and controlled in accordance with regulatory limits (see Sections 4.8, 4.9, 5.8, and 5.9).	SMALL
Materials, energy, and uranium	Irreversible and irretrievable commitments of materials and energy, including depletion of uranium. Construction materials include concrete, aggregate, rebar, conduit, cable, piping, building supplies, and tools. Equipment needs include cranes, cement trucks, excavation equipment, dump trucks, and graders.	SMALL
Hazardous and radioactive waste	Mixed waste stored, transported, treated, and disposed in compliance with both NRC and EPA regulations would consume some regional or national waste treatment or disposal capacity, offset by treatment and disposal costs (see Sections 4.10 and 5.10).	SMALL
Water use and water quality	Water usage during construction and operations would have a minor impact on the availability and quality of the water resources in the area. Reclaimed water from the Miami-Dade Water and Sewer Department would be used as cooling water for normal operations. Approximately 29,230 gpm would be lost through evaporation and drift. An additional 12,461 gpm would be discharged to the Boulder Zone as blowdown from the cooling system. Onsite groundwater withdrawals would be limited to temporary dewatering during construction. Water for potable and sanitary uses would be from a municipal supply (see Sections 4.2 and 5.2).	SMALL

(a) Impact assessments are listed for all impacts evaluated in detail as part of this EIS. The details on impact assessments are found in the indicated sections of this EIS.
(b) Internal costs are those incurred by FPL to implement proposed building and operation of the Turkey Point site. Note that no impact assessments are provided for these private financial impacts.
(c) FPL 2014-TN4058; overnight construction costs include transmission line construction costs; total project costs include finance costs

Table 10-4. (contd)

Cost Category	Description	Impact Assessment[(a)]
(d) Review team calculation of price per kilowatt-hour based on MIT 2009-TN448. (e) The U.S. used-fuel program is funded by a 0.1 cent/kWh charge. (f) USA experience (WNA 2014-TN4111). (g) A determination of "NONE" for environmental justice analyses does not mean there are no adverse impacts on minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.		

Internal costs include all of the costs included in a total capital cost assessment—the direct and indirect cost to physically build the power plant (capital costs), plus the annual costs of operation and maintenance, fuel costs, waste disposal, and decommissioning costs. In accordance with the NRC staff's guidance in NUREG–1555 (NRC 2000-TN614), the internal costs of the proposed project are presented in monetary terms. External costs include all costs imposed on the environment and region surrounding the plant that are not internalized by the company and may include such things as a loss of regional productivity, environmental degradation, or loss of wildlife habitat. The external costs listed in Table 10-4 summarize environmental impacts on resources that could result from preconstruction, construction, and operation of the proposed Units 6 and 7.

10.6.2.1 Internal Costs

The most substantial monetary cost associated with nuclear energy is the cost of capital. Nuclear power plants have relatively high capital costs for building the plant but low operating costs relative to alternative power-generation systems. Fluctuations in the real prices of key heavy construction commodities, such as cement, steel, and copper, can have a significant impact on nuclear plant capital costs (although it should be noted that these price changes would change construction costs for non-nuclear power plants as well). Construction delays can add significantly to the cost of a plant. Because of the large capital costs for nuclear power, and the relatively long construction period before revenue is returned, servicing the capital costs of a nuclear power plant also is a key factor in determining the economic competitiveness of nuclear energy. Because a power plant does not yield profits during construction, longer construction times mean a longer time before any costs can be offset by revenues. Furthermore, the longer it takes to build the plant, the higher would be the interest expenses on borrowed construction funds.

Construction Costs

In evaluating monetary costs related to constructing proposed Units 6 and 7, FPL reviewed recent published literature, vendor information, internally generated financial information, and internally generated, site-specific information. The review team also compared recent cost estimates with FPL's. These estimates are based on a number of studies that were conducted by government agencies, universities, and other entities; the estimates include a significant contingency to account for uncertainty. Capital costs are costs incurred during construction, including preconstruction, when the actual outlays for equipment and construction and engineering are made. "Overnight capital costs" include engineering, procurement, and

construction costs; however, it is presumed that the plant is constructed overnight; thus, interest is not included. FPL based its estimates of overnight capital costs for construction and preconstruction on analysis of four comprehensive studies of nuclear plant costs (University of Chicago 2004-TN719; MIT 2003-TN720; Dominion et al. 2004-TN721; OECD 2005-TN722), in which estimates ranged from $1,100 per kilowatt to $2,500 per kilowatt (in 2002 dollars). FPL estimates that overnight cost range to be $3,570 to $5,190 per kilowatt in 2012 dollars. On this basis, FPL estimates an overnight capital cost for the two Turkey Point units of between $7.9 billion and $11.4 billion in 2012 dollars (FPL 2014-TN4058). In addition to the studies FPL used, the review team also considered more recent studies: construction costs from other applicants and a 2009 update to the 2003 Massachusetts Institute of Technology (MIT) study on the cost of nuclear power (MIT 2009-TN448).

- Tennessee Valley Authority estimated its per kilowatt cost of construction for two new proposed AP1000 units at its Bellefonte site in Alabama between $2,850 and $3,200/kW (TVA 2008-TN4140), which if applied to proposed Units 6 and 7 at FPL (installed capacity of 2,200 MW(e)), would yield an overnight capital cost of $6.2 to $7 billion.
- Southern Nuclear Operating Company estimated the overnight cost of construction for two AP1000 units at its Vogtle site in Georgia to be between $3,200 and $3,500/kW (SNC 2008-TN4141), which if applied to proposed Units 6 and 7 at FPL would yield an overnight capital cost of $7 billion to $7.7 billion.
- The MIT Update (MIT 2009-TN448) estimated the overnight construction cost at $4,000/kW in 2007 dollars or about $8.8 billion for 2,200 MW(e) in 2008 dollars.

Except for the Keystone study, the general studies do not present the total cost of construction (i.e., overnight costs do not include interest expense). Keystone presented a range of approximately $4,300 to $4,800/kW in 2007 dollars (Keystone 2007-TN724). FPL's estimated "all-in" construction cost for Units 6 and 7 ranges from $5,823 to $8,497/kW in 2012 dollars leading to total construction costs of $12.8 to $18.7 billion (FPL 2014-TN4058).

Operation Costs

Operation costs are frequently expressed as levelized cost of electricity, which is the lowest price per kilowatt-hour of producing electricity that covers operating costs, maintenance costs, fuel expenditures, and annualized capital costs over the life of the project. For nuclear power plants, overnight capital costs typically account for a third of the levelized cost, and interest costs on the overnight costs account for another 25 percent (University of Chicago 2004-TN719). FPL noted that the four studies mentioned above estimate levelized cost for Turkey Point Units 6 and 7 to be in the range of $36 to $83/MWh (3.6 to 8.3 cents/kWh) (FPL 2014-TN4058; University of Chicago 2004-TN719; MIT 2003-TN720; Dominion et al. 2004-TN721; OECD 2005-TN722). In addition, the review team examined the update to the MIT study (MIT 2009-TN448) which re-evaluated the overnight levelized cost of electricity at 8.4 cents/kWh (2007$). However, the Keystone study estimates the levelized cost for their low and high construction-cost estimates to range from $0.083 to $0.111/kWh (Keystone 2007-TN724). Factors affecting the range include choices for discount rate, construction duration, plant life span, capacity factor, cost of debt and equity, and split between debt and equity financing, depreciation time, tax rates, and premium for uncertainty. Estimates include decommissioning

but, because of the effect of discounting a cost that would occur as much as 40 years or more in the future, decommissioning costs have relatively little effect on the levelized cost.

Fuel Costs

The cost of fuel is included in the calculation of levelized cost. Based on the 2009 MIT study (MIT 2009-TN448), the review team estimates nuclear fuel costs to be 0.7 cents/kWh.

Waste Disposal

The back-end costs of nuclear power contribute a very small share of the total cost because of both the long lifetime of a nuclear reactor and the fact that provisions for waste-related costs can be accumulated over that time. Spent fuel management costs are estimated to be one-tenth of a cent per kilowatt-hour (WNA 2014-TN4111; DOE 2008-TN725). It should be recognized, however, that radioactive nuclear waste poses unique disposal challenges for long-term management. While spent fuel and radioactive nuclear waste are being stored successfully in onsite facilities, the United States has yet to implement final disposition of spent fuel or high-level radioactive waste streams created at various stages of the nuclear fuel cycle.

Decommissioning

The NRC has requirements for licensees at 10 CFR 50.75 (TN249) to provide reasonable assurance that funds would be available for the decommissioning process. Because of the effect of discounting a cost that would occur as much as 40 years in the future, decommissioning costs have relatively little effect on the levelized cost of electricity generated by a nuclear power plant. Decommissioning costs are about 9 to 15 percent of the initial capital cost of a nuclear power plant. However, when discounted, they contribute only a few percent to the investment cost and even less to generation cost. In the United States, these costs account for one to two-tenths of a cent per kilowatt-hour (WNA 2014-TN4111).

10.6.2.2 External Costs

External costs are related to the social and/or environmental effects that would be caused by the construction of and generation of power by two new reactors at the Turkey Point site. This EIS includes the review team's analysis that considers and weighs the environmental impacts of building and operating new nuclear units at the Turkey Point site or at alternative sites and mitigation measures available for reducing or avoiding these adverse impacts. It also includes the NRC staff's recommendation to the Commission regarding the proposed action.

Environmental and Social Costs

Chapter 4 describes the impacts of building proposed Units 6 and 7 on the environment with respect to the land, water, ecology, socioeconomics, radiation exposure to construction workers, and measures and controls to limit adverse impacts during building of the proposed new units at the Turkey Point site. Chapter 5 examines environmental issues associated with operation of the proposed new nuclear Units 6 and 7 for an initial 40-year period. Potential operational impacts on land use, air quality, water, terrestrial and aquatic ecosystems, socioeconomics, historic and cultural resources, environmental justice, nonradiological and radiological health

effects, postulated accidents, and applicable measures and controls that would limit the adverse impacts of station operation during the 40-year operating period are considered. In accordance with 10 CFR Part 51 (TN250), all impacts identified in Chapters 4 and 5 have been analyzed, and a significance level of potential adverse impacts (i.e., SMALL, MODERATE, or LARGE) has been assigned.

Chapter 6 addresses the environmental impacts from (1) the uranium fuel cycle and solid-waste management, (2) the transportation of radioactive material, and (3) the decommissioning of nuclear units at the Turkey Point site. Chapter 9 includes the review team's review of alternative sites and alternative power-generation systems.

Unlike generation of electricity from coal and natural gas, normal operation of a nuclear power plant does not result in any emissions of criteria (e.g., oxides of nitrogen or sulfur dioxide), methyl mercury, or greenhouse gases associated with global warming and climate change. Chapter 9 analyzes coal-fired and natural-gas–fired alternatives to the building and operation of proposed Turkey Point Units 6 and 7. Air emissions from these alternatives and nuclear power are summarized in Chapters 5 and 9 of this EIS.

10.6.3 Summary of Benefits and Costs

FPL's business decision to pursue generating capacity by adding two nuclear reactors at the Turkey Point site is an economic decision based on private financial factors subject to regulation by the Florida Public Utility Commission. Florida Public Utility Commission's issuance of a determination of need provides great weight to the NRC's decision regarding whether there is a need for the power that would be generated by the construction and operation of the two proposed units at the Turkey Point site. The internal costs to construct additional units appear to be substantial; however, FPL's decision to pursue this expansion implies that it has concluded that the internal benefits of the proposed facility (production of 16,400,000 to 17,900,000 MWh/yr for the 40-year life of the plant and 2,200 MW of baseload capacity) outweigh the internal costs. In comparison, the external socio-environmental costs imposed on the region appear to be relatively minor. Although no specific monetary values could reasonably be assigned to the identified societal benefits, the review team determined it is not unreasonable to conclude that the potential societal benefits of the proposed Units 6 and 7, including the primary benefit of the generated power and baseload capacity, outweigh the potential social and private costs of the proposed action.

Table 10-4 includes a summary of both internal and external costs of the proposed activities at the Turkey Point site for Units 6 and 7, and Table 10-3 identifies the benefits. The tables include a reference to other sections of this EIS where more detailed analyses and impact assessments are available for specific topics.

On the basis of the assessments summarized in this EIS, the review team concludes that building and operating the proposed Units 6 and 7, with the anticipated mitigation measures identified by the review team, would have accrued benefits that most likely would outweigh the economic, environmental, and social costs. For the NRC-proposed action (NRC-authorized construction and operation) the accrued benefits would also outweigh the costs of construction and operation of Units 6 and 7.

10.7 NRC Staff Recommendation

The NRC staff's recommendation to the Commission related to the environmental aspects of the proposed action is that the COLs should be issued. The NRC staff's evaluation of the safety aspects of the proposed action will be addressed in the Safety Evaluation Report that is anticipated to be published in November 2016 (NRC 2016-TN4619).

The staff's recommendation is based on (1) the ER submitted by FPL (2014-TN4058); (2) consultation with Federal, State, Tribal, and local agencies; (3) the review team's independent review; (4) the consideration of public comments received on the environmental review and; (5) the assessments summarized in this EIS, including the potential mitigation measures identified in the ER and this EIS. In addition, in making its recommendation, the NRC staff determined that none of the alternative sites assessed is obviously superior to the Turkey Point site.

The NRC's determination is independent of the USACE's permit decision, which will be documented in the USACE's ROD.

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11. ABSTRACT (200 words or less)
This environmental impact statement (EIS) has been prepared in response to an application submitted to the U.S. Nuclear Regulatory Commission (NRC) by Florida Power and Light Company (FPL) for two combined construction permits and operating licenses) combined licenses or COLs). The proposed actions related to the FPL application are (1) NRC issuance of COLs for two new power reactor units (Units 6 & 7) at the Turkey Point Nuclear Power Plant site in Miami-Dade County, Florida, and (2) U.S. Army Corps of Engineers (USACE) decision to issue, deny, or issue with modifications a Department of the Army (DA) permit to perform certain dredge and fill activities in waters of the United States and to construct structures in navigable waters of the United States related to the project.

This EIS documents the review team's analysis, which considers and weighs the environmental impacts of constructing and operating two new nuclear units at the Turkey Point site and at alternative sites, including measures potentially available for reducing or avoiding adverse impacts.

After considering the environmental aspects of the proposed action before the NRC, the NRC staff's recommendation to the Commission is that the COLs be issued as proposed. This recommendation is based on (1) the application, including the Environmental Report (ER), submitted by FPL; (2) consultation with Federal, State, Tribal, and local agencies; (3) the review team's independent review; (4) the consideration of public comments received on the environmental review; and (5) the assessments summarized in this EIS, including the potential mitigation measures identified in the ER and this EIS.

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Environmental Impact Statement for Combined Licenses (COLs) for Turkey Point Nuclear Plant Units 6 and 7

Final Report

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Environmental Impact Statement for Combined Licenses (COLs) for Turkey Point Nuclear Plant Units 6 and 7

Final Report

Appendices A to K

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Division of New Reactor Licensing
Office of New Reactors
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Regulatory Division
Jacksonville District
U.S. Army Corps of Engineers
Jacksonville, Florida 32232-0019

US Army Corps of Engineers®

Final Environmental Impact Statement for the Combined License (COL)
FOR THE TURKEY POINT NUCLEAR PLANT

Lead Agency: U.S. Nuclear Regulatory Commission
Cooperating Agency: U.S. Army Corps of Engineers, Jacksonville District
Contact: Alicia Williamson, Environmental Project Manager
Environmental Projects Branch
Division of New Reactor Licensing
Office of New Reactors
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
Telephone: 301-415-1878
e-mail: Alicia.Williamson@nrc.gov

ABSTRACT

This environmental impact statement (EIS) has been prepared in response to an application submitted to the U.S. Nuclear Regulatory Commission (NRC) by Florida Power & Light Company (FPL) for two combined construction permits and operating licenses (combined licenses or COLs). The proposed actions related to the FPL application are (1) NRC issuance of COLs for two new power reactor units (Units 6 and 7) at the Turkey Point Nuclear Power Plant site in Miami-Dade County, Florida, and (2) U.S. Army Corps of Engineers (USACE) decision to issue, deny, or issue with modifications a Department of the Army (DA) permit to perform certain dredge and fill activities in waters of the United States and to construct structures in navigable waters of the United States related to the project. The NRC, its contractors, and USACE make up the review team. The National Park Service (NPS) is also a cooperating agency on this EIS but does not now have a request to take any specific regulatory action before it. Due to this unique set of circumstances, impact determinations made in this EIS should only be attributed to the review team. This EIS documents the review team's analysis, which considers and weighs the environmental impacts of constructing and operating two new nuclear units at the Turkey Point site and at alternative sites, including measures potentially available for reducing or avoiding adverse impacts.

The EIS includes an evaluation of the impacts of construction and operation of Turkey Point Units 6 and 7 on waters of the United States pursuant to Section 404 of the Clean Water Act and on navigable waters of the United States pursuant to Section 10 of the Rivers and Harbors Act of 1899. The USACE will base its evaluation of FPL's DA permit application, on the requirements of USACE regulations, the Clean Water Act Section 404(b)(1) Guidelines, and the USACE public interest review process.

After considering the environmental aspects of the proposed action before the NRC, the NRC staff's recommendation to the Commission is that the COLs be issued as proposed. This recommendation is based on (1) the application, including the Environmental Report (ER), submitted by FPL; (2) consultation with Federal, State, Tribal, and local agencies; (3) the review

team's independent review; (4) the consideration of public comments received on the environmental review; and (5) the assessments summarized in this EIS, including the potential mitigation measures identified in the ER and this EIS.

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EXECUTIVE SUMMARY

This environmental impact statement (EIS) presents the results of a U.S. Nuclear Regulatory Commission (NRC) environmental review of an application for a combined construction permit and operating license (combined license or COL) for two new nuclear reactor units at a proposed Turkey Point site in Miami-Dade County, Florida. The U.S. Army Corps of Engineers (USACE) participated in the preparation of the EIS as a cooperating agency and as a member of the review team, which consisted of the NRC staff, its contractor staff, and the USACE staff. The National Park Service (NPS) participated in the environmental review as a cooperating agency by providing special expertise for the areas in and around the adjacent national parks (Biscayne and Everglades National Parks). The NPS does not have a request to take any specific regulatory actions related to the proposed COLs before it. Due to this unique set of circumstances, all impact determinations made in this EIS should not be attributed to NPS, but only to the NRC and USACE (also referred to as the review team). The NPS's participation in connection with this EIS does not imply NPS concurrence.

Background

On June 30, 2009, the Florida Power & Light Company (FPL) submitted an application to the NRC for a combined construction permit and operating license (combined license or COL) for Turkey Point Units 6 and 7.

Upon acceptance of FPL's application, the NRC review team began the environmental review process by publishing a Notice of Intent to prepare an EIS and conduct scoping in the *Federal Register* on June 15, 2010. As part of this environmental review, the review team did the following:

- conducted public scoping meetings on July 15, 2010 in Homestead, Florida
- conducted a site visit of the proposed Units 6 and 7 plant area on the Turkey Point site in June 2010
- conducted visits to alternative sites in July 2010
- reviewed FPL's Environmental Report (ER)
- consulted with Tribal Nations and other agencies such as the U.S. Fish and Wildlife Service (FWS), Advisory Council on Historic Preservation, Florida Fish and Wildlife Conservation Commission, National Marine Fisheries Service, Miami-Dade Office of Historic and Archaeological Resources, and Florida Division of Historical Resources
- conducted the review following guidance set forth in NUREG-1555:
  - "Standard Review Plans for Environmental Reviews for Nuclear Power Plants
  - Supplement 1: Operating License Renewal"
- considered public comments received during the 60-day scoping process from June 15, 2010 to August 16, 2010

- conducted public meetings on the draft EIS on April 22, 2015, in Miami, Florida, and on April 23, 2015, in Homestead, Florida
- considered public comments received during the comment periods for the draft EIS, which extended from March 5 to May 22 and from May 28 to July 17, 2016.

Proposed Action

FPL initiated the proposed Federal action by submitting an application for Turkey Point Units 6 and 7 to the NRC. The NRC's Federal action is issuance of COLs for two Westinghouse AP1000 reactors at the Turkey Point site near Homestead, Florida.

The USACE is a cooperating agency in preparation of this EIS. The USACE's Federal action is its decision of whether to issue, deny, or issue with modifications a Department of Army (DA) permit pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899 to authorize certain construction activities potentially affecting waters of the United States.(1)

Purpose and Need for Action

The purpose of the proposed NRC action, issuance of the COL, is to provide for additional baseload electric generating capacity for use in the FPL service territory.

The USACE determines both a basic and an overall project purpose pursuant to the Clean Water Act Section 404(b)(1) Guidelines, 33 CFR § 230.10. The basic purpose is to meet the public's need for electric energy. The overall purpose is to meet the public's need for reliable increased electrical baseload generating capacity in FPL's service territory.

Affected Environment

The Turkey Point site is located in southeast Miami-Dade County, Florida, near Homestead (Figure ES-1). Turkey Point Units 6 and 7 would be located on the same site as the existing Turkey Point site, which has five other power plants, including two nuclear power reactors. Turkey Point would be located 25 mi south of Miami and 4.5 and 8 mi east of Homestead and Florida City, respectively. The primary source of cooling water would be reclaimed wastewater and the alternative source would be saltwater supplied from radial collector wells beneath Biscayne Bay. The ultimate heat sink for Turkey Point Units 6 and 7 would be the atmosphere, using three mechanical draft cooling towers per reactor.

(1) Waters of the United States" is used to include both "waters of the United States" as defined by 33 CFR Part 328 (TN1683) defining the extent of USACE geographic jurisdiction pursuant to Section 404 of the Clean Water Act and "navigable waters of the United States" as defined by 33 CFR Part 329 (TN4770) defining the extent of USACE geographic jurisdiction pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403) (TN4768).

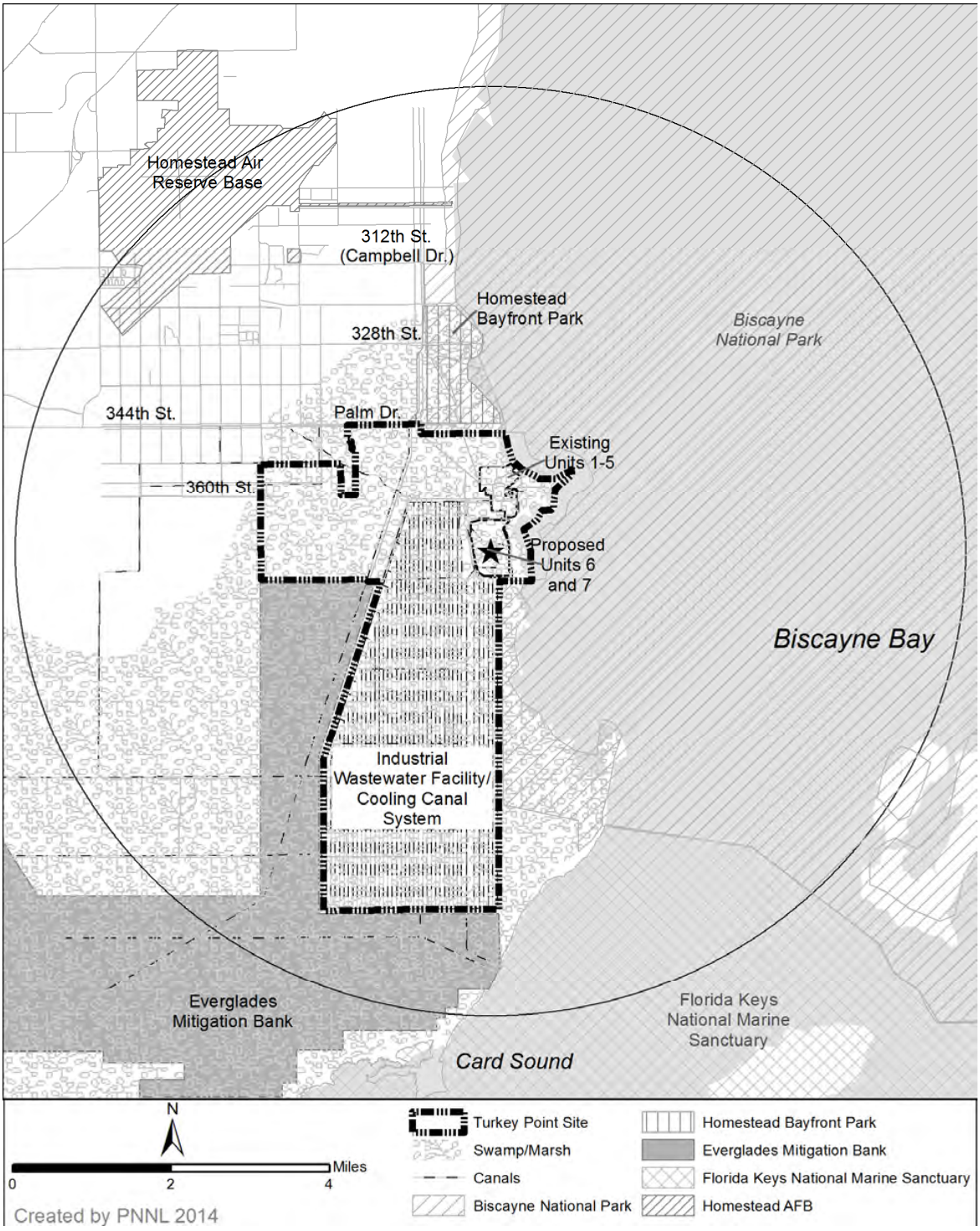

Figure ES-1. The Turkey Point Site and Affected Environment

Evaluation of Environmental Impacts

SMALL: Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.

MODERATE: Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.

LARGE: Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

This EIS evaluates the potential environmental impacts of the construction and operation of the two new nuclear plants proposed for the Turkey Point site related to the following resource areas:

- land use
- air quality
- aquatic ecology
- terrestrial ecology
- surface and groundwater
- waste (radiological and nonradiological)
- human health (radiological and nonradiological)
- socioeconomics
- environmental justice
- cultural resources
- fuel cycle, decommissioning, and transportation

The impacts are designated as SMALL, MODERATE, or LARGE. The incremental impacts related to the construction and operations activities requiring NRC authorization are described and characterized, as are the cumulative impacts resulting from the proposed action when the effects are added to, or interact with, other past, present, and reasonably foreseeable future effects on the same resources. A summary of the construction and operation impacts are outlined in Table ES-1. Table ES-2 summarizes the review team's assessment of cumulative impacts. The review team's detailed analysis which supports the impact assessment of the proposed new units can be found in Chapters 4, 5, and 7, respectively.

Table ES-1. Environmental Impact Levels of the Proposed Turkey Point Units 6 and 7

Resource Category	Preconstruction and Construction	Operation
Land Use	MODERATE (NRC authorized construction impact level is SMALL)	MODERATE
Water-Related		
Water Use – Surface Water	SMALL	SMALL
Water Use – Groundwater Use	SMALL	SMALL
Water Quality – Surface Water	SMALL	SMALL
Water Quality – Groundwater	SMALL	SMALL
Ecology		
Terrestrial Ecosystems	MODERATE (NRC authorized construction impact level is SMALL)	MODERATE
Aquatic Ecosystems	SMALL to MODERATE	SMALL
Socioeconomic		
Physical Impacts	SMALL (adverse) to MODERATE (beneficial)	SMALL (adverse) to MODERATE (beneficial)
Demography	SMALL	SMALL
Economic Impacts on the Community	SMALL	SMALL and beneficial
Infrastructure and Community Services	SMALL to MODERATE	SMALL to MODERATE
Environmental Justice	NONE[(a)]	NONE[(a)]
Historic and Cultural Resources	MODERATE (NRC authorized construction impact level is SMALL)	SMALL
Air Quality	SMALL	SMALL
Nonradiological Health	SMALL	SMALL
Nonradiological Waste	SMALL	SMALL
Radiological Health	SMALL	SMALL
Postulated Accidents	n/a	SMALL
Fuel Cycle, Transportation, and Decommissioning	n/a	SMALL

(a) A determination of "NONE" for Environmental Justice analyses does not mean there are no adverse impacts to minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

Table ES-2. Cumulative Impacts on Environmental Resources, Including the Impacts of Proposed Turkey Point Units 6 and 7

Resource Category	Impact Level
Land Use	MODERATE
Water-Related	
Water Use – Surface Water	SMALL
Water Use – Groundwater Use	SMALL
Water Quality – Surface Water	MODERATE
Water Quality – Groundwater	SMALL
Ecology	
Terrestrial Ecosystems	MODERATE to LARGE
Aquatic Ecosystems	MODERATE
Socioeconomic	
Physical Impacts	SMALL adverse to MODERATE beneficial
Demography	SMALL
Economic Impacts on the Community	SMALL and beneficial
Infrastructure and Community Services	SMALL to MODERATE
Environmental Justice	NONE[(a)]
Historic and Cultural Resources	MODERATE
Air Quality	SMALL to MODERATE for criteria pollutants and MODERATE for GHGs
Nonradiological Health	SMALL
Nonradiological Waste	SMALL
Radiological Health	SMALL
Postulated Accidents	SMALL
Fuel Cycle, Transportation, and Decommissioning	SMALL

(a) A determination of "NONE" for Environmental Justice analyses does not mean there are no adverse impacts to minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

Alternatives

The review team considered the environmental impacts associated with alternatives to issuing a COL for the two new nuclear units proposed by FPL for the Turkey Point site. These alternatives included a no-action alternative (i.e., not issuing the COL) and alternative energy sources, siting locations, and system designs.

The no-action alternative would result in the COL not being granted or the USACE not issuing its permit. Upon such a denial, construction and operation of new units at the Turkey Point site would not occur and the predicted environmental impacts would not take place. If no other facility would be built or strategy implemented to take its place, the benefits of the additional electrical capacity and electricity generation to be provided would also not occur and the need for baseload power would not be met.

Based on the NRC staff's review of energy alternatives, the NRC staff concluded that, from an environmental perspective, none of the viable alternatives is environmentally preferable to building a new baseload nuclear power generation plant at the Turkey Point site. The NRC staff eliminated several energy sources (e.g., wind, solar, geothermal, and biomass) from full

consideration because they are not currently capable of meeting the need of this project. None of the viable baseload alternatives (natural gas, coal, or a combination of alternatives) was environmentally preferable to the proposed Turkey Point units.

After comparing the cumulative effects of a new nuclear power plant at the proposed site against those at the alternative sites, the NRC staff concluded that none of the alternative sites would be environmentally preferable to the proposed site for building and operating a new nuclear power plant (Table ES-3). The four alternatives sites selected were as follows (Figure ES-2):

- Glades
- Martin
- Okeechobee 2
- St. Lucie.

Table ES-3. Comparison of Cumulative Impacts at the Turkey Point and Alternative Sites

Resource Category	Turkey Point Site[a]	Glades[b]	Martin[b]	Okeechobee 2[b]	St. Lucie[b]
Land Use	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
Water-Related					
Surface-water use	SMALL	MODERATE	MODERATE	MODERATE	SMALL
Groundwater use	SMALL	SMALL	SMALL	SMALL	SMALL
Surface-water quality	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
Groundwater quality	SMALL	SMALL	SMALL	SMALL	SMALL
Ecology					
Terrestrial and wetland ecosystems	MODERATE to LARGE	MODERATE	MODERATE	MODERATE	MODERATE
Aquatic ecosystems	MODERATE	MODERATE	MODERATE	MODERATE	SMALL to MODERATE
Socioeconomics					
Physical impacts	SMALL adverse except for MODERATE beneficial impacts on road quality	MODERATE adverse to SMALL beneficial impacts on road quality	MODERATE adverse to MODERATE beneficial impacts on road quality	MODERATE adverse to SMALL beneficial impacts on road quality	LARGE adverse to MODERATE beneficial impacts on road quality
Demography	SMALL	SMALL	SMALL	SMALL	SMALL, except for LARGE residential displacement impacts
Economic impacts on the community	SMALL and beneficial	SMALL and beneficial, except for LARGE and beneficial property tax revenues for Glades County and School District	SMALL and beneficial, except for MODERATE and beneficial property tax revenues for Martin County and School District	SMALL and beneficial, except for LARGE and beneficial property tax revenues for Okeechobee County and School District	SMALL and beneficial

Table ES-3. (contd)

Resource Category	Turkey Point Site[a]	Glades[b]	Martin[b]	Okeechobee 2[b]	St. Lucie[b]
Infrastructure and community services	SMALL except for MODERATE adverse impacts on traffic	SMALL except for MODERATE adverse impacts on traffic	SMALL except for MODERATE adverse impacts on traffic	SMALL except for MODERATE adverse impacts on traffic	SMALL except for MODERATE adverse impacts on traffic
Environmental Justice	None[c]	None[c]	None[c]	None[c]	None[c]
Historic and Cultural Resources	MODERATE	MODERATE	SMALL	MODERATE	SMALL
Air Quality					
Criteria pollutants	SMALL to MODERATE	SMALL	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE
Greenhouse gas emissions	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
Nonradiological Health	SMALL	SMALL	SMALL	SMALL	SMALL
Radiological Health	SMALL	SMALL	SMALL	SMALL	SMALL
Postulated Accidents	SMALL	SMALL	SMALL	SMALL	SMALL

(a) Cumulative impact determinations taken from EIS Table 7-3.
(b) Cumulative impact determinations taken from EIS Table 9-28.
(c) A determination of "NONE" for Environmental Justice analyses does not mean there are no adverse impacts on minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

Table ES-3 provides a summary of the cumulative impacts for the proposed and alternative sites. The NRC staff concluded that all of the sites were generally comparable, and it would be difficult to state that one site is preferable to another from an environmental perspective. In such a case, the proposed site prevails because none of the alternatives is environmentally preferable to the proposed site.

Table ES-4 provides a summary of the EIS-derived impacts for a new nuclear power plant in comparison with the energy alternatives. The NRC staff concluded that none of the viable energy alternatives is preferable to construction of a new baseload nuclear power-generating plant located within FPL's region of interest.

The NRC staff considered various alternative systems designs, including seven alternative heat-dissipation systems and multiple alternative intake, discharge, and water-supply systems. The review team identified no alternatives that were environmentally preferable to the proposed Turkey Point Units 6 and 7 systems design.

Figure ES-2. Location of Sites Considered as Alternatives to the Turkey Point Site

Table ES-4. Summary of Environmental Impacts[a] of Construction and Operation of New Nuclear, Coal-Fired, and Natural-Gas–Fired Generating Units and a Combination of Alternatives

Impact Category	Nuclear	Coal[b]	Natural Gas[b]	Combination of Alternatives[b]
Land Use	MODERATE	MODERATE	MODERATE	MODERATE
Air Quality	SMALL	MODERATE	SMALL to MODERATE	SMALL to MODERATE
Water Use and Quality	SMALL	SMALL	SMALL	SMALL
Ecology	MODERATE	MODERATE	MODERATE	MODERATE
Waste Management	SMALL	MODERATE	SMALL	SMALL
Socioeconomics	MODERATE Beneficial to MODERATE Adverse	MODERATE Beneficial to MODERATE Adverse	MODERATE Beneficial to SMALL Adverse	MODERATE Beneficial to MODERATE Adverse
Human Health	SMALL	SMALL	SMALL	SMALL
Historic and Cultural Resources	MODERATE	MODERATE	MODERATE	MODERATE
Environmental Justice	NONE[b]	NONE[b]	NONE[b]	NONE[b]

(a) Impact levels for all alternatives are for construction and operation but do not reflect cumulative impacts. Thus, the nuclear impacts identified here may differ from those used to compare the proposed site to the alternative sites, which reflect cumulative impacts.
(b) Impacts taken from EIS Table 9-4. These conclusions for energy alternatives should be compared to NRC-authorized activities reflected in Chapters 4, 5, and Sections 6.1, and 6.2.
(c) A determination of "NONE" for Environmental Justice analyses does not mean there are no adverse impacts to minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

Benefits and Costs

The NRC staff compiled and compared the pertinent analytical conclusions reached in the EIS. It gathered all of the expected impacts from building and operating proposed Turkey Point Units 6 and 7 and aggregated them into two final categories: (1) expected environmental costs and (2) expected benefits to be derived from approval of the proposed action. Although the analysis in Section 10.6 is conceptually similar to a purely economic benefit-cost analysis, which determines the net present dollar value of a given project, the purpose of the section is to identify potential societal benefits of the proposed activities and compare them to the potential internal (i.e., private) and external (i.e., societal) costs of the proposed activities. In general, the purpose is to inform the COL process by gathering and reviewing information that demonstrates the likelihood that the benefits of the proposed activities outweigh the aggregate costs.

On the basis of the assessments in this EIS, the building and operation of proposed Turkey Point Units 6 and 7, with mitigation measures identified by the review team, would accrue benefits that most likely would outweigh the economic, environmental, and social costs. For the NRC-proposed action (i.e., NRC-authorized construction and operation), the accrued benefits would also outweigh the costs of preconstruction, construction, and operation of proposed Turkey Point Units 6 and 7.

Public Involvement

A 60-day scoping period was held from June 15, 2010, to August 16, 2010. On July 15, 2010, the NRC held two public scoping meetings in Homestead, Florida. The review team received many oral comments during the public meetings and 32 e-mails and 10 letters throughout the rest of the scoping period on numerous topics including energy alternatives, terrestrial ecology, ground and surface water, and socioeconomics. The review team's response to the in-scope public comments can be found in Appendix D. The Scoping Summary Report (Agencywide Documents Access and Management System (ADAMS) Accession No. ML103130609) contains all of the comments, even those considered out-of-scope (e.g., security, safety issues).

During the initial 75-day comment period on the draft EIS, which began on March 6, 2015, the review team held public meetings in Miami, Florida, on April 22, 2015, and in Homestead, Florida, on April 23, 2015. During the course of the comment period, the NRC received requests from members of the public, a Tribal government, and Federal agencies to extend the comment period. In response to these requests, the NRC reopened the comment period on the draft EIS on May 28, 2015, until July 17, 2015, allowing additional time for public comments. In total, approximately 68 people provided oral comments at the public meetings held in April, and the NRC received approximately 11,300 pieces of correspondence during the original and reopened comment period.

Recommendation

The NRC's recommendation to the Commission related to the environmental aspects of the proposed action is that the COL should be issued.

This recommendation is based on the following:

- the application, including the ER, submitted by FPL
- consultation with Federal, State, Tribes, and local agencies
- site audits and alternative sites audits
- consideration of public comments received during the environmental review
- the review team's independent review and assessment summarized in this EIS.

The NRC's determination is independent of the USACE's determination of whether to issue, deny, or issue with modifications the DA permit application for the Turkey Point Units 6 and 7. The USACE will conclude its Clean Water Act Section 404(b)(1) Guidelines and public interest analyses in its Record of Decision.

ABBREVIATIONS/ACRONYMS

AADT	annual average daily traffic
ac	acre(s)
ACC	averted cleanup and decontamination costs
ac-ft	acre (foot) feet
ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
AD	Anno Domini
ADAMS	Agencywide Documents Access and Management System
AERMOD	American Meteorological Society/U.S. Environmental Protection Agency (AMS/EPA) Regulatory Model
AICUZ	Air Installation Compatible Use Zone
ALARA	as low as reasonably achievable
a.m.	ante meridian
AO	Administrative Order
AP-42	EPA's Compilation of Air Pollutant Emission Factors document
APE	Area of Potential Effect
APPZ	Avon Park Permeable (or Producing) Zone
AQCR	Air Quality Control Region
ARNI	Aquatic Resources of National Importance
ARRA	American Recovery and Reinvestment Act of 2009
ASE	advanced safety evaluation
ASR	aquifer storage and recovery (system)
ATC	Atlantic Coastal Ridge
BA	Biological Assessment
BACT	Best Available Control Technologies
BBCW	Biscayne Bay Coastal Wetlands
BC	Before Christ
BEBR	University of Florida's Bureau of Economic and Business Research
BEA	U.S. Bureau of Economic Analysis
BEIR VII	Biological Effects of Ionizing Radiation VII
bgs	below ground surface
BISC	Biscayne Bay
BLS	U.S. Bureau of Labor Statistics
BMP	Best Management Practice
Btu	British thermal unit
°C	degree(s) Celsius
μCi	microcurie(s)

μCi/mL	microcuries per milliliter
CA	Consent Agreement
CAA	Clean Air Act
CAIR	Clean Air Interstate Rule
CCD	Colony Collapse Disorder
CCR	coal combustion residuals
CCS	cooling-canal system (also known as IWF)
CDF	core damage frequency
CDMP	Comprehensive Development Master Plan
CDNFRM	cost for decontamination of non-farmland
CEC	chemical/contaminant of emerging concern
CEQ	Council on Environmental Quality
CERP	Comprehensive Everglades Restoration Program (also Project, Plan)
CFR	*Code of Federal Regulations*
cfs	cubic foot/feet per second
cm	centimeter(s)
cm^2	square centimeter(s)
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COL	combined construction permit and operating license
CPI	Consumer Price Index
CPUE	catch per unit effort
CSAPR	Cross-State Air Pollution Rule
CTEMISS	cooling-tower emissions processor
CWA	Clean Water Act (aka Federal Water Pollution Control Act)
CWS	circulating-water system
CZMP	Coastal Zone Management Plan
d	day(s)
D	Directional Distribution Factor
DA	Department of the Army
dB	decibel(s)
dBA	decibel(s) on the A-weighted scale
DBA	design basis accident
DCD	Design Control Document
DEET	*N*,*N*-Diethyl-*meta*-toluamide
DEIS	draft environmental impact statement
DERM	Miami-Dade County Department of Environmental Resources Management
DHS	Department of Homeland Security

DNL	day-night average sound level
DOE	U.S. Department of Energy
DOI	U.S. Department of Interior
DOT	U.S. Department of Transportation
DPS	distinct population segment
DSM	demand-side management
DZMW	dual-zone monitoring well
EAB	exclusion area boundary
EAI	Ecological Associates, Inc.
EC10	effective concentration required to induce a 10% effect
EC50	effective concentration required to induce a 50% effect
ECOTOX	EPA Ecotoxicology
EDR	Florida Legislature's Office of Economic and Demographic Research
EEEA	East Everglades Expansion Area
EEL	Environmentally Endangered Lands (Program)
EFH	essential fish habitat
EIA	Energy Information Administration
EIS	environmental impact statement
EJ	environmental justice
ELF	extremely low frequency
ELF-EMF	extremely low frequency-electromagnetic field
EMB	Everglades Mitigation Bank
EMF	electromagnetic field
ENP	Everglades National Park
EPA	U.S. Environmental Protection Agency
EPOC	emerging pollutant of concern
EPRI	Electric Power Research Institute
ER	Environmental Report
ESA	Endangered Species Act of 1973, as amended
ESOC	emerging substance of concern
ESRP	Environmental Standard Review Plan (NUREG-1555, Supplement 1, Operating License Renewal)
EW	exploratory well
°F	degree(s) Fahrenheit
FAA	Federal Aviation Administration
FAC	Florida Administrative Code or Fla. Admin. Code
FDEP	Florida Department of Environmental Protection
FDHR	Florida Division of Historic Resources
FDOH	Florida Department of Health

FDOT	Florida Department of Transportation
FEC	Florida East Coast (Railway)
FEFP	Florida Education Finance Program
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FFWCC	Florida Fish and Wildlife Conservation Commission
FIRM	Flood Insurance Rate Map
FKNMS	Florida Keys National Marine Sanctuary
FLUCFCS	Florida Land Use, Cover, and Forms Classification System
FLUM	Future Land Use Map
FMNH	Florida Museum of Natural History
FMP	fishery management plan
FMSF	Florida Master Site File (form)
FNAI	Florida Natural Areas Inventory
FONSI	Findings of No Significant Impact
FPL	Florida Power & Light Company
fps	foot (feet) per second
FPSC	Florida Public Service Commission
FR	*Federal Register*
FRCC	Florida Reliability Coordinating Council
FSAR	Final Safety Analysis Report
FSER	Final Safety Evaluation Report
ft	foot/feet
ft^2	square foot/feet
ft/d	foot (feet) per day
ft^2/d	square foot (feet) per day
ft^3	cubic foot (feet)
ft^3/d	cubic foot (feet) per day
ft^3/yr	cubic foot (feet) per year
FTE	full-time equivalent
FWPCA	Federal Water Pollution Control Act (also known as the Clean Water Act of 1977)
FWS	U.S. Fish and Wildlife Service
FY	fiscal year
µg	microgram(s)
µg/L	microgram(s) per liter
µGy	microgray(s)
g	gram(s) or gravity of Earth (g-force)
gal	gallon(s)
gal/yr	gallon(s) per year

GC	gas centrifuge
g/cm^3	gram(s) per cubic centimeter
GCRP	U.S. Global Change Research Program
GEIS	Generic Environmental Impact Statement (for License Renewal of Nuclear Plants, NUREG-1437)
GHG	greenhouse gas
GIS	geographic information system
gpd	gallon per day
gpm	gallon per minute
gpm/ft	gallon(s) per minute per foot
g/s	gram(s) per second
GU	Interim District (zone)
GW	gigawatt(s)
GWh	gigawatt hour(s)
ha	hectare(s)
HAP	hazardous air pollutant
HAPC	habitat area of particular concern
HBB	health-based benchmark
HDR	HDR Engineering, Inc.
HEC-RAS	Hydrologic Engineering Centers River Analysis System
hr	hour
HUD	U.S. Department of Housing and Urban Development
Hz	hertz
I	Interstate
IAEA	International Atomic Energy Agency
ICRP	International Commission on Radiological Protection
ID	identification
IGCC	integrated gasification combined-cycle
in.	inch(es)
IRWST	in-containment refueling water storage tank
ISFSI	independent spent fuel storage installation
IUCN	World Conservation Union
IWF	industrial wastewater facility (also known as CCS)
K	Standard Peak Hour Factor
kg	kilogram(s)
kg/d	kilogram(s) per day
kg/L	kilogram(s) per liter
kg/yr	kilogram(s) per year

kg/ha/mo	kilogram(s)/hectare/month
kHz	kilohertz
km	kilometer(s)
km^2	square kilometer(s)
km/hr	kilometer(s) per hour
kt	knot(s)
kV	kilovolt(s)
kV/m	kilovolt(s) per meter
kW	kilowatt(s)
kWh	kilowatt-hour(s)
L	liter(s)
lb	pound(s)
lb/yr	pound(s) per year
L_{dn}	day-night average sound level
LEDPA	least environmentally damaging practicable alternative
L_{eq}	noise level equivalent
LFA	Lower Floridan Aquifer
LLC	Limited Liability Company
LLW	low-level waste
LOEC	lowest-observed effect concentration
LOS	level of service
LPZ	low-population zone
LST	local standard time
LWA	Limited Work Authorization
LWR	light water reactor
µmhos/cm	micromhos per centimeter
m	meter(s)
m/s	meter(s) per second
m^2	square meter(s)
m^3	cubic meter(s)
m^3/d	cubic meters per day
m^3/s	cubic meter(s) per second
mA	milliampere(s)
MACCS	MELCOR Accident Consequence Code System
MCU	Middle Confining Unit
MDC	Miami-Dade County
M-DCPS	Miami-Dade County Public School District
MDWASD	Miami-Dade Water and Sewer Department
MEI	maximally exposed individual

mg	milligram(s)
mG	milliGauss
Mgd	million gallon(s) per day
Mgd/yr	million gallon(s) per day per year
Mgm	million gallons per month
Mg/L	milligram(s) per liter
Mg/m^3	milligram(s) per cubic meter
mg N/L	milligrams of nitrate per liter
mg P/L	milligrams of phosphate per liter
mGy	milligray(s)
mGy/d	milligray(s) per day
MFCMA	Magnuson–Stevens Fishery Conservation and Management Act (or Magnuson–Stevens Act)
MHz	megahertz
mi	mile(s)
mi^2	square mile(s)
min	minute(s)
MIT	Massachusetts Institute of Technology
mL	milliliter(s)
MMBtu	one million British thermal units
MMBtu/hr	one million British thermal units per hour
MMBtu/yr	one million British thermal units per year
mo	month(s)
MOU	Memorandum of Understanding
mph	mile(s) per hour
mrad	millirad
mrem	millirem
msl or MSL	mean sea level
mSv	millisievert(s)
MSW	municipal solid waste
MT	metric ton(nes)
MTU	metric ton uranium
MW	megawatt(s)
MWd/MTU	megawatt-days per metric ton of uranium
MW(e)	megawatt(s) electric
MW(t)	megawatt(s) thermal
MWh	megawatt hour(s)
MWh/yr	megawatt hour(s) per year
N	north or nitrogen
NA	not applicable

NAAQS	National Ambient Air Quality Standard
NAD83	North American Datum of 1983
NARUC	National Association of Regulatory Utility Commissioners
NASCAR	National Association for Stock Car Auto Racing
NAVD88	North American Vertical Datum of 1988
NCI	National Cancer Institute
NCRP	National Council on Radiation Protection and Measurements
NEPA	National Environmental Policy Act of 1969, as amended
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NFC	Natural Forest Community
NGCC	natural-gas combined-cycle
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
NIEHS	National Institute of Environmental Health Sciences
NMFS	National Marine Fisheries Service
NNC	Numerical Nutrient Criteria
NO_2	nitrogen dioxide
NO_3+NO_2	nitrate+nitrite
NO_x	nitrogen oxides
NOAA	National Oceanic and Atmospheric Administration
NOEC	no-observed effect concentration
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRC	U.S. Nuclear Regulatory Commission
NRHP	National Register of Historic Places
NSR	new source review
NUREG	U.S. Nuclear Regulatory Commission technical document
NW	northwest
NWS	National Weather Service
O_2	oxygen
O_3	ozone
ODCM	Offsite Dose Calculation Manual
OFW	Outstanding Florida Water
OIG	Office of the Inspector General
ORV	off-road vehicle
OSHA	Occupational Safety and Health Administration
P	phosphorus
PAH	polycyclic aromatic hydrocarbon

PC	personal computer
PCB	polychlorinated biphenyl
pCi/L	picocurie(s) per Liter
pH	measure of acidity or basicity in solution
PHU	panther habitat units
PHU	panther habitat unit
PFA	Panther Focus Area
P/L	phosphorus per liter
PIR	Public Interest Review or Project Implementation Report
PIRF	Public Interest Review Factor
PK-12	preschool through 12th grade
p.m.	post meridian
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter of 10 microns or less
$PM_{2.5}$	particulate matter with an aerodynamic diameter of 2.5 microns or less
PPSA	Power Plant Siting Act
ppm	part(s) per million
ppt	parts per thousand
PRA	probabilistic risk assessment
PSA	probabilistic safety assessment
PSD	Prevention of Significant Deterioration (Permit)
psu	practical salinity unit
PWR	pressurized water reactor
rad	radiation absorbed dose
RAI	Request for Additional Information
RCRA	Resource Conservation and Recovery Act of 1976, as amended
RCW	radial collector well
rem	roentgen equivalent man
REMP	radiological environmental monitoring program
RfC	reference concentration
RFI	Request for Information
RHA	Rivers and Harbors Act of 1899
RIMS II	Regional Input-Output Modeling System
RMS	root mean square
Rn-222	radon-222
ROD	Record of Decision
ROI	region of interest
RPHP	Radiation Public Health Project
RRY	reference reactor year
RSICC	(Oak Ridge) Radiation Safety Information Computational Center

RV	recreational vehicle
RWTF	reclaimed water-treatment facility
Ryr	reactor year
s or sec	second(s)
SAFMC	South Atlantic Fisheries Management Council
SAMA	severe accident mitigation alternative
SAMDA	severe accident mitigation design alternative
SAV	submerged aquatic vegetation
SBO	Station Blackout
SCA	Site Certification Application
scf	standard cubic feet
SCR	selective catalytic reduction
SDWWTP	South District Wastewater Treatment Plant
sec	second(s)
SECA	State Energy Conversion Alliance
SER	Safety Evaluation Report
SFRPC	South Florida Regional Planning Council
SFWMD	South Florida Water Management District
SGWEA	Southern Glades Wildlife Environmental Area
SHA	seismic hazard analysis
SHPO	State Historic Preservation Office (or Officer)
s/m^3	seconds per cubic meter
SO_2	sulfur dioxide
SO_x	oxides of sulfur
SOR	Save Our Rivers (Program)
SPCC	Spill Prevention, Control, and Countermeasure (Plan)
SR	State Route
SRP	Standard Review Plan
SSC	Species of Concern
SU	Standard Unit(s)
Sv	sievert(s)
SW	southwest
SWPPP	stormwater pollution prevention plan
SWS	service-water system
T	ton(s) or tonne(s)
T/B	Tug/Barge
TB_q	terrabequerel
TCP	traditional cultural property
T&E	threatened and endangered

TDS	total dissolved solids
TEDE	total effective dose equivalent
THPO	Tribal Historic Preservation Officer
TIMDEC	decontamination time
TKN	total Kjeldahl nitrogen
TLD	thermoluminescent dosimeter
TLF	Treasured Lands Foundation
TN	total nitrogen
TOC	total organic carbon
TP	total phosphorus
TRC	total reportable cases
TVA	Tennessee Valley Authority
UDB	urban development boundary
UF_6	uranium hexafluoride
UIC	underground injection control
UMAM	Uniform Mitigation Assessment Method
UMTRI	University of Michigan Transportation Research Institute
UNESCO	United National Educational, Scientific and Cultural Organization
UO_2	uranium dioxide
US	U.S. (State Highway)
U.S.	United States
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USCB	U.S. Census Bureau
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USDW	underground source of drinking water
USGS	U.S. Geological Survey
VOC	volatile organic compound
W	west
W.A.T.E.R.	Wetland Assessment Technique for Environmental Review
WCA	water conservation area
Westinghouse	Westinghouse Electric Company, LLC
WHO	World Health Organization
wk	week(s)
WOTUS	waters of the United States
WRDA	Water Resources Development Act
WTP	water treatment plant
WWTP	wastewater treatment plant

χ/Q	atmospheric dispersion factor(s); annual average normalized air concentration value(s)
yd^3	cubic yards
yr	year(s)

APPENDIX A

CONTRIBUTORS TO THE ENVIRONMENTAL IMPACT STATEMENT

APPENDIX A

CONTRIBUTORS TO THE ENVIRONMENTAL IMPACT STATEMENT

The overall responsibility for the preparation of this environmental impact statement was assigned to the Office of New Reactors, U.S. Nuclear Regulatory Commission (NRC). The statement was prepared by members of the Offices of New Reactors with assistance from other NRC organizations, the U.S. Army Corps of Engineers, the National Park Service - Biscayne Bay and Everglades National Park, Pacific Northwest National Laboratory, and Information Systems Laboratories.

Name	Education/Expertise	Contribution
Nuclear Regulatory Commission		
Alicia Williamson	B.S. Biology and Chemistry; M.S. Environmental Science; 12 years relevant experience	Environmental Project Manager
Andrew Kugler	B.S., Mechanical Engineering; M.S. Technical Management; 14 years relevant experience	Alternatives, Environmental Project Manager
Tomeka Terry	M.S. Civil Engineering; 12 years relevant experience	Assistant Project Manager
Stacey Imboden	B.S. Meteorology; M.S. Environmental Engineering and Science; 13 years relevant experience	Meteorology , Air Quality, Climate Change
Kevin Quinlan	B.S. Meteorology; M.S. Atmospheric Science; 6 years relevant experience	Meteorology, Air Quality
Mohammad Haque	M.S. Civil Engineering; 35 years relevant experience	Surface Water Hydrology
Daniel Barnhurst	B.S. Environmental Geology; M.S. Geology 11 years relevant experience	Groundwater Hydrology, Geology
Michael Masnik	B.S. Conservation; M.S. and Ph.D. Zoology, 42 years relevant experience	Aquatic Ecology; Essential Fish Habitat
Robert Schaaf	B.S. Mechanical Engineering; 24 years relevant experience	Fuel Cycle
Peyton Doub	B.S. Plant Sciences; M.S. Plant Physiology; Professional Wetland Scientist; 27 years relevant experience	Terrestrial Ecology, Land Use, Transmission Lines
Daniel Mussatti	B.A. Economics; M.S. Natural Resource and Environmental Economics; 24 years relevant experience	Socioeconomics, Environmental Justice, Benefit-Cost, Need for Power
Jennifer Davis	B.A. Historic Preservation and Classical Civilization; 14 years relevant NEPA and NHPA experience	Historic and Cultural Resources

Name	Education/Expertise	Contribution
Jack Cushing	B.S. Marine Engineering; 30 years relevant nuclear experience	Historic and Cultural Resources, Nonradiological Health and Waste
Donald Palmrose	M.S. and Ph.D. Nuclear Engineering; 30 years relevant experience	Radioactive Waste Management, Health Physics, Decommissioning, Fuel Cycle, Postulated Accidents, Transportation
Malcolm Patterson	B.S. Systems Engineering; 39 years relevant experience	Severe Accidents
Seshagiri Tammara	M.S. Chemical and Environmental Engineering; 40 years relevant experience	Demography, Transportation, Postulated Accidents
Charles Hinson	M.S. Nuclear Engineering / Health Physics; 40 years relevant experience	Construction Worker Dose, Radioactive Waste Management
Michelle Hart	B.S. Physics; M.S. Nuclear Engineering; 18 years relevant experience	Postulated Accidents
Zachary Gran	B.S. Physics; M.S. Radiological Health Physics; 5 years relevant experience	Radiological Health
Stephen Giebel	B.S. Health Physics; 31 years relevant experience	Decommissioning
U.S. Army Corps of Engineers		
Megan Clouser	B.S. Marine Science and Biology; 18 years relevant experience	Senior Project Manager
David Pugh	M.A. Historic Archaeology / History; 20 years relevant experience	Historic and Cultural Resources
Jacob Hemingway	B.S. Anthropology; M.S. Geography; 7 years relevant experience	Historic and Cultural Resources
National Park Service		
Elsa Alvear	M.S. Biology; 22 years relevant experience	Natural Resources; Environmental Impact Analysis
Sarah Bellmund	B.S. Biochemistry; M.A. Marine Sciences; 31 years relevant experience	Natural Resources; Environmental Impact Analysis; Ecology; Hydrology
Tylan Dean	B.S. Fishery and Wildlife Management; M.S. Wildlife Ecology and Conservation; 21 years relevant experience	Natural Resources; Ecology
Bryan Faehner	B.S. Environmental Policy; M.S. Environmental Studies; 10 years relevant experience	Natural Resources; Environmental Impact Analysis
Vanessa McDonough	Ph.D. Biology; 14 years relevant experience	Ecology
David Rudnick	Ph.D. Oceanography; 30 years relevant experience	Hydrology; Environmental Impact Analysis

Name	Education/Expertise	Contribution
Erik Stabenau	B.A. Chemistry; Ph.D. Marine and Atmospheric Chemistry; 16 years relevant experience	Climate Science
Pacific Northwest National Laboratory[(a)]		
Robert Bryce	B.S. Geology; M.S. Hydrology/ Hydrogeology; 36 years relevant experience	Task Leader
Sandra McInturff	B.S. Business; 35 years of relevant experience	Deputy Task Leader
Carmen Arimescu	B.S. and M.S. Computer Science; 30 years relevant experience	Comment Database
Terri Miley	B.S. and M.S. Mathematics; 27 years relevant experience	Comment Database
Tom Anderson	B.S. Botany; 41 years relevant experience	Alternatives
Jeffrey Ward	B.A. Zoology; M.S., Environmental Engineering; 25 years relevant experience	Aquatic Ecology
Ann Miracle	B.A Biology, M.S. Population Genetics, Ph.D. Molecular Immunology; 17 years relevant experience.	Aquatic Ecology
Corey Duberstein	B.S. Wildlife; M.S. Natural Resource Science; 20 years relevant experience	Terrestrial Ecology
Lara Aston	B.S. and M.S. Environmental Science; 15 years relevant experience	Nonradiological Health; Terrestrial Ecology
Michelle Niemeyer	B.S. and M.S. Agricultural Economics; 8 years relevant experience	Need for Power, Benefit Cost
Paul Thorne	B.S. Chemistry/Math; M.S. Hydrology; 34 years relevant experience	Groundwater Use, Hydrology
Steve Breithaupt	B.S. Aquatic Biology; M.S. Environmental Science; Ph.D., Water Resource Engineering; 34 years relevant experience	Surface Water Use, Hydrology
Mart Oostrom	Ph.D. Soil Physics and Engineering; 25 years relevant experience	Staff Scientist
Lance Vail	B.S. Environmental Systems Engineering; M.S. Civil Engineering; 35 years relevant experience	Surface Water Use, Hydrology
Nancy Kohn	B.S. Freshwater Studies; 6 years relevant experience	Site Layout and Plant Description
Philip Daling	B.S. Physical Metallurgy; 33 years relevant experience	Transportation
Susan Loper	B.S. Biology; 13 years relevant experience	Geographic Information Systems
Susan Ennor	B.A. Journalism; 35 years relevant experience	Technical Editing and Text Processing

Name	Education/Expertise	Contribution
Cary Counts	B.S. Ceramic Engineering; M.S. Environmental Systems Engineering; 42 years relevant experience	Technical Editing and Text Processing
Mike Parker	B.A. English; 16 years relevant experience	Technical Editing and Text Processing
Heather Culley	B.S. Biology and Philosophy; M.A. Medical History and Ethics; 8 years relevant experience	Technical Editing and Text Processing
Christine Ross	A.A. Microcomputer Management/ Multimedia Specialist; B.A., Social Sciences; 19 years relevant experience	References, EARRTH
Susan Gulley	B.A. English/Library Science; 15 years relevant experience	References
Joanne Duncan	B.A. Biology; 15 years relevant experience	Reference Coordinator
Information Systems Laboratories		
Ali Azarm, IESS Corp[(b)]	B.S. Electrical Engineering; Ph.D. Nuclear Engineering; 15 years relevant experience	Severe and Design Basis Accidents
Alex Uriarte, ICF International[(b)]	M.S. Economics; PH.D. Development Studies; 15 years relevant experience	Socioeconomics, Environmental Justice
Ralph Grismala, ICF International[(b)]	M.S. Civil Engineering; 37 years relevant experience	Nonradioactive Waste, Fuel Cycle
Gregory Hofer, SC&A[(b)]	M.S. Physics; M.S. Nuclear Engineering; 33 years relevant experience	Health Physics, Radioactive Waste Management
Rose Gogliotti, SC&A[(b)]	B.S. Radiological Health; 6 years relevant experience	Health Physics
Abe Zeitoun, SC&A[(b)]	B.S. Chemistry and Zoology; M.S. Fisheries; Ph.D. Environmental Sciences; 40 years relevant experience	Radioactive Waste Management
Sally Zeff, ICF International[(b)]	M.A. Urban Planning; 30 years relevant experience	Land Use, Transmission Lines
Edward Carr, ICF International[(b)]	M.S. Atmospheric Science; 33 years relevant experience	Meteorology, Air Quality
Michael Bever, ICF International[(b)]	Ph.D. Anthropology; 20 years relevant experience	Historic and Cultural Resources
U.S. Geological Survey		
Gary Patterson		Hydrology

Pacific Northwest National Laboratory is operated by Battelle for the U.S. Department of Energy.
ICF International, Sandy Cohen & Associates (SC&A), and Innovative Engineering and Safety Solutions, LLC (IESS Corp) are subcontractors to Information Systems Laboratories (ISL).

APPENDIX B

ORGANIZATIONS CONTACTED

APPENDIX B

ORGANIZATIONS CONTACTED

The following Federal, State, regional, Tribal, and local organizations were contacted during the course of the U.S. Nuclear Regulatory Commission staff's independent review of potential environmental impacts from the construction and operation of two new nuclear units, Turkey Point Units 6 and 7, at the Turkey Point site in Miami-Dade County, Florida:

Organization Name, City, State

Advisory Council on Historic Preservation, Washington, D.C.

Archaeological and Historical Conservancy, Inc., Davie, Florida

Asian American Advisory Board

Assistant Director, Community Redevelopment Agency, City of Homestead, Florida

Centro Campesino, Florida City, Florida

City of Florida City, Florida City, Florida

City of Homestead, Homestead, Florida

City of Miami, Office of the City Attorney, Miami, Florida

City of South Miami, South Miami, Florida

Department of Health, Bureau of Radiation Control, Tallahassee, Florida

Director of Planning and Zoning, City of South Miami, Florida

Fish and Wildlife Services, South Florida Ecological Services Office, Vero Beach, Florida

Florida Department of Environmental Protection, Tallahassee, Florida

Florida Department of Environmental Protection, West Palm Beach, Florida

Florida International University, Miami, Florida

Florida Keys Aqueduct Authority, Key West, Florida

Florida State Historic Preservation Officer (SHPO), Tallahassee, Florida

Florida State House of Representatives, Tallahassee, Florida

Florida State Senate, Tallahassee, Florida

Florida Wildlife and Fisheries Conservation Commission, South Region Office, West Palm Beach, Florida

Historic Preservation Administrator, City of Coral Gables, Florida

Historic Preservation Officer, City of Miami, Florida

Homestead Housing Authority, Homestead, Florida

Miami-Dade County Community Action Agency, Miami, Florida

Miami-Dade County Department of Planning and Zoning, Miami, Florida

Miami-Dade County Department of Regulatory and Economic Resources, formerly DERM, Miami, Florida

Miami-Dade County Office of Historic and Archaeological Resources, Miami, Florida

Miami-Dade County Permitting, Environment, and Regulatory Affairs, Miami, Florida

Miami-Dade County Planning, Miami, Florida

Miami-Dade County Public Schools, Miami, Florida

Miami-Dade Office of Community Advocacy, Miami, Florida

Miami-Dade Water and Sewer Department, Miami, Florida

Miccosukee Tribe of Indians of Florida, Miami, Florida

Monroe County, Key West, Florida

Muscogee (Creek) Nation, Okmulgee, Oklahoma

NGO Sembrando Flores, Homestead, Florida

NMFS, Southeast Regional Office, Saint Petersburg, Florida

South Florida Water Management District, Hydrogeology Section, Water Supply, Palm Beach, Florida

Stephen P. Clark Center, Miami, Florida

Town of Cutler Bay, Cutler Bay, Florida

Tribal Historic Preservation Officer (THPO), Poarch Band of Creek Indians, Atmore, Alabama

Tribal Historic Preservation Officer (THPO), Seminole Nation of Oklahoma, Wewoka, Oklahoma

Tribal Historic Preservation Officer (THPO), Seminole Tribe of Florida, Clewiston, Florida

U.S. Department of Homeland Security, Federal Emergency Management Agency, Region IV, Atlanta, Georgia

U.S. Environmental Protection Agency, Region 4, Atlanta, Georgia

U.S. Geological Survey, Fort Lauderdale, Florida

U.S. House of Representatives, Washington, D.C.

U.S. Interior Fish and Wildlife Services, South Florida Ecological Services Office, Vero Beach, Florida

U.S. National Marine Fisheries Services, Southeast Regional Office, St. Petersburg, Florida

U.S. National Park Service, Biscayne National Park, Homestead, Florida

U.S. National Park Service, Everglades National Park, Homestead, Florida

U.S. Senate, Washington, D.C.

Village of Pinecrest, Pinecrest, Florida

APPENDIX C

NRC AND USACE ENVIRONMENTAL REVIEW CORRESPONDENCE

APPENDIX C

NRC AND USACE ENVIRONMENTAL REVIEW CORRESPONDENCE

This appendix contains a chronological list of correspondence between the U.S. Nuclear Regulatory Commission (NRC) or the U.S. Army Corps of Engineers (USACE) and Florida Power & Light Company (FPL). Other correspondence related to the environmental review of FPL's application for combined construction permits and operating licenses (COLs) and a USACE permit at the Turkey Point Nuclear site in Miami-Dade County, Florida, is also included.

All documents, with the exception of those containing proprietary information, are available electronically from the Public Electronic Reading Room found on the Internet at the following web address: www.nrc.gov/reading-rm.html. From this website, the public can gain access to the NRC's Agencywide Documents Access and Management System (ADAMS), which provides text and image files of NRC's public documents. The ADAMS accession number or *Federal Register* citation for each document is included within the parenthesis following the reference.

November 10, 2008	NRC trip report for readiness assessment (C-1) visit for a future combined license application at the Turkey Point site (ML082880307).
April 15, 2009	NRC trip report for readiness assessment (C-2/C-3) visit for a future combined license application at Turkey Point site (ML090850294).
May 15, 2009	NRC trip report for readiness assessment (C-2) visit for a future combined license application at Turkey Point site (ML091320137).
June 4, 2009	NRC trip report for pre-application visit with regulatory agencies related to a future combined license application at the Turkey Point site (ML091470726).
June 30, 2009	FPL letter submitting an application for a combined license for Units 6 and 7 at the Turkey Point site (ML091830589).
July 23, 2009	Letter from NRC to FPL acknowledging receipt of the COL application for Turkey Point Units 6 and 7 (ML091890130).
August 3, 2009	Federal Register notice of receipt and availability of application for a combined license for Turkey Point (ML092590051).
August 7, 2009	Letter from FPL to NRC providing meteorological information for the Turkey Point COL application (ML092250585).
September 4, 2009	Letter from NRC to FPL accepting for docketing the COL application for Turkey Point Units 6 and 7 (ML092380248).

September 16, 2009	Letter from the County of Monroe, Florida, requesting NRC to keep it informed of activities related to the NRC staff's review of the COL application for Turkey Point Units 6 and 7 (ML092750383).
October 1, 2009	FPL letter to NRC providing schedule for response to NRC staff's requests for additional information (ML092810318).
October 7, 2009	Federal Register notice of acceptance for docketing of an application for a combined license for Turkey Point Units 6 and 7 (ML092860057).
November 10, 2009	FPL letter to NRC withdrawing the request for a limited work authorization (ML093170513).
November 25, 2009	Letter from NRC to Ms. Susan Grimsley, Assistant County Attorney, County of Monroe, Florida, Acknowledging Receipt of the Letter from County of Monroe Proposal (Accession No. ML092960671).
November 25, 2009	Letter from NRC to Mr. David S. Hobbie, Chief Regulatory Division, U.S. Army Corps of Engineers, NRC's Environmental Impact Statement for FPL Combined License Application for Turkey Point, units 6 and 7 (ML092610207).
December 10, 2009	Letter from Mr. Donald Kinard, Chief Regulatory Division, U.S. Army Corps of Engineers, agreeing to become a cooperating agency for the environmental impact statement for FPL combined license application for Turkey Point, Units 6 and 7 (ML093520690).
January 4, 2010	Letter from NRC to Ms. Zelda Ryles, Manager, South Dade Regional Library, Regarding Maintenance of Document at the South Dade Regional Library Related to Combined License Application for Turkey Point, Units 6 and 7 (ML092610278).
January 4, 2010	Letter from NRC to Ms. Pamela Hogue, Manager, Homestead Branch Library, Regarding Maintenance of Document at the Homestead Branch Library Related to Combined License Application for Turkey Point, Units 6 and 7 (ML092610521).
May 28, 2010	Letter from NRC to Mr. M. Nazar, FPL, Providing the Turkey Point Units 6 and 7 Nuclear Power Plants Combined License Application Review Schedule (ML101310404).
June 9, 2010	Letter from NRC to Mr. W. Maher, FPL, Notice of Intent to Prepare an Environmental Impact Statement and Conduct Scoping Related to a Combined License Application for Turkey Point, Units 6 and 7 (ML101580552).

June 14, 2010	Letter from NRC to Mr. M. Nazar, FPL, Florida Power & Light – Application for a Combined License for the Turkey Point Nuclear Power Plant Units 6 and 7; the Notice of Hearing, Opportunity to Petition for Leave to Intervene, and Associated Order (ML101400547).
June 18, 2010	Federal Register Notice, Florida Power & Light Company, Combined License Application for the Turkey Point Units 6 and 7, Notice of Hearing, Opportunity to Petition for Leave to Intervene and Associated Order Imposing Procedures for Access to Sensitive Unclassified Non-Safeguards Information and Safeguards Information for Contention Preparation (ML102370715).
June 18, 2010	Letter from NRC to Ms. N. Linehan, Florida Wildlife and Fisheries Conservation Commission, Request for Participation in the Scoping Process and List of State Listed Protected Species for the Environmental Review for the Turkey Point Units 6 and 7 Combined License Application Review (ML101610556).
June 23, 2010	Letter from NRC to Mr. R. Nelson, Advisory Council on Historic Preservation, Request for Participation in the Scoping Process for the Turkey Point Units 6 and 7 Combined License Application Review (ML101610537).
June 23, 2010	Letter from NRC to Mr. P. Souza, U.S. Fish and Wildlife Service, Notification and Request for Consultation and Participation in the Environmental Scoping Process and a List of Protected Species within the Area Under Evaluation for the Turkey Point Units 6 and 7 Combined License Application Review (ML101610560).
June 23, 2010	Letter from NRC to Dr. R. Crabtree, National Marine Fisheries Service, Notification and Request for Consultation and Participation in the Environmental Scoping Process and a List of Protected Species within the Area Under Evaluation for the Turkey Point Units 6 and 7 Combined License Application Review (ML101610565).
June 24, 2010	Letter from NRC to Those on the Attached List, Request for Participation in the Scoping Process for the Turkey Point Units 6 and 7 Combined License Application Review (ML101610568).
June 24, 2010	Letter from NRC to Mr. S. Terry, Miccosukee Tribe of Indians of Florida, Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Turkey Point Units 6 and 7 Combined License Application (ML101690501).

June 24, 2010	Letter from NRC to Ms. J. Bear, Muscogee (Creek) Nation, Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Turkey Point Units 6 and 7 Combined License Application (ML101690496).
June 24, 2010	Letter from NRC to Mr. R. Thrower, Poarch Band of Creek Indians, Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Turkey Point Units 6 and 7 Combined License Application (ML101690503).
June 24, 2010	Letter from NRC to Mr. W. Steele, Seminole Tribe of Florida, Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Turkey Point Units 6 and 7 Combined License Application (ML101690499).
June 24, 2010	Letter from NRC to Ms. N. Deere, Seminole Nation of Oklahoma, Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Turkey Point Units 6 and 7 Combined License Application (ML101690497).
June 29, 2010	Letter from NRC to Ms. L. Kammerer, Florida Deputy State Historic Preservation Officer, Notification and Request for Consultation and Participation in the Environmental Scoping Process for the Environmental Review of the Turkey Point Units 6 and 7 Combined License Application (ML101690480).
June 29, 2010	Notice of Public Scoping Meeting for the Turkey Point Units 6 and 7 Combined License (ML101690484).
July 1, 2010	Letter from NRC to Mr. R. Carr, Archaeological and Historical Conservancy, Inc., Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Turkey Point Units 6 and 7 Combined License Application (ML101690462).
July 1, 2010	Letter from NRC to Ms. K Kauffman, Miami-Dade Office of Historic & Archaeological Resources, Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Turkey Point Units 6 and 7 Combined License Application (ML101690468).
July 1, 2010	Letter from NRC to Ms. E. Uguccioni, Historic Preservation Officer, City of Miami, Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Turkey Point Units 6 and 7 Combined License Application (ML101690472).

July 1, 2010	Letter from NRC to Ms. S. Chin, Historic Preservation Administrator, City of Coral Gables, Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Turkey Point Units 6 and 7 Combined License Application (ML101730494).
July 1, 2010	Letter from NRC to Mr. D. Wick, Assistant Director of Community Redevelopment Agency, City of Homestead, Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Turkey Point Units 6 and 7 Combined License Application (ML101730511).
July 1, 2010	Letter from NRC to Mr. S. Youkilis, Director of Planning and Zoning, City of South Miami, Notification and Request for Consultation and Participation in the Scoping Process for the Environmental Review of the Turkey Point Units 6 and 7 Combined License Application (ML101730515).
July 1, 2010	Letter from NRC to Those on the Attached List, Invitation to a Government-to-Government Meeting for the Turkey Point Units 6 and 7 Combined License Application Environmental Review (ML101800575).
July 8, 2010	Letter from Ms. C. Hall, Advisory Council on Historic Preservation, to NRC, Regarding Florida Power and Light's Application for Two New Nuclear Power Plants, Turkey Point Site, Homestead, Florida (ML101900325).
July 28, 2010	Letter from Ms. L. Kammerer, Florida Division of Historical Resources, to NRC, Providing Scoping Comments Regarding Cultural Resources (ML102220345).
August 5, 2010	Letter from Mr. M. Croom, National Marine Fisheries Service, to NRC, Providing Scoping Comments and Information Supporting Consultation Under the Endangered Species Act and the Magnuson-Stevens Act (ML102320025).
August 12, 2010	Letter from Ms. K. Kauffman, Miami-Dade Office of Historic & Archaeological Resources, to NRC, Providing Scoping Comments and Accepting the NRC Invitation to Consult (ML102390102).
August 16, 2010	Letter from Ms. M. Poole, Florida Fish and Wildlife Conservation Commission, to NRC, Providing Scoping Comments and a List of Species (ML102280488).

August 30, 2010 Memorandum, Summary of July 22, 2010, Category 1 Public Teleconference with the Florida Power and Light Company to Discuss Environmental Information Needs for the Turkey Point Units 6 and 7 Combined License Application (ML102150618).

August 31, 2010 Memorandum, Summary of July 15, 2010, Public Meetings to Support the Review of the Turkey Point Units 6 and 7 Combined License Application (ML102080607).

August 31, 2010 Letter from NRC to Mr. W. Maher, FPL, Turkey Point Units 6 and 7 Combined License Application Online Reference Portal (ML102320391).

September 3, 2010 Letter from Mr. M. Nazar, FPL, to NRC, Submittal of Annual Update to the COL Application – Revision 1, and the Semiannual Update of the Departures Report (ML102570371).

September 14, 2010 Letter from Ms. A. Mullins, Seminole Tribe of Florida, to NRC, Assessment of Effects for the Proposed Construction of Two Additional Nuclear Reactors at Turkey Point, Miami-Dade County, Florida (ML102660296).

September 21, 2010 Memorandum, Summary of the Environmental Site Audit Related to the Review of the Combined License Application for Turkey Point Units 6 and 7 (ML101880784).

October 21, 2010 Memorandum, Summary of the Environmental Alternative Sites Audit Related to the Review of the Combined License Application for Turkey Point Units 6 and 7 (ML102660659).

November 1, 2010 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, NRC June 2010 Environmental Audit, Supplemental Information Request Response 1 (ML103080837).

November 1, 2010 Summary of September 29, 2010, Teleconference Between NRC and the Miami-Dade Water and Sewer Department Regarding Use of Treated Wastewater for Turkey point Units 6 and 7 (ML103490981).

November 5, 2010 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Combined License Application Online Reference Portal (ML103130133).

November 16, 2010 Memorandum, Summary of the November 2, 2010, Teleconference between NRC and EPA Regarding Emerging Pollutants of Concern in Cooling Water (ML110050170).

December 1, 2010 Memorandum, Scoping Summary Report Related to the Environmental Scoping Process for the Turkey Point Units 6 and 7 Combined License Application (ML103130609).

December 8, 2010 Summary of the October 20, 2010, Meeting between the Seminole Tribe of Florida, the U.S. Army Corps of Engineers, and the NRC to Discuss Issues Related to Cultural Resources (ML103420623).

December 15, 2010 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, NRC June 2010 Environmental Audit, Supplemental Information Request Response 2, Part 1 (ML103540248).

December 15, 2010 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, NRC June 2010 Environmental Audit, Supplemental Information Request Response 2, Part 2 (ML103560533).

December 21, 2010 Letter from Mr. M. Nazar, FPL, to NRC, Early Submittal of Annual Update to the COL Application – Revision 2, and the Semiannual Update of the Departures Report (ML103630059).

January 11, 2011 Memorandum, Summary of October 26, 2010, Teleconference with Dr. G. Rand, Florida International University, Regarding Reclaimed Water Quality and Toxicology Testing (ML110200187).

February 1, 2011 Email Forwarding U.S. Army Corps of Engineers Request for Additional Information Related to Site Selection (ML110330126).

February 28, 2011 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, NRC June 2010 Environmental Audit, Submittal of Groundwater Model Development and Analysis: Units 6 and 7 Dewatering and Radial Collector Well Simulations, Revision 1 (ML110610723).

March 1, 2011 Letter from NRC to Mr. M. Nazar, FPL, Environmental Request for Additional Information Letter 1102231 Related to ESRP Section 2.7, Cultural Resources, for the Combined License Application Review for Turkey Point Units 6 and 7 (ML110601020).

March 1, 2011 Letter from NRC to Mr. M. Nazar, FPL, Environmental Request for Additional Information Letter 1102232 Related to ESRP Section 9.3.1, Site Selection Process, for the Combined License Application Review for Turkey Point Units 6 and 7 (ML110601062).

March 1, 2011 Letter from NRC to Mr. M. Nazar, FPL, Environmental Request for Additional Information Letter 1102233 Related to ESRP Section 3.1, External Appearance and Plant Layout, for the Combined License Application Review for Turkey Point Units 6 and 7 (ML110601071).

March 7, 2011 Letter from NRC to Mr. M. Nazar, FPL, Environmental Request for Additional Information Letter 1103071 Related to ESRP Section 5.7, Meteorological and Air Quality Impacts, for the Combined License Application Review for Turkey Point Units 6 and 7 (ML110660019).

March 9, 2011 Letter from NRC to Mr. M. Nazar, FPL, Environmental Request for Additional Information Letter 1103091 Related to ESRP Section 5.3.4, Non-Radiological Health, for the Combined License Application Review for Turkey Point Units 6 and 7 (ML110680020).

March 9, 2011 Letter from NRC to Mr. M. Nazar, FPL, Environmental Request for Additional Information Letter 1103092 Related to ESRP Section 3.4.4, Nonradioactive Waste Systems, for the Combined License Application Review for Turkey Point Units 6 and 7 (ML110680022).

March 9, 2011 Letter from NRC to Mr. M. Nazar, FPL, Environmental Request for Additional Information Letter 1103093 Related to ESRP Section 2.2, Land Use, for the Combined License Application Review for Turkey Point Units 6 and 7 (ML110680053).

March 9, 2011 Letter from NRC to Mr. M. Nazar, FPL, Environmental Request for Additional Information Letter 1103094 Related to ESRP Section 9.3, Alternative Sites, for the Combined License Application Review for Turkey Point Units 6 and 7 (ML110680062).

March 10, 2011 Letter from NRC to Mr. M. Nazar, FPL, Environmental Request for Additional Information Letter 1103101 Related to ESRP Section 2.4.1, Terrestrial and Wetlands Ecology, for the Combined License Application Review for Turkey Point Units 6 and 7 (ML110690002).

March 10, 2011 Letter from NRC to Mr. M. Nazar, FPL, Environmental Request for Additional Information Letter 1103102 Related to ESRP Section 2.5, Socioeconomics, for the Combined License Application Review for Turkey Point Units 6 and 7 (ML110690003).

March 11, 2011 Letter from NRC to Mr. D. Vela, National park Service, Invitation to Become a Cooperating Agency for the U.S. Nuclear Regulatory Commission’s Environmental Impact Statement for the Florida Power and Light Company Combined License Application for Turkey Point Units 6 and 7, Miami-Dade County, Florida (ML102030501).

March 14, 2011 Memorandum, Summary of February 24, 2011, Category 3 Public Meeting with the Florida Power and Light Company to Discuss the Revised Groundwater Model for the Turkey Point Units 6 and 7 Combined License Application (ML110620735).

March 14, 2011	Letter from NRC to Mr. M. Nazar FPL Environmental Request for Additional Information Letter 120316 Related to ESRP Section 9.3-US Army Corps of Engineers, For the Combined License Application Review for Turkey Point, Units 6 and 7 (ML12074A005).
March 17, 2011	Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Request for Additional Information eRAI 5340, Revision 1, U.S. Army Corps of Engineers for Application Section 9.3 (ML110820044).
March 17, 2011	Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, NRC June 2010 Environmental Audit, Submittal of Groundwater Flow Model (MODFLOW) Calculation Revision 4 Input/Output Files (ML110830787).
April 6, 2011	Letter from NRC to Mr. M. Nazar, FPL, Environmental Request for Additional Information Letter 1104071 Related to ESRP Section 9.3.1, Site Selection Process, for the Combined License Application Review for Turkey Point Units 6 and 7 (ML110960520).
April 6, 2011	Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 1103094 (RAI 5563), Environmental Standard Review Plan Section 9.3, Alternative Sites (ML110980612).
April 12, 2011	Letter from NRC to Mr. M. Nazar, FPL, Environmental Request for Additional Information Letter 1104121 Related to ESRP Section 9.3, Alternative Sites, for the Combined License Application Review for Turkey Point Units 6 and 7 (ML111010357).
April 15, 2011	Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 1102231 (RAI 5480), Environmental Standard Review Plan Section 2.7, Cultural Resources (ML111090274).
April 15, 2011	Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 1102232 (RAI 5481), Environmental Standard Review Plan Section 9.3.1, Site Selection Process (ML111080761).

April 15, 2011 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 1102233 (RAI 5482), Environmental Standard Review Plan Section 3.1, External Appearance and Plant Layout (ML11108A146).

April 20, 2011 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 1103071 (RAI 5498), Environmental Standard Review Plan Section 5.7, Meteorological and Air Quality Impacts (ML111170331).

April 21, 2011 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 1103092 (RAI 5595), Environmental Standard Review Plan Section 3.4.4, Non-Radioactive Waste Systems (ML11122A054).

April 22, 2011 Letter from Mr. D. Vela, National Park Service, Southeast Regional Office, to Mr. S. Flanders, NRC, Accepting the NRC Invitation to Become a Cooperating Agency on the Turkey Point, Units 6 and 7, Environmental Impact Statement (ML111160378).

April 25, 2011 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 1103093 (RAI 5561), Environmental Standard Review Plan Section 2.2, Land Use (ML11116A160).

April 25, 2011 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 1103091 (RAI 5594), Environmental Standard Review Plan Section 5.3.4, Non-Radiological Health (ML11116A161).

April 26, 2011 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 1103102 (RAI 5570), Environmental Standard Review Plan Section 2.5, Socioeconomics (ML11118A177).

April 26, 2011 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 1103101 (RAI 5562), Environmental Standard Review Plan Section 2.4.1, Terrestrial and Wetlands Ecology (ML111180713).

April 27, 2011	Letter from NRC to Mr. M. Nazar, FPL, Environmental Request for Additional Information Letter 1104271 Related to ESRP Section 1.5, Compliance and Consultations, for the Combined License Application Review for Turkey Point Units 6 and 7 (ML111170533).
May 4, 2011	Letter from NRC to Mr. M. Nazar, FPL, Environmental Request for Additional Information Letter 1105042 Related to ESRP Section 2.4.2, Aquatic Ecology, for the Combined License Application Review for Turkey Point Units 6 and 7 (ML111240011).
May 4, 2011	Letter from NRC to Mr. M. Nazar, FPL, Environmental Request for Additional Information Letter 1105043 Related to ESRP Section 4.3.2, Aquatic Impacts, for the Combined License Application Review for Turkey Point Units 6 and 7 (ML111240013).
May 4, 2011	Letter from NRC to Mr. M. Nazar, FPL, Environmental Request for Additional Information Letter 1105041 Related to ESRP Section 9.3, Alternative Sites, for the Combined License Application Review for Turkey Point Units 6 and 7 (ML111230733).
May 5, 2011	Letter from NRC to Mr. M. Nazar, FPL, Environmental Request for Additional Information Letter 1105051 Related to ESRP Section 8.4, Assessment of Need for Power, for the Combined License Application Review for Turkey Point Units 6 and 7 (ML111240406).
May 18, 2011	Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Audit Data and Information Needs AQ-4, H-13, H-23, H-31, H-34, H-35, H-38, H-40, NR-6 (ML11143A090).
May 23, 2011	Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, First (Partial) Response to NRC Environmental Request for Additional Information Letter 1104071 (RAI 5588), Environmental Standard Review Plan Section 9.3.1, Alternative Site Selection Process (ML11145A041).
May 27, 2011	Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, First (Partial) Response to NRC Environmental Request for Additional Information Letter 1104121 (RAI 5589), Environmental Standard Review Plan Section 9.3.1, Alternative Site Selection Process (ML11151A198).
June 3, 2011	Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 1104271 (RAI 5699), Environmental Standard Review Plan Section 1.5, Compliance and Consultations (ML11157A123).

June 10, 2011 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 1105041 (RAI 5708), Environmental Standard Review Plan Section 9.3, Alternative Sites (ML11165A034).

June 13, 2011 Email from NRC to Mr. W. Maher, FPL, Turkey Point Environmental – Final RAI EIS 9.4 (RAI No. 5770) – System Design Alternatives (ML11175A140).

June 14, 2011 Letter from NRC to Mr. M. Nazar, FPL, Environmental Request for Additional Information Letter 110614 Related to ESRP Section 3.2.2, Structures with a Major Environmental Interface, for the Combined License Application Review for Turkey Point Units 6 and 7 (ML111650769).

June 14, 2011 Letter from NRC to Mr. M. Nazar, FPL, Environmental Request for Additional Information Letter 110614 Related to ESRP Section 2.3, Water, for the Combined License Application Review for Turkey Point Units 6 and 7 (ML111650597).

June 14, 2011 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 1105042 (RAI 5704), Environmental Standard Review Plan Section 2.4.2, Aquatic Ecology (ML11168A043).

June 20, 2011 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 1105043 (RAI 5707), Environmental Standard Review Plan Section 4.3.2, Aquatic Impacts (ML11172A285).

June 20, 2011 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 1105051 (RAI 5565), Environmental Standard Review Plan Section 8.4, Assessment of Need for Power (ML11178A015).

July 7, 2011 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 1103101 (RAI 5562), Environmental Standard Review Plan Section 2.4.1, Terrestrial and Wetlands Ecology (ML11195A164).

July 7, 2011	Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 1103093 (RAI 5561), Environmental Standard Review Plan Section 2.2, Land Use (ML11192A042).
July 11, 2011	Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Revised Schedule for Response to NRC Environmental Request for Additional Information Letter 1104071 (RAI 5588), Environmental Standard Review Plan Section 9.3.1, Alternative Site Selection Process (ML11194A007).
July 27, 2011	Letter from NRC to Mr. M. Nazar, FPL, Environmental Request for Additional Information Letter 1107271 Related to ESRP Section 5.2, Water Related Impacts, for the Combined License Application Review for Turkey Point Units 6 and 7 (ML112081475).
July 28, 2011	Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 2011001 (RAI 5770), Environmental Standard Review Plan Section 9.4, System Design Alternatives (ML11213A095).
July 29, 2011	Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 110614 (RAI 5764), Environmental Standard Review Plan Section 3.2.2, Structures with a Major Environmental Interface (ML11214A031).
July 29, 2011	Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 110614 (RAI 5763), Environmental Standard Review Plan Section 2.3, Water (ML11214A032).
August 8, 2011	Letter from Mr. P. Kruger, U.S. Army Corps of Engineers, to Ms. F. Braun, Florida Power & Light Company, Regarding an Alternative to the Western Transmission Line Corridor (ML112690006).
August 17, 2011	Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Revised Schedule for Response to NRC Environmental Request for Additional Information Letter 1104121 (RAI 5589), Environmental Standard Review Plan Section 9.3, Alternative Sites (ML11231A239).

August 30, 2011 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 110614 (RAI 5763), Environmental Standard Review Plan Section 2.3, Water (ML11243A165).

September 1, 2011 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 1104071 (RAI 5588), Environmental Standard Review Plan Section 9.3.1, Alternative Site Selection Process (ML11250A130).

September 2, 2011 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Request for Additional Information RAI 5340 Revision 1 Standard Review Plan Section: EIS USACE – U.S. Army Corps of Engineers for Application Section: 9.3 (ML11250A052).

September 2, 2011 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 1103094 (RAI 5563), Environmental Standard Review Plan Section 9.3 - Alternative Sites (ML11251A209).

September 6, 2011 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 110614 (RAI 5763), Environmental Standard Review Plan Section 2.3, Water (ML11251A168).

September 12, 2011 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 1107271 (RAI 5767), Related to ESRP Section 5.2, Water Related Impacts (ML11257A133).

September 13, 2011 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Revised Schedule for Response to NRC Environmental Request for Additional Information Letter 1104121 (RAI 5589), Environmental Standard Review Plan Section 9.3, Alternative Sites (ML11258A158).

September 13, 2011 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 110614 (RAI 5763), Environmental Standard Review Plan Section 2.3, Water (ML11258A156).

September 13, 2011 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 1104071 (RAI 5588), Environmental Standard Review Plan Section 9.3.1, Alternative Site Selection Process (ML11258A155).

September 30, 2011 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information Letter 1104121 (RAI 5589), Environmental Standard Review Plan Section 9.3, Alternative Sites (ML11276A099).

October 27, 2011 Letter from NRC to Mr. M. Nazar, FPL, Issuance of a Revised Review Schedule for the Combined License Application Review for Turkey Point, Units 6 and 7 (ML111040122).

November 10, 2011 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Environmental Request for Additional Information RAI 5340, Standard Review Plan Section: EIS USACE – US Army Corps of Engineers, Application Section 9.3 (ML113190089).

November 10, 2011 Letter from Mr. W. Maher, FPL, to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Revised Schedule for Response to NRC Environmental Request for Additional Information Letter 110614 (RAI 5763) Environmental Standard Review Plan Section 2.3 - Water (ML11318A323).

December 8, 2011 Letter from NRC to Mr. M. Nazar, FPL Environmental Request for Additional Information Letter 1112081 Related to ESRP Section 4.2. Water-Related Impacts, for the Combined License Application Review for Turkey Point, Units 6 and 7 (ML113420010).

December 14, 2011 Letter from Mr. W. Maher, FPL to NRC eRAI Letter 1112081 Related to ESRP Section 4.2, Water-related Impacts, For the COL application review for Turkey Point, Units 6 and 7 (ML11350A197).

January 23, 2012 Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Request for Additional Information Letter 1112082 (RAI 5769) Related to ESRP Section 9.3 – Alternative Sites (ML12025A266).

January 23, 2012 Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Request for Additional Information Letter 1112081 (RAI 5765) Related to ESRP Section 4.2 – Water-Related Impacts (ML12025A263).

March 7, 2012	Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and 7, Response to NRC Request for Additional Information Letter 110614, ESRP Section 2.3, Water
March 13, 2012	Letter from NRC, NRC to Mr. M.K. Nazar, FPL, Environmental Request for Additional Information Letter 120316 Related to ESRP Section 9.3 -US Army Corps of Engineers, for the Combined License Application Review for Turkey Point, Units 6 and 7 (ML12074A005).
March 21, 2012	Letter from NRC to Mr. M.K. Nazar, FPL, Environmental Request for Additional Information Letter 122103 Related to ESRP Section 5.2, Water Related Impacts for Combined License Application Review for Turkey Point, Units 6 and 7 (ML12081A068).
March 22, 2012	Letter from NRC to Mr. M.K. Nazar, FPL, Environmental Request for Additional Information Letter 122203 Related to Environmental Standard Review Plan Section 7.2, Water Use and Quality, for the Combined License Application Review for Turkey Point, Units 6 and 7 (ML12081A238).
April 3, 2012	Letter from NRC to Mr. M. K. Nazar, FPL, Environmental Request for Additional Information Letter 120329 Related to Environmental Standard Review Plan Section 2.3.1 Hydrology, for the Combined License Application Review for Turkey Point, Units 6 and 7 (ML12089A145).
April 4, 2012	Letter from NRC to Mr. M. Nazar, FPL, Environmental Request for Additional Information Letter 120403 Related to Environmental Standard Review Plan Section 5.8.1 Etiological Agents, for the Combined License Application Review for Turkey Point, Units 6 and 7 (ML1209A302).
April 26. 2012	Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company, Proposed Turkey Point Units 6 and 7, Response to NRC Request for Additional Information Letter 120316 (RAI 6347 Rev.1) Related to ESRP Section 9.3- US Army Corps of Engineers (ML12121A365).
May 4, 2012	Letter from NRC to Mr. M.K Nazar, FPL, Turkey Point Units 6 and 7 Combined License Application Review Schedule (ML120740390).
May 7, 2012	Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and 7, Response Schedule for NRC Request for Additional Information Letter 122103 (RAI 5766 Rev. 2) Related to ESRP Section 5.2 - Water Related Impacts (ML1213A166).

May 10, 2012 — Letter from NRC to Mr. M. Nazar, FPL, Environmental Request for Additional Information Letter 120510 Related to Environmental Standard Review Plan Section 5.2 Water Related Impacts for the Combined License Application Review for Turkey Point, Units 6 and 7 (ML12122A886).

May 11, 2012 — Letter from Mr. M. Nazar, FPL, Florida Power & Light Company, Response to NRC COLA Review Schedule Letter dated May 4, 2012 (ML12156A420).

May 21, 2012 — Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and 7, Response to NRC Request for Additional Information Letter 122103 (RAI 5766 Rev. 2) Related to ESRP Section 5.2 - Water Related Impacts (ML1214A357).

May 21, 2012 — Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and 7, 10 CFR 52.3 Response to NRC Request for Additional Information Letter 120403 (RAI 6350 Rev. 1) Related to ESRP Section 5.8.1 - Etiological Agents (ML12143A356).

June 25, 2012 — Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and 7, 10 CFR 52.3 Response to NRC Request for Additional Information Letter 120510 (RAI 6384 Rev. 1) Related to ESRP Section 5.2 - Water Related Impacts (ML12178A552).

June 25, 2012 — Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and 7, NRC June 2010 Environmental Audit Revised Supplemental Information Request Response 2 Part 2 (ML12178A553).

June 29, 2012 — Letter from Mr. R. Braun, South Florida Water Management District to NRC, Florida Power and Light Combined License Application for Turkey Point Units 6 and 7 – Water Availability at Alternative Sites (ML12191A171).

July 12, 2012 — Notice of Forthcoming Public Teleconference to Discuss the Environmental Review Related to Florida Power and Light's Turkey Point Units 6 and 7, Combined License Application (ML12194A143).

July 18, 2012 — Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and 7, Response to NRC Request for Additional Information Letter 120329, Related to ESRP Section 2.3.1-Hydrology (ML12202A068).

July 30, 2012 — Memorandum, Summary Meeting with South Florida Water Management District Related to the Alternative Sites for the Proposed Turkey Point Units 6 and 7 Environmental Review (ML12205A348).

August 18, 2012 Memorandum, Summary of Meeting with Florida Power and Light to Discuss the Environmental Review Related to Turkey Point Units 6 and 7 Combined License Application – Socioeconomics (ML12221A192).

August 20, 2012 Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and 7, Response to NRC Request for Additional Information Letter 120329, Related to ESRP Section 2.3.1-Hydrology (ML12234A549).

August 30, 2012 Letter from NRC to Mr. M. Nazar, FPL, Environmental Request for Additional Information Letter 120830 Related to Environmental Standard Review Plan Section 9.3.1 Alternative Site Selection, for the Combined License Application Review for Turkey Point, Units 6 and 7 (ML12242A329).

October 17, 2012 Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and 7, Supplemental Response to NRC Request for Additional Information Letter 120329 Related to ESRP Section 2.3.1- Hydrology (ML12293A236).

November 14, 2012 Letter from NRC to Mr. M. Nazar, FPL, Environmental Request for Additional Information Letter 121114 Related to the Environmental Standard Review Plan Section 9.3.1 Alternative Site Selection, for the Combined License Application Review for Turkey Point, Units 6 and 7 (ML12346A225).

November 15, 2012 Notice of Forthcoming Public Meeting to Discuss Environmental Requests for Additional Information Draft Responses Relating to the Alternative Sites Selection Process for Florida Power and Light's Turkey Point Units 6 and 7 Combined License Application (ML12310A157).

December 12, 2012 Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and 7, Response to NRC Request for Additional Information Letter 120830, Related to ESRP Section 9.3.1-Alternative Site Selection (ML12349A243).

January 3, 2013 Memorandum, Summary of the Public Meeting to Discuss Environmental Requests for Additional Information Draft Responses Relating to the Alternative Site Selection Process For Florida Power and Light's Turkey Point Units 6 and 7 Combined License Application (ML12352A203).

January 10, 2013 Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and 7, Response to NRC Request for Additional Information Letter 120830, eRAI 6353 Rev 2, Related to ESRP Section 9.3.1-Alternative Site Selection (ML13011A348).

January 17, 2013	Notice of Forthcoming Public Teleconference to Follow up on Action Items from the December 7, 2012, Public Meeting Relating to the Alternative Sites Selection Process for Florida Power & Light's Turkey Point Units 6 and 7 Combined License Application (ML13002A490).
February 6, 2013	Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and 7, Response to NRC Request for Additional Information Letter 120830, Related to ESRP Section 9.3.1-Alternative Site Selection (ML13039A018).
February 12, 2013	Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and 7, Status of Actions to Address NRC COLA Review Schedule Letter dated May 4, 2012 (ML13044A567).
February 13, 2013	Letter from NRC to Mr. M. Nazar, FPL, Follow-up Questions to Environmental Requests for Additional Information 6353 Question 3 Related to ESRP Section 9.3.1 Alternative Site Selection, for the Combined License Application Review for Turkey Point Units 6 and 7 (ML13042A155).
February 25, 2013	Memorandum, Summary of Public Teleconference to Discuss Environmental Requests for Additional Information Draft Responses Relating to the Alternative Site Selection Process for Florida Power and Light's Turkey Point Units 6 and 7 Combined License Application (ML13051A425).
February 28, 2013	Letter from NRC to Mr. M.K Nazar, FPL, Turkey Point Units 6 and 7 Combined License Application Review of Alternative Sites (ML13036A340).
March 13, 2013	Letter from NRC to Mr. M. Nazar, FPL, Environmental Requests for Additional Information Letter 120316 Related to ESRP Section 9.3-US Army Corps of Engineers, for the Combined License Application Review for Turkey Point Units 6 and 7 (ML12074A005).
March 26, 2013	Letter from Mr. R. Orthen, FPL to NRC Florida Power & Light Company Proposed Turkey Point Units 6 and 7, Supplemental Response to NRC Request for Additional Information Letter 120329, Related to ESRP Section 2.3.1- Hydrology (ML13127A052).
April 2, 2013	Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and 7, Relocation Changes for the Combined License Application, Part 3 Environmental Report, Subsection 3.9, Preconstruction and Construction Activities (ML13093A409).

April 18, 2013	Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and 7, Supplemental Response to NRC Request for Additional Information Letter 120830, Related to ESRP Section 9.3.1- Alternative Site Selection Process (ML13109A431).
May 10, 2013	Notice of Forthcoming Meeting to Discuss Environmental Requests for Additional Information Draft Responses Relating to the Alternative Sites Selection Process for Turkey Point Units 6 and 7 Combined License Application (ML13130A327).
June 19, 2013	Memorandum, Summary of Public Meeting to Discuss the Environmental Review for Florida Power and Light's Turkey Point Units 6 and 7 Combined License Application (ML13158A220).
July 8, 2013	Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and Supplemental Response to NRC Request for Additional Information Letter 120830, Related to ESRP Section 9.3.1- Alternative Site Selection (ML13196A063).
July 8, 2013	Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and Supplemental Response to NRC Request for Additional Information Letter 121114, Related to ESRP Section 9.3.1- Alternative Site Selection (ML13196A064).
September 11, 2013	Letter from Mr. M. Raffenberg, FPL to US Army Corps of Engineers, Regarding Requests for Additional Information for a Department of the Army Permit, Assigned Number SAJ-2009-02417, Turkey Point Units 6 and 7 Project (ML15037A237).
October 9, 2013	Letter from NRC to Mr. M. Nazar, FPL, Environmental Request for Additional Information Letter 131009 Related to the Environmental Standard Review Plan Section 9.3.1 Alternative Site Selection, for the Combined License Application Review for Turkey Point, Units 6 and 7 (ML13280A543).
November 1, 2013	Notice of Forthcoming Public Meeting to Discuss the Alternative Sites Selection Analysis for Florida Power and Light's Turkey Point Units 6 and 7 Combined License Application (ML13301A630).
November 25, 2013	Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and 7, Response to NRC Request for Additional Information Letter 131009, Related to ESRP Section 9.3- Alternative Site Selection Process (ML13330B668).
December 13, 2013	Memorandum, Summary of Public Meeting Discussing the Alternative Sites Selection Process for Florida Power and Light's Turkey Point Units 6 and 7 Combined License Application (ML13343A323).

April 17, 2014 Letter from NRC to Mr. M.K Nazar, FPL, Turkey Point Units 6 and 7 Combined License Application Environmental Review of Alternative Sites and Schedule Updates (ML14065A577).

June 4, 2014 Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and 7, Supplemental Response to NRC Request for Additional Information Letter No. 72, Liquid Waste Management Systems (ML14156A393).

June 12, 2014 Notice of Forthcoming Public Teleconference to Discuss Potential Construction Noise Impacts to Aquatic Ecology Relating to the Florida Power and Light Turkey Point Units 6 and 7 Combine License Application (ML14163A426).

June 18, 2014 Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and 7, Supplemental Response to NRC Request for Additional Letter No .080, Related to SRP Section 20.01.03 Population Density (ML14188C484).

July 22, 2014 Memorandum, Summary of the June 23, 2014, Public Teleconference to Discuss Potential Aquatic Ecology Construction Impacts as a Result of the Florida Power and Light's turkey Point Units 6 and 7 Combined License Application (ML14211A534).

August 12, 2014 Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and 7, Construction Noise and Vibration Aquatic Impacts Assessment Report for the Combined License Application Part 3, Environmental Report (ML14226A013).

October 22, 2014 Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and 7, Supplemental Response to NRC Request for Additional Information Letter No. 031, Standard Review Plan Section 12.03-12.04, Radiation Protection Design Features (ML14303A671).

November 14, 2014 Memorandum, Supplemental Site Audit Summary Related to the Environmental Review of the Proposed Turkey Point Nuclear Power Plant Units 6 and 7 (ML14311A792).

February 25, 2015 Letter from NRC to Mr. L. Williams, U.S. Fish and Wildlife Service, Request for Comments on the Draft Environmental Impact Statement and Biological Assessment for Turkey Point Nuclear Plant Units 6 and 7 (ML15049A309).

February 25, 2015	Letter from NRC to Mr. R. Neslon, Advisory Council on Historic Preservation, Notification of the Issuance of the Draft Environmental Impact Statement for the Turkey Point Nuclear Plant Units 6 and 7 (ML15049A317).
February 25, 2015	Letter from NRC to Mr. M. Nazar, Florida Power & Light Company, Notice of Availability of the Draft Environmental Impact Statement for Turkey Point Nuclear Plant Units 6 and 7 (ML15049A302).
February 25, 2015	Letter from NRC to Mr. M. Croom, U.S. National Marine Fisheries Services, Request for Comments on the Draft Environmental Impact Statement, Essential Fish Habitat, and Biological Assessment for the Turkey Point Nuclear Plant Units 6 and 7 (ML15049319).
February 26, 2015	Letter from NRC to Mr. H. Mueller, U.S. Environmental Protection Agency, Notification of the Issuance of the Draft Environmental Impact Statement for the Turkey Point Nuclear Plant Units 6 and 7 (ML15049A313).
March 5, 2015	NRC Federal Register Notice, Florida Power and Light Company, Combined License Application for Turkey Point Nuclear Power Plant, Units 6 and 7 Draft Environmental Impact Statement Request for Comments (ML15049A320).
March 6, 2015	Environmental Protection Agency (EPA) Federal Register Notice, Florida Power & Light Company, Combined License Application for Turkey Point Nuclear Power Plant, Units 6 and 7 Draft Environmental Impact Statement Request for Comments 80 FR 12173.
March 16, 2015	Letter from NRC to Dr. T. Parsons, Compliance and Review, Notification of the Issuance of the Draft Environmental Impact Statement for the Turkey Point Nuclear Plant Units 6 and 7 (ML15065A208).
March 16, 2015	Letter from NRC to Mr. F. Dayhoff, Miccosukee Tribe of Indians of Florida Notification of the Issuance of the Draft Environmental Impact Statement for the Turkey Point Nuclear Plant Units 6 and 7 (ML15065A305).
March 16, 2015	Letter from NRC to Mr. E. Spain, Muscogee (Creek) Nation, Notification of the Issuance of the Draft Environmental Impact Statement for the Turkey Point Nuclear Plant Units 6 and 7 (ML15065A322).
March 16, 2015	Letter from NRC to Mr. R. Thrower, Poarch Band of Creek Indians, Notification of the Issuance of the Draft Environmental Impact Statement for the Turkey Point Nuclear Plant Units 6 and 7 (ML15065A330).
March 16, 2015	Letter from NRC to Ms. N. Harjo, Seminole Nation of Oklahoma, Notification of the Issuance of the Draft Environmental Impact Statement for the Turkey Point Nuclear Plant Units 6 and 7 (ML15065A365).

March 16, 2015	Letter from NRC to Dr. P. Backhouse, Seminole Tribe of Florida Notification of the Issuance of the Draft Environmental Impact Statement for the Turkey Point Nuclear Plant Units 6 and 7 (ML15065A366).
March 16, 2015	Letter from NRC to Mr. R. Carr, Archeological and Historical Conservancy, Inc., Notification of the Issuance of the Draft Environmental Impact Statement for the Turkey Point Nuclear Plant Units 6 and 7 (ML15069A578).
March 16, 2015	Letter from NRC to Mr. R. Bendus, State Historic Preservation Officer, Notification of the Issuance of the Draft Environmental Impact Statement for the Turkey Point Nuclear Plant Units 6 and 7 (ML15069A558).
March 16, 2015	Letter from NRC to Ms. M. Schmitt, Preservation Officer, City of Miami, Notification of the Issuance of the Draft Environmental Impact Statement for the Turkey Point Nuclear Plant Units 6 and 7 (ML15065A182).
March 16, 2015	Letter from NRC to Ms. K. Kauffman, Office of Historic Preservation, Notification of the Issuance of the Draft Environmental Impact Statement for the Turkey Point Nuclear Plant Units 6 and 7 (ML15065A261).
March 17, 2015	Letter from NRC to Mr. R. Ammirato, Homestead Community Redevelopment Agency, Notification of the Issuance of the Draft Environmental Impact Statement for the Turkey Point Nuclear Plant Units 6 and 7 (ML15076A291).
March 17, 2015	Letter from NRC to Ms. D. Spain, Historic Preservation Administrator, Notification of the Issuance of the Draft Environmental Impact Statement for the Turkey Point Nuclear Plant Units 6 and 7 (ML15065A363).
March 17, 2015	Letter from NRC to Mr. C. Brimo, City of South Miami, Notification of the Issuance of the Draft Environmental Impact Statement for the Turkey Point Nuclear Plant Units 6 and 7 (ML15076A244).
April 27, 2015	Email from Seminole Tribe of Florida to U.S. Army Corps of Engineers Regarding Seminole Tribe of Florida Request to Extend Turkey Point Comment Period on the Draft Environmental Impact Statement (ML15153A255).
May 14, 2015	Email from National Park Service to NRC Requesting NRC to Extend Turkey Point Comment Period on the Draft Environmental Impact Statement (ML15153A234).
May 14, 2015	Email from U.S. Environmental Protection Agency Requesting NRC to Extend Turkey Point Comment Period on the Draft Environmental Impact Statement (ML15153A227).

June 23, 2015	Summary of the June 23, 2015, U.S. Army Corps of Engineers, and the NRC Meeting with Seminole Tribe of Florida to Discuss Turkey Point National Historic Preservation Act Section 106 Consultation (ML16266A254).
June 24, 2015	Summary of the June 24, 2015, U.S. Army Corps of Engineers, and the NRC Meeting with Miccosukee Tribe of Indians of Florida to Discuss Turkey Point National Historic Preservation Act Section 106 Consultation (ML16266A255).
August 20, 2015	Memorandum, Summary of Public Meeting Conducted for the Draft Environmental Impact Statement for the Turkey Point Units 6 and 7 Combined License Application (ML15219A261).
October 5, 2015	Letter from Mr. B. M. Mueller, Seminole Tribe of Florida Tribal Historic Preservation Officer, to Ms. M. Clouser, U.S. Army Corps of Engineers, Related to Transmission Line Corridors for the Combined License Application Review for Turkey Point, Units 6 and 7 (ML15289A368).
November 2, 2015	Letter from NRC to Mr. M. Nazar, FPL Environmental Request for Additional Information Letter 150211 Related to Aquatic and Terrestrial Ecology and Hydrology/Groundwater, for the Combined License Application Review for Turkey Point, Units 6 and 7 (ML15307A160).
December 17, 2015	Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and 7, Partial Response to NRC Request for Additional Information Letter No. 150211, Related to Hydrology/Ground Water (ML15364A408).
January 25, 2016	Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and 7, Supplemental Response to NRC Request for Additional Information Letter No. 150211, Related to Hydrology/Ground Water (ML16028A121).
February 3, 2016	Letter from NRC to Mr. M. Nazar, FPL Environmental Request for Additional Information Letter 160302 Related to Radioactive Waste-Management Systems and Meteorology and Air Quality, for the Combined License Application Review for Turkey Point, Units 6 and 7 (ML16033A453).
February 22, 2016	Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and 7, Response to NRC Request for Additional Information Letter 160302, Related to Radioactive Waste Management Systems (ML16061A223).

February 29, 2016	Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and 7, Response to NRC Request for Additional Information Letter 160302, Related to Meteorology and Air Quality (ML16062A035).
March 7, 2016	Letter from Mr. I. Gilbert, U.S. Army of Corps of Engineers to Mr. F. Dayhoff, Miccosukee Tribe of Indians of Florida Tribal Historic Preservation Officer, Related to Consultation and Coordination for the Combined License Application Review for Turkey Point, Units 6 and 7 (ML16172A120).
March 7, 2016	Letter from Mr. W. Maher, FPL to NRC, Florida Power & Light Company Proposed Turkey Point Units 6 and 7, Partial Response to NRC Request for Additional Information Letter 150211, Related to Hydrology/Ground Water (ML16071A005).
March 31. 2016	Letter from Mr. M. Raffenberg, FPL to Ms. M. Clouser, U.S. Army Corps of Engineers, Related to Transmission Line Corridors for the Combined License Application Review for Turkey Point, Units 6 and 7 (ML16095A127).
August 2, 2016	Letter from Mr. B. M. Mueller, Seminole Tribe of Florida Tribal Historic Preservation Officer, to Ms. M. Clouser, U.S. Army Corps of Engineers, Related to Cultural Resources for the Combined License Application Review for Turkey Point, Units 6 and 7 (ML16266A253).
September 28, 2016	Letter from NRC to Mr. L. Williams, U.S. Fish and Wildlife Service, Response to Comments Received on the Biological Assessment for the Proposed Turkey Point Units 6 and 7 (ML16237A312).
October 27, 2016	Supplemental Site Audit Trip Report Related to the Environmental Review of the Proposed Turkey Point Units 6 and 7 (ML16280A339).

APPENDIX D

SCOPING COMMENTS AND RESPONSES

APPENDIX D

SCOPING COMMENTS AND RESPONSES

On June 15, 2010, the U.S. Nuclear Regulatory Commission (NRC) published a Notice of Intent to Prepare an Environmental Impact Statement and Conduct Scoping Process in the *Federal Register* (75 FR 33851) (TN511). The Notice of Intent notified the public of the staff's intent to prepare an environmental impact statement (EIS) and conduct scoping for the applications for combined construction permits and operating licenses (COLs) received from Florida Power & Light Company (FPL) for two units, identified as Units 6 and 7, to be located at the Turkey Point site. The Turkey Point Nuclear Generating Station site is located approximately 4.5 mi east of Homestead Florida and approximately 25 mi south of the City of Miami, Florida. The NRC invited the applicant; Federal, Tribal, State, and local government agencies; local organizations; and individuals to participate in the scoping process by providing oral comments at the scheduled public meeting and/or submitting written suggestions and comments no later than August 16, 2010.

D.1 Overview of the Scoping Process

The scoping process provides an opportunity for public participants to identify issues to be addressed in the EIS and highlight public concerns and issues. The Notice of Intent identified the following objectives of the scoping process:

- Define the proposed action that is to be the subject of the EIS.
- Determine the scope of the EIS and identify significant issues to be analyzed in depth.
- Identify and eliminate from detailed study those issues that are peripheral or that are not significant.
- Identify any environmental assessments and other EISs that are being prepared or will be prepared that are related to, but not part of, the scope of the EIS being considered.
- Identify other environmental review and consultation requirements related to the proposed action.
- Identify parties consulting with the NRC under the National Historic Preservation Act, as set forth in Title 36 of the Code of Federal Regulations (CFR) 800.8(c)(1)(i) (TN513).
- Indicate the relationship between the timing of the preparation of the environmental analyses and the Commission's tentative planning and decision-making schedule.
- Identify any cooperating agencies and, as appropriate, allocate assignments for preparation and schedules for completing the EIS to the NRC and any cooperating agencies.
- Describe how the EIS will be prepared and include any contractor assistance to be used.

Two public scoping meetings were held at the Homestead Young Men's Christian Association facility located at 1034 Northeast 8th Street, Homestead, Florida, on July 15, 2010. Approximately 150 to 200 people attended each scoping meeting session. The scoping

meetings began with NRC staff members providing a brief overview of NRC's review process for COL applications and the National Environmental Policy Act of 1969, as amended (NEPA) process (42 USC 4321 et seq.) (TN661). In addition, a representative of the U.S. Army Corps of Engineers (USACE) discussed the USACE regulatory role and authority and permitting decisions. After the NRC's and USACE's prepared statements, the meeting was opened for public comments. Forty six attendees provided either written statements or oral comments that were recorded and transcribed by a certified court reporter. In addition to the oral and written statements provided at the public scoping meetings, 10 letters and 32 emails were received during the scoping period.

Transcripts for both the afternoon and evening scoping meetings can be found in the NRC Agencywide Documents Access and Management System (ADAMS) under accession numbers ML102150591 (NRC 2010-TN518) and ML102150597 (NRC 2010-TN519), respectively. ADAMS is accessible from the NRC website at http://www.nrc.gov/reading-rm/adams.html#web-based-adams (in the Public Electronic Reading Room; note: the URL is case-sensitive). Additional comments received later in letters or emails are also available. A meeting summary memorandum (ML102170529, NRC 2010-TN514) was issued August 31, 2010.

At the conclusion of the scoping period, the NRC staff reviewed the scoping meeting transcripts and all written material received during the comment period and identified individual comments. These comments were organized according to topic within the proposed EIS or according to the general topic if they were outside the scope of the EIS. Once comments were grouped according to subject area, the staff determined the appropriate response for the comment. The staff made a determination on each comment that it was one of the following:

- a comment that was actually a question and introduced no new information
- a comment that was either related to support or opposition of combined licensing in general (or specifically the Turkey Point COL) or made a general statement about the COL process. In addition, it provided no new information and did not pertain to 10 CFR Part 52 (TN251).
- a comment about an environmental issue that
  - provided new information that would require evaluation during the review
  - provided no new information.
- a comment that was outside the scope of the COL, which included, but was not limited to
  - a comment about the safety record of the applicant.

Preparation of the EIS has taken into account the relevant issues raised during the scoping process. The comments received on the draft EIS will be considered in the preparation of the final EIS. The final EIS, along with the staff's Safety Evaluation Report (SER), will provide much of the basis for the NRC's decision on whether to grant the Turkey Point COLs.

The comments related to this environmental review are included in this appendix. They were extracted from the *Turkey Point Nuclear Plant Combined License Scoping Summary Report* (ML103130610 [NRC 2010-TN515] and ML103130612 [NRC 2010-TN516]) and are provided for the convenience of those interested specifically in the scoping comments applicable to this

environmental review. The comments that are outside the scope of the environmental review for the proposed Turkey Point site are not included in this appendix. These include comments related to the following:

- safety
- emergency preparedness
- NRC oversight for operating plants
- security and terrorism
- support or opposition to the licensing action, licensing process, nuclear power, hearing process, or the applicant.

More detail regarding the disposition of general or out-of-scope comments can be found in the Scoping Summary Report. To maintain consistency with the Scoping Summary Report, the comment source identification (ID) and comment number along with the name of the commenter used in that report are retained in this appendix.

Table D-1 identifies, in alphabetical order, the individuals who provided comments during the scoping period, their affiliation (if given), and the ADAMS accession number that can be used to locate the correspondence. Although all commenters are listed, the comments presented in this appendix are limited to those within the scope of the environmental review. Table D-2 lists the comment categories in alphabetical order and commenter names and comment numbers for each category. Table D-3 lists the comment categories in the order they are presented in this appendix. The balance of this appendix presents the comments themselves with NRC staff responses organized by topic category.

Table D-1. Individuals Providing Comments During the Scoping Comment Period

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID
Anonymous		Letter (ML102100532)	0011
Accursio, James	Capri Restaurant, Inc.	Meeting Transcript (ML102090730)	0003-4
Alexander, William	Latin Chamber of Commerce	Meeting Transcript (ML102150597)	0002-10
Amor, Valerie		Meeting Transcript (ML102150591)	0001-11
Bass, Ken		Email (ML102000006)	0005
Burris, Jessica		Email (ML102000003)	0007
Cornick, Lance	National Parks Conservation Association	Meeting Transcript (ML102150591)	0001-15
Croom, Miles	NOAA	Email (ML102320025)	0033
Daley, Dennis	Self	Meeting Transcript (ML102150591)	0001-20
De Villiers, Elena	Self	Letter (ML102370766)	0031

Table D-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID
del Cid, Victor	Self	Meeting Transcript (ML102150597)	0002-4
Diggs, Bill	Miami-Dade Chamber of Commerce	Meeting Transcript (ML102150591)	0001-17
DiNuzzo, Laura	Self	Email (ML102310004)	0028
Eney, Douglas	Self	Meeting Transcript (ML102150597)	0002-17
Espinosa, Carlos	Department of Environmental Resources Management	Letter (ML102370765)	0015
Fessler, Greg	Self	Meeting Transcript (ML102150591)	0001-28
Finlan, Mary	Great Homestead/Florida City Chamber of Commerce	Meeting Transcript (ML102150597)	0002-15
Flinn, Eugene	Village of Palmetto Bay	Meeting Transcript (ML102150591)	0001-22
Garcia, Maria	Self	Meeting Transcript (ML102150591)	0001-27
Garcia, Preston		Email (ML102000004)	0008
Golden, James	Self	Letter (ML102370759)	0032
Grosso, Richard	Everglades Law Center	Meeting Transcript (ML102150597)	0002-6
Guendelsberger, Debra	Self	Letter (ML102300037)	0029
Gustave, Unito	Board of County Commissioners, Miami-Dade County	Meeting Transcript (ML102150591)	0001-26
Hamilton, Karen	Self	Email (ML102280577)	0019
Hancock, Mandy	Southern Alliance for Clean Energy	Meeting Transcript (ML102150591)	0001-14
Hancock, Mandy	Southern Alliance for Clean Energy	Meeting Transcript (ML102150597)	0002-18
Harris, Walter	South Miami	Meeting Transcript (ML102150591)	0001-2
Harum-Alvarez, Albert	Self	Meeting Transcript (ML102150591)	0001-24
Hogsed, Daniel		Email (ML102000002)	0009
Horton, Richard	Economic Development Council, South Miami-Dade	Meeting Transcript (ML102150591)	0001-25
Jacobs, Jeanne	Miami-Dade College Homestead	Meeting Transcript (ML102150591)	0001-4
Johnson, Barry	Greater Miami Chamber of Commerce	Meeting Transcript (ML102150591)	0001-5

Table D-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID
Johnson, Michael	Florida Carpenter's Regional Council	Meeting Transcript (ML102150591)	0001-8
Kammerer, Laura	Florida Division of Historical Resources	Letter (ML102220345)	0013
Kauffman, Kathleen	Miami-Dade County Department of Planning and Zoning	Email (ML102290548)	0026
Kiley, Mike	Turkey Point	Meeting Transcript (ML102150591)	0001-3
Kiley, Mike	Turkey Point	Meeting Transcript (ML102150597)	0002-5
Kimball, Dan	National Park Service	Email (ML102290549)	0025
Kipnis, Daniel	Self	Email (ML102320036)	0034
LaFerrier, Marc		Email (ML102290222)	0023
Landeta, Hector		Meeting Transcript (ML102150591)	0001-18
Lee, Nancy		Email (ML102070008)	0010
Lee, Nancy	Urban Environment League	Meeting Transcript (ML102150591)	0001-12
Lerner, Cindy	Village of Pinecrest	Meeting Transcript (ML102150591)	0001-21
Lewis, Mark	National Park Service	Email (ML102290549)	0025
MacLaren, Kaitlin	Tropical Audubon Society	Meeting Transcript (ML102150591)	0001-7
Marinelli, Francis J.	Self	Meeting Transcript (ML102150591)	0001-10
Martinelli, Tom	Clean and Safe Energy Coalition	Meeting Transcript (ML102150591)	0001-9
Martinelli, Tom	Clean and Safe Energy Coalition	Meeting Transcript (ML102150597)	0002-9
McHugh, John	Self	Meeting Transcript (ML102150597)	0002-12
Meerbott, Tim	Cutler Bay	Meeting Transcript (ML102150597)	0002-2
Miller, Lloyd		Meeting Transcript (ML102150591)	0001-6
Moses, Dorothy	Self	Email (ML102300015)	0027
Mueller, Heinz	EPA	Letter (ML102250207)	0014
Mulkey, Cindy	Self	Email (ML102280580)	0020
O'Katy, Jessica	Self	Meeting Transcript (ML102150597)	0002-8
Payne, Nkenga	City of South Miami	Letter (ML102160400)	0012

Table D-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID
Poole, Mary Ann	Florida Fish and Wildlife Conservation Commission	Email (ML102280488)	0018
Reynolds, Laura	Self	Email (ML102290221)	0022
Roff, Rhonda		Meeting Transcript (ML102150597)	0002-11
Ryan, Megan	Self	Meeting Transcript (ML102150591)	0001-19
Schwartz, Matthew	Broward Group of the Sierra Club	Meeting Transcript (ML102150597)	0002-14
Shlackman, Mara	Self	Meeting Transcript (ML102150597)	0002-16
Showen, Steve	Citizens Alliance for Safe Energy	Meeting Transcript (ML102150591)	0001-16
Simpson, Roce	South Florida Building and Construction Trades and International Brotherhood of Electrical Workers,	Meeting Transcript (ML102150597)	0002-13
Singer, Craig		Email (ML102000005)	0004
Smilan, Stan	Self	Meeting Transcript (ML102150591)	0001-13
Snelson, Richard	Self	Meeting Transcript (ML102150597)	0002-7
Sorenson, Katy	Self	Meeting Transcript (ML102150597)	0002-1
Troner, Susannah	Self	Email (ML102280487)	0017
Vrooman, Paul	Cutler Bay	Meeting Transcript (ML102150591)	0001-23
Walker, Tom	Florida Keys Aqueduct Authority	Email (ML102290224)	0024
Walker, Tom	Florida Keys Aqueduct Authority	Meeting Transcript (ML102150597)	0002-3
Wallace, Otis	Florida City	Meeting Transcript (ML102150591)	0001-1
Weins, Brian		Email (ML102000007)	0006
White, Barry	Citizens Allied for Safe Energy, Inc.	Email (ML102280490)	0016
White, Barry	Citizens Allied for Safe Energy, Inc.	Meeting Transcript (ML102090730)	0003-2
Wilansky, Laura	Self	Email (ML102290220)	0021

Table D-2. Comment Categories with Associated Commenters and Comment IDs

Comment Category	Commenter (Comment ID)
Accidents-Severe	• Hancock, Mandy (0001-14-9)
Alternatives-Energy	• Amor, Valerie (0001-11-7) (0001-11-8) (0001-11-11) • Burris, Jessica (0007-7) • De Villiers, Elena (0031-6) • DiNuzzo, Laura (0028-3) (0028-4) (0028-6) • Finlan, Mary (0002-15-4) • Guendelsberger, Debra (0029-2) • Hancock, Mandy (0001-14-3) (0001-14-4) (0001-14-7) (0002-18-3) • Harum-Alvarez, Albert (0001-24-4) • Hogsed, Daniel (0009-2) (0009-4) • Kiley, Mike (0001-3-3) • Lerner, Cindy (0001-21-5) • Mueller, Heinz (0014-16) • O'Katy, Jessica (0002-8-3) (0002-8-9) • Payne, Nkenga (0012-2) (0012-15) (0012-18) • Ryan, Megan (0001-19-4) • Schwartz, Matthew (0002-14-3) • Shlackman, Mara (0002-16-4) • Showen, Steve (0001-16-8) • Smilan, Stan (0001-13-8) • Sorenson, Katy (0002-1-4) • Troner, Susannah (0017-3) (0017-5) • Weins, Brian (0006-4) • White, Barry (0016-12) • Wilansky, Laura (0021-12) (0021-20)
Alternatives-Sites	• Cornick, Lance (0001-15-1) • Kimball, Dan (0025-1-6) (0025-1-7) (0025-1-8) (0025-1-9) (0025-1-10) • Lerner, Cindy (0001-21-6) • Lewis, Mark (0025-1-6) (0025-1-7) (0025-1-8) (0025-1-9) (0025-1-10) • Meerbott, Tim (0002-2-1) • Miller, Lloyd (0001-6-9) • Moses, Dorothy (0027-2) • Ryan, Megan (0001-19-3) • Sorenson, Katy (0002-1-1)
Alternatives-System Design	• Kimball, Dan (0025-2-12) (0025-3-22) (0025-3-47) • LaFerrier, Marc (0023-1-25) (0023-1-49) (0023-2-7) (0023-3-48) • Lewis, Mark (0025-2-12) (0025-3-22) (0025-3-47) • Poole, Mary Ann (0018-9) (0018-14)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
Benefit-Cost Balance	• De Villiers, Elena (0031-4) • Grosso, Richard (0002-6-8) • Hamilton, Karen (0019-8) (0019-11) • Hancock, Mandy (0001-14-2) • Harum-Alvarez, Albert (0001-24-1) (0001-24-3) • Payne, Nkenga (0012-14) • Reynolds, Laura (0022-2-10) (0022-3-16) • Ryan, Megan (0001-19-5) • Showen, Steve (0001-16-5) (0001-16-6) • Singer, Craig (0004-2) • Troner, Susannah (0017-1) • White, Barry (0003-2-2) (0016-7) • Wilansky, Laura (0021-15) (0021-18)
Cumulative Impacts	• Espinosa, Carlos (0015-5) • Golden, James (0032-28) • Hamilton, Karen (0019-3) • Harris, Walter (0001-2-3) • Kimball, Dan (0025-1-12) (0025-1-15) (0025-2-13) • Kipnis, Daniel (0034-1) (0034-2) (0034-3) (0034-4) (0034-5) • LaFerrier, Marc (0023-1-10) • Lerner, Cindy (0001-21-3) • Lewis, Mark (0025-1-12) (0025-1-15) (0025-2-13) • MacLaren, Kaitlin (0001-7-1) (0001-7-2) (0001-7-4) (0001-7-8) (0001-7-9) • Miller, Lloyd (0001-6-5) • Mueller, Heinz (0014-7) (0014-14) • Payne, Nkenga (0012-6) (0012-9) • Reynolds, Laura (0022-1-9) (0022-2-17) (0022-4-17) • Shlackman, Mara (0002-16-1) (0002-16-2) • Sorenson, Katy (0002-1-2) • White, Barry (0016-5) (0016-6) (0016-14) • Wilansky, Laura (0021-4)
Decommissioning	• Reynolds, Laura (0022-4-14) • Wilansky, Laura (0021-6)
Ecology-Aquatic	• Amor, Valerie (0001-11-10) • Croom, Miles (0033-1) (0033-2) (0033-3) (0033-4) (0033-7) (0033-9) (0033-10) • Golden, James (0032-9) • Grosso, Richard (0002-6-7) • Kimball, Dan (0025-1-11) (0025-1-14) (0025-3-17) (0025-3-18) (0025-3-19) (0025-3-29) (0025-3-30) • LaFerrier, Marc (0023-1-18) (0023-1-36) (0023-1-64) (0023-2-14) (0023-2-15)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
	• Lewis, Mark (0025-1-11) (0025-1-14) (0025-3-17) (0025-3-18) (0025-3-19) (0025-3-29) (0025-3-30) • Mulkey, Cindy (0020-2) • Poole, Mary Ann (0018-2) (0018-4) (0018-6) (0018-8) (0018-10) • Reynolds, Laura (0022-2-6) (0022-2-7) (0022-3-1) (0022-3-18) (0022-3-21)
Ecology-Terrestrial	• Amor, Valerie (0001-11-3) • Burris, Jessica (0007-1) (0007-3) • Croom, Miles (0033-11) • Espinosa, Carlos (0015-3) (0015-4) • Garcia, Preston (0008-2) • Golden, James (0032-12) (0032-14) (0032-16) (0032-17) (0032-19) (0032-25) (0032-27) (0032-35) (0032-36) • Grosso, Richard (0002-6-5) • Kimball, Dan (0025-2-6) (0025-2-11) (0025-2-18) (0025-3-31) (0025-3-32) (0025-3-33) (0025-3-34) (0025-3-43) • LaFerrier, Marc (0023-1-17) (0023-1-19) (0023-1-22) (0023-1-46) (0023-1-50) (0023-1-62) (0023-1-63) (0023-1-71) (0023-2-5) (0023-2-8) (0023-2-9) (0023-2-10) (0023-2-11) (0023-2-12) (0023-2-13) (0023-2-16) (0023-2-17) (0023-2-30) (0023-2-31) (0023-2-32) (0023-3-18) (0023-3-22) (0023-3-23) (0023-3-24) (0023-3-25) (0023-3-51) (0023-3-53) (0023-3-69) (0023-4-5) (0023-4-9) (0023-4-14) (0023-4-15) (0023-4-16) (0023-4-18) (0023-4-20) • Lewis, Mark (0025-2-6) (0025-2-11) (0025-2-18) (0025-3-31) (0025-3-32) (0025-3-33) (0025-3-34) (0025-3-43) • MacLaren, Kaitlin (0001-7-3) • Miller, Lloyd (0001-6-4) • Mueller, Heinz (0014-10) (0014-15) (0014-17) (0014-18) • Payne, Nkenga (0012-7) • Poole, Mary Ann (0018-3) (0018-5) (0018-16) • Reynolds, Laura (0022-1-16) (0022-1-17) (0022-1-19) (0022-2-3) (0022-2-21) • Schwartz, Matthew (0002-14-10) • Simpson, Roce (0002-13-7)
Geology	• Reynolds, Laura (0022-1-14)
Health-Nonradiological	• Burris, Jessica (0007-4) • De Villiers, Elena (0031-3) • Hamilton, Karen (0019-6) • Kimball, Dan (0025-3-28) • LaFerrier, Marc (0023-1-11) (0023-3-35) • Lewis, Mark (0025-3-28) • O'Katy, Jessica (0002-8-6) • Reynolds, Laura (0022-1-15) (0022-1-18) (0022-1-20) (0022-2-2) • Schwartz, Matthew (0002-14-7)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
	• White, Barry (0003-2-1) (0016-3)
Health-Radiological	• , Anonymous (0011-1) • Burris, Jessica (0007-5) • O'Katy, Jessica (0002-8-8) • Payne, Nkenga (0012-8) • Reynolds, Laura (0022-4-8) (0022-4-10) (0022-4-11) (0022-4-12) (0022-4-15) • Showen, Steve (0001-16-3) (0001-16-4) • Smilan, Stan (0001-13-6) • Walker, Tom (0002-3-7) (0024-4) • Wilansky, Laura (0021-9) (0021-14) (0021-19)
Historic and Cultural Resources	• Kammerer, Laura (0013-1) • Kauffman, Kathleen (0026-1) (0026-2) • Kimball, Dan (0025-3-41) • LaFerrier, Marc (0023-2-1) (0023-3-32) (0023-3-33) • Lewis, Mark (0025-3-41)
Hydrology-Groundwater	• Croom, Miles (0033-5) (0033-6) (0033-8) • De Villiers, Elena (0031-7) • DiNuzzo, Laura (0028-2) • Espinosa, Carlos (0015-2) • Golden, James (0032-7) (0032-8) (0032-11) (0032-29) (0032-30) (0032-31) (0032-32) • Grosso, Richard (0002-6-9) • Kimball, Dan (0025-1-4) (0025-1-5) (0025-1-13) (0025-2-1) (0025-3-1) (0025-3-2) (0025-3-3) (0025-3-4) (0025-3-5) (0025-3-6) (0025-3-7) (0025-3-8) (0025-3-9) (0025-3-10) (0025-3-11) (0025-3-12) (0025-3-13) (0025-3-14) (0025-3-16) (0025-3-21) • LaFerrier, Marc (0023-1-1) (0023-1-2) (0023-1-3) (0023-1-4) (0023-1-7) (0023-1-9) (0023-1-14) (0023-1-15) (0023-1-29) (0023-1-31) (0023-1-32) (0023-1-33) (0023-1-34) (0023-1-35) (0023-1-37) (0023-1-38) (0023-1-39) (0023-1-40) (0023-1-41) (0023-1-42) (0023-1-44) (0023-1-47) (0023-1-66) (0023-1-67) (0023-1-68) (0023-1-70) (0023-3-13) (0023-3-38) (0023-3-40) (0023-3-47) (0023-4-10) • Lerner, Cindy (0001-21-2) • Lewis, Mark (0025-1-4) (0025-1-5) (0025-1-13) (0025-2-1) (0025-3-1) (0025-3-2) (0025-3-3) (0025-3-4) (0025-3-5) (0025-3-6) (0025-3-7) (0025-3-8) (0025-3-9) (0025-3-10) (0025-3-11) (0025-3-12) (0025-3-13) (0025-3-14) (0025-3-16) (0025-3-21) • MacLaren, Kaitlin (0001-7-10) • McHugh, John (0002-12-1) (0002-12-6) (0002-12-9) (0002-12-10) • Miller, Lloyd (0001-6-3) (0001-6-6) • Moses, Dorothy (0027-6) (0027-7) • Mueller, Heinz (0014-5) (0014-6) • Mulkey, Cindy (0020-1)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
	• O'Katy, Jessica (0002-8-4) • Poole, Mary Ann (0018-1) • Reynolds, Laura (0022-1-1) (0022-1-21) (0022-2-8) (0022-2-9) (0022-2-13) (0022-2-20) (0022-3-2) (0022-3-3) (0022-3-8) (0022-3-9) (0022-4-6) (0022-4-7) • Walker, Tom (0002-3-1) (0002-3-2) (0002-3-3) (0002-3-5) (0024-1) (0024-2) (0024-3) (0024-5) (0024-6) • White, Barry (0016-8)
Hydrology-Surface Water	• Burris, Jessica (0007-6) • Cornick, Lance (0001-15-2) (0001-15-3) • Croom, Miles (0033-12) (0033-13) • Eney, Douglas (0002-17-6) • Espinosa, Carlos (0015-6) • Golden, James (0032-2) (0032-3) (0032-4) (0032-5) (0032-6) (0032-10) (0032-13) (0032-23) (0032-26) (0032-34) • Grosso, Richard (0002-6-1) (0002-6-2) • Hancock, Mandy (0001-14-6) • Kimball, Dan (0025-2-4) (0025-2-15) (0025-2-17) (0025-3-15) (0025-3-35) (0025-3-36) • LaFerrier, Marc (0023-1-13) (0023-1-48) (0023-2-20) (0023-3-26) (0023-3-27) (0023-3-39) (0023-3-43) (0023-3-59) (0023-3-60) (0023-4-1) (0023-4-11) • Lewis, Mark (0025-2-4) (0025-2-15) (0025-2-17) (0025-3-15) (0025-3-35) (0025-3-36) • McHugh, John (0002-12-4) • Meerbott, Tim (0002-2-3) • Moses, Dorothy (0027-5) • O'Katy, Jessica (0002-8-5) • Payne, Nkenga (0012-10) • Poole, Mary Ann (0018-7) (0018-11) (0018-12) • Reynolds, Laura (0022-1-4) (0022-1-8) (0022-2-19) • Ryan, Megan (0001-19-2) • Schwartz, Matthew (0002-14-14) • Walker, Tom (0002-3-4) (0002-3-6) • White, Barry (0016-9) (0016-11)
Land Use-Site and Vicinity	• Burris, Jessica (0007-2) • Golden, James (0032-21) (0032-24) (0032-33) (0032-37) (0032-38) • Gustave, Unito (0001-26-3) • Hamilton, Karen (0019-4) (0019-12) (0019-13) • Kimball, Dan (0025-3-27) • LaFerrier, Marc (0023-1-30) (0023-3-2) (0023-3-54) • Lewis, Mark (0025-3-27) • Miller, Lloyd (0001-6-7) • Moses, Dorothy (0027-3)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
	• Mueller, Heinz (0014-12)
Land Use-Transmission Lines	• Cornick, Lance (0001-15-4) • De Villiers, Elena (0031-2) • Flinn, Eugene (0001-22-1) (0001-22-2) (0001-22-3) (0001-22-4) • Garcia, Preston (0008-3) • Golden, James (0032-22) • Hamilton, Karen (0019-5) (0019-7) (0019-9) (0019-10) • Harum-Alvarez, Albert (0001-24-6) • Horton, Richard (0001-25-5) • Kimball, Dan (0025-2-5) (0025-2-7) (0025-2-8) (0025-2-9) (0025-2-10) (0025-3-37) • LaFerrier, Marc (0023-3-19) (0023-3-20) (0023-3-31) (0023-3-37) (0023-3-52) (0023-3-62) (0023-3-63) • Lerner, Cindy (0001-21-1) (0001-21-4) • Lewis, Mark (0025-2-5) (0025-2-7) (0025-2-8) (0025-2-9) (0025-2-10) (0025-3-37) • MacLaren, Kaitlin (0001-7-5) • Meerbott, Tim (0002-2-2) • Miller, Lloyd (0001-6-8) • Reynolds, Laura (0022-1-6) (0022-1-7) (0022-4-5) • Schwartz, Matthew (0002-14-9) • Sorenson, Katy (0002-1-5) • Vrooman, Paul (0001-23-1) (0001-23-2) (0001-23-3) • Wallace, Otis (0001-1-3)
Meteorology and Air Quality	• Kimball, Dan (0025-2-3) (0025-3-25) (0025-3-45) • LaFerrier, Marc (0023-1-16) (0023-1-26) (0023-1-28) (0023-3-16) (0023-4-7) (0023-4-8) • Lewis, Mark (0025-2-3) (0025-3-25) (0025-3-45) • MacLaren, Kaitlin (0001-7-7) • Mueller, Heinz (0014-21) • Reynolds, Laura (0022-2-1) (0022-2-16) (0022-2-18) (0022-4-2) (0022-4-3) (0022-4-4) • White, Barry (0016-2) • Wilansky, Laura (0021-11)
Need for Power	• Eney, Douglas (0002-17-2) • Hancock, Mandy (0001-14-5) • Horton, Richard (0001-25-2) • Johnson, Barry (0001-5-2) • Martinelli, Tom (0001-9-3) • O'Katy, Jessica (0002-8-1) • Reynolds, Laura (0022-1-5) (0022-3-4) (0022-3-5) (0022-3-6) (0022-4-24) • Schwartz, Matthew (0002-14-1) (0002-14-2)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
	• Snelson, Richard (0002-7-2) • Weins, Brian (0006-5) • Wilansky, Laura (0021-3)
Nonradiological Waste	• LaFerrier, Marc (0023-1-8) (0023-1-60)
Process-ESP-COL	• Kimball, Dan (0025-1-2) (0025-3-20) • LaFerrier, Marc (0023-1-59) (0023-3-42) (0023-3-50) (0023-3-64) (0023-3-66) (0023-4-21) • Lee, Nancy (0001-12-1) • Lewis, Mark (0025-1-2) (0025-3-20) • Miller, Lloyd (0001-6-10) • Mueller, Heinz (0014-3) (0014-4) • Ryan, Megan (0001-19-10) • Singer, Craig (0004-3)
Process-NEPA	• Kimball, Dan (0025-2-19) • Lewis, Mark (0025-2-19)
Related Federal Projects	• Golden, James (0032-1) (0032-15) (0032-18) (0032-20) • Grosso, Richard (0002-6-4) • Kimball, Dan (0025-1-1) (0025-2-14) (0025-2-16) (0025-3-42) (0025-3-44) • LaFerrier, Marc (0023-1-51) (0023-3-3) (0023-3-7) (0023-3-8) (0023-3-9) (0023-3-10) (0023-3-11) (0023-3-12) (0023-3-15) (0023-3-17) (0023-3-21) (0023-3-28) (0023-3-45) (0023-3-46) • Lewis, Mark (0025-1-1) (0025-2-14) (0025-2-16) (0025-3-42) (0025-3-44) • MacLaren, Kaitlin (0001-7-6) • Reynolds, Laura (0022-1-13)
Site Layout and Design	• Amor, Valerie (0001-11-4) • Kimball, Dan (0025-1-3) (0025-3-24) (0025-3-26) • LaFerrier, Marc (0023-1-20) (0023-1-21) (0023-1-23) (0023-1-24) (0023-1-27) (0023-1-43) (0023-1-52) (0023-1-54) (0023-1-55) (0023-1-56) (0023-1-61) (0023-1-65) (0023-1-69) (0023-2-6) (0023-2-18) (0023-2-19) (0023-2-21) (0023-2-22) (0023-2-33) (0023-2-34) (0023-2-35) (0023-2-36) (0023-2-37) (0023-2-38) (0023-2-39) (0023-2-40) (0023-2-41) (0023-3-4) (0023-3-5) (0023-3-6) (0023-3-14) (0023-3-29) (0023-3-30) (0023-3-41) (0023-3-44) (0023-3-57) (0023-3-65) (0023-3-67) (0023-4-2) (0023-4-3) (0023-4-6) (0023-4-12) (0023-4-13) (0023-4-19) • Lewis, Mark (0025-1-3) (0025-3-24) (0025-3-26) • Mueller, Heinz (0014-8) (0014-20) • Poole, Mary Ann (0018-13) (0018-15) • Reynolds, Laura (0022-2-4) (0022-2-5) (0022-2-11) (0022-2-12) (0022-2-14) (0022-2-15) (0022-3-7) (0022-3-10) (0022-3-11) (0022-3-12)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
	(0022-3-13) (0022-3-14) (0022-3-17) (0022-3-20) (0022-4-1)
Socioeconomics	• Accursio, James (0003-4-4) (0003-4-5) • Alexander, William (0002-10-1) (0002-10-3) (0002-10-4) • Daley, Dennis (0001-20-5) • Diggs, Bill (0001-17-1) (0001-17-2) • Grosso, Richard (0002-6-3) • Hamilton, Karen (0019-1) (0019-2) • Harum-Alvarez, Albert (0001-24-5) • Jacobs, Jeanne (0001-4-2) • Johnson, Barry (0001-5-3) (0001-5-4) • Johnson, Michael (0001-8-3) • Kiley, Mike (0001-3-1) (0002-5-4) • Kimball, Dan (0025-3-38) (0025-3-39) (0025-3-40) (0025-3-46) • LaFerrier, Marc (0023-1-53) (0023-2-2) (0023-2-3) (0023-2-4) (0023-2-23) (0023-2-24) (0023-2-25) (0023-2-26) (0023-2-27) (0023-2-28) (0023-2-29) (0023-3-1) (0023-3-34) (0023-3-36) • Landeta, Hector (0001-18-2) (0001-18-3) (0001-18-5) • Lerner, Cindy (0001-21-7) • Lewis, Mark (0025-3-38) (0025-3-39) (0025-3-40) (0025-3-46) • Marinelli, Francis J. (0001-10-2) • Martinelli, Tom (0001-9-2) (0002-9-3) • McHugh, John (0002-12-5) • Reynolds, Laura (0022-4-16) • Ryan, Megan (0001-19-7) (0001-19-8) • Schwartz, Matthew (0002-14-4) • Shlackman, Mara (0002-16-3) • Simpson, Roce (0002-13-3) (0002-13-4) (0002-13-5) • Snelson, Richard (0002-7-3) (0002-7-4) • Wallace, Otis (0001-1-5)
Uranium Fuel Cycle	• Amor, Valerie (0001-11-5) • Bass, Ken (0005-2) • DiNuzzo, Laura (0028-5) • Guendelsberger, Debra (0029-3) • Hancock, Mandy (0001-14-8) • Harris, Walter (0001-2-4) • Marinelli, Francis J. (0001-10-1) • O'Katy, Jessica (0002-8-2) (0002-8-7) • Payne, Nkenga (0012-13) • Reynolds, Laura (0022-4-13) • Schwartz, Matthew (0002-14-8) (0002-14-13) • Shlackman, Mara (0002-16-5) • Weins, Brian (0006-2) • Wilansky, Laura (0021-10) (0021-21)

Table D-3. Comment Categories in Order as Presented in this Report

D.1.1 Comments Concerning Process – COL
D.1.2 Comments Concerning Process – NEPA
D.1.3 Comments Concerning Site Layout and Design
D.1.4 Comments Concerning Land Use – Site and Vicinity
D.1.5 Comments Concerning Land Use – Transmission Lines
D.1.6 Comments Concerning Geology
D.1.7 Comments Concerning Hydrology – Surface Water
D.1.8 Comments Concerning Hydrology – Groundwater
D.1.9 Comments Concerning Ecology – Terrestrial
D.1.10 Comments Concerning Ecology – Aquatic
D.1.11 Comments Concerning Socioeconomics
D.1.12 Comments Concerning Historic and Cultural Resources
D.1.13 Comments Concerning Meteorology and Air Quality
D.1.14 Comments Concerning Health – Nonradiological
D.1.15 Comments Concerning Health – Radiological
D.1.16 Comments Concerning Nonradiological Waste
D.1.17 Comments Concerning Accidents – Severe
D.1.18 Comments Concerning the Uranium Fuel Cycle
D.1.19 Comments Concerning Decommissioning
D.1.20 Comments Concerning Related Federal Projects
D.1.21 Comments Concerning Cumulative Impacts
D.1.22 Comments Concerning the Need for Power
D.1.23 Comments Concerning Alternatives – Energy
D.1.24 Comments Concerning Alternatives – System Design
D.1.25 Comments Concerning Alternatives – Sites
D.1.26 Comments Concerning Benefit-Cost Balance

D.1.1 Comments Concerning Process – COL

Comment: Having these meetings out in one corner of the County is not fair to the rest of the County because this affects the entire County. All our commissioners vote on this and yet, you'll have it in one commission district. It's all our Bay. The water which you are going to bring in to cool the plants is all our water. The power lines are going throughout all our neighborhoods. This is not just a Homestead issue; it's not a local issue; it's a Countywide issue. And I would say it's a regional issue because I think Monroe County should be part of the plan, too. I think there should be meetings held all over the County. The scoping meeting out to Homestead, I had to drive an hour-and-a-half to get here and I'm just on the other side of the County. So the Urban Environment League calls for scoping meetings throughout the County because this empty room should tell you something. (**0001-12-1** [Lee, Nancy])

Response: *Public meetings are generally held in the community located geographically closest to the proposed project location. Interested parties that are unable to attend the public meetings in person are also afforded the opportunity to submit written comments. This comment expresses opposition to the NRC's scoping process, but provides no specific information on the*

NRC's environmental review of the Turkey Point Units 6 and 7 COL application. Therefore, this comment will not be addressed in the environmental impact statement (EIS).

Comment: I just want to make is that I that I think we should be evaluating environmental impacts and safety on the same plane and not rank safety above environmental. Because if you neglect the environmental impacts of building these reactors, you are putting the safety of my generation and the future generation at risk. (**0001-19-10** [Ryan, Megan])

Comment: I have little faith in what might happen here. As you have heard, they have never and can't find any instance in which they have refused a nuclear power plant. They've always managed to find ways to accommodate it. (**0001-6-10** [Miller, Lloyd])

Response: *The NRC takes seriously its responsibility under the Atomic Energy Act to protect the health and safety of the public and the environment in regulating the U.S. nuclear power industry. More information about NRCs roles and responsibilities is available on the NRCs website at* http://www.nrc.gov/about-nrc.html*. NRC approval of an application for a COL is not a foregone conclusion. Environmental issues, as well as safety issues, will be evaluated before a decision on an application is reached. As described in the regulations, the NRC can deny an application based on the finding of its review.*

Comment: In my opinion there should be one universal standard design, agreed upon by a panel of experts, and built to exacting standards so it becomes cheaper and less time consuming. (**0004-3** [Singer, Craig])

Response: *This comment did not provide information related to the environmental effects of the proposed action and will not be addressed in the EIS.*

Comment: The Draft EIS should discuss the status and any issues/concerns associated with the following approvals: Approval of the application to the NRC for a COL; Approval of the application to the State of Florida for site certification; Approval of any required National Pollutant Discharge Elimination Permit(s) (NPDES) for water discharge; Approval of the Prevention of Significant Deterioration (PSD) air permit; Approval of a 316(b) demonstration for the proposed cooling water intake; Approval of the U.S. Army Corps of Engineers (USACE) Section 404 and Section 10 permits to construct structures in wetlands and regulated waterways; Approval of hazardous waste management and disposal plans; Approval of the "determination of consistency" under the requirements of the Coastal Zone Management Act to ensure the expanded plant is consistent with existing federal and state coastal zone management plans. (**0014-4** [Mueller, Heinz])

Comment: Four (4) sixty thousand gallon above ground diesel fuel tanks, four (4) 1300 gallon diesel generator day tank, and two (2) diesel driven fire pumps are mentioned. No details and specification were provided to establish compliance with Chapter 24 and FAC 62-762 or obtain the necessary approval of the Director of DERM or his designee. (**0023-1-59** [LaFerrier, Marc])

Comment: The expiration date on the copies of USFWS permits No. MB697722-0, MB697722-1 and MB1335540-0, included in Appendix 10.2.10 indicate that these permits

expired on March 31, 2009. The applicant shall provide copies of the current permits. (**0023-3-64** [LaFerrier, Marc])

Comment: In Section 5.12, the application states that No variances from applicable regulatory standards are being sought for construction of the Project. In Section 4.5.5, however, the application states that a variance is needed. (**0023-3-66** [LaFerrier, Marc])

Comment: The application states that FPL will prepare and submit an earthwork and materials disposal plan prior to the start of construction. (**0023-4-21** [LaFerrier, Marc])

Comment: The COL application proposes the discharge of cooling tower blowdown from Units 6&7 to underground injection wells within the Boulder Zone of the Lower Floridan Aquifer. FPL makes the assumption that a Class I Underground Injection Control permit will be issued by FDEP. However, a FDEP permit has not been acquired for this action, to date. (**0025-3-20** [Kimball, Dan] [Lewis, Mark])

Response: *An appendix of the EIS will contain a list of environmental-related authorizations, permits, and certifications potentially required by FPL from Federal, State, regional, local, and affected Native American Tribal agencies related to the COLs for proposed Turkey Point Units 6 and 7.*

Comment: DERM has determined that the proposed work or activity may result in adverse environmental impacts as defined in Section 24-5 of the Code of Miami-Dade County. The application does not contain sufficient information to evaluate the project's environmental impacts, benefits, and detriments with regard to assessment points numbers 1 thru 6 as defined in Section 24-5 of the Code of Miami-Dade County under Comprehensive Environmental Impact Statement. (**0023-3-42** [LaFerrier, Marc])

Response: *This comment refers specifically to the Site Certification Application (SCA) submitted to the State of Florida by FPL, but it indicates an interest in the potential impacts of the proposed plant on the environment. The potential impacts of building and operating the proposed plant on the environment will be addressed in Chapters 4, 5, and 7 of the EIS, based on the affected environment described in Chapter 2.*

Comment: Please clarify mitigation success criteria for the proposed mitigation plans. What are the projected goals? What will constitute success? Please include details of the routine monitoring and maintenance plans designed to achieve planned success levels that are required in order to evaluate the adequacy of the proposed mitigation. (**0023-3-50** [LaFerrier, Marc])

Response: *This comment refers to the SCA submitted to the State of Florida by FPL, but it indicates an interest in mitigation of the impacts of proposed Turkey Point Units 6 and 7 on wetlands. The potential impacts of building and operating the proposed plant on wetlands and potential mitigation of those impacts will be discussed in Chapters 4 and 5 of the EIS, based on the affected environment that will be described in Chapter 2. A wetland mitigation plan is included in the Clean Water Act (CWA) Section 404 permit application submitted to the U.S. Army Corps of Engineers (USACE or Corps). Monitoring plans during building and operating the proposed plant will be presented in Chapters 4 and 5.*

Comment: The Draft EIS should discuss any plans by the applicant to seek a Limited Work Authorization (LWA). On similar projects an LWA was sought prior to certain environmental permits being obtained. EPA understands that an LWA could potentially authorize site development and deep/shallow foundation construction. (**0014-3** [Mueller, Heinz])

Comment: The parks encourage the NRC to carefully analyze the activities which would be permitted as Preconstruction Activities and/or Limited Work Authorization Construction. This project is located in a highly sensitive, wetlands coastal environment, immediately adjacent to a national park, and components of the COL are proposed to run through or adjacent to a second national park. This permit evaluation will examine the environmental impacts of roads, bridges, facility location, transmission lines, cooling water pipelines (radial collector wells), and other issues. Although these non-safety related components may frequently be allowed as Preconstruction Activities and/or Limited Work Authorization Construction, the parks believe many of these activities present the potential for cumulative impacts to this sensitive ecosystem and require a greater amount of environmental review than the LW A process provides. (**0025-1-2** [Kimball, Dan] [Lewis, Mark])

Response: *Cumulative impacts are the impacts that result from the combination of the proposed action and past, present, and reasonably foreseeable actions, regardless of who takes the actions. The cumulative impacts associated with building and operating proposed Units 6 and 7, including those actions identified as preconstruction, will be evaluated for each affected resource. The results of cumulative impact analyses will be presented in Chapter 7 of the EIS. FPL withdrew its request for a limited work authorization (LWA) in a letter to the NRC dated November 10, 2009.*

D.1.2 Comments Concerning Process – NEPA

Comment: NPS urges a comprehensive evaluation, additional documentation, and consultation with respect to potential impacts of the Turkey Point 6 & 7 Project and other power plant and transmission corridor site alternatives. NPS concerns should be addressed in the EIS process in order to avoid and minimize potential adverse impacts to the resources and values of Biscayne and Everglades National Parks and conflicts with CERP goals and projects. (**0025-2-19** [Kimball, Dan] [Lewis, Mark])

Response: *The potential impacts of building and operating the proposed units at the alternative sites will be discussed in Chapter 9 of the EIS. The alternative sites will be compared against the proposed site to determine whether any of the alternative sites are environmentally preferable to the proposed site. The environmental impacts of building and operating the proposed transmissions lines will be addressed in Chapters 4, 5 and 7. Alternative transmission corridors would not typically be considered within the context of an NRC EIS for a proposed nuclear power plant. However, the Corps of Engineers, and perhaps the National Park Service, will be cooperating with the NRC on the EIS. To the extent that a cooperating agency addresses such alternatives for its NEPA analysis, those alternatives would likely be included in this EIS in order to support the cooperating agency's environmental review.*

D.1.3 Comments Concerning Site Layout and Design

Comment: We also know through many studies by scientists that the sea level waters are rising and that I have been told through a presentation through an environmental group that I'm a part of and on committees with different towns -- I'm on a lot of different groups -- that they're going to raise their plant, I thought it was 28 feet; Lloyd said 24. The reality is they know that it's a problem. (**0001-11-4** [Amor, Valerie])

Comment: Please publish a map showing new and existing canals, pipelines, STAs, pump locations, and pump capacities associated with the water management feature(s). (**0022-3-10** [Reynolds, Laura])

Comment: Please state the specific material that will be used to line the water management feature(s) and state the minimum thickness of the lining. (**0022-3-11** [Reynolds, Laura])

Comment: Please state whether the lining of the water management feature(s) will be impervious to the flow of groundwater. (**0022-3-12** [Reynolds, Laura])

Comment: Please state how the lining of the water management feature(s) will be stabilized knowing that groundwater continually flows through the Biscayne Aquifer. (**0022-3-13** [Reynolds, Laura])

Comment: Please state the number of times the water management feature(s) can be drained and refilled while retaining its structural integrity. (**0022-3-14** [Reynolds, Laura])

Comment: Please state how long the applicant plans to own and operate the water management feature(s). (**0022-3-17** [Reynolds, Laura])

Comment: Please state the dimensions, capacities, and location(s) of the water management feature(s) resulting from excavations of the FPL-Owned fill source (rockmines). (**0022-3-7** [Reynolds, Laura])

Comment: Provide a process flow with description of the proposed FPL reclaim treatment plant & plant effluent. (**0023-1-27** [LaFerrier, Marc])

Comment: [P]lease provide a detailed map of all FPL land holdings within the Biscayne Coastal Wetlands and Model Lands Basins. Please identify on the map which areas are proposed for development and which are proposed for mitigation. (**0023-4-3** [LaFerrier, Marc])

Comment: If the water reservoir for Units 6&7 is unlined, the seepage of wastewater constituents, including EPOCs, will occur to the Biscayne Aquifer and cause uptake to adjacent wetlands; migration of these contaminants will be transported subsequently to the bay. The ecological impacts associated with an unlined reservoir should be evaluated. (**0025-3-26** [Kimball, Dan] [Lewis, Mark])

Response: *A description of the FPL site layout, the reactor type, and the cooling-water systems for proposed Turkey Point Units 6 and 7 will be provided in Chapter 3 of the EIS. Offsite features associated with the proposed units will also be described in Chapter 3.*

Comment: Please provide plans for the handling and disposal of the spoils generated from demucking of the Units 6 & 7 site. (**0023-1-20** [LaFerrier, Marc])

Comment: Please submit evaluation criteria for non-acceptable vs. acceptable material that would be used for common or structural backfill and demonstrate how the criteria for material that would be used for common or structural backfill meet the clean fill requirements of Section 24-48, Miami-Dade Code. (**0023-1-21** [LaFerrier, Marc])

Comment: Please identify temporary vs. permanent impacts expected to result from the proposed work within the barge unloading area, and provide a detailed description of these impacts. (**0023-1-23** [LaFerrier, Marc])

Comment: The application did not provide sufficient information to fully evaluate work proposed in the barge area. Please submit detailed plans, including but not limited to applicable site surveys, site plan and cross sectional views with mean high water and mean low water lines, existing depth and proposed resulting depth of the turning basin, details of any proposed alteration of the existing shoreline inclusive of complete designs for creating any vessel notches or bays, as well as detailed stabilization methodology for any portion of the shoreline that is to be modified as a result of the proposed expansion of the Barge Turning Basin. (**0023-1-24** [LaFerrier, Marc])

Comment: [I]nclude sufficient information for the radial collection wells, specifically the spacing between the well screen laterals and the maximum distance that the well screen laterals will extend under Biscayne Bay. Please .... show the boundaries of sovereign submerged lands and the extent to which the radial collection wells would be located within sovereign submerged lands. (**0023-1-43** [LaFerrier, Marc])

Comment: Pipe installation and canal crossing details were not provided. (**0023-1-54** [LaFerrier, Marc])

Comment: Table 4.5-1 (Stream Number 36) lists the reclaimed water volume to FPL as 72.7 MGD (50,481 gpm) and Appendix 10.9, Section 2.0 states Turkey Point Units 6 & 7 will require 55.3 million gallons per day (MGD) if supplied from reclaimed water. The discrepancy in the reclaimed water volume is not addressed. (**0023-1-65** [LaFerrier, Marc])

Comment: The quantity of fill needed for Unit 6&7 and associated facility construction, the quantity of fill to be extracted at this site, the dimensions of the rock pit. Commitment approved by MDC CAO that no fill will be sold. (**0023-3-4** [LaFerrier, Marc])

Comment: Geologic cross section of the proposed excavation (including the amount of water storage above- and below-ground, detailed information on the depth of the area to be mined) (**0023-3-6** [LaFerrier, Marc])

Comment: The application states that muck removed from several construction sites will be stored in the spoil disposal site. (**0023-4-13** [LaFerrier, Marc])

Comment: Application does not provide information on demolition or renovation that may occur as part of this project. (**0023-4-6** [LaFerrier, Marc])

Response: *These comments refer specifically to the SCA submitted to the State of Florida by FPL, but they indicate an interest in the activities that will occur to build proposed Turkey Point Units 6 and 7. Chapter 3 of the EIS will describe the activities that will be taken to build the proposed units. The review team will assess the potential impacts of building the proposed units in Chapter 4 of the EIS.*

Comment: Are there any roads, whether for plant access or associated with the transmission lines that are being proposed as temporary roads? If so, please identify them and provide a map of their locations. (**0023-1-52** [LaFerrier, Marc])

Comment: No data is provided indicating which roads are temporary, which roads are to be left as-built, and which roads are to be reduced after construction of power generation units and supporting facilities. (**0023-2-22** [LaFerrier, Marc])

Comment: The application does not adequately depict property ownership in areas surrounding proposed linear features such as access roads, including Miami-Dade County Environmentally Endangered Lands (EEL) Program projects that have been at least partially acquired. (**0023-2-6** [LaFerrier, Marc])

Comment: Information including but not limited to depth, slope, deep cut lines, levee height, etc. for the water management feature and rock mining activities proposed for the FPL owned fill source are not provided in the application. (**0023-3-14** [LaFerrier, Marc])

Comment: No sketches are provided clearly denoting if rights-of-way shown are FPL right-of-way, road right-of-way or other right-of-way. (**0023-3-29** [LaFerrier, Marc])

Comment: No data is provided describing the existing available right-of-way and ownership thereof. Provide clear maps denoting the aforementioned. (**0023-3-30** [LaFerrier, Marc])

Comment: The applicant shall provide detailed information on the elevation of all project features that is sufficient to determine whether this requirement has been met. (**0023-3-44** [LaFerrier, Marc])

Comment: Detailed information on the proposed excavation including the exact proposed location not provided. (**0023-3-5** [LaFerrier, Marc])

Comment: The application does not provide sufficient information to determine whether all construction operations involving earthwork, including disposal, are limited to clean fill. (**0023-4-12** [LaFerrier, Marc])

Response: *These comments refer specifically to the SCA submitted to the State of Florida by FPL, but they indicate an interest in the layout of the proposed plant. The layout of features associated with proposed Turkey Point Units 6 and 7 will be described in Chapter 3 of the EIS. The review team will assess the potential impacts of building the proposed units in Chapter 4.*

Comment: The project's draft PSD permit incorporates the use of reclaimed water as the primary source of cooling water for the cooling towers as well as the use of salt water from radial collector wells as a backup source or some combination of the two as necessary. As

presented in the PSD emissions calculations, particulate emissions are highly dependent on the source of the cooling water. The Draft EIS should discuss: impacts related to particulate emissions with respect to the-source of the cooling water; anticipated availability of reclaimed water to support the new units in addition to existing units; recordkeeping and monitoring plans to assess water flow rates and the ratio of reclaimed to salt water used; and any salinity changes outside of the range used for the emissions calculations. (**0014-20** [Mueller, Heinz])

Comment: As mentioned previously, FPL apparently proposes that Units 6 and 7 will have their cooling water needs provided by cooling towers as opposed to the existing canal system. The Draft EIS should discuss the wastewater-to-reclaimed water process, including describing the processes to remove debris, sand, sediment, and other large solids. The Draft EIS should discuss use of any microorganisms to break down organic materials, proposed clarifiers to remove microorganisms and remaining solids, filtering processes, and what type of disinfection (chlorine?) will be used to kill microorganisms. The monitoring of the re-use facilities and processes should be discussed in order that only high-quality reclaimed water is distributed and that it is clear and free of pathogens. (**0014-8** [Mueller, Heinz])

Comment: Please provide a schedule of radial collector well operation including initial operation and all planned subsequent events, as well as monitoring protocol for the above-mentioned resources. (**0018-15** [Poole, Mary Ann])

Comment: Please state the maximum pressure the deep well injection pumps will generate. Please state the maximum water temperatures of the wastes that will be deep well injected. (**0022-2-11** [Reynolds, Laura])

Comment: Please state the affects of the geologic fracturing that will occur as a result of pressure, temperature, exotic chemicals, and oxygen from deep well injections. (**0022-2-12** [Reynolds, Laura])

Comment: Please state the amount of heat that will be discharged into the atmosphere from units 6&7 and state the temperature differential between the discharged heat and the ambient temperature. Please state the amount of water vapor that will be discharged into the atmosphere from units 6&7 and state the moisture differential between the discharged water vapor and the ambient humidity. (**0022-2-15** [Reynolds, Laura])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to varieties and concentrations of pathogenic waste, toxic waste, EPOCs, chemical waste, and radioactive waste that will be disposed by deep well injection, please provide them. (**0022-2-4** [Reynolds, Laura])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to the ultimate location(s) of the deep well injected wastes, please provide them. (**0022-2-5** [Reynolds, Laura])

Comment: Please state, specifically, which wastewater batches will be deep well injected and which wastewater batches will be released into the unlined cooling canal system for both construction activities and normal operation activities. (**0022-3-20** [Reynolds, Laura])

Comment: Please state, specifically, all additives and all additive quantities, injected into the cooling water, such as solvents, detergents, biocides, corrosion inhibitors, lubricants, scale inhibitors, oxygen removing agents, foam removing agents, salts, and any other chemicals. (**0022-4-1** [Reynolds, Laura])

Comment: Pretreatment of the wastewater reuse source water to include treatment of EPOCs should be evaluated, considering Biscayne National Park's status as an Outstanding Florida Water Body with a no degradation standard under Florida Statutes. (**0025-3-24** [Kimball, Dan] [Lewis, Mark])

Response: *The proposed design for Turkey Point Units 6 and 7, including cooling tower and injection well performance, will be addressed in Chapter 3 of the EIS. The review team will assess the potential impacts of operating the proposed plant in Chapter 5, based on the affected environment described in Chapter 2. The EIS will include citations for documents used in its preparation.*

Comment: Based on the review of the Environmental Report, Part 3, submitted as pat1 of the Nuclear Regulatory Commission (NRC) Combined Operating License (COL), several inconsistencies have been noted when compared to the State of Florida Site Certification Application (SCA). The COL and the State of Florida SCA should contain the same design specifications and construction elements. For example, the FPL-owned fill source (rock mine) has been removed from the State of Florida SCA and the Army Corps of Engineers permit application. Without the Florida and ACOE permit approvals, the excavation cannot proceed. (**0025-1-3** [Kimball, Dan] [Lewis, Mark])

Response: *The NRC process is to review the license application and prepare an EIS based on the actions proposed in that application. Information to be used during the review will include documents obtained from State and Federal agencies, including the SCA, to the extent necessary to characterize the Turkey Point site. The FPL-owned fill source remains in the COL application at this time and a review of the environmental impacts of obtaining fill material will be presented in Chapter 4 of the EIS.*

Comment: Not enough information provided to assess water supply alternatives. Appendix 10.9 is a summary of alternative water supply study conducted by FPL. MDWASD has not received the reports cited in the Appendix (Analysis of Baseline Water Source, HDR Dec. 2007; Task 1 Initial Water Source Alternative Screening, HDR March 2008; Task 2 and 3 Water Source Alternative Characterization and Scope, HDR March 2008; Conceptual Engineering of Cooling Water supply and Disposal for Turkey Point Units 6 & 7, HDR, June 2008; Cooling Water Supply and Disposal Conceptual Design Report, HDR, March 2009). (**0023-1-56** [LaFerrier, Marc])

Comment: Condition 5 of Z-56-07 requires FPL to provide an alternative water source plan that will outline all sources of water not supplied by WASD through reuse. (**0023-3-41** [LaFerrier, Marc])

Comment: Please provide additional information on the quality, quantity, timing and reliability of the proposed reclaimed water for hydrologic improvements. (**0023-4-2** [LaFerrier, Marc])

Response: *These comments are directed at the applicant and refer specifically to the SCA submitted to the State of Florida by FPL, but they indicate an interest in the cooling water supply for the proposed units. The cooling-water source for proposed Turkey Point Units 6 and 7 will be described in Chapter 3 of the EIS. Alternative water supplies will be considered in Chapter 9.*

Comment: Most of the lands adjacent to the proposed roadway segment improvements occur within the boundaries of the Biscayne Bay Coastal Wetlands CERP Project, and several segments would be located where this CERP project proposes infrastructure for restoration of the surrounding wetlands and Biscayne Bay. These road improvements would directly interfere with CERP features associated with the Biscayne Bay Coastal Wetlands Project, including pumps and spreader canals. (**0023-2-18** [LaFerrier, Marc])

Comment: Please address how the proposed roadway features would be constructed to be consistent with the proposed CERP features. (**0023-2-19** [LaFerrier, Marc])

Comment: The applicant must provide a detailed map identifying areas where roads or road improvements would not be completely contained within the boundaries of either FPL-owned land or an existing public right-of-way. The applicant must also identify adjacent property owners whose land may need to be obtained to accommodate the road or road improvements, including but not limited to the Miami-Dade Environmentally Endangered Lands Program, and explain the process by which the additional property will be obtained. (**0023-2-21** [LaFerrier, Marc])

Response: *These comments refer specifically to the SCA submitted to the State of Florida by FPL, but they indicate an interest in the proposed road improvements associated with building and operating Turkey Point Units 6 and 7. The EIS will describe the proposed road improvements in Chapter 3 of the EIS. The impacts of these road improvements will be presented in Chapters 4 and 5. The cumulative impacts of road improvements and CERP actions will be presented in Chapter 7 of the EIS.*

Comment: Please state the locations and extents of permitted ASR wells sites within 25 miles of units 6&7. Please state the capacity of each of the permitted ASR well sites within 25 miles of units 6&7. (**0022-2-14** [Reynolds, Laura])

Response: *The cumulative impact of the operation of proposed Turkey Point Units 6 and 7 and existing facilities that impact groundwater, such as the aquifer storage and recovery wells located in the vicinity of the Turkey Point site, will be addressed in Chapter 7 of the EIS.*

Comment: Flow rate used to calculate water demands on Table 4.5-1 not provided. Not clear on how water demands for potable water use were calculated. (**0023-1-55** [LaFerrier, Marc])

Comment: No information was provided to show that the facility will be in compliance with the Flood Plain Management requirements including flood proofing as may be required. Please explain why existing runoff from pre-development conditions results in more runoff volume than

post development conditions, despite the fact that the pre-development plant site is mostly undeveloped and should have no runoff volume to be pre-treated. (**0023-1-61** [LaFerrier, Marc])

Comment: Details for road improvements list"...NHW Elevation to be provided by DERM. Please provide further explanation as to what is expected. (**0023-1-69** [LaFerrier, Marc])

Comment: Pursuant to Condition 9 of Z-56-07, Planned restoration features such as, but not limited to, pump PU-M3 (BBCW proposed project feature] and downstream hydrologic restoration shall not be compromised or constrained by the roadway(s). The application does not contain sufficient information to determine whether the requirements of Condition 9 of Z-56-07 have been met. (**0023-2-33** [LaFerrier, Marc])

Comment: Pursuant to Condition 9 of Z-56-07, Sheet flow shall be maintained across roadway alignments by elevating portions of the roadway and through the installation of culverts in other areas. The application does not contain sufficient information to determine whether the requirements of Condition 9 of Z-56-07 have been met. (**0023-2-34** [LaFerrier, Marc])

Comment: Roads are to be constructed to comply with Flood Criteria requirements, at a minimum. Assess impact on a larger study area. (**0023-2-35** [LaFerrier, Marc])

Comment: No data is provided describing the existing available right-of-way and ownership thereof. Provide clear maps denoting the aforementioned. Clearly denote which roadways are to be public and which are to be private. Provide clear maps denoting the aforementioned. All roads to be dedicated as public right-of-way (arterials-section lines and half-section lines) should include the following: dedication of the zoned right-of-way for future widening and no easements within said right-of-way. Any utilities within the right-of-way will be allowed to be installed by permit only. No sketches are provided clearly denoting if right-of-way shown are FPL right-of-way, road right-of-way or other right-of-way. (**0023-2-36** [LaFerrier, Marc])

Comment: The traffic studies provided in Appendices 1 0.7.4.1 and 1 0.7.4.2 do not demonstrate the need for construction vehicle traffic access to the power plant site from SW 359 Street. (**0023-2-37** [LaFerrier, Marc])

Comment: [T]he traffic studies presented in Appendices 10.7.4.1 and 10.7.4.2 do not provide sufficient data to demonstrate the need for the proposed roadway improvements. (**0023-2-38** [LaFerrier, Marc])

Comment: Assumptions: Substantiate the following assumptions: maximum work-force of 3,650 construction workers and vehicle occupancy of 1.0 worker per vehicle. Study Area. Given the amount of vehicular traffic likely to be generated, the number of employees and the size of project, the study area to be analyzed shall include all roadway facilities where traffic generated by the proposed project is equal to or greater than five (5) percent of the maximum service volume at the adopted level of service standard applicable to the roadway facility. Trip Generation. Given the unique characteristics of the use proposed, the trip generation shall include the following information: average daily, AM peak hour and PM peak hour. Consider car pooling, van pooling or employer-based car pooling. Analysis Period. Consider three analysis periods: Short-term (Concurrency Analysis for 3 years; construction is estimated to begin in

2011); and long-term (Years 2016 and 2020). Peak construction employment for the project is estimated for 2016; Project construction is estimated to conclude in 2020. Trip Distribution. For the Concurrency Analysis use the Cardinal Directional Trip Distribution from Zone 1401 and Year 2015, and the computerized travel demand forecasting (FSUTMS) model, refined where needed, for Years 2016 and 2020. (**0023-2-39** [LaFerrier, Marc])

Comment: Future Conditions Analyses. Perform an assessment of future conditions on the study area roadways for the long-term planning horizons without the impacts of the application-generated traffic; perform other assessment of future conditions on study area roadway and intersections with the impacts of the application-generated traffic. Incorporate programmed and planned roadway improvements consistent with Adopted Plans and Programs above. Mitigation Analysis. If the application causes the study area roadways to fall below their adopted LOS standards, recommend mitigation through physical or operational improvements, travel demand management strategies, fair-share contributions, or a combination of these or other strategies. (**0023-2-40** [LaFerrier, Marc])

Comment: Provide detailed supporting documents for trip generation of 3,650 construction peak period employees. Document all the growth rates and estimate growth factors values for different analysis years. Since there are different peak hours for construction (5:00 AM to 6:00 AM) and regular employees arrival (6:00 AM to 7.00 AM), traffic volumes for these two hours should not be combined in the analysis. Future roadway improvements in TIP, LRTP and Comprehensive Plans of effected jurisdictions should be investigated and listed in the report. Potential improvements may include bike trails, greenways and roadways etc. Potential improvements such as bike trails, greenways and roadway improvements, etc. Provide detailed supporting documents for trip generation of 36 construction-related trucks per hour. The existing truck volumes should also be included in the traffic data collection. This data can provide more accurate operational analysis as well as pavement design. To ease the review process, please provide traffic counts in the form of maps. Provide detailed supporting documents for trip generation of 806 and 2000 employees in normal traffic operational analysis for Scenario 1 and 2, respectively. Presence of only 940 employees during data collection period while 1,467 employees work. Therefore, trips should be adjusted, or it should be documented that only 940 employees are usually present. Please note that traffic data should be adjusted for all types of seasonal variations. (**0023-2-41** [LaFerrier, Marc])

Comment: Parking demand and supply analysis should be included in the report. Regional traffic impact analysis should also be conducted because of the anticipated high peak-hour volumes generated during peak periods. Different access routes should be explored to the site, such as through SW 328 Street. (**0023-3-57** [LaFerrier, Marc])

Comment: Pursuant to Condition 21 of Z-56-07, FPL has agreed to allow water level increases on the project site on the order of one foot or more, pursuant to regional restoration projects, and will design the project to accommodate these water level increases at FPL's expense. Information in the application is not sufficient to determine whether the requirements of this condition have been met. (**0023-3-65** [LaFerrier, Marc])

Comment: Further elaboration is needed on item 49 on Table 4.5-1 and noted in Figure 4.5-1 (Effluent from FPL Reclaimed TP to Future FPL Users = 9,739 gallons per minute). (**0023-3-67** [LaFerrier, Marc])

Comment: Please submit the earthwork and materials disposal plan required under Condition 7 of Z-56-07. The plan should include, but not be limited to plans and sketches pertaining to the proposed Spoil Areas including elevation details and slope stabilization. The applicant should also provide the management plan for listed species required under Condition 2 of Z-56-07, which should include but not be limited to identifying the plans established to protect endangered or threatened species from impacts resulting from the proposed work. (**0023-4-19** [LaFerrier, Marc])

Response: *These comments are directed at the applicant and refer specifically to the SCA submitted to the State of Florida by FPL, but they indicate an interest in site layout and design. The review team will describe the layout of proposed Turkey Point Units 6 and 7 and support features in Chapter 3 of the EIS. The potential impacts of building the proposed units will be presented in Chapter 4, and the potential impacts of operating the proposed units in Chapter 5.*

Comment: Under what circumstances would the radial collector wells be required to be used and at what capacities? Under what specific anticipated circumstance would radial collector wells constitute 100% of water source composition? (**0018-13** [Poole, Mary Ann])

Response: *The proposed cooling-water source for proposed Turkey Point Units 6 and 7, including operational information provided by FPL, will be described in Chapter 3 of the EIS.*

D.1.4 Comments Concerning Land Use – Site and Vicinity

Comment: The Miami-Dade Board of County Commissioners, where Dennis C. Moss sits as the Chairman, recently approved a land use change in order to accommodate the expansion plan, which is the subject of the request that is before you today. (**0001-26-3** [Gustave, Unito])

Comment: The proposed expansion by Florida Power & Light involves the land use of 38,607 acres composed of wetlands, agricultural land, barren land, and water. Less than 5% of the proposed expansion involves the use of pre-established urban or built up land [1]. (**0007-2** [Burris, Jessica])

Comment: The project should be consistent with the Goal, Objectives, and Policies of the Miami-Dade County Master Development Comprehensive Plan and its corresponding land development regulations. It is important for the applicant to coordinate permits with all governments of jurisdiction. (**0019-12** [Hamilton, Karen])

Comment: Council staff recommends that the Goals and Policies of the Strategic Regional Policy Plan for South Florida (SRPP) related to protecting and enhancing South Florida's natural resources should be observed (**0019-13** [Hamilton, Karen])

Comment: Consider the full the impacts of construction of the plant, and related facilities as they relate to rights-of way issues, relocation of facilities and infrastructure, and provide the appropriate mitigation strategies. (**0019-4** [Hamilton, Karen])

Comment: The plant site is located in Environmental Protection Subarea F, and is consistent only if the use is deemed consistent with the goals, objectives and policies of the Comprehensive Development Master Plan (CDMP). (**0023-1-30** [LaFerrier, Marc])

Comment: Potential viewshed impacts may increase over current levels in Biscayne National Park from the construction of Units 6&7 and non-transmission facilities. This will impact visitor use and experience within the park and should be evaluated. (**0025-3-27** [Kimball, Dan] [Lewis, Mark])

Comment: The scope of this project (adding two new reactors) is extraordinarily large. It will more than double the size of the existing plant. It requires changes in land use designations, unbelievable amounts of fill, building heavy duty roads, modifying shorelines, destroying wetlands and hammocks, digging a very large hole in South Dade for fill, (not to be restored), digging radial and injection wells, installing a wastewater treatment plant, installing a water treatment plant, installing miles of transmission lines, installing miles of pipelines, changing the horizon, and in effect building a small industrial city, yet FPL insists in their license application that this project in its entirety will have small to no impact. Amazing. Of course there will be an environmental impact and a big one. (**0027-3** [Moses, Dorothy])

Comment: Identify specific measures that will be adopted to protect the environmentally sensitive lands south of Palm Drive (S.W. 3 4 4th Street) from illegal access and activities such as dumping, use of all-terrain vehicles, and poaching. The new roadways proposed south of Palm Drive will increase opportunities for illegal access to environmentally sensitive lands, including those in the Model Lands Basin area. (**0032-38** [Golden, James])

Response: *Land-use impacts of building and operating proposed Turkey Point Units 6 and 7 and associated offsite facilities and transmission lines will be presented in Chapters 4 and 5 of the EIS, and cumulative land-use impacts will be presented in Chapter 7. The analysis of land-use impacts will address the general consistency of the proposed new facilities with applicable zoning regulations and land-use plans. Many of the land-use issues raised in this set of comments overlap with ecological issues, which will also be addressed in Chapters 4, 5, and 7.*

Comment: The SFWMD recommends that the following issues be addressed in the Environmental Impact Statement: Electrical Transmission Lines - The potential for adverse impacts to the SFWMD's L-30 and L-31N Canal levees, which are located within the West Preferred Corridor. FPL is proposing use the existing access roads on the canal levees for construction and maintenance purposes; however, portions of the levees have not been designed to accommodate the heavy equipment proposed to be used by FPL; therefore, the levees will need to be enhanced and widened. The SFWMD advised FPL that any proposed levee enhancements will need to meet USACE design specifications, compaction, and side slope stabilization (grass/sod) requirements. (**0032-21** [Golden, James])

Comment: The SFWMD recommends that the following issues be addressed in the Environmental Impact Statement: Electrical Transmission Lines - The potential for adverse impacts to wetlands that are part of northeastern Shark River Slough, within the boundaries of Everglades National Park, and wetlands within Water Conservation Area 3B, associated with the West Secondary Corridor. Both of these areas are part of the Everglades Protection Area

as defined in the Everglades Forever Act and are targets for restoration under CERP. FPL has not provided adequate information on potential impacts from the construction, operation, and maintenance of the proposed transmission lines and related access (fill) roads through these areas. Currently, there are no existing access roads in this area other than the L-30 and L-31 N levee roads. New road construction would result in long-term impacts to wetland habitat, disrupt existing hydrologic flows, and impact water quality. New road construction would potentially conflict with future CERP project restoration efforts related to the relocation of the S-356 pump station and the promotion of wetland sheet flow. Vehicles (other than airboats) moving over the wetlands (without roads) would also result in major disturbance to existing wetlands by compacting soils, disrupting existing hydrologic flows, and impacting habitat for listed species. (**0032-24** [Golden, James])

Response: *Environmental impacts associated with planned new transmission corridors, as well as potential impacts associated with upgrades to the existing lines, if required, will be addressed in Chapters 4, 5, and 7 of the EIS. The analysis will consider possible effects on canals, levees, and other existing facilities in the affected areas as well as planned future Everglades' restoration projects.*

Comment: Then there's a plan to put those two nukes on a pile of dirt 24 feet high, about 10 million cubic yards. The bulk of this would come from a piece of property that FPL owns back from the edge of the Bay. That will take a very large hole, very deep. (**0001-6-7** [Miller, Lloyd])

Comment: The Draft EIS should discuss sources of limestone rock proposed for use in the construction of Units 6 and 7. Any impacts from required mining should be discussed, particularly the impacts on Biscayne National Park or U.S. Air Force lands. (**0014-12** [Mueller, Heinz])

Comment: The allowance of rock mining in agricultural areas is subject to approval of an amendment to the Comprehensive Development Master Plan. FPL has filed an amendment; however no action will be taken by local government until October 2009. Approval of this amendment is subject to extensive informational requests which have not been provided through this application. Therefore land use/zoning consistency cannot be determined at this time. (**0023-3-2** [LaFerrier, Marc])

Response: *The impacts of the proposed offsite fill-source operation as a part of building proposed Turkey Point Units 6 and 7 will be considered in Chapters 4 and 7 of the EIS. The analysis of land-use impacts in Chapters 4 and 7 will address the general consistency of the proposed fill-source operation with applicable land use plans and regulations.*

Comment: Please verify whether all proposed road construction, including stabilization slopes, will fall within the road ROW's. How will proposed impacts, either direct or secondary, adjacent to private property and areas held under conservation easement be addressed? (**0023-3-54** [LaFerrier, Marc])

Response: *Environmental impacts associated with planned new roadways, as well as potential impacts associated with upgrades to the existing roadways, if required, will be addressed in Chapters 4, 5, and 7 of the EIS.*

Comment: Indicate which roadway improvements will be temporary and which will be permanent and specify the time-frames when each temporary roadway improvement will be restored to its previous, or better, condition. Although the applicant, FPL, indicates that all of the roadway improvements will be temporary, the County's Supplement to the Initial Recommendations Report for Application 6 states, "The [Miami-Dade County Planning] Department favors the dedication of the proposed roadway improvements as permanent facilities". Without clear identification of temporary and permanent roadway improvements, the District cannot identify all potential impacts. (**0032-33** [Golden, James])

Comment: Include the additional roadway improvements proposed under the Additional Access Option in the plan. The plan only addresses the roadway improvements proposed by FPL. It should be modified to include the additional roadway improvements under consideration that are referred to in the County's Supplement to the Initial Recommendations Report as the Additional Access Option. (**0032-37** [Golden, James])

Response: *Potential impacts associated with roadways will be addressed in Chapters 4, 5, and 7 of the EIS. The analysis will distinguish temporary from permanent roadway improvements. The review team does not advise the applicant on alternative roadway improvement plans; these decisions are made by the applicant and State regulatory bodies. Therefore, the choice of roadway improvements will not be addressed in the EIS.*

D.1.5 Comments Concerning Land Use – Transmission Lines

Comment: I'm mindful of the concern of many of my fellow cities north of us with the transmission line issue. Those issues do not pertain to the City of Florida City at all. However, I believe that it's good for us to understand, and I believe this is the fact, that with regard to transmission lines, it doesn't matter what kind of power source we eventually construct at the Turkey Point site. If we construct fossil fuel plants, a fossil fuel plant, that power will still have to be transmitted. Hence, the transmission lines will be necessary no matter the type of generation system we have there. So the transmission line issue is not a child of the nuclear reactor request. And I think we are going to have to figure out a way to take care of transmission regardless of the power source. (**0001-1-3** [Wallace, Otis])

Comment: Lastly, the plan calls for nearly 90 miles of new transmission corridors. NPCA is particularly opposed to the western corridor proposal which calls for the construction of more than 50 miles of power lines either within or adjacent to Everglades National Park. FP&L hasn't given any alternative plans that are acceptable with respect to the placement of these power lines, which are bad for migratory birds, parklands, and wetlands alike.
(**0001-15-4** [Cornick, Lance])

Comment: The impact that we are most immediately dealing with is the Florida Power & Light's transmission line process that they have undertaken from -- as a result of the Florida statutory framework. We are participating within that administrative hearing. And as a result of the

environmental study indicating that you are also going to be looking at that as an indicator, we will be giving you some very specific information about the incompatibility and very adverse impact of the proposed alternate corridor along US-1. We have a process that we are a part of where we will be submitting an alternate corridor outside of the US-1 corridor for the siting of the transmission lines. (**0001-21-1** [Lerner, Cindy])

Comment: In addition, the US-1 corridor, as I said, is our only commercial area. And we are working towards plans -- you'll hear from my colleagues about the plans they have already implemented for the ability to take the US-1 corridor, which is our major transit, transportation, and commercial corridor, and over the course, the vision for Miami-Dade County for the future of the US-1 corridor is to create the opportunity for in-fill by having mixed use development along that corridor, encouraging people to move along the corridor and use the transit that is there as opposed to going out and having the sprawl that we are all fighting against. And preserving the urban development boundaries would require that we focus on mixed use development along US-1. Placing the power lines along that US-1 corridor would absolutely not only inhibit, it would destroy any commercial interest or developer in coming along and complying with that. (**0001-21-4** [Lerner, Cindy])

Comment: We're here to talk jobs. Just as the discussion is jobs in regards to the nuclear power plant such as with the siting lines, we're here to present a pro-business, a pro-job argument for why we need the least intrusive siting of these lines. Now, to a large degree we've been powerless in this regard because with the state statutes that govern siting, there's really no discretion that has been allowed within the different municipalities. In essence, we've been preempted and it's a state matter that will eventually go before the Cabinet if we get in front of the Administrative Law Judge. For the record, what I would like to bring and present to you on DVD's are the legislative actions that the various three municipalities have taken in regards to the US-1 Business District and the transmission sitings. And what these are are the resolutions as well as some of the charrette plans and the other actions that we've taken. Now, I would like to make that part of the record on behalf of the Village of Palmetto Bay, the town of Cutler Bay, and the Village of Pinecrest. (**0001-22-1** [Flinn, Eugene])

Comment: Why that's important -- and Mayor Vrooman will discuss in more detail those charrettes that he's been involved in, that we've been involved in in regards through Chambers South, a very important community partner, and the different cities, is one of the first things the Village of Palmetto Bay did in incorporating in 2002, was to attempt to put a rudder on an otherwise local economic area that was adrift. And we are attempting to bring jobs; we are attempting to bring sustainable development. And we believe that the record evidence from an economist and from our engineers, who is going to show that these siting lines have a severe risk in actually forcing sprawl. Why is that? Because they're going to render commercially useless some areas where significant work was done. What I would like to show as our first board here, is this is the Franjo Triangle Commercial Island charrette. And it is a wonderful vision for the community. And I think if you will take a look at this, this is primarily an economic center. It is a mixed use; it does include residential. But you're going to have quite a few jobs, small businesses, which is a huge component of our Miami-Dade County economy here. These lands will be rendered, from some of the information we've received, will be severely impacted by the siting of these lines basically going through them. These lines are incompatible. From what we've seen, these lines are more appropriate what you would see driving down Krome

Avenue and those areas that weren't seen fit to put through the areas 30 years ago, they're less fit to put through here now. (**0001-22-2** [Flinn, Eugene])

Comment: We are attempting to work with FP&L. It is an adversarial proceeding but we're attempting to work together. We have just passed resolutions, Pinecrest and Palmetto Bay, in regards to engaging an engineer to get us to the first section of this process and have our input. Because we believe there are better locations for these lines without adversely affecting the hard work that's been going on. You have three municipalities here that have done outstanding work since they're been incorporated. And Paul Vrooman, I don't -- maybe I should just yield the floor to you at this point. But our position at this time is that they are incompatible with the area. They could be rendered more compatible if we undergrounded them, which we understand the issues on that. But we're not sure we're getting the feedback or the recognition as to what our issues are. We do not want to render these plans obsolete. If you render these plans obsolete you are going to see no net gain in jobs for the South Dade area; you're going to see no net gain improvement; and the only thing you're going to see coming out of here is power for other areas. (**0001-22-3** [Flinn, Eugene])

Comment: Now, we have an opportunity to properly site these areas but that's not the plan on the board here. We have two other boards here. These are not from Palmetto Bay, Pinecrest, or Cutler Bay. But just to show you the charrettes that the South Dade area have been involved in in trying to revision this area, the Leisure City Naranja Lake charrette area plan. And, Paul, if you could talk about the goals and come up with your plan and the South Dade, too. Because we're trying to put together a comprehensive vision for South Dade. This is not a single city issue; this is a regional issue that affects the entire county. And we need to work together to find the least intrusive solution to this problem. And right now we're in a position to where we have to take this head on and try to get a result in the best interest of South Dade. And that's why we're opposing this at this time. (**0001-22-4** [Flinn, Eugene])

Comment: I'm proud to be here with my colleagues from Palmetto Bay and Pinecrest and to speak in opposition to the transmission line on US-1. I am not here to speak -- and my mind is not made up -- on the wisdom of the additional reactors. That is not the issue that I am authorized to bring here on behalf of my Town Council. However, I am authorized -- we do have a Resolution on our record that Mayor Flinn turned in that said that we do not feel that it is in the public interest to do transition -- transmission lines up US-1. (**0001-23-1** [Vrooman, Paul])

Comment: And the reason why I want to discuss that is an environmental factor. What is environmental impact? Is it just the impact that happens on the site; is it what happens adjacent to the plant; is it the footprint of the plant; or is it broader policy? Well, we've had discussions in this community on a regional basis about suburban sprawl, and about sprawl going out into places like the Everglades; something that our country is spending billions of dollars to try to mitigate and try to repair. So, if we are creating policies or -- that respond to that as our in-fill policies and our smart growth policies have done on a regional basis to combat that, which essentially means adding mixed use, urban in-fill, transit-friendly development on the US-1 corridor, and this plant results in a transmission line gutting that plan by running up US-1, then I see that as a very definite environmental impact. The impact of that transmission line won't be -- you won't be able to identify that on US-1 specifically. But I can tell you that when the next ring of homes and the next ring of development goes out into the Everglades because we have

not provided an alternative to that on US-1, that will be directly because of these decisions that are going to be made, vis-a-vis this application. (**0001-23-2** [Vrooman, Paul])

Comment: I think that we've said that enough times but I do want to reflect that I do see this as an environmental issue. I do see this as effectively gutting the regional response from the county and all the municipalities up and down US-1 to come up with a response to suburban sprawl that is economic friendly. I think if you look at the boards around me, it's not hard to imagine the number of jobs that that will create that will come from that construction, that will come from the businesses that will be there, and it is much, much Greener, environmental friendly alternative growth patterns. And this will be very, very detrimental to our ability to make that come true. (**0001-23-3** [Vrooman, Paul])

Comment: I want to agree with the mayors of Palmetto Bay, Cutler Bay, and Pinecrest. We've done some incredible things on walkable areas along US-1. We should protect those and I do believe that should be in the scope. (**0001-24-6** [Harum-Alvarez, Albert])

Comment: Additional environmental destruction would involve their desire to put the transmission lines through Everglades National Park, because all the towns up US-1 don't want any more transmission lines. So where else do you put them? Well, you go tear up the Everglades and put them out there. (**0001-6-8** [Miller, Lloyd])

Comment: FPL's proposed transmission corridor will impact upon lands within Everglades National Park and the footprint of BBCW and seek to fill more than 300 acres of wetlands. In addition, the other proposed sites for these transmission lines is along the US-1 corridor which is very important for nodal growth as this is an area where public transportation exists. And if we don't develop along these nodal corridors, then this encourages sprawl which will, of course, affect Everglades and other wetlands. (**0001-7-5** [MacLaren, Kaitlin])

Comment: In closing, I also want to join the voices of the Mayors from Cutler Bay, Palmetto Bay, South Miami and Pinecrest, who object to the environmental impact of power lines along the US-1 corridor, which would destroy the plans of mixed use pedestrian and transit oriented development, compact urban form that holds the line on urban sprawl, and which in turn protects our Everglades and environmentally sensitive areas. (**0002-1-5** [Sorenson, Katy])

Comment: Power lines through Everglades National Park. That's another part of this licensing thing. The land that was purchased by the people of the United States in a place called the East Everglades Expansion Area, was purchased for one particular reason; the protection and restoration of that section of the Everglades, the Shark River Slough, the heart of the Everglades ecosystem. Now FP&L is planning to put three power lines through that National Park, the iconic National Park in Florida; 150 feet tall, 500,000 kilovolts each. And they're demanding that the Park turn over the eastern edge to them so they can put this thing in there. How do they get away with that? I looked at the documents at the beginning when that expansion area first came through. NPS looked at that corridor that they owned. They said, well, we valued the land, we can give you 100, $200,000 for it. When could you turn it over? That was 20 years ago, and now they're on the verge -- National Park Service is on the verge of turning this corridor, on the eastern edge of our Park, over to them. Not only is it going to create

an industrial landscape for Everglades National Park, which will happen. 150 foot tall towers would be visible from Shark River Slough. (**0002-14-9** [Schwartz, Matthew])

Comment: The transmission lines along the US-1 corridor is a direct contradiction of what we, the leaders of these cities, have envisioned for an improved US-1 corridor which will allow us to go ahead and develop our communities in smart ways rather than going further into the Everglades. (**0002-2-2** [Meerbott, Tim])

Comment: Do not allow transmission lines to be run down US 1. This is a primary federal highway that runs directly through many south Florida cities. Please run these down our expressways and railway right of ways to prevent aesthetic loss of property values along our cities. (**0008-3** [Garcia, Preston])

Comment: Consider the full the impacts of construction of the transmission lines and related facilities as they relate to rights-of way issues, relocation of facilities and infrastructure, and provide the appropriate mitigation strategies. (**0019-5** [Hamilton, Karen])

Comment: Ensure the proposed transmission lines are compatible with existing and future uses in terms of mass, scale and height. (**0019-7** [Hamilton, Karen])

Comment: Consider how the placement of transmission lines along the more urbanized areas of the two proposed corridors will affect future opportunities to provide new transit features, the South Miami-Dade Busway or Metrorail expansion, greenways and pedestrian features, redevelopment projects, and scheduled roadway improvements (**0019-9** [Hamilton, Karen])

Comment: Provide contextual perspectives for both existing and proposed electric poles and supporting infrastructure to demonstrate that chosen technology and structures will be compatible with the surrounding land uses. (**0023-3-31** [LaFerrier, Marc])

Comment: Please provide a detailed description of the construction methodology that will be used to limit secondary impacts, especially along the linear infrastructure features. (**0023-3-52** [LaFerrier, Marc])

Comment: Potential impacts from the construction and operation of transmission lines and access roads in either the West Preferred or West Secondary Corridors include disruption of hydrologic flows; wildlife and habitat disruption; wetland plant community destruction; reduction of native plant species populations; adverse effects on threatened and endangered species and migratory birds; introduction of non-native, invasive species; air and water pollution; noise; impacts to cultural resources, adverse impacts to viewsheds and wilderness character; and degradation of park visitor experiences. A cultural resources survey should be performed to identify cultural resources in the two corridors and measures to avoid and minimize potential impacts. (**0025-2-10** [Kimball, Dan] [Lewis, Mark])

Comment: The EIS should evaluate the direct, indirect and cumulative effects of the transmission lines and related facilities needed to connect Units 6 & 7 to FPL's electric transmission system. (**0025-2-5** [Kimball, Dan] [Lewis, Mark])

Comment: The Western Transmission Line Corridor includes two options, a West Preferred Corridor option and a West Secondary Corridor option. Either option would include the installation of two 500 kV transmission lines, one 230 kV transmission line and related towers, guy wires, ground wires, fill pads, and access roads. Both corridors are partially located within the boundaries of Everglades National Park Expansion Area as shown in Fig 9.4-13 of the COLA Environmental Report. (**0025-2-7** [Kimball, Dan] [Lewis, Mark])

Comment: The NPS is conducting a wilderness study for the 109,500 acre ENP Expansion Area. This study evaluates lands for possible recommendation to Congress for inclusion in the national wilderness preservation system as required by the Wilderness Act of 1964. Construction of transmission structures and access roads in the West Secondary Corridor would result in 320 acres of lands not being eligible for wilderness designation. FPL's West Preferred Corridor runs through lands within the Expansion Area that may also be eligible for wilderness designation. The eligibility of lands adjacent to either corridor would be adversely affected by introducing visible man-made structures (such as transmission facilities), and introducing noise (from construction/operation/maintenance activities) that would adversely affect opportunities for solitude. (**0025-3-37** [Kimball, Dan] [Lewis, Mark])

Comment: Kingston Square Condominium is located at 9300 -9430 SW 77th Avenue and our street is the preferred route for FPL to erect 80 -100 foot transmission lines of 230 volts. This is an outrage! Ours is a quiet residential street of homes, condominiums, a Baptist Church with orphanage, and small businesses. (**0031-2** [De Villiers, Elena])

Response: *Environmental impacts associated with the planned new transmission corridors and roadways will be addressed in Chapters 4, 5, and 7 of the EIS, as will potential impacts associated with upgrades to the existing lines if required. The land-use impact analyses sections in Chapters 4, 5, and 7 will consider the compatibility of the proposed transmission lines and other offsite facilities with existing and proposed land uses in the affected areas and with land-use plans under consideration by State and local governments. The analyses will also consider potential impacts from the transmission lines and other offsite facilities on Everglades National Park, Biscayne National Park, and other affected public lands. The impacts of power lines on human health will be addressed in Chapter 5.*

Comment: FPL owns, and has owned since the 1960's and early 1970's, approximately 320 acres of undeveloped land within the Expansion Area (part of the West Secondary Corridor). Since the FPL Property is currently undeveloped and is needed for the restoration and enhancement of the ecosystem through improvement of natural hydrologic conditions, the NPS intends to acquire the FPL property and manage it as part of ENP and to maintain the FPL Property in its undeveloped natural condition. The NPS began negotiations with FPL in 1996 but to date the federal government and FPL have been unable to reach an agreement on the direct acquisition of FPL's property by the United States. (**0025-2-8** [Kimball, Dan] [Lewis, Mark])

Comment: As noted, in Section 9.4.3.1 of the COLA Environmental Report, the Omnibus Public Land Management Act of 2009 authorized the Secretary of the Interior to exchange 260 acres of NPS property within and along the eastern edge of the Expansion Area (part of FPL's West Preferred Corridor) for FPL's 320-acre property within the Expansion Area (part of FPL's West Secondary Corridor). The NPS lands being considered for exchange were acquired

by the NPS for the purpose of restoring the hydrology and ecology of the park. The exchange decision is left to the Secretary's discretion subject to conditions necessary for protection of resources, equalization of land values and evaluation of potential environmental impacts pursuant to the National Environmental Policy Act (NEPA). The NPS is currently preparing an environmental assessment regarding the potential exchange. At the conclusion of the NEPA process, the NPS will decide whether to exchange lands with FPL or to acquire the FPL property by direct purchase/eminent domain. There are many uncertainties regarding the exchange, and it is not a foregone conclusion that the NPS will decide to exchange lands. An NPS decision to acquire FPL's property, rather than exchange lands, would result in neither corridor within the Park being available for placement of transmission lines.
(**0025-2-9** [Kimball, Dan] [Lewis, Mark])

Response: *Potential land-use impacts of building and operating proposed Turkey Point Units 6 and 7 on the Everglades National Park, Biscayne National Park, and other parks and preserves, including impacts on wetlands within those areas and on threatened or endangered species, will be evaluated in Chapters 4, 5, and 7 of the EIS.*

Comment: The applicant must provide details on what other parties are filing alternate transmission line corridors, along with an explanation of how the process for approving transmission line corridors differs, including but not limited to obligations of other parties to meet applicable Conditions in Z-56-07, when FPL is not the applicant. (**0023-3-19** [LaFerrier, Marc])

Comment: The map series showing the transmission corridor locations do not differentiate between existing rights-of-way/easements and areas proposed. (**0023-3-20** [LaFerrier, Marc])

Comment: Maps and narratives do not demonstrate existing rights-of-way or existing certified corridors along the proposed east and west transmission corridor alignments.
(**0023-3-37** [LaFerrier, Marc])

Comment: Location of greenways/trails are not shown in map series showing preferred corridors or secondary corridors although the criteria in Tables W 9.3.1-4 and E 9.3.1-4 specifically state that the acquisition status of existing and proposed greenways was included in the Alternative Route Qualitative Evaluation Criteria. Please provide mapping of existing and proposed greenways. The Application does not address the Parks and Open Space System Master Plan prepared in compliance with Policy ROS-4 of the Recreation and Open Space Element of the CDMP and as approved by the Board of County Commissioners.
(**0023-3-62** [LaFerrier, Marc])

Comment: Materials provided are not sufficient to determine whether corridor alignments, construction techniques, and proposed pole designs will ensure protection of future inland wetlands, wellfield areas, and Natural Forest Communities from incompatible land use.
(**0023-3-63** [LaFerrier, Marc])

Response: *These comments refer specifically to the SCA submitted to the State of Florida by FPL, but they indicate an interest in the potential impacts of the proposed transmission lines. The review team will assess the potential impacts of the proposed transmission lines in Chapters 4 and 5, based on the affected environment described in Chapter 2.*

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts of the Turkey Point FPL power station and its transmission lines on the environment, including any cost-benefit analyses, please provide them. (**0022-1-6** [Reynolds, Laura])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts of construction and operation of the proposed Eastern Transmission Corridor and the proposed Western Transmission Corridor, on the environment, including any cost-benefit analysis, please provide them. (**0022-1-7** [Reynolds, Laura])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts of construction or operation of the Clear Sky switchyard, the Davis substation, the Miami substation, the Pennsuco substation or the Levee substation in the future, including any cost-benefit analysis, please provide them. (**0022-4-5** [Reynolds, Laura])

Response: *The potential impacts of building and operating proposed Turkey Point Units 6 and 7 and associated offsite facilities, including transmission lines, on the environment will be addressed in Chapters 4, 5, and 7 of the EIS, based on the affected environment described in Chapter 2. The EIS will include citations for documents used in its preparation.*

Comment: We are limited in what we can do with underground lines, or overhead poles, or all of the things that are needed to get the transmission of the power to all of our communities. (**0001-25-5** [Horton, Richard])

Comment: Explore the alternatives of undergrounding and co-locating transmission lines with Metrorail. (**0019-10** [Hamilton, Karen])

Response: *The environmental impacts of building and operating the proposed transmission lines will be addressed in Chapters 4, 5, and 7 of the EIS. However, the review team does not advise the applicant on alternative designs of transmission facilities; these decisions are made by the applicant and State regulatory bodies. Therefore, issues related to possible underground transmission lines would ordinarily not be addressed in the EIS. However, the Corps of Engineers, and perhaps the National Park Service, will be cooperating with the NRC on the EIS. To the extent that a cooperating agency addresses such alternatives for its NEPA analysis, those alternatives would likely be included in this EIS in order to support the cooperating agency's environmental review.*

Comment: The SFWMD recommends that the following issues be addressed in the Environmental Impact Statement: Electrical Transmission Lines - The potential for the Preferred Corridors to adversely impact SFWMD-owned communications towers and radio matrix sites. In particular, the West Preferred Corridor is located very close to various SFWMD communications towers and radio matrix sites. Although FPL has indicated that they will work with the SFWMD to resolve any unlikely interference issues, they have not provided the SFWMD with adequate information to determine if or to what extent critical SFWMD-owned communications facilities

may be impacted by the proposed transmission line facilities. The SFWMD advised FPL that it is unacceptable to wait until impacts have occurred to identify, design, permit, construct, and implement solutions, since this could substantially impact the SFWMD's ability to use these facilities to meet SFWMD flood protection and other critical emergency management responsibilities. (**0032-22** [Golden, James])

Response: *The impacts of operating proposed Turkey Point Units 6 and 7, including the impacts of the associated transmission lines, on community services, will be addressed in Chapter 5 of the EIS. The potential impact of transmission lines on radio signals used by local and regional agencies to perform their missions will be considered in preparing that chapter.*

D.1.6 Comments Concerning Geology

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts of operation of the rock mining associated with the Turkey Point FPL power station on the environment in the past, currently, and in the future, please provide them. (**0022-1-14** [Reynolds, Laura])

Response: *Available information about the fill source will be provided in Chapter 3 of the EIS. The potential impacts of obtaining fill material on water resources will be presented in Chapter 4 of the EIS, based on baseline information on the affected environment described in Chapter 2. The cumulative impacts of the actions proposed by FPL to build and operate proposed Turkey Point Units 6 and 7 along with other past, present, and reasonably foreseeable future actions will be presented in Chapter 7.*

D.1.7 Comments Concerning Hydrology – Surface Water

Comment: And the one last thing I keep wondering about is, the nuclear power plants generate hot water; correct? What about desalinization, especially in areas like South Florida, to take that hot water and use it as part of a desalinization solution? (**0002-17-6** [Eney, Douglas])

Response: *The impact of effluents discharged from proposed Turkey Point Units 6 and 7 on water resources and ecological resources will be discussed in Chapter 5 of the EIS. The NRC does not advise the applicant on alternative uses of waste heat from a power plant; these decisions are made by the applicant and State regulatory bodies. Therefore, the comment related to alternative use of waste heat will not be discussed in the EIS.*

Comment: We also continue to be concerned about the saltwater intrusion into the Biscayne Bay that is being facilitated by the current cooling canals. The effects of the increased salinity are negatively impacting Biscayne Bay restoration efforts. (**0001-15-3** [Cornick, Lance])

Response: *The review team will assess and discuss baseline water-quality conditions within the affected environment in Chapter 2 of the EIS. The team will assess the impacts of building and operating proposed Turkey Point Units 6 and 7 on water resources in Chapters 4 and 5, respectively. The cumulative impact of the proposed action and other past, present, and reasonably foreseeable actions that have the potential to affect water resources will be discussed in Chapter 7.*

Comment: Water impact and the saltwater intrusion has been coming to Dade County -- I used to swim right there before the plant was built. I used to crab right there -- just south of there. I was a human bobber. My dad used to pull me behind the boat and used to go and dive and get crabs and all kind of fish. You don't see a lot of that now. But, is it the plant's fault? No. It's because Dade County has gone from 100,000 people to 1 million 9, or whatever our current is. And that impact is going to continue. It's not the plant that's causing the problem. Our water situation, with that mitigation of fresh water flowing out to the ocean, now you're going to have saltwater coming in; it's not the plant's fault. (**0002-12-4** [McHugh, John])

Response: *This comment refers to changes in baseline water quality and aquatic ecology in Biscayne Bay in the vicinity of the proposed units. The review team will present baseline water-quality conditions within the affected environment in Chapter 2 of the EIS. Predicated on this information, the team will assess the impacts of the proposed action on water resources in Chapters 4 and 5 for building and operating proposed Turkey Point Units 6 and 7, respectively. The cumulative impact of the proposed action and other past, present, and reasonably foreseeable actions that have the potential to affect water resources will be discussed in Chapter 7.*

Comment: Growing up in Florida I have seen firsthand our issue with water consumption and lack of water. Lately, reports of clean water becoming scarce is an issue being talked about by many world leaders. Half of the world's schools do not have access to clean water and 1.5 billion people do not have access to clean water either. We're taking water, one of our most precious natural resources, for granted by consuming so much through nuclear energy. Conserving water and our incredible ecosystems in Florida should be a main priority and a main influence for FP&L decisions. Nuclear power is very water-intensive and we'll only have problems in the future. It is not efficient as other options that Florida should be considering, such as solar and wind. (**0001-19-2** [Ryan, Megan])

Comment: But we also need to consider that the water they're going to be using, the 90 million gallons of water that they want to use to cool these plants, is about one-third of our grey water, and there are other alternatives that we could use for that. We could be using irrigation and other areas rather than just turning it over to FP&L. So I want them to consider the use of the water along with the impact it will have on the development of the US-1 quarter. (**0002-2-3** [Meerbott, Tim])

Comment: As a result, we request that the scoping that you're providing in the EIS present a very high level of detail in the water resource mass balance of both the hydrology and the water chemistries that we have in South Dade County to prohibit any negative impacts. We already have enough negative impacts, and last year was a good example. We had a drought that brought the surface water of the Biscayne aquifer down to zero, and as you know we can't keep it at zero too long with the saltwater head pushing inland. So, we need to do everything we can to protect our water resources and our water supply for our citizens. (**0002-3-4** [Walker, Tom])

Comment: What are the cumulative effects of radial collector wells on water conditions in Biscayne Bay, including salinity, flushing, clarity, water quality, localized temperatures, etc.? Further, what are the anticipated effects at increments of 25%, 50% and 100% of full implementation of this proposal? (**0018-12** [Poole, Mary Ann])

Comment: Radial Collector Wells: The application does not provide enough information on this technology and the current conditions at the locations of the radial collector wells for us to assess whether their construction or operation would have an impact on fish and wildlife resources. We wish to point out the highest priority for recovering the ecosystem health of Biscayne Bay is on addressing the negative impacts that water resource development and water management have had on the salinity regime of the Bay and its associated coastal wetlands, which provide important habitat for fish and wildlife resources. If radial collector wells, which are vertical wells that then discharge laterally via a series of pipes underground, would disrupt the groundwater system, which is closely tied to surface water (which in turn supports fish and wildlife resources) in this extremely porous karst area, this proposal would seem to be contrary to commitments made by the Governor's Office and U.S. Congress, which signed into law authorizations to restore Biscayne Bay (Water Resources Development Act of 2000 -see http://www.fws.gov/habitatconservation/omnibus/wrda2000. pdf). (**0018-7** [Poole, Mary Ann])

Comment: Whether the extraction of water from the Biscayne Bay system will change or reduce the freshwater inflow to the bay and/or increase salinity at least seasonally shall be examined through additional modeling as part of the application. (**0023-1-48** [LaFerrier, Marc])

Response: *The review team will assess the impacts of building and operating proposed Turkey Point Units 6 and 7 on the water quantity and quality of both local and regional water resources and identify mitigation measures proposed by the applicant to reduce adverse impacts. This assessment will consider current and future conditions, including changes in water demands to serve the needs of the future population, and changes in water supply. The review team will present baseline water quality conditions in the environment around the proposed site in Chapter 2 of the EIS. The impacts of building and operating the proposed units on water resources will be presented in Chapters 4 and 5 of the EIS, respectively. Cumulative water-use impacts will be addressed in Chapter 7 and cooling-water alternatives in Chapter 9.*

Comment: Florida Power & Light refers to plans to fill at least 70 acres of existing wetlands in the Miami Dade region surrounding Turkey Point. This fill could have devastating impacts on the surrounding environment and economy, as it would eliminate 70 acres of existing flood water storage during intense rainfall or hurricane. Filled wetlands can cause both on-site and off-site flooding [2], damaging the plant itself on property owned by Florida Power & Light, and also causing possible devastating damage to the surrounding communities, even possible loss of life. (**0007-6** [Burris, Jessica])

Response: *The environmental impacts of building and operating proposed Turkey Point Units 6 and 7, including the infilling of wetlands, on local hydrology and terrestrial ecology will be evaluated in Chapters 4 and 5 of the EIS. Safety issues related to potential floods are outside the scope of the environmental review, but will be evaluated by the NRC staff in its SER.*

Comment: If the scientists are correct, and they keep moving that global warming -- not global warming, but global sea level change up more and more because the glaciers of Greenland, of Antarctica, are melting. They are melting. You don't have to believe it or not. Look at the photos and look at it, look at the measurements and look at it. (**0002-14-14** [Schwartz, Matthew])

Comment: Sea level rise is a real and ongoing interesting element that we haven't had to deal with before that is going to be causing major challenges to our infrastructure. We would hope that FPL's proposed facility do not add any unintended consequences by moving millions of tons of dirt and moving waters around that could increase the potential impacts as a result of the already impacting sea level rise. (**0002-3-6** [Walker, Tom])

Comment: [L]ook ahead through the expected life of the new facilities, and should consider potential future conditions in the analysis, including a change in sea level. Sea level has been rising in this region since records were established, and could ultimately affect how the plant and associated facilities interact with the surrounding environment. Miami-Dade County recommends that the time period for projections of future conditions include the potential that the license would be renewable for a second operational period. This has been the case for the existing Units 3 and 4. Given FPL's operational record, there is no reason to assume otherwise for the proposed Units 6 and 7. (**0015-6** [Espinosa, Carlos])

Comment: A further 2-foot sea level rise by the end of the century, as projected in the 2001 IPCC report, would make life in south Florida very difficult for everyone. Spring high tides would be +4.5 to 5 feet above present mean sea level 3 q; storm surges would be higher; barrier islands, fill islands and low-lying mainland areas would be frequently flooded; salt water intrusion would restrict available freshwater resources; drainage would be more sluggish; Turkey Point would be an offshore island; and so on. (**0016-9** [White, Barry])

Comment: Please state all the projections for sea level rise used by the NRC. (**0022-1-4** [Reynolds, Laura])

Comment: No identification of sea level rise projections used to model the water management project provided. (**0023-3-59** [LaFerrier, Marc])

Comment: Other specific issues NMFS recommends for evaluation in the EIS or EFH assessment: 5. *Sea level rise*. Please include information in the EIS that evaluates potential seal level rise scenarios and how the project is being designed to mitigate these effects. (**0033-13** [Croom, Miles])

Response: *The review team will assess the impacts of building and operating proposed Turkey Point Units 6 and 7 on local and regional water resources and aquatic and terrestrial ecology. This assessment will consider both current and future conditions that affect the environment including sea level rise and mitigation measures identified by the applicant that could reduce adverse impacts. Impacts on water and ecological resources from building and operating the units will be discussed in EIS Chapters 4 and 5, respectively. Cumulative impacts will be addressed in Chapter 7 and plant design alternatives in Chapter 9. The period of consideration for environmental impacts is over the 40-year license period; under the NRCs environmental protection regulations (Title 10 of the Code of Federal Regulations [CFR] Part 51), which implement Section 102(2) of the National Environmental Policy Act of 1969, as amended (NEPA), if renewal of the operating license is requested, preparation of an EIS would again be required. Because license renewal is not certain to occur (or even to be requested), to include that extended period for environmental impacts would be speculative and outside the bounds of*

NEPA. Therefore, the assertion that the time period for projection of future considerations should include a second operational period is out of scope for this EIS.

Comment: Please state the amount of disruption to sheetflow of wetlands that the construction of units 6 & 7 will make including the plant site, all support facilities, all structures, all borrow pits (including rockmines) all fencing, all roads, all berms, all pipelines, all transmission lines, all basins, all parking lots, and all vehicle usage. (**0022-2-19** [Reynolds, Laura])

Comment: The application does not provide a description of the specific upgrades FPL proposes to satisfy this condition. A complete and detailed description shall be provided. In addition, FPL shall describe what sheet flow improvements, if any, are proposed within transmission corridors for which mitigation lift is being sought. (**0023-3-26** [LaFerrier, Marc])

Comment: Please resolve the apparent conflict between this condition and the stated intent to install roads in the transmission line corridors where no impediments to sheetflow currently exist, such as the portion of the West transmission corridor in Section 31 T57S R39E. (**0023-3-27** [LaFerrier, Marc])

Comment: The construction of proposed access roads to the new reactor facility will also impact the Biscayne Bay Coastal Wetlands Project by altering sheet flow that is important to the success of the Project. (**0025-2-17** [Kimball, Dan] [Lewis, Mark])

Comment: The SFWMD recommends that the following issues be addressed in the Environmental Impact Statement: Electrical Transmission Lines - The potential for adverse impacts to existing wetland slough systems, located within the vicinity of U.S. Highway 1, from new and/or improved fill roads associated with the West Preferred Corridor. East of U.S. 1, under the CERP Biscayne Bay Coastal Wetlands Project, additional surface water flows are to be diverted southward, through existing wetland slough systems in this area, to hydrate wetlands to the south, including wetlands in the SFWMD's Model Lands Basin area, and possibly the SFWMD's Southern Glades Basin area. The SFWMD is a partner with the USACE in this project. Even if culverts are installed, they are very poor at maintaining low head flows (i.e., sheetflow). West of U.S. 1, the corridor crosses the SFWMD's Southern Glades Save Our Rivers Parcel GR701-025. (**0032-23** [Golden, James])

Comment: The SFWMD recommends that the following issues be addressed in the Environmental Impact Statement: Electrical Transmission Lines - Regarding Water Conservation Area 3B, there are potential impacts related to the construction, operation, and maintenance of the proposed transmission line with respect to the SFWMD's legally mandated responsibilities for managing its lands within Water Conservation Area 3B. These lands were specifically acquired for water management-related purposes (i.e., flood control, water supply, conservation, reclamation, and other allied purposes) and are managed by the SFWMD and other agencies, including the U.S. Fish and Wildlife Service and the Florida Fish and Wildlife Conservation Commission, through special agreements for those purposes. (**0032-26** [Golden, James])

Response: *The review team's assessment of the impacts of building proposed Turkey Point Units 6 and 7 on the environment, including impacts on sheetflow associated with building*

roads, transmission lines, and other linear features, will be presented in Chapter 4 of the EIS. Cumulative impacts will be addressed in Chapter 7. The EIS will include citations for documents used in its preparation.

Comment: Simulation should cover, at a minimum, the area bounded by SW 344th St in the north, Old Card Sound Road in the west, and the coastline in the south and east. The EPA-SWMM and XP-SWMM are recommended models to simulate the variety of structures within the area, in order to obtain hydrographs and pollutographs at selected points. The model should also simulate contaminant transport and dilution effect. Event simulations should be run to obtain the conditions before and after the proposed development, including the new inflow and loads from the proposed Administrative/Training Buildings, Parking area, and Reclaimed Water Treatment Facility. (**0023-1-13** [LaFerrier, Marc])

Response: *This comment refers specifically to the SCA submitted to the State of Florida by FPL, but it indicates an interest in the potential impacts of the building of the proposed units on local and regional water supply and water quality. Modeling data provided by the applicant will be reviewed and evaluated in the course of the development of the assessment. The assessment of the impacts on water resources from building proposed Turkey Point Units 6 and 7 will be presented in Chapter 4 of the EIS, based on information describing the affected environment in Chapter 2.*

Comment: Please provide drainage plans and associated calculations for the proposed access roads. (**0023-2-20** [LaFerrier, Marc])

Comment: The mitigation plan proposes to discharge wastewater into the Model Lands and to seek mitigation credit for this discharge. Since the area proposed for discharge is a sawgrass wetland, pollutant levels, including but not limited to nutrient levels, would need to be very low (e.g. less than 10 ppb phosphorous). The application, however, provides insufficient information on the treatment methodology, the resulting quality, volume, and timing of the discharge. The applicant shall provide complete and detailed water quality information for the proposed discharge water that is sufficient to determine whether the water quality of the proposed discharge water is sufficient to prevent degradation of the receiving wetlands. (**0023-3-43** [LaFerrier, Marc])

Comment: In order to have hydrologic improvements, with the exception of reclaimed water, water must be captured or diverted from other areas. Please describe in detail how the redirection of water will affect those donor areas, such as Biscayne Bay. Is there a loss of function from some areas associated with the diversion of water for the proposed hydrologic improvements? (**0023-4-1** [LaFerrier, Marc])

Comment: [T]he application does not provide sufficient information to evaluate the impact of these discharges on water quality of adjacent surface. (**0023-4-11** [LaFerrier, Marc])

Response: *These comments refer specifically to the SCA submitted to the State of Florida by FPL, but they indicate an interest in the potential impacts of the operation of proposed Turkey Point Units 6 and 7 on water availability, water quality, and terrestrial ecology. The review team's assessment of impacts on local and regional water resources and terrestrial ecology*

from building the proposed units will be presented in Chapter 4 of the EIS. Impacts from operation of the proposed units will be presented in Chapter 5. Cumulative impacts will be addressed in Chapter 7 and plant effluent discharge alternatives in Chapter 9.

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts of utilizing reclaimed water as supplied by M-D County to the Turkey Point FPL power station in the future, including any cost-benefit analyses please provide them. (**0022-1-8** [Reynolds, Laura])

Comment: [T]he COL proposes the use of tertiary treated wastewater as the primary cooling water supply source for Units 6&7.] Biscayne Bay is designated an Outstanding Florida Water and as such has a no degradation standard. The use of tertiary treated wastewater for cooling water would indirectly introduce PPCPs, surfactants, biocides, and EDCs into southern Biscayne Bay that were not present at the time of designation. (**0025-2-4** [Kimball, Dan] [Lewis, Mark])

Response: *These comments refer to the impacts of using treated wastewater as the primary cooling water supply for proposed Turkey Point Units 6 and 7. The impacts of the proposed units on local and regional water resources, including impacts related to using reclaimed water on water quality in Biscayne Bay, will be presented in Chapter 5 of the EIS, based on information describing the affected environment in Chapter 2 and plant design and operations discussed in Chapter 3. The EIS will include citations for documents used in its preparation.*

Comment: A lot has changed since this facility was originally sited here. You are about to undertake an analysis of a proposal to place two nuclear reactors on the shores of a bay that is the subject of a major Federal multi-billion dollar restoration project. The nature of the impacts that this project will have; water consumption, wetland loss that is sort of off the charts in terms of modern wetland permitting in Southeast Florida; habitat loss; impacts to hydrology in the way water moves, are the types of impacts that that multi-billion dollar Federal project is trying to reverse. And so the notion of coming in and bringing about water use impacts, that are unlike anything else known in South Florida, and wetland impacts that are kind of off the charts, just fundamentally is a major problem and doesn't really add up. The exacerbation of things that one arm of the Federal Government is trying to fix, doesn't make sense in the modern world. (**0002-6-1** [Grosso, Richard])

Comment: Will this project potentially interfere with the goals of the Biscayne Bay Coastal Wetlands Project (BBCW)? Please indicate how the applicant is coordinating with the BBCW team to ensure that the use of the radial collector wells will not hinder the success of the BBCW project. (**0018-11** [Poole, Mary Ann])

Comment: The application predicts the potential for additional salinization throughout the area as a result of the project by drawing salty water landward via the radial collector wells and from deposition of salts as a result of cooling tower operations. In contrast, the CERP BBCW project seeks to reduce salinity levels in and adjacent to Biscayne Bay to restore more natural estuarine conditions. No documentation is provided to examine the specific impacts to the area from additional salinization generally and for CERP consistency specifically. A study is needed that

includes a salt budget and an examination of the cumulative effects of existing and proposed operations at Turkey Point including but not limited to the existing chloride plume created by the cooling canal system and the additional salts that would be added to the area as a result of the proposed project. The study shall also be sufficient to determine the extent to which the radial collector wells would capture, redirect, or otherwise affect groundwater from the existing plume emanating from FPL's Cooling Canal System. (**0023-3-39** [LaFerrier, Marc])

Comment: Narrative description of the timing and the approval process of the FPL water management project and the Alternative "O" CERP project, to ensure that both can and will likely be accomplished. Analysis by FPL, with cooperation from the SFWMD, on whether the incorporation of the water management project into the CERP process will alter or jeopardize the potential approval and funding of the CERP project not provided. (**0023-3-60** [LaFerrier, Marc])

Comment: The groundwater modeling is currently insufficient to effectively simulate impacts to the bay, or even to determine the percentage of fresh water from the aquifer, which would be removed from the ecosystem by the RCWs. Until it can be satisfactorily determined that the RCW system will not remove aquifer water, this plan appears to conflict with the CERP Biscayne Bay Coastal Wetlands project. (**0025-2-15** [Kimball, Dan] [Lewis, Mark])

Comment: Construction of infrastructure associated with transmission lines and access roads in either corridor would result in the permanent filling of over 100 acres of wetlands. Direct and indirect effects of filling need to be included in the evaluation of impacts resulting from this project. In particular, installation of additional access roads in either corridor would create new barriers to flow in a critical portion of northeast Shark River Slough. This area is a focal point of Modified Water Deliveries (MWD) and CERP restoration projects designed to restore natural flow to that area. In addition, modification of the existing L-31 N levee in the western preferred corridor to provide access to proposed transmission lines would create an impediment to the natural north to south flow of water in the area. Access roads, even if culverted, will result in reduction of surface water flow critical to maintenance of ENP wetlands. This is in direct conflict with one of the critical components of hydrological restoration under CERP. The impacts of this flow reduction on park wetland resources and on MWD and CERP restoration projects that are underway or planned needs to be evaluated. (**0025-3-35** [Kimball, Dan] [Lewis, Mark])

Comment: Construction, maintenance and vegetation management in either transmission line corridor identified by FPL would result in impacts to ENP water quality through soil disturbance and/or the introduction of chemical pesticides. These impacts need to be evaluated. (**0025-3-36** [Kimball, Dan] [Lewis, Mark])

Comment: The SFWMD recommends that the following issues be addressed in the Environmental Impact Statement: Radial Wells and Construction Dewatering Withdrawals at Power Plant Site - The potential for the proposed withdrawals to adversely impact the CERP Biscayne Bay Coastal Wetlands project. (**0032-10** [Golden, James])

Comment: Proposed Project may result in adverse impacts to: The Biscayne Bay Coastal Wetlands CERP Project -This project will replace lost overland fresh water flow and partially compensate for the reduction in groundwater seepage by redistributing, through a spreader system, available surface water entering the area from regional canals. The goal of this project

is to improve the ecological health of Biscayne Bay (including freshwater wetlands, tidal creeks and near-shore habitat) by adjusting the quantity, quality, timing, and distribution of freshwater entering Biscayne Bay and Biscayne National Park. Redistribution of freshwater flow and the expansion and restoration of wetlands will help to restore or enhance freshwater wetlands, tidal wetlands, and near shore bay habitat. The project, located in southeastern Miami-Dade County, includes pump stations, spreader swales, stormwater treatment areas, flowways, levees, culverts, and backfilled canals. The project covers 13,600 acres along the L-31 E Canal. The purpose of the project is to capture, treat, and redistribute freshwater runoff from the watershed going into Biscayne Bay, creating more natural water deliveries and expanding the spatial extent and connectivity of coastal wetlands and improving recreational opportunities. (**0032-2** [Golden, James])

Comment: Proposed Project may result in adverse impacts to: The L31 N (L-30) Seepage Management Pilot CERP Project -This project, located along a portion of the L-30 levee north of U.S. Highway 41 in Miami-Dade County, will help resolve critical uncertainties associated with seepage management, including the characterization of the Biscayne aquifer hydrodynamics, constructability in south Florida geology, reliability of materials and technologies, feasibility of implementing a seasonally flexible operating system, appropriateness of monitoring to evaluate effects on seepage, and cost and time requirements necessary for implementation. The recommended plan will test two structural seepage reduction technologies (steel sheet pile and slurry wall), and will test the ability to seasonally manage seepage flows through pumping operations with the use of extraction and injection wells. Field tests, seepage reports, and historical data independently show that this is one of the most transmissive parts of the Biscayne aquifer. (**0032-3** [Golden, James])

Comment: Provide assurance that the proposed roadway improvements will be designed to be compatible with CERP Biscayne Bay Coastal Wetlands Project Alternative "O". The amendment does not demonstrate how the proposed roadway improvements will be designed to be compatible with CERP Biscayne Bay Coastal Wetlands Project Alternative O. Under Alternative O, additional surface water flow :(sheetflow) is to be diverted southward, through existing wetland slough systems, into environmentally sensitive lands located south of Palm Drive (S.W. 344th Street), generally between the District's L-31E Canal and U.S. Highway 1. Under this amendment, several new roadway improvements are proposed that could interfere with the proposed sheetflow. Prior, to adoption, the amendment should be revised to include policies, strategies, and commitments to ensure that the appropriate engineering analyses are conducted and any proposed drainage features, including culverts, be designed, sized, and spaced to handle existing and proposed flows. (**0032-34** [Golden, James])

Comment: Proposed Project may result in adverse impacts to: The South Dade C-111 Project and Modified Water Delivery Project to Everglades National Park (Modwaters) -This project will modify the existing water management infrastructure to improve water deliveries to Everglades National Park (ENP). Changes are being made to Water Conservation Area 3A/3B levees and canals to redirect water flow into Northeast Shark River Slough in and around the proposed new Florida Power & Light (FPL) Turkey Point Units 6 & 7 transmission line corridors. Current water management actions focus on re-establishing sheet flow into ENP by removing barriers such as the Tamiami Trail road and replacing it with a bridge. Future water management changes will increase the volume of water introduced and distributed into Northeast Shark River Slough.

Additional changes are being implemented along the Lower C-1 11 Canal to promote rehydration of Taylor Slough and northern Florida Bay in the southern limits of ENP. A series of detention areas are being constructed west of the L31N Canal to provide storm water detention and create a hydrologic barrier between the managed canal levels and the Everglades marsh. Water levels will be managed at higher levels within the detention areas to create a positive hydrologic head and reduce seepage from ENP. (**0032-4** [Golden, James])

Comment: Proposed Project may result in adverse impacts to: Decompartmentalization of Water Conservation Area 3A/3B -This is a CERP project and a companion to the South Dade C-1 11/Modwaters Project promoting removal of existing levees and canals impacting sheet flow into ENP. Future changes include removal of existing canals, levees, and structures separating WCA 3A/3B and ENP, such as removal of the Miami Canal within WCA 3A, removal of the L-67A/C levee segments, and additional bridging of Tamiami Trail together with the removal of the L-29 containment levee. (**0032-5** [Golden, James])

Comment: In addition to the potential for significant adverse impacts to specific restoration projects, the SFWMD is concerned about the potential for significant adverse impacts that relate to its overall mission to manage the water resources of the State located within the SFWMD's geographic boundaries. (**0032-6** [Golden, James])

Comment: Other specific issues NMFS recommends for evaluation in the EIS or EFH assessment: 4. *Biscayne Bay Coastal Wetlands (BBCW)*. Please describe any potential conflicts this project may have with the restoration goals of BBCW. Please indicate how FPL and NRC are working with the BBCW team to ensure that any expansion at Turkey Point will not hinder the success of the BBCW project. (**0033-12** [Croom, Miles])

Response: *These comments refer to interactions between the proposed action and regional projects, including CERP projects. The review team will assess the impact of proposed Turkey Point Units 6 and 7 on local and regional water resources and aquatic and terrestrial ecology. Assessment of the impacts of building and operating the proposed units on water quality and ecological resources will be presented in Chapters 4 and 5 of the EIS, respectively. Cumulative impacts, including interactions with CERP and other restoration efforts, will be addressed in Chapter 7.*

Comment: The SFWMD recommends that the following issues be addressed in the Environmental Impact Statement: Additional Construction Impacts at Power Plant Site - The potential for adverse impacts to Biscayne Bay associated with the proposed barge canal dredging. (**0032-13** [Golden, James])

Response: *The impacts of the proposed action on hydrology and water quality in Biscayne Bay, specifically the impacts related to dredging of the barge canal (barge-turning basin and barge-unloading area), will be presented in Chapter 4 of the EIS. The impact assessment in Chapter 4 will be based on information describing the affected environment in Chapter 2 and plant design and operations discussed in Chapter 3.*

Comment: The NRC needs to acknowledge that this area is an extremely sensitive hydrological environment. The history of the Everglades and the current costly restoration

projects illustrate the long-term shortsightedness that has scarred Florida's waterways. (**0001-14-6** [Hancock, Mandy])

Comment: The new reactors will require more fresh water for cooling and there's already a shortage of water in the natural system. So, although the comprehensive Everglades Restoration Plan plans to provide reused water to help restore Biscayne Bay, the two new reactors would require additional water as well. This plan puts Florida Power & Light development in competition with Everglades Restoration and we think restoration has had enough competition already. (**0001-15-2** [Cornick, Lance])

Comment: The water use is massive. Biscayne Bay restoration is all about fixing the problem that we don't get enough fresh water into the bay anymore. So the notion that you would add this type of fresh water consumptive use right there at that same location, is incredibly troubling. We haven't figured out how we're going to get the amount of fresh water back into the bay that we need to make it work again. This water demand could absolutely preclude ever getting that done. (**0002-6-2** [Grosso, Richard])

Comment: Sixty billion gallons of water is the last statistic that I heard that would be needed per day. That's way too much water. And I also heard that it would be warmer after use, going into the cooling and going back into our water. And just a small degree change can definitely affect all of our wetlands and things here. (**0002-8-5** [O'Katy, Jessica])

Comment: [T]he new nuclear power plants will require more than ninety million gallons of fresh water a day to cool the reactors, causing severe problems to the already water restricted Southeast Florida. (**0012-10** [Payne, Nkenga])

Comment: THERE IS NOT ENOUGH WATER IN THE AREA TO SUPPORT TP 6&7! (**0016-11** [White, Barry])

Comment: The required amounts of water needed to operate the reactors is beyond the capability of the water supply in South Florida. I am presently restricted from certain water use. What will be my future if these reactors are allowed to be built? How much potable water will be needed to support the doubling of the plant without the reactors? (**0027-5** [Moses, Dorothy])

Response: *The impacts of building and operating proposed Turkey Point Units 6 and 7 on consumptive water use and cooling water discharge for both local and regional water resources will be presented in Chapters 4 and 5 of the EIS. Cumulative water-use impacts will be addressed in Chapter 7 and cooling water alternatives in Chapter 9.*

Comment: Table 4.6-1 states that occasional surface water overflow/run-off from deep well injection wells would be directed to the Cooling Canal System. This would cause infiltration of wastewater constituents, including EPOCs, to the Biscayne Aquifer and subsequently to Biscayne Bay via subsurface flow. Wastewater migration to the bay would negatively impact the flora and fauna of the nearshore habitat due to the release of nutrient and microconstituents (i.e., EPOCs), which requires further consideration. (**0025-3-15** [Kimball, Dan] [Lewis, Mark])

Response: *Table 4.6-1 indicates "The deep injection wells and the required monitoring wells would be installed in accordance with an FDEP injection well permit and any local permit*

requirements. During the construction of the injection wells and associated equipment, any surface water runoff would be directed to the cooling canals of the industrial wastewater facility." During construction, wastewater constituents will not be present at the well sites and so would not be discharged to the Cooling Canal System. The impacts of constructing the injection wells will be presented in Chapter 4 of the EIS.

D.1.8 Comments Concerning Hydrology – Groundwater

Comment: As Mayor of the Village of Pinecrest and a former legislator, when I did serve in the House of Representative in the Florida Legislature, I had an opportunity to learn about and really come to grips with some of the potential for contamination and impact on the Floridan aquifer and the Biscayne aquifer, and I've been very attentive to that ever since, the concept of placing deep well injection. And back in the year 2001, there was an effort by the State and the Legislature and the Water Management Districts, to inject untreated storm water into the aquifer, and that actually passed the Florida Senate. We had to go back and undo it and we killed that legislation. I have been very involved in supporting the sustainability and the comprehensive Everglades Restoration Project ever since. (**0001-21-2** [Lerner, Cindy])

Comment: And what will 70 million gallons of hot water do each day that they will have to get rid of? Where do you put 70 million gallons of water each day? You can't pump it down into the same place you're getting your cooling water from. If they got their cooling water from the sewage treatment plant then they would want to dump the hot water down into the boulder zone. Nobody has any idea what that would mean. We know that with sewage we pump way down deep into there offshore is now coming back up in Biscayne Bay and elsewhere. Also, that hot water is slightly radioactive. (**0001-6-6** [Miller, Lloyd])

Comment: FPL proposes to inject 40 million gallons a day of waste in the boulder zone, a layer of the lower Floridan aquifer. And we are -- as the previous speaker mentioned, we are really unclear what the effects of this might be. (**0001-7-10** [MacLaren, Kaitlin])

Comment: Please state the amount of waste seepage, by volume, into drinking water aquifers from deep well injection for units 6&7. (**0022-2-13** [Reynolds, Laura])

Comment: To the extent that you are aware of any of any consent decrees or administrative orders or settlements concerning underground injection control wells in Florida, please provide them. (**0022-2-8** [Reynolds, Laura])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts of operation of underground injection control wells in the South Florida area, please provide them. (**0022-2-9** [Reynolds, Laura])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts of the deep well injection of wastes exceeding the capacity of the wastes reservoir, please provide them. (**0022-4-6** [Reynolds, Laura])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to the maximum geographical extent of the deep well injected waste reservoir for the duration of the operating license, please provide them. (**0022-4-7** [Reynolds, Laura])

Comment: The application does not address any proposed treatment of biocide additive in the cooling waters, and how biocides are removed before reinjection into the proposed deep wells. (**0023-1-15** [LaFerrier, Marc])

Comment: Given the high evaporation rate, the concentrations of the analytes leaving the cooling tower system will be significantly higher that the concentration of those analytes entering the system. Considering that the final discharge point of the cooling system blowdown water is proposed to be the boulder zone (via underground injection wells), projected water quality characteristics for the blowdown must be provided. (**0023-1-7** [LaFerrier, Marc])

Comment: The application proposes the discharges of industrial wastes from several sources to injection wells. No information was provided to ascertain compliance with the applicable discharge standards. No information was provided to show that no treatment is necessary or that contamination will not result from such discharges. (**0023-1-9** [LaFerrier, Marc])

Comment: The primary source of cooling water is supposedly reclaimed water from Miami-Dade Water & Sewer Authority. The daily flow rate for cooling is supposedly 60mgd. The EIS should confirm that the cooling water concentrate from the reclaimed water source will be disposed of in the boulder zone through a class one deep injection well. Similarly, if the Floridian Aquifer water is used for cooling, concentrated brine reject should be disposed of in the deep well injection system in the boulder zone. (**0024-6** [Walker, Tom])

Comment: Current hydrologic knowledge regarding underground injection into the Boulder Zone suggests that the porosity and permeability in the Floridan can vary greatly depending on the location and formation. A history of dual zone groundwater monitoring results from the Miami-Dade County South District Wastewater Treatment Plant shows evidence of wastewater contaminant migration into the Upper Floridan. Upon the submittal of the pending USGS groundwater underground injection investigation for this region, it may be soon proven that the geology of the injection zone is incapable of confining the volume of injected sewage. These same concerns seem applicable to this project and the very large amount of discharged fluids intended to be injected. The Upper Floridan supplies make-up cooling water for existing Unit 5. Based on the above discussion, a similar breach of the Boulder Zone is possible and would compromise the water supply quality of Unit 5. (**0025-3-21** [Kimball, Dan] [Lewis, Mark])

Comment: An even more frightening scenario is FPL's intention of using injection wells for radioactive wastewater. I do not believe this has ever been done before. Can the NRC guarantee these waters will not percolate back up into our water supply or into our coral reefs or marine environments or national parks or my backyard? Does anyone know with complete certainty where this radioactive waste may end up? (**0027-7** [Moses, Dorothy])

Response: *The impacts on the Biscayne and Floridan Aquifers from deep well injection to the Boulder Zone will be assessed by the team and discussed in Chapter 5 of the EIS. The*

cumulative impacts of the proposed injection and other past, present, and reasonably foreseeable actions will be presented in Chapter 7.

Comment: Secretary of Interior, Stewart Udall, took the federal court -- took FPL to federal court and forced them to construct an enormous cooling canal system, closed circuit cooling canal system. It's so big it can be seen from space. And it now contains super saline water and it has now penetrated and started to move in toward the farmlands and the tree farms. (**0001-6-3** [Miller, Lloyd])

Comment: The Draft EIS should disclose/summarize results from all recent hydrologic studies and on-going assessments of the existing cooling canal system being utilized by Florida Power & Light Company's (FPL) for Turkey Point. EPA has met with National Park Service (NPS) officials from the Biscayne National Park regarding their concerns with the existing cooling canal system and its contribution to salt water intrusion in the South Miami-Dade area. NPS is concerned that the planned increased electric output from the existing units and the construction of two new nuclear reactors may exacerbate the salt water intrusion. This has raised concerns about adversely affecting local potable water supplies and the on-going Everglades restoration efforts. (**0014-5** [Mueller, Heinz])

Comment: The Draft EIS should address concerns by agencies that the canal system has created a very warm and "hypersaline" water that sinks and spreads into the Biscayne Aquifer below. (**0014-6** [Mueller, Heinz])

Comment: Water quality data summarized in Table 3.3.4-2 is not sufficient to fully assess the hydrologic characteristics of the cooling canal system. Cooling canal system is complex hydrology and includes interaction with Bay and groundwater (Section 3.3.2.1), and as such may have temporal and spatial variability. (**0023-1-67** [LaFerrier, Marc])

Comment: Data indicate that migration of the cooling canal system water is impacting adjoining surface and groundwater in the vicinity of the cooling canal system. (**0023-4-10** [LaFerrier, Marc])

Comment: [The Florida Keys Aqueduct Authority has] concerns for any potential impacts to our water supply. As the proposed project is significant in size and nature, conducting a comprehensive EIS to address key concerns and impacts to the natural resources is a necessary part of the evaluation process. It is our understanding that FPL's existing cooling water canal system, located west and south of the power plant contains high salinity concentrations. This high salinity is derived from evaporation of natural sea water discharged within these cooling water canals. As the highly concentrated seawater enters the groundwater along the bottom and the sides of the canals, the receiving groundwater becomes more saline. Without adequately operating system controls, this hydrogeological process can continue with a resultant salt load into a fresher groundwater aquifer. The higher saline groundwater with a higher specific gravity can increase the rate and amount of salt water intrusion from east to west in the Biscayne Aquifer and toward the FKAA wellfield. (**0024-1** [Walker, Tom])

Response: *The impacts of the cooling canals of the existing Turkey Point units on groundwater near the plant are in general outside the scope of the current EIS, which will assess the impact*

of building and operating proposed Turkey Point Units 6 and 7. To the extent that the building and operation of the proposed units interact with the cooling canals, the building impacts will be presented in Chapter 4 and the operations impacts will be presented in Chapter 5 of the EIS. The cumulative impacts of the proposed units and the existing units, to the extent that they impact the same resources, will be presented in Chapter 7.

Comment: We have an impact for water, we have an impact for saltwater intrusion. But don't we have that naturally? (**0002-12-1** [McHugh, John])

Comment: When I moved out to my house -- I live west of Krome Avenue -- I could drink the water right out of my well, and that was fine for over 20 years. And then about 10 years ago they decide -- I used to have 4 houses to my block, okay, about 1 square mile. Now I have about 50 or 60 houses to my block. My water supply is not the same now. The quality of water is not the same as it was 10 years ago before those houses were built. See? And it's not any difference except now there's 40 or 50 more people in the area drawing off that same aquifer that there was only 4 before. (**0002-12-6** [McHugh, John])

Comment: The agriculture out there uses massive amounts of water. Okay. When I lived out there for 20 years agriculture used massive amounts of water. We didn't have bad quality of water. Okay. The water was there, it was used, reached right under the ground. (**0002-12-9** [McHugh, John])

Response: *The impacts of saltwater intrusion on baseline water quality in the vicinity of the proposed plant will be discussed in Chapter 2 of the EIS. The impacts of the proposed action on water resources will be discussed in Chapters 4 and 5 for building and operating the units, respectively. Projects that have the potential to interact cumulatively with the operations of the proposed units and affect water resources will be discussed in Chapter 7.*

Comment: The Florida Keys primary water supply comes from a well field that is within ten miles of the proposed project. That's the well field itself. The actual aquifer that draws water into the well field is all around where we are. It's a very open, porous, surficial aquifer that's very vulnerable, very sensitive to wants and needs and with water chemistry in and about the land uses in South Dade County. Not just our well fields, there's well fields for Florida City, Homestead, and many other private and public systems in South Dade County that are within this region, some closer, some further away than ours, to the proposed project. (**0002-3-1** [Walker, Tom])

Comment: Saltwater intrusion is a real issue to the Biscayne aquifer. We've seen the saltwater front line move over time inland. We have a huge number of monitoring wells as sentinels to help keep an eye and monitor the chemistries in the Biscayne aquifer. We have seen the intrusion exacerbated by existing operation at the existing FPL facility. One of the prior speakers mentioned high density saline water from the cooling canals. And that's been studied to some degree, however, the transparency of seeing the data is not as good as we would like from the applicant. (**0002-3-2** [Walker, Tom])

Comment: We understand also that the proposal included potentially huge amounts of borrow excavation in and around the facility. Also, a huge amount of reclaimed water to be used as

cooling. Both of these elements are going to change potentially the hydrology and the water chemistry in and around the area. (**0002-3-3** [Walker, Tom])

Comment: And the final point I'll make is about saltwater impacts. One aspect of Everglades and Biscayne Bay restoration is about ecology. The other aspect is about South Florida's drinking water supply. We've had major drinking water crises. We've had development moratoriums because of a lack of drinking water. Saltwater intrusion is a major problem. Saltwater intrusion, if it contaminates drinking water is not just an environmental problem, but it's a sound growth into the future development problem for South Florida. It's not a risk that a place like South Florida that already has major droughts and already has major drinking water shortages can afford to take. So, that's an unacceptable risk. The unacceptability of that risk ought to be considered strongly. (**0002-6-9** [Grosso, Richard])

Comment: I'd like to ask that you please look at the protection of our wetlands and our national parks, and be careful of saltwater intrusion in our aquifers. It doesn't seem like that when we're going to be drilling for more fresh water that we need here, as well as filling acres, what we have wetland restorations for now. (**0002-8-4** [O'Katy, Jessica])

Comment: Water resources issues associated with this project include protection of water quality and the Biscayne Aquifer. The Biscayne Aquifer is a sole source aquifer providing high quality drinking water throughout Miami-Dade and Monroe Counties. Protection of this aquifer from contamination by chlorides and sodium from saline water sources is key to ensuring the continued ability to deliver safe drinking water from public well fields in Florida City and Homestead as well as from the Florida Keys Aqueduct Authority Navy Wells facility. The EIS should include an assessment of the potential impact of the project on water resources in this area. (**0015-2** [Espinosa, Carlos])

Comment: There is already salt water intrusion into the area to the west of TP. Not only is this a threat to the rock in the area, you cannot use rock for building if it has salt water in it, but to the water supply. TP 3&4 have already increased the salinity in the area; the cooling canals are twice the density of sea water. Any operation of TP 6&7 which will increase salinity could force the need for desalinization to produce potable water. (**0016-8** [White, Barry])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts of the Turkey Point FPL power station on groundwater (quality or quantity), please provide them. (**0022-1-1** [Reynolds, Laura])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts of operation of the Turkey Point FPL power station on the Biscayne Aquifer, in the past, currently, and in the future, please provide them. (**0022-1-21** [Reynolds, Laura])

Comment: Please state the amount of disruption to groundwater flow and the salt front that the construction of units 6&7 will make including the plant site, all support facilities, all structures, all borrow pits (including rockmines,) all fencing, all roads, all berms, all pipelines, all transmission lines, all basins, all parking lots, and all vehicle usage. (**0022-2-20** [Reynolds, Laura])

Comment: Please state the worst case scenario and the worst timeline projection, as a result of hydrologic changes from units 6&7 for salt water intrusion affecting the municipal wellfields of Miami- Dade County, the City of Homestead, the City of Florida City, the Florida Keys Aqueduct Authority, and private well users. (**0022-3-2** [Reynolds, Laura])

Comment: Please state what protective measures will be taken to prevent salt water intrusion, as a result of hydrologic changes from units 6&7, to the municipal wellfields of Miami-Dade County, the City of Homestead, the City of Florida City, the Florida Keys Aqueduct Authority, and private well users. (**0022-3-3** [Reynolds, Laura])

Comment: [T]he effect that the proposed facility would have on surface and groundwater quality, and groundwater table elevation within the C111 Basin (Model Land Area). Furthermore, any model used for evaluation of this project should be able to predict changes, if any, in the contaminant concentrations; in the water table elevations; and in the salinity wedge movement under different scenarios (baseline and post-construction conditions, for a wet, dry, and average year, etc). Models should combine groundwater with surface water and contaminant transport, and shall include the effect of the difference in densities between salt and fresh water. In addition, the area in the model should be large enough to avoid any boundary-induced bias; boundary conditions could be taken from South Florida Water Management District regional models. EPA authorized models, such as MODFLOW, MODPATH, and FEMWATER should be considered for use in this study. Another possible model would be the FEFLOW, which combines the groundwater contaminant transport (MODFLOW and MODPATH capabilities) with the two density fluids wedge salinity difference (FEMWATER capability). (**0023-1-14** [LaFerrier, Marc])

Comment: [A] DERM approved hydrologic study and its results shall be provided that evaluates all impacts to surface and groundwater. This study should include consideration of seasonal differences in groundwater flow cited in Section 3.3.3.2 and determine the extent to which these differences are due to current operations at Turkey Point.
(**0023-3-47** [LaFerrier, Marc])

Comment: The FKAA requests that additional ground water modeling and monitoring be presented at the current salt/fresh water interface of the Biscayne Aquifer. As you see in the attached ground water monitoring plan, a trend has been shown and interface presented in collaboration with the USGS and Miami-Dade County to demonstrate the current interface location and its movement. For the EIS, modeling of potential changes to the interface position of this salt/fresh interface resulting from the proposed impacts from the construction and operation of the facility is requested. (**0024-3** [Walker, Tom])

Comment: A robust, peer-reviewed hydrologic modeling analysis is essential to fully incorporate regional and site specific conditions in the vicinity of Turkey Point. The Biscayne Aquifer has a unique lithology and consists of a karst substrate with very high transmissivity. This surficial aquifer is hydraulically connected to nearby man-made surface water bodies, which has a profound impact on model construction. FPL's current groundwater model fails to simulate actual or planned conditions that include: seasonal and temporal variability, hypersaline plume migration, Biscayne Aquifer heterogeneity, and CERP project

implementation. NPS does not believe the COL sufficiently analyzes or evaluates these hydrological and estuarine issues. (**0025-2-1** [Kimball, Dan] [Lewis, Mark])

Comment: Given the sensitive designation of the adjacent surface water body, Biscayne National Park, a horizontal pilot test, including a tracer study, should be considered as a critical design feature and would be more representative of actual full-scale RCW operation than a limited scope vertical pump test. (**0025-3-1** [Kimball, Dan] [Lewis, Mark])

Comment: The new hypersaline plume delineation and hydrogeologic data collected as part of the well drilling and logging for the Uprate Project for Turkey Point Units 3 & 4 should be incorporated in the groundwater modeling and planning for evaluation of the effects of the RCWs. (**0025-3-10** [Kimball, Dan] [Lewis, Mark])

Comment: The groundwater model should reflect implementation of CERP project features. (**0025-3-11** [Kimball, Dan] [Lewis, Mark])

Comment: The Biscayne Aquifer is an unconfined surficial aquifer that has a fragile karst macroporosity substrate. A comprehensive geological survey should be performed for the proposed locations of the RCWs (Turkey Point peninsula) to identify voids or cavities in the aquifer substrate. Soil borings that were performed as part of the 2009 pump test are not aerially sufficient to represent a known dual porosity karst limestone aquifer. (**0025-3-12** [Kimball, Dan] [Lewis, Mark])

Comment: Contingency plans should be established should a karst fracture occur during the construction or operation of the RCWs. (**0025-3-13** [Kimball, Dan] [Lewis, Mark])

Comment: Even based on the rather dubious groundwater modeling provided, FPL is proposing to remove 8% of the total withdrawal from the aquifer, which equals approximately 10 million gallons of groundwater daily. Pursuant to the Resolution (No. Z-56-07, conditions 4 & 5) of the Board of County Commissioners of Miami-Dade County, FPL shall not apply for any water withdrawals from the Biscayne Aquifer as a source of cooling water for the proposed facilities, and shall use reclaimed or reuse water to the maximum extent possible. This consumptive water use conflict must be resolved. (**0025-3-14** [Kimball, Dan] [Lewis, Mark])

Comment: The effects of dewatering on the Biscayne Aquifer (e.g., hypersalinity plume migration, salt water intrusion, etc.) during plant construction were based on the dubious current model, and warrants further evaluation. (**0025-3-16** [Kimball, Dan] [Lewis, Mark])

Comment: Drilling through karst limestone can cause a bay bottom collapse or a cavity could be encountered that would be significantly closer to the surface than anticipated. A structural collapse due to macroporosity features of the Biscayne Aquifer (i.e., dual porosity) or drilling through existing touching-vug preferential flow zones or large karst features would alter the potential velocity of flow through the RCW. Flow in this case would be substantially higher than anticipated. These types of macrokarst features have been found in drilling the wells for the Units 3 & 4 Uprate project, and should be reflected in the groundwater model. (**0025-3-2** [Kimball, Dan] [Lewis, Mark])

Comment: The groundwater model (FSAR Section 2.4-12 Appendix 2CC) utilizes a constant density groundwater model with a reference value of seawater. Average salinity values are not appropriate since Biscayne Bay is an estuarine environment with seasonal salinity variability, which is not equivalent to an ocean salinity pattern. In addition, shallow groundwater salinity observed during the 2009 pump test in MW-I SS (20 avg psu) is not representative of seawater. Also, the groundwater in the vicinity of the Industrial Waste Facility exhibits hypersaline concentrations (68 avg psu). A groundwater salinity range of 48 psu on average is not indicative of a constant density groundwater profile. The constant density assumption cannot adequately determine the effects of the hypersaline plume eastern migration and bay salinity impacts due to the operation of the RCWs and dewatering activities. (**0025-3-3** [Kimball, Dan] [Lewis, Mark])

Comment: A coupled surface water and groundwater hydrologic model, including a separate solute transport module, is necessary to fully evaluate all the associated impacts to Biscayne Bay. (**0025-3-4** [Kimball, Dan] [Lewis, Mark])

Comment: The model input parameters (e.g., hydraulic conductivity, boundary inflow values, etc.) should be based on site specific conditions and data, when available, and be consistent with the calibrated results. Please note that the model calibration results in Table 2CC-205 of the COL, FSAR, Part 2, do not correspond to the calibration results provided in the State of Florida SCA. This discrepancy between the two applications should be rectified. Furthermore, the hydraulic conductivities listed in Table 2CC-205 for the different stratigraphic units of the aquifer do not appear to correspond to site-specific hydraulic conductivity values obtained from on-site pump tests nor published values. This flaw seriously affects the results and validity of the groundwater model. (**0025-3-5** [Kimball, Dan] [Lewis, Mark])

Comment: The margin of error associated with the groundwater model simulation results should be provided. This information is necessary to ascertain the value of the model and how realistic the model output is. 5. Seasonal variability (i.e., rainfall, water levels, surface water flow, salinity, etc.) is inherent to South Florida and cannot be sufficiently reflected in a steady state model. (**0025-3-6** [Kimball, Dan] [Lewis, Mark])

Comment: There are significant temporal differences between the cooling canals, Biscayne Aquifer, and the bay that will affect the water source pathway for the RCWs, which cannot be evaluated with a constant density, steady state model. (**0025-3-7** [Kimball, Dan] [Lewis, Mark])

Comment: An equivalent porous media value was utilized for the groundwater model, which does not reflect the Biscayne Aquifer. The Biscayne Aquifer is defined as a heterogeneous aquifer with documented dual porosity and preferential flow pathways. (**0025-3-8** [Kimball, Dan] [Lewis, Mark])

Comment: Should a preferential subsurface flow pathway be encountered through an RCW lateral, the water source intake will originate from the flow pathway of least resistance. This scenario should be accounted for in the groundwater modeling. (**0025-3-9** [Kimball, Dan] [Lewis, Mark])

Comment: Salt water intrusion is already a problem on our aquifer, anymore rock mining and water usage will cause further degradation of our fresh water supply. (**0027-6** [Moses, Dorothy])

Comment: Turkey Point is hastening saltwater intrusion into South Miami-Dade well fields that supply water to our nearby communities. (**0031-7** [De Villiers, Elena])

Comment: The SFWMD recommends that the following issues be addressed in the Environmental Impact Statement: Radial Wells and Construction Dewatering Withdrawals at Power Plant Site - The potential for adverse impacts to regional water resources, including public water supply wellfields, Biscayne National Park, the Biscayne Bay Aquatic Preserve, and the Florida Keys National Marine Sanctuary from induced seepage from the Turkey Point cooling canal system as a result of cumulative impacts, including additional loading from construction dewatering/wastewater discharges and runoff from stored muck, and reduced head in the vicinity of the power block construction dewatering withdrawals and the radial well withdrawals. The unlined cooling canal system contains hypersaline water overlying the highly permeable Biscayne Aquifer. The salinity of cooling canal system water is significantly greater than natural groundwater salinity in the area and the waters within adjacent Biscayne Bay; therefore, the presence of density driven seepage upgradient (to the west) and downgradient (to the east and south) is likely. Monitoring wells up to approximately three miles west of the cooling canal system have encountered groundwater with chemical constituents indicative of cooling canal system water, including hypersalinity and/or tritium. Constituents within the cooling canal system that have or may have the potential to degrade water resources include hypersaline water, radiological isotopes, nutrients, or other compounds that may be discharged into the cooling canal system from plant operations and/or muck storage adjacent to the cooling canal system. (**0032-11** [Golden, James])

Comment: Ground Water Modeling Summary - *Conceptualization and Configuration:* The entire model domain is assumed to be constant density and saline. Both of these assumptions are inconsistent with other submitted documentation. The simulation bounds of the model are neither all saline nor are they of the same density. FPL has asserted that the assumption is valid for the type of analyses (pump induced drawdown of flux) conducted. While this may be possible in the narrowest interpretation, it is likely that impacts of density dependent flow or temperature induced buoyancy may dominate in some areas; however, the modeling provided does not afford the SFWMD or FPL the opportunity to examine these situations. Also, it is unusual for a system that is made up of fresh, brackish, salt and hyper-saline water to be generically represented as sea water. While we understand an equivalent fresh water head was used, the impacts of this representation on gradients, stage (heads), simulated drawdown, and flows, as well as conclusions derived from these, need to be further explored and justified. (**0032-29** [Golden, James])

Comment: Ground Water Modeling Summary - *Boundary Conditions*: By utilizing a steady state simulation, the impact of selected boundary conditions will propagate over the entire model. By definition, a steady state is reached when all hydrologic drivers, including those specified at the boundaries, reach equilibrium. This assumption makes the specification of the model boundaries, such as head in the constant head cells that represent Biscayne Bay, very crucial. It is understood that for permitting purposes, non-exact simulations may be acceptable, if they are conservatively estimated; however, a non-conservative estimate (e.g., the water level

in Biscayne Bay) could result in under-estimation or over-estimation of pumping rate necessary to achieve necessary drawdown during dewatering. Similarly, a non-conservatively selected stage in Biscayne Bay could overestimate the contribution of this boundary (source) to the radial collection well system. It is typical in these scenarios for extensive sensitivity analyses to be performed to establish the sensitivity of the outcome or conclusions, to erroneous or non-conservatively specified boundary conditions. FPL has applied an average value to the boundary representing Biscayne Bay. This may mask tidal or seasonal trends and is unlikely to represent the critical condition for dewatering or assessing the impacts of dewatering. (**0032-30** [Golden, James])

Comment: Ground Water Modeling Summary - *Parameterization:* In selecting model parameters and applying them to the model cells, FPL has used a homogeneous representation of aquifer parameters in a highly heterogeneous aquifer system. This representation is, along with some unusual layering in the model construct, suspect, and must be tested to ensure that it does not negate conclusions drawn from the model. Specific concerns include the representation of the vertical hydraulic conductivity of the top two layers in the model (1 to 1 ratio for Kh to Kv), the representations of those layers in locations where canals and other surface features intersect the conceptual (or physical) tops of the model layers, as well as the representation of the vertical connectivity in layers that were split for predictive simulations following the calibration. It is important for FPL to demonstrate that the conclusions and determinations based on modeling remain unchanged, with more correct representation of model parameters. (**0032-31** [Golden, James])

Comment: Ground Water Modeling Summary - *Calibration:* The model was calibrated to the results of on-site pump tests (quantitative) and to regional groundwater gradients and flow directions (qualitative). Both calibrations were based on steady state simulations. FPL justified these simulations by the rapid response of the system to the volumes extracted during the pump test. This was further justified by the intent to apply the tools also in steady state. While these justifications are understood, the calibration remains insufficient and does not represent stresses to the system similar in magnitude to the intended applications. In addition, the conditions used for calibration do not demonstrate the impact of the effect of boundary conditions on the simulation results. Lastly, the model does not include important on-site operations or features present during the pump test that could contribute to the observed data to which the model is calibrated. The foregoing notwithstanding, a review of the calibration results presented show a number of situations where multiple monitoring wells show exactly the same, response in the model while they vary in the measured data. This may be suggestive of impacts of a specified boundary or inadequately tuned model parameter. If the variability that is missing is important to the required outcome from the model, then the model may not be adequately calibrated for use. (**0032-32** [Golden, James])

Comment: The SFWMD recommends that the following issues be addressed in the Environmental Impact Statement: The adequacy of the ground water modeling submitted by FPL. (**0032-7** [Golden, James])

Comment: The SFWMD recommends that the following issues be addressed in the Environmental Impact Statement: Radial Wells and Construction Dewatering Withdrawals at Power Plant Site - The potential for the proposed withdrawals to exacerbate saline water

intrusion and ground water contamination due to the existence of preferential flow paths within the Biscayne aquifer. (**0032-8** [Golden, James])

Response: *The impacts of the proposed action on water resources, specifically the potential impacts to water availability and water quality in the Biscayne Aquifer, will be assessed by the review team and presented in Chapters 4 and 5 of the EIS for building and operating proposed Turkey Point Units 6 and 7, respectively. Modeling data provided by the applicant will be reviewed and evaluated in the course of developing this assessment. Cumulative water-use and water-quality impacts will be addressed in Chapter 7.*

Comment: FPL, just last year, negotiated a new groundwater monitoring plan with the South Florida Water Management District. However, there were compliance questions from the initial groundwater monitoring plan that had been issued 20 years ago, and there was, I think, a lack of some transparency of looking at the groundwater data. So I would request that that data be sought and included in your evaluation in the scoping process. (**0002-3-5** [Walker, Tom])

Comment: We understand that the FPL has negotiated a new ground water monitoring program with the South Florida Management District (SFWMD.) Unfortunately, the prior ground water monitoring plan has been questioned and from what we have understood, had compliance issues which were never quite resolved. Subsequently, a new monitoring plan was laid out and approved by the SFWMD; yet, much of the historic information may provide important trending information which would be helpful for the EIS to evaluate. We request that the NRC obtain the previous ground water monitoring information relative to these cooling canals and analyze their past and present impacts to the ground water in the adjacent aquifer. (**0024-2** [Walker, Tom])

Response: *The environmental monitoring data collected at the existing units for the current baseline water resources in the affected environment, including water quality and quantity, will be discussed in Chapter 2 of the EIS. Chapters 4 and 5 will include descriptions of environmental monitoring to be conducted at the units during building and operating, respectively. Cumulative impacts will be assessed in Chapter 7. The EIS will include citations for documents used in its preparation.*

Comment: Please state the distance between the water management feature(s) and the salt front at the land's surface and the distance between the water management feature(s) and the salt front at the base of the Biscayne Aquifer. (**0022-3-8** [Reynolds, Laura])

Comment: Please publish a vertical profile of the land showing 1. the surface of the water management feature(s), 2. the depth of the water management feature(s), 3. the location of the current salt front at the land surface, and 4. the location of the current salt front at the base of the Biscayne Aquifer. (**0022-3-9** [Reynolds, Laura])

Response: *These comments refer to the distance between proposed Turkey Point Units 6 and 7s water-management feature and the salinity intrusion front in the Biscayne Aquifer. A description of the affected environment, including local groundwater flow, water quality, and quantity, will be presented in Chapter 2 of the EIS. The plant layout, including the detailed locations of facilities and design specifications for the units, will be provided in Chapter 3.*

Comment: Miami-Dade County has previously provided the U.S. Nuclear Regulatory Commission with a copy of our comments on the State of Florida Site Certification Application for the Turkey Point Power Plant. The County would like to point out one discrepancy between the state and federal applications, the Florida Power & Light owned fill source was removed from the state application but remains part of the federal application. The proposed fill source may adversely impact groundwater, destroy wetlands and advance salt water intrusion closer to wellfields. Additional details on these concerns are provided in the attached table summarizing our initial comments on the state application. This table, as well as, the documents previously submitted to the NRC should be considered as part of the record for the scoping process. (**0023-1-1** [LaFerrier, Marc])

Response: *The NRC process is to review the COL application and prepare an EIS based on the actions proposed in the application. Information to be used during the review will include documents obtained from State and Federal agencies, including the SCA to the extent necessary to characterize the Turkey Point site. The FPL-owned fill source remains in the COL at this time and a review of the environmental impacts of obtaining fill material will be presented in Chapter 4 of the EIS.*

Comment: The application proposes to dewater up to 26 MGD of groundwater by discharging it to the cooling canals. Pursuant to Condition No. 15 of the Unusual Use Approval Resolution Z-56-07, a DERM approved hydrologic study is required. The study results are required to evaluate all impacts to surface and groundwater, including but not limited to all dewatering activities. The hydrologic study should include, but not be limited to providing data and modeling to show how the existing groundwater plume under the Cooling Canal System would respond to the dewatering activities. (**0023-1-2** [LaFerrier, Marc])

Comment: Sufficient information is not provided to make a determination of dewatering impacts. Please provide a description of all required dewatering activities and the techniques that will be used to ensure that all surface and groundwater quality standards will be met. (**0023-1-3** [LaFerrier, Marc])

Response: *These comments refer to the SCA submitted to the State of Florida by FPL, but they indicate an interest in the potential impacts of the proposed units on water quality and hydrology from the discharge of dewatering flows to the cooling-canal system during plant construction. The review team will assess the impact of proposed Turkey Point Units 6 and 7s dewatering at the site on water resources. The dewatering effluent produced by the proposed units will be described in Chapter 3 of the EIS. The impacts of building the proposed units on water resources will be presented in Chapter 4. Cumulative impacts will be addressed in Chapter 7. Modeling data provided by the applicant will be technically evaluated in the course of developing the EIS.*

Comment: Disposal of the facility's wastewater is proposed via deep well injection into the boulder zone. The application does not include an evaluation of the technical feasibility for reuse of the wastewater discharge for the benefit of the Biscayne Bay Coastal Wetlands Project as required pursuant to Z-56-07. (**0023-3-38** [LaFerrier, Marc])

Response: *This comment refers to the SCA submitted to the State of Florida by FPL, but it indicates an interest in alternative uses of blowdown water from the proposed units. Alternatives to deep-well injection for plant effluent discharges will be described in Chapter 9 of the EIS.*

Comment: [T]he application does not provide sufficient detail on what standard of reclaimed water quality is required. This information is necessary to evaluate the application (**0023-1-29** [LaFerrier, Marc])

Response: *This comment refers to the SCA submitted to the State of Florida by FPL, but it indicates an interest in the quality of reclaimed water to be used as cooling water at the proposed units. The water quality of the reclaimed water will be described in Chapter 3 of the EIS.*

Comment: Conditions outlined in Zoning Resolution Z-56-07 must be met to achieve land use/zoning consistency. This resolution stated that no water will be withdrawn from the Biscayne Aquifer (Condition 4) and that a hydrologic study (Condition 15) will be performed. The radial well component does not demonstrate consistency with these two conditions; therefore this component will be subject to a land use/zoning consistency determination. (**0023-1-31** [LaFerrier, Marc])

Comment: Selection of potential locations, idealized designs, number of wells, and even the pipe sizes of the radial lines of the collector wells should be based on hydrogeologic data within the areas Biscayne Bay that the wells will tap. (**0023-1-32** [LaFerrier, Marc])

Comment: Site specific aquifer characteristics have not been made available. (**0023-1-33** [LaFerrier, Marc])

Comment: Lithologic descriptions are contradictory. The observations from the site subsurface investigation (Section 3.3.2.2) contradict expectations that almost all the water withdrawn by the radial collector wells would be recharged from the Bay (Section 3.3.4.1). Therefore additional information is necessary to evaluate this aspect of the proposal. (**0023-1-34** [LaFerrier, Marc])

Comment: [D]etermine the impact of the radial collector well system on the fate and transport of the groundwater plume associated with the cooling canal system, the potential for and effect of the recharge of the radial collector well system through horizontal preferential flow zones in the aquifer, the impact of the radial collector well system on salt intrusion. (**0023-1-35** [LaFerrier, Marc])

Comment: [N]o information was found in the application discussing potential effects of inducing ground water flow towards the proposed withdrawal wells. (**0023-1-38** [LaFerrier, Marc])

Comment: Neither preferential vertical nor horizontal stratigraphic flow directions have been established. Vertical hydraulic conductivity data is not presented in the application, but it is needed to properly evaluate how the horizontal screens installed in the Fort Thompson Formation 30 to 35 feet below the shallow bay bottom are expected to preferentially draw water from the less transmissive Miami Limestone above instead of from the much more transmissive Fort Thompson. (**0023-1-39** [LaFerrier, Marc])

Comment: Cones of influence are not defined and aquifer pump-test data has not been presented to properly evaluate hydrologic conditions under which the collector wells would be operated. Neither has there been any data presented to indicate the potential cone of depression that pumping more than 120 million gallons a day from a wellfield located along the shoreline would have on the movement of the salt front line. (**0023-1-40** [LaFerrier, Marc])

Comment: The applicant has not provided sufficient geologic, hydrologic and water quality data to evaluate the application. (**0023-1-41** [LaFerrier, Marc])

Comment: The applicant has not provided sufficient information to evaluate the mixing chamber model that was used to project impacts from the radial collector wells. (**0023-1-42** [LaFerrier, Marc])

Comment: Adequate hydrogeologic data have not been presented and the application does not include sufficient information to determine whether the proposed withdrawals from the radial collector wells would meet the requirements of Section 24-43.2 Miami-Dade County Code. Selection of potential locations, idealized designs, number of wells, and even the pipe sizes of the radial lines of the collector wells should be based on hydrogeologic data within the areas under Biscayne Bay that the wells would tap. (**0023-1-44** [LaFerrier, Marc])

Comment: Please provide adequate analysis in support of the conclusion made that the Biscayne Aquifer is not affected by the Radial Collector wells. A fully three dimensional mathematical model should be used to determine the boundary conditions (influence cones) of the proposed radial collector well. (**0023-1-47** [LaFerrier, Marc])

Comment: Application does not adequately demonstrate that the proposed radial collector wells do not violate Condition 4 of Z-56-07 which prohibits withdrawal from the Biscayne Aquifer. (**0023-1-66** [LaFerrier, Marc])

Comment: Data presented for Groundwater Impact assessment is not sufficient. Visual MODFLOW data files are not provided for assessment. Not enough data provided to assess statement that radial collector wells are substratum collectors of saltwater that will recharge from below Biscayne Bay. The applicant states that almost all the water withdrawn by the proposed radial collectors will be recharged from the Bay; however, no data to support this statement is provided in the application. The applicant shall provide all relevant data relating to recharge of the Biscayne Aquifer that would be induced by operation of the radial collectors. Pursuant to Condition No. 4 of the Unusual Use approved but he BCC through resolution Z-56-07, FPL shall not apply for any withdrawals from the Biscayne Aquifer as a source of cooling water for the proposed facilities. (**0023-1-68** [LaFerrier, Marc])

Comment: The radial wells are located so as to draw from the easterly groundwater flow. Please resolve the apparent conflict between the location of the wells and the water from which they are drawing and Condition 4 of Z-56-07, which prohibits withdrawal from the Biscayne Aquifer. (**0023-1-70** [LaFerrier, Marc])

Comment: Condition 5 of Z-56-07 requires FPL to analyze the potential use of marine water as a secondary source of cooling water. Under this scenario, a directional bore would be used to

construct a pipeline under the Florida Keys National Marine Sanctuary or under Biscayne National Park in order to obtain salt water from the ocean with limited or no permanent impacts to benthic resources. Provide a detailed analysis that documents the reasons why this potential secondary source of cooling water was not selected. (**0023-3-40** [LaFerrier, Marc])

Response: *These comments refer to the SCA submitted to the State of Florida by FPL, but they indicate an interest in impacts on the Biscayne Aquifer below Biscayne Bay from the withdrawal of cooling water using radial collector wells (RCW) at proposed Turkey Point Units 6 and 7. The impacts of these units consumptive use of water on local and regional water resources, including the Biscayne Aquifer, will be presented in Chapters 4 and 5 of the EIS for building and operating, respectively. Cumulative water-use impacts will be addressed in Chapter 7 and cooling-water alternatives in Chapter 9.*

Comment: The application does not provide information on how the water management project would operate, the water source for the feature, any related infrastructure, projected water quality of the completed feature, or information on best technology regarding a liner or other hydrologic isolation from surrounding ground and surface waters, the hydrologic impact of the feature on adjoining areas. (**0023-3-13** [LaFerrier, Marc])

Response: *Available information about the water-management feature will be provided in Chapter 3 of the EIS. The impacts of the water-management feature on water resources will be presented in Chapters 4 and 5 for building and operation, respectively, based on information about the affected environment provided in Chapter 2. Cumulative impacts will be presented in Chapter 7.*

Comment: And that's what they're trying to do on a couple of the different designs, is to pump the water back down into the ground. There have got to be some options. We have too much knowledge and too much in our industry to overcome these minor problems.
(**0002-12-10** [McHugh, John])

Response: *The comment refers to the discharge of effluent from the plant, specifically the effluent sourced from reclaimed water to be used as cooling water at proposed Turkey Point Units 6 and 7. The proposed units effluent discharge locations, quantity, and quality will be described in Chapter 3 of the EIS. Alternative discharge locations will be discussed in Chapter 9.*

Comment: FPL recently proposed a restriction on using the RCWs to 90 days per year; this proposed restriction is not mentioned in the COLA. Such inconsistencies between the two separate applications should be resolved and the State of Florida SCA and NRC COL applications should be fairly uniform. (**0025-1-5** [Kimball, Dan] [Lewis, Mark])

Response: *The NRC process is to review the COL application, including revisions provided by the applicant, and prepare an EIS based on the actions proposed in the application. Information to be used during the review will include documents obtained from State and Federal agencies, including the SCA, to the extent necessary to characterize the Turkey Point site. A review of the environmental impacts of using RCWs to obtain cooling water will be presented in Chapter 5 of the EIS.*

Comment: To add insult to injury, these 2 dangerous nuclear plants are proposed to be over/around the only natural aquifer we have that provides clean water to millions of people! (**0028-2** [DiNuzzo, Laura])

Response: *The impacts of building and operating proposed Turkey Point Units 6 and 7 on the sustainability of local and regional water resources will be presented in Chapters 4 and 5 of the EIS, respectively. Cumulative water-use impacts will be addressed in Chapter 7.*

Comment: The CEIS should include, at minimum, an analysis of the water quality for the source water for each dewatering project, including radionuclides such as tritium. (**0023-1-4** [LaFerrier, Marc])

Response: *The CWA designated the Environmental Protection Agency (EPA) as the Federal agency with general responsibility for effluent discharges to the nation's waters. In Florida, the EPA has delegated this responsibility to the Florida Department of Environmental Protection (FDEP). Therefore, in Florida, the FDEP is the primary regulatory authority over water quality. While the NRC only regulates radiological effluents, the NRC does have the responsibility under NEPA to assess and disclose the expected impacts of the proposed action on water quality. The assessment of the radiological and nonradiological impacts on water quality from the operation of proposed Turkey Point Units 6 and 7 will be presented in Chapter 5 of the EIS.*

Comment: The proposed radial collector wells would be located within or adjacent to a groundwater plume emanating from FPL's Cooling Canal System, which contains high levels of chlorides. It also contains tritium, which may be used as a tracer. In addition, portions of this plume contain heated water, although underground directional travel of the heated water has not been established. No information regarding the delineation of this plume is contained within the application and the extent to which this plume would be affected by the proposed groundwater withdrawals is not documented. (**0023-1-37** [LaFerrier, Marc])

Response: *The impacts of the RCWs with respect to building and operating proposed Turkey Point Units 6 and 7 on Biscayne Bay and adjacent lands are part of the overall EIS analysis. The results of the analysis of impacts of proposed Turkey Point Units 6 and 7 operations on water quality, ecology, and aesthetics will be presented in Chapter 5 of the EIS, and the results of cumulative impact analyses will be presented in Chapter 7.*

Comment: The proposed project requires a significant amount of borrow material to build the platform for the new reactors. Such volumes of borrow in high quantities requires significant movement of material in and around the aquifers in such low lying areas as South Miami-Dade County. Such excavation can disturb the water resources. The EIS should do a quantification of the amount of material required and its potential impact to see if in fact such borrow material can be moved or can be excavated in the vicinity of the existing power plant and the FKAA well field. If not, material must be obtained elsewhere where such impacts are not detrimental to local well fields. (**0024-5** [Walker, Tom])

Response: *Available information about the fill source will be provided in Chapter 3 of the EIS. The impacts of obtaining fill material will be presented in Chapter 4; and the cumulative impacts of the proposed action by FPL to build and operate proposed Turkey Point Units 6 and 7, along*

with other past, present, and reasonably foreseeable future actions by other agencies, will be presented in Chapter 7.

Comment: A major area of interest is whether operation of the radial collector wells would cause the karst Biscayne Aquifer to fracture (frac out), thereby altering the salinity of the Biscayne Bay and affecting the area's fish and wildlife resources. Staff from Florida Power & Light (FPL) believes that these radial collection wells will not be used for a substantial part of the time that the plant would be in operation, and consequently taken a conservative approach by modeling a scenario during which the radial collector wells would inject water laterally constantly. Other agencies participating in the review and whose staff has the expertise to test the model are doing so, and we are waiting for the results in order to determine the extent to which we may be concerned about the possibility of frac out actually occurring. (**0018-1** [Poole, Mary Ann])

Comment: Concerns still remain regarding unknowns related to the Radial Collector Well (RCW) System including, but not limited to: possible impacts to the Bay including benthic flora and fauna; salinity; and possible impacts of the radial collector wells on the freshwater input to the bay, flora and fauna. These issues and concerns will require further review and discussion. (**0020-1** [Mulkey, Cindy])

Comment: The operation of the RCWs would result in hydrologic impacts, including ... surface water, on Biscayne Bay due to geological disturbances, resulting in water volume and quality alterations ... [A] large portion of the nearly 124 million gallons of Biscayne Bay water will originate from within Biscayne National Park boundaries, which is a protected water body. (**0025-1-13** [Kimball, Dan] [Lewis, Mark])

Comment: The Florida Department of Environmental Protection (FDEP) is requiring a revised groundwater model due to many deficiencies, including the inability to effectively simulate impacts to Biscayne Bay; as a result, the SCA remains incomplete to date. Thus, a revised groundwater model is pending submittal to the State of Florida for the SCA process. The revised SCA groundwater model should be consistent with the groundwater model submitted as part of the COLA. A model that represents the Biscayne Aquifer and site specific hydrologic features is necessary to fully evaluate the impacts of the operation of the radial collector wells (RCWs) on the Biscayne Bay nearshore ecosystem function (see Attachment 1.B.). Therefore, the COLA groundwater model results that claim 92 to 100 percent of the intake water for the RCWs comes from the bay has not been substantiated. (**0025-1-4** [Kimball, Dan] [Lewis, Mark])

Comment: Other specific issues NMFS recommends for evaluation in the EIS or EFH assessment: 1.a *Radial wells*. Impacts to EFH associated with radial well construction and operation within Biscayne Bay should be fully evaluated. The evaluations should include detailed HDD routes and examinations of the potential for frac-outs. Monitoring and mitigation measures for frac-out detection and clean-up will also be needed. (**0033-5** [Croom, Miles])

Comment: Other specific issues NMFS recommends for evaluation in the EIS or EFH assessment: 1.b *Radial wells*. Impacts to EFH associated with radial well construction and operation within Biscayne Bay should be fully evaluated. The evaluations should include

detailed explanations of the circumstances under which radial wells would be required and at what capacities. (**0033-6** [Croom, Miles])

Comment: Other specific issues NMFS recommends for evaluation in the EIS or EFH assessment: 1.d *Radial wells*. Impacts to EFH associated with radial well construction and operation within Biscayne Bay should be fully evaluated. The evaluations should include a more clear explanation of how use of the radial wells will affect salinity, including identification of the geographic area that would be affected and how that area would change seasonally and under various environmental conditions (such as tides and prevailing wind conditions). This analysis of effects on water quality also should include pH and temperature.
(**0033-8** [Croom, Miles])

Response: *These comments indicate an interest in impacts on the Biscayne Aquifer below Biscayne Bay and on the Bay itself from the withdrawal of cooling water using RCW at the proposed units. The impacts of the plant's consumptive use of water on local and regional water resources, including the Biscayne Aquifer, will be presented in Chapters 4 and 5 of the EIS for building and operating, respectively. Cumulative water-use impacts will be addressed in Chapter 7 and cooling water alternatives in Chapter 9.*

D.1.9 Comments Concerning Ecology – Terrestrial

Comment: I was very disappointed to hear that the U.S. Army Corps of Engineers so casually referred to that almost all nuclear power plants are placed near wetlands. That, alone, to me is a concern. This one, too, would be the same. (**0001-11-3** [Amor, Valerie])

Comment: They [FPL] may need 90 million gallons of cooling water a day for these two new units. One plan would take that from a big sewage treatment plant to be built 25 miles up the road. How would they get 90 million gallons of water a day down here? That takes a big pipe and maybe some pumping stations. They're not going to get permission to run that down through Biscayne Bay so they'll have to put it in the wetlands, and there go the wetlands next to the Bay. (**0001-6-4** [Miller, Lloyd])

Comment: Besides fresh water loss the loss of wetlands is the other major thing we're trying to fix there. The numbers of wetland loss here are just astronomical, and they're not something that we really ought to be considering in modern 2010 times anymore.
(**0002-6-5** [Grosso, Richard])

Comment: The planned expansion of Units 6&7 of Turkey Point requires the permanent destruction of untouched wetlands just off of the Biscayne Bay national park regions.
(**0007-1** [Burris, Jessica])

Comment: In the West Preferred Corridor, additional access pads (approximately 79-170 ft long) are proposed east of the power line poled structures that would provide access from the structure pads to the existing L-31 North Levee Road (Figures 5A-5B). Additional wetland filling would be required to construct the proposed pads beneath the power line poled structures. Construction of the access roads/pad would require filling of more than 100 acres of wetlands within the West Preferred Corridor (that is currently within Everglades National Park) per the COLA/SCA. A perpetual 90 ft vegetation easement is proposed to extend from the westernmost

portion of the West Preferred Corridor into ENP to allow FPL to manage non-native vegetation. (**0025-3-31** [Kimball, Dan] [Lewis, Mark])

Comment: Vegetation in the ENP portion of both transmission line corridors identified by FPL consists primarily of high quality, long and short hydroperiod native marsh and prairie communities. Direct impacts of the construction and maintenance of power line infrastructure on the natural abundance and distribution of these native plant communities need to be evaluated. 2. Limited information on the presence of state listed threatened and endangered plant species exists for either corridor identified by FPL. Nonetheless, preliminary surveys of the Western Preferred Corridor resulted in the identification of at least one state listed endangered plant species within the boundary of the corridor. Additional survey work is needed and the results of that survey work should be used to evaluate impacts on threatened and endangered plant species in both corridors. 3. The proposed exotic vegetation management easement associated with the Western Preferred Corridor will result in the modification and/or of native plant species by mechanical or chemical means within boundaries of ENP. The impacts of these actions on individual species native plant community composition need to be considered in this evaluation. 4. Soil disturbance and modification of natural elevations in either corridor identified by FPL has the potential to introduce new invasive plant species or exacerbate existing invasive plant species populations. These impacts need to be evaluated. (**0025-3-34** [Kimball, Dan] [Lewis, Mark])

Response: *The impacts on wetlands from building proposed Turkey Point Units 6 and 7, including water supply pipelines and transmission corridors, will be addressed in Chapter 4 of the EIS and the impacts of plant operation will be addressed in Chapter 5.*

Comment: I had fished, hunted and camped exactly where the power plants are before they were built. I could tell you, beyond a doubt right now, there's probably, in most instances, as many fish, deer, and other types of wildlife in that area now as there were when I was a kid. That hasn't been impacted all that greatly. (**0002-13-7** [Simpson, Roce])

Response: *The impacts of building and operating proposed Turkey Point Units 6 and 7 on fish and wildlife will be evaluated in Chapters 4 and 5 of the EIS, respectively.*

Comment: The second area of concern, of course, is Everglades impact. The expansion will impact hundreds of acres of wetlands which is contradictory to our very expensive and very important effort to restore the Everglades right now. (**0001-7-3** [MacLaren, Kaitlin])

Comment: It [the new transmission lines] also will create a corridor for invasive species; it will disrupt the water flow; birds run into power lines all the time, electrocutions, collisions. (**0002-14-10** [Schwartz, Matthew])

Comment: The largest percentage of this land, 61% of the 38,607 acres evaluated for this project are composed of wetlands bordering Biscayne National Park, Biscayne Bay Aquatic Preserve, Homestead Bayfront Park, the Model Lands Basin, and the Everglades Mitigation Bank as openly noted in the NRC environmental report concerning this expansion. The destruction of wetlands in the surrounding areas of national reserves has possible drastic results on the reserved area. In addition to destroying the ecological foundation for wildlife in the

affected region itself, the permanent destruction of everglade wetlands surrounding the reserve equally affects the ecology of areas designated to remain untouched by U.S National Park service and the U.S department of the interior. (**0007-3** [Burris, Jessica])

Comment: The Draft EIS needs to fully address the alternative transmission line corridors and the environmental effects it may have on Everglades National Park. (**0014-15** [Mueller, Heinz])

Comment: The Turkey Point facility is located within the southeastern saline Everglades, which is a large, contiguous wetland system that consists of both freshwater and coastal wetlands. This area is strategically located in the watershed for the Florida Keys National Marine Sanctuary, Biscayne National Park, the Crocodile Lake National Wildlife Refuge, and the State of Florida's Card Sound Aquatic Preserve. In addition, the proposed transmission line corridor bisects this wetland system and continues westward into Everglades National Park, as well. This region provides habitat for many plant and animal species that are protected at the county, state and/or federal level, including the wood stork, Everglades snail kite, American crocodile, Florida panther, and Eastern indigo snake, among others. It is a known stop-over for migratory songbirds and waterfowl, and the proposed plant site provides significant shorebird habitat, as well. The EIS should also include an assessment of the impacts of the project on wetlands habitat and habitat for rare threatened and endangered species. (**0015-3** [Espinosa, Carlos])

Comment: Although the NRC does not directly regulate transmission lines, Miami-Dade County understands that the Army Corps of Engineers (ACOE) will be a cooperating agency for this EIS. Since the Army Corps will be using the EIS as the basis for their Section 404 permit decision as it relates to the wetland impacts that would be necessary to construct the proposed plant and associated facilities, including the transmission lines, we strongly recommend the NRC include a comprehensive impacts analysis of all features that will or could potentially impact environmental resources, including wildlife and jurisdictional wetlands to be affected by the proposed transmission corridors. (**0015-4** [Espinosa, Carlos])

Comment: Construction of roads and tower pads would likely result in soil disturbance and the colonization of exotic vegetation like Brazilian pepper if unchecked. The potential land exchange property is frequently used for exotic vegetation management and monitoring of wetlands in the project area. NPS staff would be required to monitor the impacts of FPL's exotic vegetation management practices on native vegetation in the vegetation management easement granted to FPL and adjacent natural vegetative communities within the park. (**0025-3-43** [Kimball, Dan] [Lewis, Mark])

Response: *The potential impacts of building and operating proposed Turkey Point Units 6 and 7 on Everglades National Park, Biscayne National Park, and other parks and preserves, especially on wetlands within those areas, will be evaluated in Chapters 4 and 5 of the EIS, respectively. The cumulative impacts on wetlands and other ecological resources in these areas will be evaluated in Chapter 7.*

Comment: [A]ny environmental mitigation should include purchasing large tracts of land south of the plant between Florida City and Key Largo and adding this acreage to Everglades National Park or Crocodile Lake National Preserve. Several endangered panthers have been hit by cars in this area, crocodiles and manatees use Turkey Point's warm water as mating and winter

weather locations. The area south of the Nuclear plant is not a good location for homes or businesses due to proximity to the plant both for safety and security as well as environmentally sensitive lands. This land should be protected as part of the environmental mitigation and permitting. (**0008-2** [Garcia, Preston])

Response: *The potential mitigation for wetland impacts and impacts on Federally and State-listed threatened or endangered species will be discussed in Chapters 4, 5, and 7 of the EIS. Evaluation of the impacts of building and operating proposed Turkey Point Units 6 and 7 on regional land use will also be included in those chapters.*

Comment: [T]he planned use of SW 359 Street as a service road through wetlands for Turkey Point 6 & 7 will compromise a $135 Million CERP/Comprehensive Everglades Restoration Project. (**0012-7** [Payne, Nkenga])

Comment: Road construction will also cause direct wetland loss and fragmentation. (**0025-2-18** [Kimball, Dan] [Lewis, Mark])

Response: *The potential impacts of proposed Turkey Point Units 6 and 7 transmission line and access road construction and operation on regional wetlands, including those involved in the CERP, as well as potential mitigation actions, will be evaluated in Chapters 4, 5, and 7 of the EIS.*

Comment: The Draft EIS should discuss how the construction of Units 6 and 7 would impact sensitive coastal. wetlands and any mangrove protected areas along Biscayne Bay and adjacent to Biscayne National Park. The Draft EIS should also address any issues related to the Florida Everglades Mitigation Bank. (**0014-10** [Mueller, Heinz])

Response: *The impacts of building proposed Turkey Point Units 6 and 7 on coastal wetlands and mangrove-protected areas along Biscayne Bay will be evaluated in Chapter 4 of the EIS. The possible role of the Florida Everglades Mitigation Bank, and other wetland mitigation banks in the region, in the mitigation of wetland losses will also be evaluated in Chapter 4.*

Comment: The Draft EIS needs to provide information on measures that have been taken to avoid and minimize wetland impacts. According to the Clean Water Act (CWA) Section 404(b)(1) Guidelines, an applicant must demonstrate avoidance and minimization of wetland impacts before compensatory mitigation can be considered. Specifically, no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem. Practicable alternatives include activities which do not involve the discharge of dredged or fill material into waters of the United States. (**0014-17** [Mueller, Heinz])

Response: *Wetland mitigation measures, as applicable to CWA Section 404 compliance, including avoidance and minimization efforts, will be discussed in Chapter 4 of the EIS.*

Comment: List of potentially occurring State-listed fish and wildlife species

Common name	**Scientific name**	**State-listing status**
Atlantic sturgeon	*Acipenser oxyrinchus*	Species of special concern

American alligator	*Alligator mississippiensis*	Species of special concern
American crocodile	*Crocodylus acutus*	Endangered
Eastern indigo snake	*Drymarchon corais couperi*	Threatened
Least tern	*Sterna antillarum*	Threatened
Limpkin	*Aramus guarauna*	Species of special concern
Snail kite	*Rostrhamus sociabilis plumbeus*	Endangered
Everglades mink	*Mustela vison evergladensis*	Threatened
Florida manatee	*Trichechnus manatus latirostris*	Endangered

(**0018-3** [Poole, Mary Ann])

Comment: The site has nesting habitat for the least tern. Least terns are listed as threatened by the FWC and may potentially be nesting on the cleared gravel upland portions of the site. Please provide least tern nesting surveys and address the loss of potential nesting habitat. (**0018-5** [Poole, Mary Ann])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts of airborne pathogens from the Turkey Point FPL power station on state or federal endangered or threatened species, as a result of using reclaimed wastewater for cooling purposes, please provide them. (**0022-1-16** [Reynolds, Laura])

Comment: Please state the amount of disruption to listed species that the construction of units 6&7 will make including the plant site, all support facilities, all structures, all borrow pits (including rockmines) all fencing, all roads, all berms, all pipelines, all transmission lines, all basins, all parking lots, and all vehicle usage. (**0022-2-21** [Reynolds, Laura])

Response: *The potential impacts of building and operating proposed Turkey Point Units 6 and 7 and associated facilities on Federally and State-listed threatened or endangered species will be addressed in Chapters 4 and 5 of the EIS, based on the affected environment described in Chapter 2. The analysis will consider possible impacts resulting from airborne pathogens. The EIS will include citations for documents used in its preparation.*

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts on farm crops, wetlands, wildlife, and marine areas from airborne pathogens, as a result of using reclaimed wastewater for cooling purposes, please provide them. (**0022-1-17** [Reynolds, Laura])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts from airborne toxic matter on farm crops, wetlands, and marine areas, as a result of using reclaimed water for cooling purposes, please provide them. (**0022-1-19** [Reynolds, Laura])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts from airborne EPOCs on farm crops, wetlands, wildlife, and marine areas, as a

result of using reclaimed water for cooling purposes, please provide them. (**0022-2-3** [Reynolds, Laura])

Response: *The potential impacts of building proposed Turkey Point Units 6 and 7 on ecological resources, including the impacts of airborne releases, will be addressed in Chapters 4, 5, and 7 of the EIS, based on the affected environment described in Chapter 2. The analysis will consider possible impacts to species and habitats resulting from airborne pathogens and contaminants. The EIS will include citations for documents used in its preparation.*

Comment: The applicant should also provide the management plan for listed species required under Condition 2 of Z-56-07, which should include but not be limited to identifying the plans established to protect endangered or threatened species from impacts resulting from the proposed work. (**0023-1-19** [LaFerrier, Marc])

Comment: The application states, "Due to the limited amount of upland habitat, mammalian wildlife species are relatively uncommon in the vicinity of the Site" and fails to acknowledge that there is a possibility for Florida panther in the vicinity. It should be noted that there have been three documented vehicle strikes of Florida Panthers in this region, including two road kills in the recent past. In addition, there have been recent agency reports of additional animals in the area, including a panther/cub pair. The application does not provide sufficient information to evaluate potential impacts to ecological resources including but not limited to rare threatened and endangered species resulting from the installation and use of the proposed access roads. [Same statement for T-Lines] (**0023-2-13** [LaFerrier, Marc])

Comment: The application notes that the Eastern indigo snake has been observed both within and adjacent to the boundaries of the site. Please provide a Comprehensive Environmental Impact Statement that includes, but is not limited to, the potential effects of the construction and operation of the plant and its associated non-linear and linear features on the Eastern indigo snake. [Same statement for T-Lines] (**0023-2-16** [LaFerrier, Marc])

Comment: Please provide documentation that demonstrates that critical habitat for threatened and endangered species will not be degraded and/or destroyed, as required pursuant to the Miami-Dade County CDMP. (**0023-4-9** [LaFerrier, Marc])

Response: *These comments refer to the SCA submitted to the State of Florida by FPL, but they indicate an interest in the potential impacts of the proposed units on Federally and State-listed threatened or endangered species. The potential impacts of building and operating proposed Turkey Point Units 6 and 7 on Federally and State-listed threatened or endangered species will be discussed in Chapters 4, 5, and 7 of the EIS, based on the affected environment described in Chapter 2.*

Comment: High quality coastal wetlands exist on the shoreline along the proposed area of work. (**0023-1-46** [LaFerrier, Marc])

Comment: Pursuant to Condition 1 of Z-56-07, the applicant shall submit a wetlands mitigation plan for the Units 6 and 7 Site. .... Pursuant to Condition 1 of Z-56-07, the plan shall identify the specific mitigation that is for the Units 6 and 7 Site. (**0023-1-62** [LaFerrier, Marc])

Comment: It is unclear from the application whether the proposed rock mines will impact existing wetland restoration areas associated with previous unauthorized impact to wetlands on FPL property in this location. (**0023-3-18** [LaFerrier, Marc])

Response: *These comments refer to the SCA submitted to the State of Florida by FPL, but they indicate an interest in the potential impacts of proposed Turkey Point Units 6 and 7 on wetlands. The potential impacts of building and operating the proposed units on wetlands will be discussed in Chapters 4, 5, and 7 of the EIS, based on the affected environment described in Chapter 2.*

Comment: The CEIS should include, at a minimum, a comprehensive species survey that utilizes professionally-accepted sampling standards to survey plants and animals at multiple locations in the mudflat at least quarterly for a minimum of one year. Sampling should include, but not be limited to algae, vascular plants, insects, birds, reptiles, amphibians, fish, aquatic invertebrates, and mammals. (**0023-1-22** [LaFerrier, Marc])

Comment: The application does not address biological, hydrological, and ecological impacts resulting from road construction and operation. Impacts that shall be addressed include but are not limited to disruption of ecological corridors, altered hydrology in surrounding wetlands (e.g. via barriers to sheetflow), increased invasion rate of non-native species, increased road-kill, impacts to listed species and their habitat, including but not limited to Florida panthers and Eastern indigo snakes, and increased access that may facilitate illegal dumping, ATV riding, poaching, and other activities that may directly or indirectly impact surrounding wetlands. (**0023-1-50** [LaFerrier, Marc])

Comment: [P]lease provide locations, details and descriptions of all wildlife protection features, including but not limited to wildlife fencing and panther underpasses. (**0023-2-17** [LaFerrier, Marc])

Comment: Application is incomplete and includes incorrect characterization of the vegetation adjacent to the site. Corrected and missing information is needed to determine the potential impacts of the application, especially on state and federally protected species. Vegetation adjacent to the site and located along the transmission line corridors includes freshwater communities, and the coastal vegetation communities are more diverse than characterized. Please provide a complete vegetation survey for all transmission line corridors, including but not limited to complete species lists for each community type and identification and location of state and federally protected species. Please also provide a complete analysis of utilization of these vegetation communities by fauna, including but not limited to insects, birds, fish, aquatic invertebrates, reptiles, amphibians, and mammals, and including but not limited to season of use, use by state or federally protected species, and nature of use. (**0023-3-22** [LaFerrier, Marc])

Comment: The application provides insufficient information on the potential effects of the transmission line corridors on state and federally protected species, designated EEL sites, Natural Forest Communities, and tree resources protected. (**0023-3-23** [LaFerrier, Marc])

Comment: The application states that new rights-of-way will need to be obtained for the east transmission line corridor. Please provide details on where new rights of way will be obtained, and whether there are state or federally protected plant or animal species, designated EEL sites, Natural Forest Communities, or tree resources that could be impacted by the work within these proposed new rights-of-way. (**0023-3-24** [LaFerrier, Marc])

Comment: Any improvements to the transmission corridors, including but not limited to the installation of power poles and lines must avoid/minimize impacts to Natural Forest Communities. A survey of all Natural Forest Communities, within and adjacent to the transmission corridors, is required and all proposed impacts to Natural Forest Communities must be identified. (**0023-3-25** [LaFerrier, Marc])

Comment: Please submit plans for the protection of Endangered and Threatened Species both during construction and for the temporary and long term use of the proposed roads and facilities. (**0023-3-51** [LaFerrier, Marc])

Comment: [T]he referenced location will be permanent or temporary, final slopes and elevations for the piles, what measures will be taken to address stormwater runoff from the spoil piles, characterization of the material including but not limited to contamination levels, potential impacts to threatened and endangered species including but not limited to potential impacts to critical habitat, and potential impacts to surrounding coastal wetlands.
(**0023-4-14** [LaFerrier, Marc])

Response: *These comments refer to the SCA submitted to the State of Florida by FPL, but they indicate an interest in the potential impacts of proposed Turkey Point Units 6 and 7 on Federally and State-listed threatened or endangered species, wetlands, and other terrestrial resources. The potential impacts of building and operating the proposed units on terrestrial ecological resources will be discussed in Chapters 4, 5, and 7 of the EIS, based on the affected environment described in Chapter 2.*

Comment: Construction and use of new access or improved access roads will provide a conduit for introduction of invasive exotic species on adjacent lands, including but not limited to, EEL conservation lands. (**0023-2-5** [LaFerrier, Marc])

Comment: Chapter 24 and the Landscape Code of Miami-Dade County require that all invasive/exotic plant species be removed prior to site development, even outside of mitigation areas. Please address exotic plant management for all parcels where impacts will occur.
(**0023-3-53** [LaFerrier, Marc])

Response: *These comments refer to the SCA submitted to the State of Florida by FPL, but they indicate an interest in the potential impacts of the proposed units and transmission lines on habitat quality on adjacent lands. The potential impacts of building and operating proposed Turkey Point Units 6 and 7 and transmission corridors on terrestrial ecological resources will be addressed in Chapters 4, 5, and 7 of the EIS, based on the affected environment described in Chapter 2. The analysis will consider the potential impacts from invasive and exotic plant species.*

Comment: Please provide in the Draft EIS a proposed mitigation plan to offset unavoidable wetland impacts. The mitigation plan should be in compliance with Federal Compensatory Mitigation Rule, dated April 10, 2008. (**0014-18** [Mueller, Heinz])

Comment: [T]he applicant shall submit a wetlands mitigation plan for the areas impacted by the construction of the access roads. (**0023-2-10** [LaFerrier, Marc])

Comment: A substantial proportion of the access road network passes through and, if approved, will impact the South Dade Wetlands and South Dade Wetlands Addition, both of which are projects designated for acquisition by Miami-Dade County's Environmentally Endangered Lands (EEL) Program. The applicant must provide information on the ultimate disposition of all proposed access roads that occur within the boundaries of these EEL projects, including but not limited to identifying roads that will be downgraded or removed, and which rights of way or road corridors could potentially be transferred or dedicated to the EEL program at the completion of the construction phase of the project after road remediation has been completed. (**0023-2-11** [LaFerrier, Marc])

Comment: Please submit information demonstrating that impacts to wetlands within and adjacent to the proposed roadway expansion area have been avoided and minimized to the maximum extent possible. (**0023-2-12** [LaFerrier, Marc])

Comment: Environmentally Endangered Lands (EEL) owned and/or managed conservation lands exist along proposed access roads. The application has not detailed the potential impacts to EEL land from any work related to the roads. The application should provide information on which roads are proposed as temporary, the ultimate disposition of the access road network, and an analysis of options for remediation of temporary roads after the project has been completed, including but not limited to road removal, restoration of impacted natural areas, and dedication of the restored land to the EEL Program. (**0023-2-8** [LaFerrier, Marc])

Comment: The EEL Program owns additional land in other areas in which project features occur, so changes to roads and rights-of-way may impact publicly-held and managed lands beyond the proposed project areas. (**0023-2-9** [LaFerrier, Marc])

Comment: Please provide additional documentation to describe the time associated with the proposed functional gain, especially in areas where the ecology, including change in the floral and faunal composition, is projected to recover based on relatively minor changes in hydroperiod and/or hydropattern. (**0023-4-5** [LaFerrier, Marc])

Comment: The SFWMD recommends that the following issues be addressed in the Environmental Impact Statement: Wetland Mitigation Proposals - The potential benefits and/or adverse impacts related to FPL's wetland mitigation proposals. Limited information has been provided to date by FPL regarding potential wetland mitigation options. (**0032-27** [Golden, James])

Response: *These comments refer to the SCA submitted to the State of Florida by FPL, but they indicate an interest in the potential impacts of the proposed units and ancillary linear corridors on wetlands and other environmentally sensitive lands. The potential impacts of building and operating proposed Turkey Point Units 6 and 7 and ancillary corridors on wetlands*

and other sensitive areas and potential mitigation of those impacts will be discussed in Chapters 4, 5, and 7 of the EIS, based on the affected environment described in Chapter 2. FPL will be required to submit a wetland mitigation plan as part of the CWA Section 404 permit application submitted to the USACE.

Comment: The NPS is particularly concerned about the potential harm to water-dependent birds, including endangered wood storks, snail kites and a host of migratory bird species that nest, forage and feed within or near the West Preferred and West Secondary corridors. Potential effects include degradation or fragmentation of valuable wetlands habitat, disturbance of birds during construction, and the permanent risk of avian injuries and death from electrocution or collisions with the transmission lines, towers, and guy wires. This area is the focus of a number of important ecosystem restoration projects that specifically seek to increase the wetland function in these areas and provide improved habitat suitability for a variety of wetland-dependent species, particularly water-dependent birds. The construction of a large complex of transmission lines in this area creates a perpetual risk to birds that is inconsistent with the goals of Everglades restoration projects. The EIS should assess the impacts of the proposed transmission infrastructure on all avian species known to use the area with particular emphasis on state- and Federally-listed threatened and endangered and migratory bird species. A risk assessment should be performed that outlines specific methods that will be employed to avoid and minimize impacts to avian species. (**0025-2-11** [Kimball, Dan] [Lewis, Mark])

Comment: The Eastern Preferred Transmission Line Corridor should be evaluated for impacts to migratory, roosting, and nesting birds. State-listed wading birds (e.g., white ibis) have nightly roosts in islands of Biscayne National Park, and they fly to the mainland daily crossing over proposed Eastern transmission lines. In addition, bald eagles, ospreys, and State-listed wading birds also have active nests within Biscayne National Park boundaries. A risk assessment should be performed that outlines specific methods that will be employed to minimize impacts to roosting and nesting birds. (**0025-2-6** [Kimball, Dan] [Lewis, Mark])

Comment: The proposed corridors are located adjacent to multiple wading bird colonies containing federal and state-listed species including the wood stork (*Mycteria americana*), snowy egret (*Egretta thula*), little blue heron (*Egretta caerulea*), tricolored heron (*Egretta tricolor*), and white ibis (*Eudocimus albus*). More than 30 other avian species of concern (federal and/or state listed) are known to, or have the potential to, occur in the corridors and habitats. 2. The endangered Everglade snail kite (*Rostrhamus sociabilis plumbeus*) forages and nests directly within the footprint of the proposed West Preferred Corridor. 3. Listed avian species are at risk of injury/mortality from collisions and electrocutions with the proposed power lines. Both corridors cross known flight pathways of the endangered wood stork and the Everglade snail kite. The West Preferred Corridor crosses flight pathways of other protected migratory species, such as waterfowl, that use the Atlantic Flyway during seasonal migrations. 4. Based on their sheer abundance, including juveniles within the area, proximity to the power line, frequent flights across the West Preferred Corridor, and morphology, listed wading birds meet many of the risk factors known to affect avian mortality rates caused by transmission power lines. 5. The endangered wood stork may be at highest risk of injury/mortality from the proposed powerlines of all avian species due to its limited population size, body form, nocturnal foraging behavior, flight patterns, and abundance of juveniles in the area. 6. Implementation of the proposed transmission lines would result in filling of over 100 acres of habitat within

Everglades National Park that includes wood stork and Everglade snail kite foraging habitat as well as Everglade snail kite nesting habitat. 7. Florida panthers have been documented in and around both corridors within ENP. Suitable panther habitat within the park would be reduced by over 100 acres as wetlands are filled for tower pads and access roads. Potential effects to panthers would include temporary disturbance during construction. (**0025-3-32** [Kimball, Dan] [Lewis, Mark])

Comment: More than 200 avian species are at risk of increased injury/mortality resulting from potential electrocutions and collisions with the proposed power lines. Species known to produce streamers, such as raptors, vultures, and herons, are at risk of injury/mortality from electrocution with the proposed power lines. 2. Besides the previously mentioned listed and special status species, other non-listed avian species that nest within colonies adjacent to the proposed corridors include great egrets (*Ardea alba*), great blue herons (*Ardea herodias*), cattle egrets (*Bub ulcus ibis*), anhingas (*Anhinga anhinga*), black-crowned night herons (*Nycticorax nycticorax*), and yellow-crowned night herons (*Nyctanassa violacea*). 3. More than 40 bird species that are not threatened, endangered, or special status species are anticipated to nest within the proposed corridors or adjacent habitats. 4. Implementation of the proposed transmission lines would result in filling of over 100 acres of habitat used by more than 200 avian species. (**0025-3-33** [Kimball, Dan] [Lewis, Mark])

Comment: The SFWMD recommends that the following issues be addressed in the Environmental Impact Statement: Electrical Transmission Lines - Another area of concern is specific to tree islands, which are commonly used as bird rookeries. Islands in or adjacent to this corridor have been Wood Stork rookeries in recent years. Given that Wood Storks are an endangered species and that restoration of the Wood Stork population, along with other Everglades wading bird populations, is a primary CERP target, the construction and presence of electrical transmission lines that could impact these tree islands and their fauna should be avoided. Please note that there may also be potential adverse impacts to the Wood Stork population and other Everglades wading bird populations from the West Preferred Corridor. (**0032-25** [Golden, James])

Response: *The potential impacts of building and operating the proposed new transmission lines on migratory, roosting, and nesting birds, including those that are Federally or State-listed as threatened or endangered will be addressed in Chapters 4, 5, and 7 of the EIS, based on the affected environment described in Chapter 2.*

Comment: Eliminate or reduce the direct and secondary wetland impacts and impacts to wetland-dependent listed species. The amendment does not demonstrate elimination or reduction of direct and secondary wetland impacts and impacts to wetland-dependent listed species. Please provide alternative analyses to document elimination or reduction of direct and secondary wetland impacts for all potential roadway corridors. Potential secondary impacts include habitat fragmentation, other induced development, and habitat alteration related to opportunistic undesirable (or exotic) vegetation. (**0032-35** [Golden, James])

Comment: Revise the habitat assessment to better reflect the actual habitat values. Provide mitigation adequate to offset the proposed wetland impacts. (**0032-36** [Golden, James])

Response: *These comments refer to the SCA submitted to the State of Florida by FPL, but they indicate an interest in the potential impacts of the proposed units and ancillary facilities on wetlands and habitat degradation. The potential impacts of building and operating proposed Turkey Point Units 6 and 7 and ancillary facilities and corridors on wetlands and habitat degradation will be discussed in Chapters 4, 5, and 7 of the EIS, based on the affected environment described in Chapter 2.*

Comment: These sections characterize the plant site as sparsely-vegetated hypersaline mud flats which provide limited habitat for aquatic biota due to fluctuations in water levels and salinity associated with the cooling canal system, DERM staff observations of the plant site during site visits, however, indicated that the site was heavily vegetated during the early wet season 2009, A Comprehensive Environmental Impact statement is needed pursuant to Chapter 24 of the Miami-Dade Code that addresses this and other issues. CEIS should include, at a minimum, a complete seasonally-based biological surveys for the proposed facility site that includes, but is not limited to birds, insects, fish, reptiles and amphibians, mammals, and aquatic invertebrates. (**0023-1-17** [LaFerrier, Marc])

Comment: The SFWMD recommends that the following issues be addressed in the Environmental Impact Statement: Radial Wells and Construction Dewatering Withdrawals at Power Plant Site - The potential for adverse impacts to wetlands and listed species. (**0032-12** [Golden, James])

Comment: The SFWMD recommends that the following issues be addressed in the Environmental Impact Statement: Additional Construction Impacts at Power Plant Site - The potential for adverse impacts to wetlands and listed species. (**0032-14** [Golden, James])

Comment: The SFWMD recommends that the following issues be addressed in the Environmental Impact Statement: Temporary Roadway Improvements for Construction of Units 6 & 7 - The potential for adverse impacts to environmentally sensitive lands within the Model Land Basin. (**0032-16** [Golden, James])

Comment: The SFWMD recommends that the following issues be addressed in the Environmental Impact Statement: Reclaimed Water Pipeline - The potential for adverse impacts to wetlands and listed species. (**0032-17** [Golden, James])

Comment: The SFWMD recommends that the following issues be addressed in the Environmental Impact Statement: Electrical Transmission Lines - The potential for adverse impacts to wetlands and listed species. (**0032-19** [Golden, James])

Response: *The potential impacts of building and operating proposed Turkey Point Units 6 and 7 and ancillary facilities and corridors on wetlands, Federally and State-listed species, and other terrestrial important resources will be addressed in Chapters 4, 5, and 7 of the EIS, based on the affected environment described in Chapter 2.*

Comment: The application does not include the listed species management plan, as required under Condition 2 of Z-56-07. Please provide the required plan. (**0023-1-63** [LaFerrier, Marc])

Comment: A plan is needed for in-kind, in-situ mitigation for impacts to existing wetlands related to the Radial Collection Well Area and Radial Collector Well Delivery Pipeline. Please include planting scheme, success criteria, monitoring and maintenance schedules. High quality coastal wetlands exist on the shoreline along the proposed area of work.
(**0023-1-71** [LaFerrier, Marc])

Comment: The application does not provide a complete and detailed exotic vegetation management plan as required by Condition 12 of Z-56-07. (**0023-2-30** [LaFerrier, Marc])

Comment: The application fails to provide sufficient information to determine whether it is in compliance with the tree protection provisions of Section 24-49 of the Miami-Dade Code.
(**0023-2-31** [LaFerrier, Marc])

Comment: The application does not include the management plan for all federal and state listed threatened and endangered species documented within the proposed access area, as required under Condition 11 of Z-56-07. (**0023-2-32** [LaFerrier, Marc])

Comment: Please submit a proposed schedule for long term monitoring, maintenance and financial assurances for all proposed mitigation areas. Please submit more detailed information about the location and types of anticipated impacts associated with the secondary Impacts. Please submit a detailed assessment of the time lag and risk associated with the restoration of the temporary impacts. (**0023-3-69** [LaFerrier, Marc])

Comment: It was stated that the Basis of Review and ratios were used to determine the mitigation credits necessary in the HID. According to the Basis of Review, the ratios should be 1.5/1 to 4/1. How was the proposed 1/1 determined and how is it consistent with the Basis of Review and the agency decisions used for other wetland impacts in the area?
(**0023-4-15** [LaFerrier, Marc])

Comment: The HID Mitigation Bank has a finite amount of mitigation that they can perform annually and receives funding from other impact associated with private development. Please provide evidence that the large amount of mitigation, as proposed, can be accomplished in the projected time frame. (**0023-4-16** [LaFerrier, Marc])

Comment: The application does not provide the planting plan required under Condition 13 of Z-56-07 for material that will not be planted at the proposed plant site.
(**0023-4-18** [LaFerrier, Marc])

Comment: The application does not include the listed species management plan, as required under Condition 2 of Z-56-07. Please provide the required plan. Pursuant to Condition 2 of Z-56-07, the plan shall include but not be limited to identification, location, and description of features such as permanent physical barriers, visual buffers, and the establishment of development setbacks necessary to prevent both direct and indirect impacts to adjacent critical habitat and disruption of sensitive behaviors such as breeding, nesting and foraging within the adjacent critical habitat. (**0023-4-20** [LaFerrier, Marc])

Response: *These comments are directed at the applicant and refer specifically to the SCA submitted to the State of Florida by FPL, but they indicate an interest in the impacts of building*

and operating proposed Turkey Point Units 6 and 7 on terrestrial resources. The potential terrestrial impacts of building the units will be presented in Chapter 4 of the EIS and the potential terrestrial impacts of operating the units will be presented in Chapter 5. Cumulative terrestrial impacts will be presented in Chapter 7.

Comment: What impact will salt deposition from the cooling towers have on freshwater wetlands in the area? What are the cumulative impacts of salt deposition from Units 3 and 4 in addition to those from the proposed Units 6 and 7? (**0018-16** [Poole, Mary Ann])

Comment: Other specific issues NMFS recommends for evaluation in the EIS or EFH assessment: 3. *Cooling towers*. Please evaluate potential impacts to wetlands from salt deposition from the cooling towers. (**0033-11** [Croom, Miles])

Response: *The potential impacts of operating proposed Turkey Point Units 6 and 7 on terrestrial ecological resources, including the impact of salt deposition from drift, will be discussed in Chapters 5 and 7 of the EIS, based on the affected environment described in Chapter 2.*

D.1.10 Comments Concerning Ecology – Aquatic

Comment: The reason they want to stay in that spot is because they're going to use the ocean water to cool the reactors. That hot water goes somewhere. It has been shown over and over again it produces algae blooms; it affects the pH around there; it kills the fish; it changes it. We have a fragile coral reef that runs along us. We are in a fragile environmental area. It is an environmental impact. (**0001-11-10** [Amor, Valerie])

Response: *The potential impacts from cooling water, including the use of reclaimed water from Miami-Dade County, use of water obtained from RCWs located at Turkey Point, and discharge of heated water to the Boulder Zone, will be discussed in Chapter 5 of the EIS.*

Comment: I haven't even begun to talk about fish and wildlife, road impacts, exotic species, and all of that. But there's a lot of information out there from the State Siting Act process that you should look at. (**0002-6-7** [Grosso, Richard])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts of the biological forms that will be affected by deep well injected wastes, please provide them. (**0022-2-6** [Reynolds, Laura])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to the geographical extent of the biological forms that will be affected by the deep well injected wastes, please provide them. (**0022-2-7** [Reynolds, Laura])

Response: *A variety of sources of information will be used during the development of the EIS, including information associated with the Florida SCA. The EIS will include citations for documents used in its preparation.*

Comment: List of potentially occurring State-listed fish and wildlife species

Common name	Scientific name	State-listing status
Atlantic sturgeon	*Acipenser oxyrinchus*	Species of special concern
American alligator	*Alligator mississippiensis*	Species of special concern
American crocodile	*Crocodylus acutus*	Endangered
Eastern indigo snake	*Drymarchon corais couperi*	Threatened
Least tern	*Sterna antillarum*	Threatened
Limpkin	*Aramus guarauna*	Species of special concern
Snail kite	*Rostrhamus sociabilis plumbeus*	Endangered
Everglades mink	*Mustela vison evergladensis*	Threatened
Florida manatee	*Trichechnus manatus latirostris*	Endangered

(**0018-2** [Poole, Mary Ann])

Response: *The potential impacts on Federally and State-listed threatened and endangered species, including those listed in the comment, from building and operating proposed Turkey Point Units 6 and 7 will be discussed in Chapters 4 and 5 of the EIS.*

Comment: Please state the amount of disruption to the biota of Biscayne National Park and adjacent bodies of Outstanding Florida Waters that the construction of units 6&7 will make including the plant site, all support facilities, all structures, all borrow pits (including rockmines,) all fencing, all roads, all berms, all pipelines, all transmission lines, all basins, all parking lots, and all vehicle usage. (**0022-3-1** [Reynolds, Laura])

Response: *The EIS will discuss the aquatic resources in the vicinity of Turkey Point in Chapter 2 of the EIS and will consider potential impacts from building proposed Turkey Point Units 6 and 7 in Chapter 4. Chapter 7 will evaluate cumulative aquatic impacts.*

Comment: Please show the barge routes and state the number of barge trips for each route for units 6&7 that traverse the waters of Biscayne National Park and other protected waters. Please state the sizes and drafts of the barges. Please state the average speed and maximum speed of the barge trips. Please state the increased damage to the benthic communities due to physical contact, turbidity, silt deposition, and wake disruptions. Please state the amounts of cumulative damage to the benthic communities resulting from historic barge trips and the increased barge trips due to units 6&7. Please state the plan for preventing barge collisions with manatees, turtles, and other protected species. Please state the plan for minimizing the number of barge trips for units 6&7. Please state the mitigation for damage to the benthic communities of Biscayne National Park and other protected waters. (**0022-3-18** [Reynolds, Laura])

Comment: The application does not provide sufficient information to demonstrate how manatees will be protected during construction of the barge slip improvements. (**0023-1-64** [LaFerrier, Marc])

Comment: Potential impacts to other key resources in Biscayne National Park - 4. FPL should clarify how they would transport construction supplies and equipment to the worksite, including via marine pathways, and evaluate any additional impacts on the marine environment. (**0025-3-30** [Kimball, Dan] [Lewis, Mark])

Response: *The potential impacts of increased barge traffic associated with building proposed Turkey Point Units 6 and 7 and the potential impacts of altering the barge slip will be discussed in Chapter 4 of the EIS.*

Comment: Surveys: Detailed surveys of all fish and wildlife resources in the vicinity of each proposed component of this project, to include laydown areas for construction equipment; areas that will be temporarily disturbed by excavations; and areas that may potentially be affected by changes in salinity, turbidity and sedimentation due to the operations of project. Please include, but do not limit to: benthic species and habitats (seagrasses, hardbottom, reefs, and associated reef resources), plankton, mangroves, and protected species (both Federally and State-listed). The design of all survey methodologies should be coordinated with the FWC. Provide a map of delineated habitat types (including mangroves and submerged habitats such as seagrasses and hardbottoms) with an overlay of the project component footprints. (**0018-4** [Poole, Mary Ann])

Comment: Surveys: For the 60-foot x 100-foot x 9-foot deep barge unloading area expansion, please provide fish and wildlife resource surveys and sea grass surveys. With regard to the potential for manatees to occur in the barge unloading expansion area during construction, the applicant should provide information detailing how observers will be selected, whether they have any previous experience observing for manatees, how many observers will be assigned to the construction areas, and how many hours per day each observer will be assigned to work. (**0018-6** [Poole, Mary Ann])

Comment: Please state the plan for protecting benthic communities for all alterations to the plant site affecting the marine environment. Please state the plan for protecting manatees, turtles, dolphins, sawfish, and other protected species from non-explosive dredging activities. Please state the plan for protecting manatees, turtles, dolphins, sawfish, and other protected species from explosive activities. (**0022-3-21** [Reynolds, Laura])

Comment: The application proposes several wildlife underpasses to facilitate movement of crocodiles under construction roads within the plant boundary. Please provide a detailed analysis of how the specified locations were selected and how crocodiles that may occur outside the plant near linear features (such as the transmission lines, access roads and spoil disposal routes) will also be protected from disturbance. [Same statement for T-Lines] (**0023-2-15** [LaFerrier, Marc])

Comment: Seasonal patterns of behavior of threatened and endangered species occupying Biscayne National Park, such as West Indian Manatees and American crocodiles, may occur if water salinity, temperature or quality changes as a result of construction or operation of Units 6&7 and non-transmission facilities. These impacts should be evaluated. (**0025-3-29** [Kimball, Dan] [Lewis, Mark])

Response: *The EIS will discuss the aquatic resources in the vicinity of Turkey Point in Chapter 2 and will consider potential impacts to benthic communities, fish, manatees, and sea turtles in Biscayne Bay and American crocodiles from building and operating proposed Turkey Point Units 6 and 7 (and planned mitigation) in Chapters 4 and 5.*

Comment: Impacts to submerged aquatic vegetation: Please submit a description of expected short term and long term anticipated impacts resulting from the proposed scope of work. (**0023-1-18** [LaFerrier, Marc])

Response: *The nature and extent of submerged aquatic vegetation will be discussed in Chapter 2 of the EIS. Potential impacts to submerged vegetation of building and operating proposed Turkey Point Units 6 and 7 will be discussed in Chapters 4 and 5, respectively. Cumulative impacts of operating the proposed units and other past, present, and reasonably foreseeable future actions that impact the same resources will be discussed in Chapter 7.*

Comment: Please provide documentation in support of this statement, including but not limited to a copy of the cited report with current data on nesting activity, nest success, hatchling sex ratios and survivorship, and survivorship to adulthood of juveniles hatched at Turkey Point over the period of record during which crocodile monitoring has been occurring at the Turkey Point power plant. [Same statement for T-Lines] (**0023-2-14** [LaFerrier, Marc])

Response: *The past and current populations of the American crocodile will be characterized and a description of the recent monitoring program for this species will be provided in Chapter 2 of the EIS.*

Comment: The cumulative effects of the proposed Units 6&7 plants and non-transmission facilities will place considerable stress on an already vulnerable ecosystem and potentially cause harm to Biscayne Bay and adjacent coastal wetlands. Disturbances to estuarine, marine, and terrestrial habitats are likely to result from proposed Units 6&7 construction and operation. (**0025-1-11** [Kimball, Dan] [Lewis, Mark])

Response: *The potential impacts associated with building and operating proposed Turkey Point Units 6 and 7 will be discussed in Chapters 4 and 5 of the EIS, respectively. A discussion of the cumulative impacts associated with the proposed units will appear in Chapter 7.*

Comment: The operation of the RCWs would result in ... water volume and quality alterations posing a threat to ecosystem function of the nearshore habitats of Biscayne Bay. (**0025-1-14** [Kimball, Dan] [Lewis, Mark])

Comment: The operation of the RCWs could potentially change sediment oxidation-reduction potential in seagrass beds and benthic communities, which should be considered an ecological impact. (**0025-3-17** [Kimball, Dan] [Lewis, Mark])

Comment: The net reduction in positive groundwater flux to the benthic ecosystem will occur due to the operation of the RCW. Groundwater is an important source of freshwater for benthic communities and any reduction should evaluated for its associated impact. (**0025-3-18** [Kimball, Dan] [Lewis, Mark])

Comment: Although the radial collector wells will be physically placed in the underlying aquifer and the laterals are not expected to extend into park boundaries, the primary source intake water is Biscayne Bay. Based on the design feature of horizontal production wells and preliminary hydrologic modeling, the cone of influence includes Biscayne National Park waters. The application design is for up to 124 million gallons per day to be withdrawn from these

surface waters. The groundwater modeling which predicts minimal impacts to the benthic organisms of the bay appears to consider the subsurface as a singular uniform, non-karst feature, which is not accurate. The groundwater modeling does not provide the degree of detail needed to determine impacts to the benthic organisms of the bay and Biscayne National Park, when the RCW system is operated. (**0025-3-19** [Kimball, Dan] [Lewis, Mark])

Comment: The SFWMD recommends that the following issues be addressed in the Environmental Impact Statement: Radial Wells and Construction Dewatering Withdrawals at Power Plant Site - The potential for the proposed withdrawals to adversely impact the ecology of Biscayne Bay. (**0032-9** [Golden, James])

Response: *The potential impacts of RCW operations will be discussed in Chapter 5 of the EIS.*

Comment: *Essential Fish Habitat within the Project Area* - Mangrove: The South Atlantic Fishery Management Council (SAFMC) designates mangroves as EFH for juvenile gray snapper (Lutjanus griseus), dog snapper (L. jocu), bluestriped grunt (Haemulon sciurus), spiny lobster (Panulirus argus), and pink shrimp (Farfantepenaeus duorarum). Mangrove habitats are ecologically important coastal ecosystems (Lugo and Snedaker 1974). At a recent meeting, FPL suggested that the mangrove habitat that would be impacted by the water treatment facility (approximately 50 acres) is composed of dwarf red mangroves (Rhizophora mangle) with hypersaline conditions and lack of direct connection to other wetlands or water bodies. These types of mangrove wetlands still provide ecological services including as a buffer against storm surges, they reduce shoreline erosion and turbidity, and absorb and transform nutrients. While this mangrove system may not be inhabited to a large degree by various life stages of federally managed fisheries, they may contribute dissolved and particulate organic detritus to estuarine food webs. They help shape local geomorphic processes and are important in the heterogeneity of landforms which provide shelter, foraging grounds and nursery areas for terrestrial organisms (e.g., through bird use as a rookery and feeding on fish). The root system binds sediments thereby contributing to sedimentation and sediment stabilization. (**0033-1** [Croom, Miles])

Comment: Seagrass and Unconsolidated Bottom: SAFMC also designates seagrass as EFH. Species associated with seagrass include pink shrimp, spiny lobster, and estuarine life stages of various species within the snapper/grouper complex including adult white grunt (Haemulon plumieri); juvenile and adult gray snapper (Lutjanus griseus); juvenile mutton snapper (Lutjanus analis). Any bottom-disturbing activities within areas that are seagrass habitat must include best management practices to avoid impacting this habitat. SAFMC also designates soft bottom habitat as EFH because it plays an important role in the ecological function of coastal ecosystems by controlling fluxes of nutrients between the sediment and the water column. Shallow water, unconsolidated bottom also provides EFH by serving as nursery grounds for early life stages of benthic-oriented, estuarine-dependent species; refuges and feeding grounds for forage species and juvenile fishes (SAFMC 2009) and feeding grounds for specialized predators, including adult white grunts (Potts and Manooch 2001). (**0033-2** [Croom, Miles])

Comment: *Habitat Area of Particular Concern within the Project Area* - SAFMC also identifies mangroves and seagrass as a Habitat Area of Particular Concern (HAPC) for several species within the snapper/grouper complex. HAPCs are subsets of EFH that are either rare,

particularly susceptible to human-induced degradation, especially important ecologically, or located in an environmentally stressed area. Federal actions with potential adversely impacts HAPCs will be more carefully scrutinized during the consultation process and subject to more stringent conservation recommendations. In addition, Biscayne Bay is an EFH-HAPC for spiny lobster. Biscayne Bay and the Biscayne National Park are also an EFH-HAPC for coral, coral reefs, and hardbottoms (SAFMC 1998). (**0033-3** [Croom, Miles])

Comment: *Essential Fish Habitat Consultation Requirements* - The Magnuson-Stevens Act directs federal agencies to consult with NMFS when the agency's activities may have an adverse affect on EFH. We recommend that the NRC coordinate closely with the NMFS Habitat Conservation Division to ensure the EFH assessment and NEPA documents contain sufficient detail, 50 CFR 600.10 to 600.920 describes the content required of an EFH assessment. Specifically, the components of an EFH assessment can be found at 50 CFR 600.920(e)(3) and (4) and are listed below (additional comments are provided in parentheses). The EFH assessment can be incorporated into the EIS or provided to NMFS under separate cover.

Components of an EFH Assessment:

1. Description of the action. (This section can reference relevant portions of the EIS.)
2. Analysis of the potential adverse effects of the action on EFH and the managed species.
3. Federal agency's conclusions regarding the effects of the action on EFH.
4. Proposed mitigation. (Unavoidable direct and indirect impacts to EFH will require compensatory mitigation.)
5. Results of an on-site inspection to evaluate the habitat and the site-specific effects of the project.
6. Views of recognized experts on the habitat or species that may be affected.
7. Review of pertinent literature and related information.
8. An analysis of alternatives to the proposed action. (This section can reference relevant portions of the EIS alternatives analysis.)

(**0033-4** [Croom, Miles])

Response: *Essential fish habitat (EFH) and mangrove habitats near Turkey Point will be described in Chapter 2 of the EIS. The review team will also assess potential impacts on EFH, including mangrove resources, from building and operating proposed Turkey Point Units 6 and 7 in an EFH assessment that will be forwarded to the National Marine Fisheries Service (NMFS) for review. The EFH assessment will be included in an Appendix of the EIS.*

Comment: [Determine] the impact on wetlands and nearshore surface and groundwater water quality in Biscayne Bay, including as it relates to CERP efforts to promote estuarine conditions in nearshore areas. (**0023-1-36** [LaFerrier, Marc])

Response: *The impacts of building and operating proposed Turkey Point Units 6 and 7 on wetlands and nearshore surface-water and groundwater quality will be discussed in Chapters 4 and 5 of the EIS. Chapter 7 of the EIS will evaluate cumulative impacts, and include a discussion of how the proposed action might affect current or planned restoration activities in the vicinity of Turkey Point.*

Comment: Other specific issues NMFS recommends for evaluation in the EIS or EFH assessment: 1.c *Radial wells*. Impacts to EFH associated with radial well construction and operation within Biscayne Bay should be fully evaluated. The evaluations should include an evaluation of impacts associated with extended use of the radial well system to include an evaluation of impacts to groundwater that is closely tied to surface water in this porous karst area and thereby supports fish and wildlife resources. (**0033-7** [Croom, Miles])

Comment: Other specific issues NMFS recommends for evaluation in the EIS or EFH assessment: 1.e *Radial wells*. Impacts to EFH associated with radial well construction and operation within Biscayne Bay should be fully evaluated. The evaluations should include a survey and monitoring plan that would enable FPL to determine impacts from radial wells to localized habitats and the fish and wildlife that depend on them. (**0033-9** [Croom, Miles])

Response: *The potential impact of building and operating radial wells on aquatic resources will be discussed in Chapters 4 and 5 of the EIS, respectively. The review team will also assess potential impacts on EFH in an EFH assessment that will be forwarded to the NMFS for review. The EFH assessment will be included in an Appendix of the EIS. FPL's proposed monitoring program will be discussed in Chapters 2, 4, and 5.*

Comment: Other specific issues NMFS recommends for evaluation in the EIS or EFH assessment: 2. *Deep-well injection*. Please provide an evaluation of effects to fish and wildlife resources from proposed deep-well injection activities. The evaluation should describe the fate (location and concentration over time), of any nuclides injected into the well. (**0033-10** [Croom, Miles])

Response: *The potential ecological impacts associated with deep-well injection of cooling tower blowdown will be discussed in Chapter 5 of the EIS.*

Comment: We would like to see a baseline survey and monitoring information for the radial collector wells, caissons, and lateral arms, with preferably a minimum of two years of data. This data should include sampling prior to, during, and at least one month after all radial collector well events. Identify and commit to modeling environmental responses such as water quality and fish and wildlife species that depend on seagrass and hard-bottom habitats. FWC staff can work with the applicant to identify species of interest. How will noise from well/pump operation affect fish and wildlife resources (particularly listed species) in the area of the lateral arms and the well caissons? Our staff is concerned that there might be a delayed impact on fish and wildlife resources if phenomena such as "frac-out" or subsidence of the bay bottom should impact on the radial collector wells and their associated lateral arms. Is this a possibility? If so, how will this possibility be avoided, and what contingencies will be in place if "frac-out" or subsidence does occur? Also, since radial collector wells have not yet been used in a saltwater environment, we suggest that FPL anticipate the potential for indirect impacts on fish and wildlife resource needs in the case where there might be a potential failure of the wells due to corrosion. (**0018-10** [Poole, Mary Ann])

Comment: How will fish and wildlife resources over the lateral arms of the radial collector wells be affected by the construction of the wells? How will the lateral arms be "advanced from the caissons"? We would like to see a survey and monitoring program that specifically enables FPL

to determine the contribution of this part of the proposal to any impacts on the surrounding ecosystem, localized habitats and the fish and wildlife that depend on them. (**0018-8** [Poole, Mary Ann])

Comment: FPL's response [to FDEP's SCA review] does not adequately address how benthic resources in the footprint of the RCWs and adjacent areas will not be significantly affected given the fact that at least 3% of the water will come from the Biscayne Aquifer, a source of freshwater inputs to the bay bottom, helping to support the benthic community. (**0020-2** [Mulkey, Cindy])

Response: *These comments refer to the Florida SCA, but express a concern that there is the potential for impact to benthic organisms in the vicinity of the RCWs. The potential impact of building and operating the RCWs on benthic resources will be discussed in Chapters 4 and 5 of the EIS, respectively.*

D.1.11 Comments Concerning Socioeconomics

Comment: Additionally, as Mayor of Florida City, I'm concerned about our economy. And the building of these two power plants in our area will be an immensely beneficial operation as far as spurring our economy. Safety first along with environmental protection; those are the first issue. Even with the economic benefit, if we can't guarantee safety and protection of the environment, we'll have to get jobs elsewhere. But once those two criteria are met, then the job creation becomes immensely important to me. People with jobs don't care about that aspects of it; but people without jobs simply do. (**0001-1-5** [Wallace, Otis])

Comment: Also, the gentleman that spoke before from the Chamber of Commerce, which I was a member of, stated that 4,000 jobs would be available for five years. And the gentleman who was just here before me said that 800 permanent jobs would be established. I would like to recall 1970 when Aerojet promised Florida City and Homestead that jobs would be created in the development of the Aerojet canal. Contractors were brought in from out of State and they got the jobs; nothing was done for the benefit of Florida City or Homestead, as you can see. I don't want to see this happen again if they decide to go ahead and approve nuclear plant 6 and 7. (**0001-10-2** [Marinelli, Francis J.])

Comment: When I look at this opportunity for growth and expansion in an area that truly needs it, I, because of not just what someone has told me or what someone has talked about, but it is something that I've lived, I see the benefits of it. I see kids being able to get jobs and come back home to a community that they're so very proud of. I see adults being able to take care of their elderly family members because of the amount of revenue and commerce that is being sparked. So with some of you I agree and others I vehemently disagree. And I say that this is about jobs, but it is about lifestyle, it's about living, and it's about opportunity. (**0001-17-1** [Diggs, Bill])

Comment: We are at a difficult time in our history in this country. Jobs are hard to come by; college kids that you've spent your life savings to send to school are having difficult time finding opportunities. I submit to you this: They'll either find it here or somewhere else. But at the end of the day this is our community. And I stand, if nothing else, but an example of what can

happen when community and business works together, because it's not just about jobs. It's about lifestyle; it's about faith; it's about hope. (**0001-17-2** [Diggs, Bill])

Comment: Data shows that the nuclear power plants contribute significantly to local economies. These are averages. The creation of a nuclear power plant will result in a creation of 1400 to 1800 jobs during the construction, with peak employment at 2400. As we can see in the back, FP&L has 3600, so the numbers are better. Operating a nuclear power plant generates from 400 to 700 permanent jobs and these jobs pay 36 percent more than average salaries in the local area. Again, FP&L has 800 permanent jobs. These permanent jobs create an equivalent number of additional jobs in the local area and provide goods and services necessary to support the nuclear workforce such as grocery stores, dry cleaners, et cetera. We're looking forward to that. (**0001-18-2** [Landeta, Hector])

Comment: Each year an average nuclear plant generates approximately 430 million in sales, goods, and services in the local community and nearly 40 million in total labor income. Again, they have better numbers. They see -- they have 6 billion -- 6 billion in economic benefits to local economy over the next decade. (**0001-18-3** [Landeta, Hector])

Comment: We need jobs. My generation is coming into this hard economic times and we need jobs. You're promising 800 full-time jobs for South Florida for these two reactors. I graduated in a class of 935 students in Palm Beach County. That doesn't cover those people. That's about 135 less jobs than there are people who graduated in my class. There are 23 high schools in Palm Beach County; there are 32 high schools in Miami-Dade. Do you think 800 jobs is going to make a dent in the number of young people looking to enter the work force in South Florida? (**0001-19-7** [Ryan, Megan])

Comment: [T]here are 800 full-time employees at the site and approximately an equivalent number of contractors of the site. Now, those 1600 people, they're members of the community; they buy their gas in the gas stations; they go to the supermarkets; their children go to the schools. (**0001-3-1** [Kiley, Mike])

Comment: We have to look at jobs. We have to build our economy back, a new economy that relies on growth. And the good news is that from this project it's anticipated that as many as 4,000 or more jobs will be added through the construction phase which will last five to seven years. That would be a rich addition to the workforce in South Florida, which will benefit all of us in so many, many ways, but most importantly for those people who are out of work and looking for jobs. And we have so many people in the construction industry who have been hit hard by the downturn in the economy. (**0001-5-3** [Johnson, Barry])

Comment: When the project is completed it will include 800 jobs -- 800 more jobs in South Dade; 800 more families in South Dade contributing to the growth of our community. And these are high-skilled well-paying jobs that our community needs. Those are the jobs that will build our future. (**0001-5-4** [Johnson, Barry])

Comment: As the previous speakers have said, 4,000 jobs can be created by having Units 6 and 7 built, and 800 permanent jobs -- not just any regular jobs, but high-paying engineering jobs and the like, can be provided by having 6 and 7 built. (**0001-9-2** [Martinelli, Tom])

Comment: We are here because of the proposed plans to build two atomic plants that will afford us the opportunity, after they are built at Turkey Point, to have a flourishing economy in the area. (**0002-10-1** [Alexander, William])

Comment: The Chamber also sees with sympathy all the efforts surrounding the industry, the generating industry, and the production of electricity and energy. We also see that it will provide around 3,000 jobs, which is very, very important to us. We also are considering not just those 3,000 temporary jobs, but also the 800 permanent jobs that would be left here in this region that sorely needs it right now. (**0002-10-4** [Alexander, William])

Comment: What these jobs will do -- there's a long-term effect from these two plants. Not only are they going to provide thousands of jobs as they're being built here locally, these jobs are jobs that give a sufficient rate of pay, a living wage. And in addition to that, most of the workers that work on these projects will either receive some type of pension benefits or health and welfare. (**0002-13-3** [Simpson, Roce])

Comment: One of the things you'll also notice when you come to the site is that there's 800 full-time employees, and there's an additional 800 contractors that work at the site and call this community their home. They buy their gas in town, they go food shopping in this town, they use the local restaurants, their children go to the schools. (**0002-5-4** [Kiley, Mike])

Comment: And you have to understand the economic impact and the economic value of a restored Biscayne Bay to the industries that are populated by a lot of folks who probably aren't here tonight; fisherman, recreational users, people that make their money off of that Bay. Those are jobs too, and those have major implications for what happens here in the future. (**0002-6-3** [Grosso, Richard])

Comment: We need these new power plants. It provides jobs for honest people. You look at it. A lot of people -- to get in at a nuclear power plant you got to take a 500 question site [psych?] test, plus pass a background check. You are attracting a good crowd of people in this area, which is good economically, not to mention -- I believe there's one other nuclear power plant being built right now, which is Plant Vogtle, I believe in Georgia. And we can lead the way to supplying our power demands. (**0002-7-3** [Snelson, Richard])

Comment: You look at it as far as local impact; the people, the training programs and stuff like that, it's going to provide a lot of permanent jobs for people. You look at all the foreclosures and the people that have lost their jobs. I think it's a win-win situation. (**0002-7-4** [Snelson, Richard])

Comment: Nuclear energy is also a smart economic choice. Constructing plants has the ability to employ about 4,000 people at its highest rate of construction, and then it employs about 500 specialized jobs, like Victor's, who came to the Pipeline Program at Miami-Dade. (**0002-9-3** [Martinelli, Tom])

Comment: Another great reason to consider building two new reactors would be to imagine just how many jobs it would create. In a downed economy such as this, jobs are a hard thing to come by; but upon the unveiling of two nuclear reactors, a significant job growth is to be expected -good jobs to boot, not just a medley of entry level positions. This will in turn spike the

cash flow in the South Florida area and analogously pass on to corporate and private businesses alike. (**0003-4-4** [Accursio, James])

Comment: In addition to jobs, it will also stimulate the economy by commencing the required construction spending to the county which thusly stimulates millions of dollars in property tax. These taxes are passed on to schools, colleges, educational institutions, economic growth firms, and many other governmental organizations; giving them the financial injection they need in these hectic times. (**0003-4-5** [Accursio, James])

Comment: Ensure the full scope of the proposed project's fiscal impacts is calculated. The location of the plant; transmission lines and associated facilities; the rate increase, which is proposed to precede the actual construction phase of the project; and additional direct costs that will be incurred by Miami-Dade County and its municipalities (including but not limited to fire, police; etc) over the life of the project should be taken into account and be incorporated into economic and fiscal analyses. (**0019-1** [Hamilton, Karen])

Comment: Ensure the economic benefits of the proposed expansion project, such as employment and capital expenditures, are realized by the residents of South Florida. (**0019-2** [Hamilton, Karen])

Response: *The expected socioeconomic impact of building and operating proposed Turkey Point Units 6 and 7, including impacts on local employment and earnings, local tax revenues, in-migration, local infrastructure, and public services will be presented in Chapters 4 and 5 of the EIS. The cumulative impacts of the proposed action and other past, present, and reasonably foreseeable actions will be presented in Chapter 7.*

Comment: So what that means is, that we're not going to have massive amounts of people, like we do now, going to Jackson Hospital and other community hospitals that have no health insurance, putting the burden back on the taxpayers to be able to furnish health insurance for these people. There is an endless line of people who are retired that have no income, waiting on Section 8 housing and other types of housing that they can get into and live in the twilight of their years. This will, in a lot of cases, prevent that from happening. (**0002-13-4** [Simpson, Roce])

Response: *The expected impact of building and operating proposed Turkey Point Units 6 and 7 on the capacity use of local medical services will be evaluated in Chapters 4, 5, and 7 of the EIS.*

Comment: To be more specific to the lodging industry, which I'm part right now, this power plant would produce a stabilizing effect on the local economy. It will compliment the tourism industry. And as maybe you know this, especially people from FP&L, refueling takes place every 18 to 24 months for each reactor and brings several hundred workers from outside the local area who stay in the hotels, motel, and eat in our local restaurants. Each reactor alternates its refueling schedule, usually resulting in at least one refueling or significant equipment installation per year, typically for us during a slack part of the tourist season. (**0001-18-5** [Landeta, Hector])

Response: *The impacts on the economy and infrastructure, including recreation and housing, will be addressed in Chapters 4, 5, and 7 of the EIS.*

Comment: You say that tourism is going to be affected because people coming to work here are going to need hotels and restaurants. But I thought you said that you wanted to create jobs for people who already live here, so we should not be talking about tourism because it's already affected enough by the Gulf oil spill. (**0001-19-8** [Ryan, Megan])

Response: *The impacts of building and operating proposed Turkey Point Units 6 and 7 on both local and in-migrating labor and indirect impacts of job creation on the local economy will be addressed in Chapters 4, 5, and 7 of the EIS.*

Comment: Regarding the ability to have jobs and provide jobs for the area. Right now Miami-Dade College offers an internship program in nuclear power and practice. And interns right now from Miami-Dade College working at the FP&L Plant at Turkey Point are making $19 to $20 an hour as an intern before they even set foot on the property as a full-time licensed person. So, you know, what I think is marvelous is that they are a good partner; they run a very safe, very secure practice. And the expansion I think only solidifies our future as a great, great place to live, that being Homestead/Florida City down here. (**0001-20-5** [Daley, Dennis])

Comment: Turkey Point has had a growing demand for highly-skilled workers, and we understand that they could soon experience workforce shortages, largely due to retirements. As a result we, together, developed an Associate in Science Degree program in electrical power technology. And I would be here to tell you this today, that that program has been extremely successful. It was targeted for a very diverse population of incumbent workers at Florida Power & Light Turkey Point and our college students. Graduates from this program meet the qualifications to work in positions in nuclear and non-nuclear facilities. To date we have had 63 students to graduate from the program. And I might add that the program began in 2006. Of those 63 graduates, 36 are currently working at Turkey Point and 20 are in the process of being hired. This has truly been a success story for Florida Power & Light and Miami-Dade College. It has enriched our community. (**0001-4-2** [Jacobs, Jeanne])

Comment: Briefly I would like to discuss training with you. For this undertaking of the construction of Units 6 and 7, we're looking at jobs for over 4,000 building tradesmen. Building tradesmen within the State of Florida who are either licensed by their trade and/or have the training that is necessary to go out and build this facility correctly, on budget, and on time. I can speak on behalf of the Florida Carpenters, that we do not send a single person out to that plant for any piece of operation that is not properly credentialed and trained. And I can also tell you that the rest of the building trades, that's their same philosophy. (**0001-8-3** [Johnson, Michael])

Comment: Along with the fact that we're going to be able to provide these jobs for working men and women during the time of construction, a lot of young people will go out there on those particular projects and be trained with a skill in a technical high-level industry and be able to take those skills back out into the community and be able to work on other projects and sustain their families for the rest of their lives. And in addition to that, for those of you that don't realize it, once these plants are built that's not the end of it. People will go back on a regular basis to

maintain, update, and upgrade these plants. It's a system that is good for the community, good for the workers. (**0002-13-5** [Simpson, Roce])

Response: *Impacts on local employment will be addressed in Chapters 4, 5, and 7 of the EIS.*

Comment: I do want to say that I think the whole discussion of the jobs that might be brought to this community, it is and should be irrelevant to an environmental study. I know that there is a socioeconomic aspect of it, and we're going to be addressing the socioeconomic, again very adverse impacts if the transmission lines were to go along the U.S. 1 corridor. (**0001-21-7** [Lerner, Cindy])

Comment: I can understand that folks in Florida City and Homestead may be interested in grabbing that relatively small amount of jobs that could come from an investment that's focused down here. But speaking regionally, of course, that's money that's taken out of the hides of everyone in the rate base. If it came right down to trying to make more jobs, well, with this amount of money I figure we could build about 50 new sports arenas for billionaire ball teams and the Heat, I think they deserve a new arena by now. That other one is getting old and they've got these three new players. It's not just about jobs. And I think in reality that should pretty much be out of scope for our discussion. (**0001-24-5** [Harum-Alvarez, Albert])

Response: *The Council on Environmental Quality guidance for implementing NEPA includes a discussion of economic or social effects when these are interrelated with natural or physical environmental effects. NRC guidance for implementing NEPA includes the analysis of employment impacts from construction and operation activities (including transmission lines) among the socioeconomic impacts to be analyzed in environmental reviews of nuclear power plants. The socioeconomic impacts of construction and operation of proposed Turkey Point Units 6 and 7 will be assessed in Chapters 4, 5, and 7 of the EIS.*

Comment: And, by the way, all the folks that are up here talking about jobs. I took a job about a month ago with a solar company installing solar installation panels on a ranger station in Biscayne National Park. That is as blue collar a job as any blue collar work I've ever done; it's construction work; it's electrical work; it's roofing; it's tiling. It's blue collar work, it produces lots of jobs. People sometimes think solar is people going up to a rooftop and meditating on the sun or something like that. It's nothing to do with that. It's the construction trades installing solar panels which are existing right now. The jobs that this plant will create are located in Homestead. If we did solar on rooftops throughout the service area of FP&L, we would be creating jobs throughout their entire service area. That's a big consideration. (**0002-14-4** [Schwartz, Matthew])

Response: *Alternative energy sources, including solar power, will be discussed in Chapter 9 of the EIS.*

Comment: People come to South Dade to go to Everglades National Park or Biscayne National Park. Business in the area benefit from that tourism and provide services to people who are going to visit those parks. So people will be affected and the locals in that way as well. (**0002-16-3** [Shlackman, Mara])

Comment: Construction of transmission towers and access roads in either corridor could impact visitor experiences. Heavy equipment including dump trucks, bulldozers, excavators and cranes would be used for construction of transmission lines. Qualities of the existing visitor experience such as primitiveness and solitude may be impacted. (**0025-3-38** [Kimball, Dan] [Lewis, Mark])

Comment: Natural vistas provide park visitors with an immediate and lasting sensory experience that strongly conveys the character of a national park. The proposed transmission lines, towers and associated roads could adversely affect the visitor's appreciation of the visual viewshed over large areas. The transmission lines and structures would be visible within the park for many miles away. Because of the flat topography and the broad unobstructed vistas, visitors on the Tamiami Trail, and to a lesser extent, visitors to Shark Valley and the Chekika areas, as well as visitors on airboat tours, would be able to see the transmission lines and structures. The transmission facilities would be an intrusion on the natural scenery of the Everglades and detract from the visitors' ability to appreciate the park. For visitors near the L 31-N canal, the towers and transmission lines would dominate the viewshed. These impacts would be permanent. A separate viewshed analysis should be prepared for scenic and visual impacts on the visitor experience. (**0025-3-39** [Kimball, Dan] [Lewis, Mark])

Comment: Similar impacts to viewsheds could occur elsewhere in the Western Transmission Corridor in Water Conservation Area 3B, north of the park, the Southern Glades Management Area, east of the park and in the Model Lands between U.S. 1 and the Turkey Point site. (**0025-3-40** [Kimball, Dan] [Lewis, Mark])

Comment: Short-term impacts would be expected from construction and maintenance activities and transmission line monitoring overflights. A corona effect from the proposed new lines (audible noise) may increase in the long-term. (**0025-3-46** [Kimball, Dan] [Lewis, Mark])

Response: *The expected impact of building and operating proposed Turkey Point Units 6 and 7 on local recreational areas, including Everglades National Park and Biscayne National Park, will be assessed in Chapters 4, 5, and 7 of the EIS.*

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts of the creation of construction jobs, temporary jobs, and permanent jobs, please provide them. (**0022-4-16** [Reynolds, Laura])

Response: *This potential impacts of building and operating proposed Turkey Point Units 6 and 7 on employment and the effects of job creation on the local infrastructure and public services will be discussed in Chapters 4, 5, and 7, based on the affected environment described in Chapter 2. The EIS will include citations for documents used in its preparation.*

Comment: Transportation Subsection indicates that the Homestead Extension of Florida's Turnpike (SR 821) and South Dixie Highway (US 1/SR 5) are the major transportation corridors for north-south movement in Miami-Dade County. The traffic impact data and analyses presented in Appendices 10.7.4.1 (Traffic Study Peak Construction) and 10.7.4.2 (Traffic Study

Operations Analysis) does not consider the impact of the construction and operation of Units 6 and 7 on these two regional corridors. (**0023-2-23** [LaFerrier, Marc])

Comment: The assertion that the proposed access road from the Turkey Point Units 6 and 7 site to theoretical SW 137 Avenue along theoretical SW 359 Street will be improved within the transmission line right-of-way is premature. The traffic studies contained in Appendices 10.7.4.1 and 10.7.4.2 do not consider other alternative roadways such as SW 344 Street and transportation demand management strategies. (**0023-2-24** [LaFerrier, Marc])

Comment: [Miami-Dade County Planning and Zoning] staff have the following concerns regarding the traffic study: the assumptions; the methodology; the impact study area; the lack of consideration of alternative roadways including SW 328 Street and SW 344 Street; and the lack of consideration of transportation demand management programs to reduce the overall traffic demand and use of single occupant vehicles. (**0023-2-25** [LaFerrier, Marc])

Comment: The consultant should identify the programmed transportation projects located within the Study Area for roadways and intersections listed in the 2010 Transportation Improvement Program (TIP); and identify the planned transportation projects located within the Study Area listed in Priority I, II and III of the 2030 Long Range Transportation Plan. (**0023-2-26** [LaFerrier, Marc])

Comment: The expected increase in non-development traffic and traffic from other previously approved and unbuilt development should be accounted for in the future years. (**0023-2-27** [LaFerrier, Marc])

Comment: Prior to the assumption of new roadway construction (SW 359 Street), traffic impact analyses with the existing and improved existing roadways for concurrency year (usually 3 years in the future), construction opening year (2011), construction peak year (2016) and normal operational year (2020) should be provided. (**0023-2-28** [LaFerrier, Marc])

Comment: Please note that LOS standards for roadways outside UDB are different than within UDB (**0023-2-29** [LaFerrier, Marc])

Comment: Include bicycle facilities as part of the road construction. (**0023-2-4** [LaFerrier, Marc])

Comment: Options for shuttle service should be explored. (**0023-3-1** [LaFerrier, Marc])

Response: *These comments refer to the SCA submitted to the State of Florida by FPL, but they indicate an interest in the potential impacts of the proposed plant on transportation. The potential impacts of building and operating proposed Turkey Point Units 6 and 7 on transportation will be discussed in Chapters 4, 5, and 7, based on the affected environment described in Chapter 2.*

Comment: Application does not supply sufficient design and placement information on Eastern corridor and location-specific pole placement to determine whether this activity is well designed and conducive to both pedestrian and transit use, and architecturally attractive. (**0023-3-34** [LaFerrier, Marc])

Response: *This comment refers to the SCA submitted to the State of Florida by FPL, but it indicates an interest in the potential impacts of the proposed transmission lines on land use, transportation, and aesthetics. The potential impacts of building and operating the transmission lines on land use, transportation, and aesthetics will be discussed in Chapters 4, 5, and 7, based on the affected environment described in Chapter 2.*

Comment: The proposed access roads are outside the existing site of the FPL power plant and are therefore subject to land use/zoning consistency determinations. Such access roadways will be subject to amendments to the Comprehensive Development Master Plan (CDMP). (**0023-1-53** [LaFerrier, Marc])

Comment: Application fails to consider the County's Greenway Plans and Parks and Open Space System Master Plan. The County's Preferred Corridor for the proposed Biscayne Trail Segment D and a portion of the southern route of the Biscayne-Everglades Greenway is located along the north side of SW 328 St. (North Canal Dr.). (**0023-2-2** [LaFerrier, Marc])

Comment: The County's Preferred Corridor for the Biscayne Trail north-south leg is located along SW 137 Av. from SW 328 Av. to Card Sound Rd. The County's Preferred Corridor for the southeastern leg of the Biscayne Trail also extends southeast along the L-31 E canal from SW 328 St. to Card Sound Rd. (**0023-2-3** [LaFerrier, Marc])

Comment: Information is not provided on how activities will impact approved Urban Centers and their respective Regulating Plans and will be in compliance with the County's Urban Design Manual. (**0023-3-36** [LaFerrier, Marc])

Response: *These comments refer to the SCA submitted to the State of Florida by FPL, but they indicate an interest in the consistency of proposed Turkey Point Units 6 and 7 with existing zoning and land use plans. The general consistency of building and operating the proposed units with existing zoning and land-use plans will be discussed in Chapters 4, 5, and 7.*

Comment: [A]pparently this would represent for the economy, after the 40 years of the building when the two plants are finally working, savings in energy costs for about $90 million. So, we believe this is very important. We have analyzed the project and realize that when the two plants that will be built here at Turkey Point are finally constructed, this will afford us the things that we need in order to have a better future. We, thus, once again, applaud FPL for its vision and for the time that it has invested in providing us with a better opportunity for our future. (**0002-10-3** [Alexander, William])

Response: *This comment refers to savings in fuel costs projected for the life of the proposed project as part of the State of Florida's Determination of Need. Need for power will be addressed in Chapter 8 of the EIS. The expected socioeconomic impact of building and operating proposed Turkey Point Units 6 and 7, including impacts on local employment and earnings, local tax revenues, in-migration, local infrastructure, and public services, will be discussed in Chapters 4, 5, and 7.*

Comment: The plant is there. Fortunately we've had the plant. It's the Government's idea of trying to provide South Florida power has made us where we've grown to this point, where we

have this power, where we have the development that we have. Okay. We have to keep going. It's not going to stop unless we put doors up there on the county line that says, we can't move anybody else in here. I don't see any difference between a plant down there and using the water, okay, or another 40,000 people moving into Dade County every two years. (**0002-12-5** [McHugh, John])

Response: *This comment suggests impacts on resources such as water would occur independently of the units. Impacts on water and other resources will be discussed in Chapters 4, 5, and 7 of the EIS.*

D.1.12 Comments Concerning Historic and Cultural Resources

Comment: This office reviewed the referenced project for possible impact to historic properties listed, or eligible for listing, in the National Register of Historic Places. The review was conducted in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended, 36 CFR Part 800: Protection of Historic Properties and the National Environmental Policy Act of 1969, as amended. In October 2008, December 2008, March, 2009, and April 2009, Janus Research conducted an archaeological and historical Phase I survey of the proposed Turkey Point Units 6 & 7 site, associated non-linear facilities, and spoils areas on plat property on behalf of the Florida Power & Light Company. Janus Research identified no cultural resources within the project area during the investigation. Our office found the submitted report complete and sufficient in accordance With Chapter 1 A-46, Florida Administrative Code. Based on the information provided, it is the opinion of this office that the proposed development will have no effect on historic properties. However, we also concur with Janus Research that, prior to construction, an unanticipated finds plan should be developed to outline the procedures and identify personnel to be contacted if significant archaeological material or human remains are encountered during construction. In 2009, Janus Research conducted background research to identify previously recorded archaeological resources within 100 feet and historic cultural resources within 500 feet of the associated linear facilities, and to identify areas of high, medium, and low probability for the presence of unrecorded cultural resources. (**0013-1** [Kammerer, Laura])

Comment: Of particular concern would be design compatibility related to shadows, traffic, height, bulk and scale of architectural elements and how pole placement and design will address these standards. (**0023-3-32** [LaFerrier, Marc])

Comment: Design details, including proposed materials, visual buffering, complementary vegetation, and fencing must be addressed to determine consistency with LU-4D for each proposed new pole and corridor alignments generally. (**0023-3-33** [LaFerrier, Marc])

Comment: Archeological surveys of the entire West Transmission Corridor will be needed. An archeological survey conducted in 2009 in FPL's West Preferred Corridor within ENP found no evidence of prehistoric humans. (**0025-3-41** [Kimball, Dan] [Lewis, Mark])

Comment: Our utmost concern will be to ensure that areas of archaeological importance will be indentified and protected from any ground disturbing activities, and that all designated historic sites and structures, as well as those eligible for designation, will be identified,

documented and protected from any new construction or view shed obstruction associated with both the new on-site structures and the transmission line corridors and related structures. (**0026-1** [Kauffman, Kathleen])

Response: *The potential impacts of building and operating proposed Turkey Point Units 6 and 7 on historic and cultural resources will be discussed in Chapters 4, 5, and 7, based on the affected environment as described in Chapter 2. The EIS will include citations for documents used in its preparation. As stated in the application, an unanticipated-finds plan will be developed.*

Comment: The application states that the Florida Master Site File forms (FMSF) maintained by the Bureau of Historic Preservation, Division of Historical Resources were reviewed to determine whether any historic or archaeological sites were in the areas of potential effects. However, the County's Office of Historic and Archaeological Resources was not given the opportunity to determine whether these areas impacted locally designated sites or sites which have been determined as eligible for designation. In addition, the application makes the assumption that the probability of impacts on undiscovered sites is considered extremely low. This conclusion is not supported without coordination with the Office of Historic and Archaeological Resources. Sites that the County has surveyed and identified, but may have not yet designated, would not necessarily be recorded in FMSF forms. (**0023-2-1** [LaFerrier, Marc])

Response: *The potential impacts of building and operating proposed Turkey Point Units 6 and 7 on historic and cultural resources will be discussed in Chapters 4, 5, and 7, based on the affected environment described in Chapter 2. The information sources from the Miami-Dade County Office of Historic and Archaeological Resources will be considered in this assessment. The EIS will include citations for documents used in its preparation.*

Comment: We are aware that the Department of State's Division of all Historical Resources has already made recommendations. We concur with those recommendations and also offer the following:

1. For all areas that have not been previously surveyed, our staff shall be notified once surveying has commenced. The County archaeologist will have the opportunity to comment on any new visual surveys performed to determine areas of high archaeological probability.
2. We concur with the development of an unanticipated finds plan, and request that the Office of Historic and Archaeological Resources be added to the contact list, should a find occur.
3. View sheds and view corridors shall be considered during the identification of the Area of Potential Effect as part of the surveys for potential impacts to historic sites and structures.
4. Copies of all new FMSF forms, created as a result of historic or archaeological resource surveys, shall be provided to our office.
5. The Office of Historic and Archaeological Resources shall have the opportunity to review and comment on any survey findings related to historic resources or eligible resources that are found within or in close proximity to the transmission line corridors.
6. The Office or Historic and Archaeological Resources shall be included in determining the Area of Potential Effect (APE) and shall be permitted to review and comment on any additional reconnaissance level historic resource surveys conducted in such areas.

(**0026-2** [Kauffman, Kathleen])

Response: *The potential impacts of building and operating proposed Turkey Point Units 6 and 7 on historic and cultural resources will be discussed in Chapters 4, 5, and 7, based on the affected environment described in Chapter 2. The EIS will include citations for documents used in its preparation. The Florida State Historic Preservation Office and Miami-Dade County will be consulted in accordance with the National Historic Preservation Act.*

D.1.13 Comments Concerning Meteorology and Air Quality

Comment: In addition, we would like you to consider in the environmental impact statement, the impacts that 30 million gallons a day of steam being released into the atmosphere could have on wildlife, Biscayne Bay, and, of course, agriculture (**0001-7-7** [MacLaren, Kaitlin])

Comment: According to FPL information, the six cooling towers for TP 6&7 will evaporate 41.5 MGD of water which will be .0005% particulates. That is 20,750 gallons of particulates 24/7. The FPL model diagram shows the dispersion of that vapor in a neat pattern around the plant assuming average wind conditions. However, the average does not fully reflect the many days down here when the wind blows from the SE at 15 to 25 MPH for hours on end. That would carry the now condensed and concentrated residue of TP over the people and the crops to the west and northwest. (**0016-2** [White, Barry])

Comment: [T]he effect of aerial dispersal of biocides from the cooling towers on surrounding areas, including surface and groundwater. (**0023-1-16** [LaFerrier, Marc])

Comment: The atmospheric deposition from the cooling towers is projected to extend into the surface waters of Biscayne National Park. Atmospheric deposition rates and for EPOCs from the proposed cooling towers should be quantified and include incremental projections over the life span of Units 6&7. (**0025-3-25** [Kimball, Dan] [Lewis, Mark])

Response: *The reactor cooling system including the water treatment, its operation and steam released to the atmosphere, and associated salt drift and other potential impacts of the cooling-system operation will be discussed in Chapter 5 of the EIS.*

Comment: Construction related emissions and other temporary or secondary emissions are not included in the PSD emissions analysis. The impacts from these activities on air quality should be discussed qualitatively in the Draft EIS. Air emissions of criteria and toxic pollutants should be addressed. A discussion of the designation status of the area in which the units will be built should also be included in the document. Finally, the Draft EIS should discuss any issues or concerns regarding obtaining the required Title V operating permit once the units are operational. (**0014-21** [Mueller, Heinz])

Comment: Please state the cumulative emissions of construction activities for each of the greenhouse gases including water vapor, carbon dioxide, methane, nitrous oxide, and ozone. (**0022-4-3** [Reynolds, Laura])

Comment: Please state the cumulative emissions of operation activities for each of the greenhouse gases including water vapor, carbon dioxide, methane, nitrous oxide, and ozone. (**0022-4-4** [Reynolds, Laura])

Response: *Environmental impacts associated with building and operating nuclear plants, including greenhouse gas emissions, will be addressed in EIS Chapters 4, 5, and 7, respectively. Greenhouse gas emissions associated with the fuel cycle will be presented in Chapter 6. A discussion of the status of air quality in the area will be presented in Chapter 2.*

Comment: Nuclear plants also do not operate well in hot conditions, as evidenced by recent instances in the US and France where nuclear plants shut themselves down, due to high temperatures in the environment. (**0021-11** [Wilansky, Laura])

Response: *The reactor cooling system, including the water-source treatment and heat dissipation during operation, will be discussed in Chapter 3 of the EIS. The potential impacts of the cooling-system operation will be addressed in Chapter 5 of the EIS. The existing climatological conditions and projected change in temperature over the licensing period will be discussed in Chapter 2.*

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to the varieties and concentrations of airborne "emerging pollutants of concern" (EPOCs) as a result of using reclaimed wastewater for cooling purposes, please provide them. (**0022-2-1** [Reynolds, Laura])

Comment: Please state, specifically, all additives and all additive quantities that will be released to the atmosphere in gaseous, particulate, or droplet form, from the cooling towers and cooling water (**0022-4-2** [Reynolds, Laura])

Comment: There is concern that constituents in the cooling water will be emitted in the aerosol/drift exhaust from the cooling towers.... (**0023-1-26** [LaFerrier, Marc])

Comment: Provide technical discussion and analysis of the effect that the cooling tower (heat transfer) process has on the reclaim water constituents and the facility's air emissions (both criteria and hazardous air pollutants). Source water analysis constituents to be addressed include: total dissolved solids, total suspended solids, salinity, organics, metals, and 'EPOCs' (emerging pollutants of concern) addressed in USGS 2006 Report identifying organic wastewater compounds, pharmaceutical compounds, antibiotic compounds, and hormones detected in effluent from the South District WW Treatment Plant). In addition to PM and PM10, provide emissions calculations for other criteria pollutants and hazardous air pollutants. (**0023-1-28** [LaFerrier, Marc])

Comment: The COL proposes the use of tertiary treated wastewater as the primary cooling water supply source for Units 6&7. The environmental risk associated with the aerial dispersal and possible subsurface release of micro-constituents, sometimes referred to as Environmental Pollutants of Concern (EPOCs), commonly associated with treated waste water requires further evaluation. Treated wastewater from municipal sewage commonly includes pharmaceuticals and personal care products (PPCPs), as well as various endocrine disrupter compounds (EDCs), and frequently heavy metals and other contaminates not normally removed in tertiary treatment. (**0025-2-3** [Kimball, Dan] [Lewis, Mark])

Response: *Potential impacts to the aquatic and terrestrial ecology environment, via the air pathway impacts associated with cooling tower "drift" as a result of using reclaimed water in the cooling towers, will be discussed in Chapters 5 and 7 of the EIS, based on the affected environment as described in Chapter 2.*

Comment: Please state the amount of heat that will be discharged into the atmosphere from units 6&7 and state the temperature differential between the discharged heat and the atmosphere. Please state the amount of water vapor that will be discharged into the atmosphere from units 6&7 and state the moisture differential between the discharged water vapor and the atmosphere. (**0022-2-16** [Reynolds, Laura])

Response: *The reactor cooling system, including the water-source treatment and heat dissipation, will be discussed in Chapter 3 of the EIS. The potential impacts of the cooling-system operation on the frequency of plume visibility will be addressed in Chapter 5 under meteorology and air quality. The affected atmospheric environment, including temperature and moisture, will be discussed in Chapter 2.*

Comment: Please state the amount of change units 6&7 will make to local weather conditions. Please state the amount of change units 6&7 will make to hurricane formation, intensity, and longevity. Please state the amount of change units 6&7 will make to tornado formation, intensity, and longevity. (**0022-2-18** [Reynolds, Laura])

Response: *The impacts of operating proposed Turkey Point Units 6 and 7 on local meteorology will be presented in Chapter 5 of the EIS. The staff will consider in its evaluation whether more remote potential meteorological impacts from the plant are likely. However, past experience with large power stations would indicate that there would be no impact to the formation, intensity, or longevity of tornados and hurricanes.*

Comment: The application does not provide sufficient information to determine facility emissions for the limestone mining operations and grading & fill activities. (**0023-3-16** [LaFerrier, Marc])

Response: *Environmental impacts associated with building proposed Turkey Point Units 6 and 7 will be addressed in Chapter 4 of the EIS. The impacts of building-related air emissions, including those from activities at FPL-owned fill sources and from grading and fill activities, will be estimated.*

Comment: Applicant needs to provide information sufficient to determine whether open burning operations would be consistent with the requirements of Chapter 24. (**0023-4-7** [LaFerrier, Marc])

Response: *Environmental impacts associated with building proposed Turkey Point Units 6 and 7 will be addressed in Chapter 4 of the EIS. The building-related air emissions and related impacts on air quality, as well as the emissions from any open burning of vegetation, will be estimated.*

Comment: The application provided insufficient details related to the General Purpose Diesel Engines on what equipment the engines are to service or what fuel tanks and day tanks will be associated with the engines. (**0023-4-8** [LaFerrier, Marc])

Comment: Construction and maintenance activities would impact air quality. (**0025-3-45** [Kimball, Dan] [Lewis, Mark])

Response: *Environmental impacts associated with building and operating proposed Turkey Point Units 6 and 7 will be addressed in EIS Chapters 4 and 5, respectively. Emissions associated with diesel fueled engines will also be discussed in Chapters 4 and 5.*

D.1.14 Comments Concerning Health – Nonradiological

Comment: These two gigantic, enormous 1,000 megawatt each nuclear generators are going to be cooled with recycled sewage. Let's say that, recycled sewage. That's what's going into these cooling towers. There's no way to get all the pharmaceuticals, all the chemicals that we flush down our toilets, out of that water that's going to be going through these plants. When that water goes through the cooling towers they're going to be released to steam, droplets are coming out with that water vapor, and lots of stuff is going to be in those droplets. Lots and lots of those chemicals are going to be in those droplets. And that's going to be sprayed out over Biscayne National Park, Biscayne Bay, and the City of Homestead, which already has extremely dubious air and water to begin with for many of the reasons people have talked about. (**0002-14-7** [Schwartz, Matthew])

Comment: And what about the workers at the plant who will have to breath that stuff 8 hours a day? What would OSHA say about that? And the particulates will be a concentration of every carcinogen known to man, having come originally from waste water. What TP 6&7 really is is the best still in the world for concentrating the highest amount of pollutants and efficiently distributing it over the land. (**0016-3** [White, Barry])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts on humans and/or the environment of airborne pathogens from the Turkey Point FPL power station as a result of using reclaimed wastewater for cooling purposes, please provide them. (**0022-1-15** [Reynolds, Laura])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to the number of fatal and non-fatal diseases from airborne toxic matter as a result of using reclaimed wastewater for cooling purposes, please provide them. (**0022-1-18** [Reynolds, Laura])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to the varieties and concentrations of known airborne toxic matter as a result of using reclaimed wastewater for cooling purposes, please provide them. (**0022-1-20** [Reynolds, Laura])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to

the number of fatal and non-fatal diseases from airborne EPOCs as a result of using reclaimed wastewater for cooling purposes, please provide them. (**0022-2-2** [Reynolds, Laura])

Response: *These comments concern the impacts of chemicals in the cooling tower drift from proposed Turkey Point Units 6 and 7 on the public and workers. The planned reactor-cooling system, including the use of reclaimed water and saltwater, along with water treatment, the expected vapor and droplet release to the atmosphere and associated "drift," and associated potential impacts, will be discussed in Chapter 5 of the EIS. These impacts will be assessed within the context of the affected environment described in Chapter 2. Cumulative impacts from past, present, or reasonably foreseeable future actions will be discussed in Chapter 7, and alternatives to the proposed cooling system will be discussed in Chapter 9. The EIS will include citations for documents used in its preparation.*

Comment: I've also heard that transmission lines would buzz, cause radiation problems that may cause cancer, especially breast cancer, in a lot of people, as well as that it might go through our Everglades as well as down US-1. (**0002-8-6** [O'Katy, Jessica])

Comment: [CASE submitted an article titled, "Recent Biomedical Literature on Health Risks of Power Transmission Lines" by Philip Stoddard, Dept Biological Sciences, Florida International University. The article expressed concern about exposure to magnetic fields.] (**0003-2-1** [White, Barry])

Comment: Information on the potential degradation of health, safety, tranquility, character, and overall welfare of residential neighborhood conditions with respect to transmission line corridors has not been provided. Information should include recent academic studies regarding EMFs and high kV electrical transmissions. (**0023-3-35** [LaFerrier, Marc])

Comment: The health of our children and families will be in grave danger! Peer reviewed medical literature shows Alzheimer's and senile dementia rates are doubled in people living near power lines. (**0031-3** [De Villiers, Elena])

Response: *These comments concern the impacts of living near transmission line corridors. Health and/or other impacts from noise, electromagnetic fields, and/or land use associated with the planned upgrade and construction of transmission lines will be addressed in Chapters 4 and 5 of the EIS, based on the affected environment described in Chapter 2. Cumulative effects will be addressed in Chapter 7.*

Comment: Areas surrounding the Turkey Point nuclear power plant are at high risk for exposed pollutants, including asbestos, mercury, and 174 detected carcinogens including tritium which was found to be leaking from over a quarter of all nuclear plants in the United States. Expanding the ground that Turkey Point inhabits would bring these pollutants closer to the National Park reserve areas, bringing endangered and rehabilitated marine life and ecology into severe danger. (**0007-4** [Burris, Jessica])

Response: *This comment concerns the potential impacts on biota of pollutants released from proposed Turkey Point Units 6 and 7. The ecological health impacts of radiological and non-radiological releases from nuclear power plants during building and operating the proposed*

units will be discussed in Chapters 4 and 5 of the EIS, respectively, within the context of the affected environment described in Chapter 2. The cumulative impacts from the proposed action when added to those of past, present, or reasonably foreseeable future actions will be discussed in Chapter 7.

Comment: Consider the full the impacts of noise and light pollution concerns to people, animals, native plants and wetlands, environmentally endangered lands, and provide the appropriate mitigation strategies. (**0019-6** [Hamilton, Karen])

Comment: Potential soundscape impacts may increase over current levels in Biscayne National Park from construction, operation and security (additional overflights by military jets). These impacts should be assessed and quantified. (**0025-3-28** [Kimball, Dan] [Lewis, Mark])

Response: *These comments concern the potential impacts of noise and light in the environs of proposed Turkey Point Units 6 and 7. The potential impacts of noise and light pollution on the public and the environment during the building and operating of the proposed units will be addressed in Chapters 4 and 5 of the EIS, respectively, within the context of the affected environment described in Chapter 2. Cumulative impacts from the proposed action when added to those of past, present, or reasonably foreseeable future actions will be discussed in Chapter 7.*

Comment: The generation of hazardous wastes (as defined in Section 24-5) and other regulated non-hazardous wastes is mentioned throughout the application. The size of tanks or containers is not specified nor their locations, nor details of the release detection methods or pollution prevention measures to be implemented. (**0023-1-11** [LaFerrier, Marc])

Response: *This comment concerns the management of hazardous and non-hazardous wastes for proposed Turkey Point Units 6 and 7. The impacts from the generation, handling, and disposal of hazardous and non-hazardous waste material from building and operating the proposed units will be addressed in Chapters 4 and 5 of the EIS, respectively, within the context of the affected environment described in Chapter 2. Cumulative impacts from the proposed action when added to those of past, present, or reasonably foreseeable future actions will be discussed in Chapter 7.*

D.1.15 Comments Concerning Health – Radiological

Comment: The NRC knows full well that in 1988 and 1990, Congress passed the Radiation Exposed Veterans Compensation Act and stipulated that 21 categories of cancer are attributable either as a causative or contributory factor to the exposure to ionizing radiation from radioactive fallout. The NRC knows full well that induced genetic damage and genetic mutations are precursors from manifesting over 21 categories of cancer as stipulated by the Congress. The NRC knows full well that cancer is a genetic process and that ionizing radiation causes genetic damage and that genetic damage and cancer are inextricably intertwined. You cannot separate the two. However, the NRC disingenuously avoided mention in its supplemental environmental impact statement of August 2007, in a Diablo Canyon license proceeding, that small children -- they omitted this -- that small children, pregnant women, women of childbearing age, and the elderly are seriously impacted and vulnerable to acquiring

induced genetic damage from exposure to ionizing radiation of a magnitude as little as 5 rems. Now, because of the concerns linking ionizing radiation to genetic damage, the Atomic Energy Commission provided the initial funding for the Human Genome Project. Most people don't know that. That Project today is jointly funded by your parent organization, the Department of Energy, and the National Institutes of Health. (**0001-13-6** [Smilan, Stan])

Comment: The health effects on communities has not been adequately studied, and the presence of childhood leukemia clusters in the vicinity of nuke plants raises serious questions about the possible connections. It is to these curious questions about the environmental impacts on public health that I request that the NRC add to its scope of inquiry. (**0001-16-4** [Showen, Steve])

Comment: Public health is ultimately what you affect most in your decision-making. We can't go back to FPL, or the M. Dade Com. College Homestead, or your members in our Capitol in 10 years and say please cleanse out our circulatory systems of our bodies and replace them. Vulnerable people depend on your wisdom now in history to choose the safest path for the citizens. (**0011-1** [, Anonymous])

Comment: We should not create the GUARANTEED RISK of radiation, toxic waste, birth defects, cancers, fish kills, and all the other consequences which can and will result from building Turkey Point 6 and 7. (**0021-14** [Wilansky, Laura])

Comment: I ask you to include the true costs of nuclear plants throughout their entire life cycle in your environmental calculations, including the reality of enormous risks to health and life. (**0021-19** [Wilansky, Laura])

Response: *These comments concern possible health effects from radiation exposure. Chapter 5 of the EIS will address the potential radiation doses and the associated health effects from operation of proposed Turkey Point Units 6 and 7. The NRC's regulatory limits for radiological protection are set to protect workers and the public from the harmful health effects of radiation on humans. These radiation standards reflect extensive scientific study by national and international standard setting organizations and incorporate conservative assumptions and models to account for differences in gender and age so as to ensure that workers and all members of the public are adequately protected from radiation.*

Comment: In addition, the public is largely unaware that radioactive emissions are permitted legally in normal operations of nuclear plants. Also, a number of nuke plants have leaked radioactive effluent into underground drinking aquifers. (**0001-16-3** [Showen, Steve])

Comment: I was looking at some of the documents you left in the back of the room. And in terms of tritium your own periodical says, nuclear power plants have reported abnormal releases of water containing tritium resulting in groundwater contamination. This is spooky stuff. And we would hope that any such releases would not go anywhere outside the boundary if such releases actually occur, and that information, if it's out there, would be immediately released to agencies that deal with water resources so we can deal with the potential implications as a result of such potential contamination. (**0002-3-7** [Walker, Tom])

Comment: One function of wetlands is to filter water as it runs through its natural ecosystem before reaching primary waterways where it is likely to be ingested. In addition to adding pollutants to the Biscayne area outside of Turkey Point with this proposed expansion the reduction of wetlands in the area will cause further harm by the natural reduction of water filtration before entering the surrounding communities. This includes the reduction of a filtration system for radioactive leakage present in groundwater leakage that is normally released from all U.S nuclear power plants. The NRC permits up to 400 gallons per day of low level leakage to be deposited into the environment surrounding nuclear power plants. Without wetlands to filter this pollution, residents of the surrounding area are directly vulnerable to this waste. (**0007-5** [Burris, Jessica])

Response: *These comments concern the potential release of radioactive material to the environment by proposed Turkey Point Units 6 and 7. Chapter 5 of the EIS will address the expected releases of radioactive material in liquid and gaseous effluents, the impacts of those releases on humans and biota other than humans, and the applicant's effluent and environmental radiological monitoring systems. The results of a licensees radiological effluent and environmental monitoring systems are publicly available in the ADAMS Public Electronic Reading Room and are accessible at* http://www.nrc.gov/reading-rm/adams.html*.*

Comment: [A]lso just got my water report reading from Miami-Dade. And I found it interesting that not only was there uranium, which we don't have here in our water, but that the levels of it were much higher closer to Turkey Point than they were in Northern Miami. I thought that was very interesting. And when I read the reason for uranium being in the water, it said that it was from natural sources. So I found that to be extremely worrisome. (**0002-8-8** [O'Katy, Jessica])

Comment: Tritium and Strontium 90 are present in the area and research is currently being done to establish their levels and concentrations (**0012-8** [Payne, Nkenga])

Response: *These comments concern the presence of radioactive materials in the environment near proposed Turkey Point Units 6 and 7. Chapter 2 of the EIS will address the current radiological environment at the proposed site for the proposed units.*

Comment: Two new, unnecessary plants are guaranteed to bring more leaks and more radioactive waste to South Florida, and will endanger us that much more. (**0021-9** [Wilansky, Laura])

Comment: At the NRC scoping meeting held in July, a handout (USNRC BACKGROUNDER, February 2010) was available which stated that Nuclear power plants have reported abnormal releases of water containing Tritium, resulting in groundwater contamination. This is also discussed on your website under operating reactors. Obviously, the potential leakage of Tritium from the Turkey Point nuclear power plant is a concern to be analyzed. With this in mind, FKAA request that any Tritium test results from the existing cooling water canals and the aquifer system adjacent to these canals be released for review. If there has been leakage above the background levels in the existing system, continued rate of analysis should be required at more stations, and the source and remedy be found. Also, whether or not there is Tritium above background levels in the existing system, the EIS should include the requirement for continued

measurements of Tritium at the interface of the reactors including water canals, strategic monitoring points, and downstream monitoring locations. (**0024-4** [Walker, Tom])

Response: *These comments concern potential groundwater contamination by inadvertent leaks of liquids containing tritium from the Turkey Point site. Chapter 2 of the EIS will address the current radiological environment at the proposed site for proposed Turkey Point Units 6 and 7. Chapter 5 of the EIS will discuss the applicant's effluent and environmental radiological monitoring systems for the proposed units.*

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts of deep well injection of radioactive wastes including annual expected amounts and the expected cumulative amount of each isotope for the duration of the requested operating license, please provide them. (**0022-4-10** [Reynolds, Laura])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts of airborne radioactive releases to the atmosphere including best practices, precautions, the cumulative number of expected non-lethal cancers, and the cumulative number of expected lethal cancers for the duration of the requested operating license, please provide them. (**0022-4-11** [Reynolds, Laura])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse radiological impacts of units 6 & 7 as a result of a sea level rise of 10 meters, please provide them. (**0022-4-12** [Reynolds, Laura])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts of leaking buried pipes, please provide them. (**0022-4-15** [Reynolds, Laura])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts of securing the storage of low-level solid radioactive wastes, including locations, structures, containers, damage from missiles, airborne solid wastes, water ingress and egress, fires, and cleanup, in the event of a tornado watch or warning is issued for the Turkey Point area, please provide them. (**0022-4-8** [Reynolds, Laura])

Response: *These comments concern the radiological impacts of operation of proposed Turkey Point Units 6 and 7, including storage of low-level wastes, release of liquid and gaseous effluents; and inadvertent pipe leaks. These impacts will be addressed in Chapter 5 of the EIS. The EIS will include citations for documents used in its preparation.*

D.1.16 Comments Concerning Nonradiological Waste

Comment: The use of hazardous materials (e.g. treatment chemicals, solvents, paints, lubricants, etc.) is mentioned throughout the application for maintenance operations, water and

wastewater (influent and effluent) treatment systems. The size of tanks or containers is not specified nor are their locations identified. In addition, no details of the release detection methods or pollution prevention measures to be implemented are provided. (**0023-1-60** [LaFerrier, Marc])

Comment: Liquid waste other than domestic sewage will be generated, used, and handled at the proposed facility which is not connected to sanitary sewer. The application did not provide sufficient information to evaluate the project with regard to requirements of Section 24-43.1 of the code of Miami-Dade County. (**0023-1-8** [LaFerrier, Marc])

Response: *The generation, management, and treatment or disposal of nonradiological waste will be discussed in Chapters 4 and 5 of the EIS.*

D.1.17 Comments Concerning Accidents – Severe

Comment: Miami-Dade is an extremely population dense area with 1158 people per square mile. Although FP&L and Westinghouse state that the probability of a severe accident is very low for the AP1000, this reactor design has never been built or operated anywhere in the world. (**0001-14-9** [Hancock, Mandy])

Response: *This comment concerns the potential for severe accidents at proposed Turkey Point Units 6 and 7. The impacts of postulated accidents including severe accidents will be addressed in Chapter 5 of the EIS.*

D.1.18 Comments Concerning the Uranium Fuel Cycle

Comment: With the addition of the nuclear power plant 6 and 7, it will be doubling the waste that's being stored out at Turkey Point. I ask the Nuclear Regulatory Commission, what is being done nationally for the storage of nuclear power plant waste? I don't see enough being done nationally for the storage and safety of this nuclear waste. (**0001-10-1** [Marinelli, Francis J.])

Comment: Waste is contained and moved, a potential problem. It is moved to Yucca Mountain that's sitting on a fault line. We are saying it's safe for now but the safety has not been proven. (**0001-11-5** [Amor, Valerie])

Comment: As the NRC is aware, FPL already operates three reactors here in Florida and is proposing to build two more. FPL also proposes to build an onsite storage facility to deal with the high level radioactive waste already overflowing in the spent fuel pools. This amount of radioactivity clustered in such a population-dense, hurricane-prone area could create significant safety and health concerns for Floridians. The NRC must address these cumulative impacts. (**0001-14-8** [Hancock, Mandy])

Comment: Tons and tons of nuclear waste are already stockpiled at this plant right now. They were cited. They were fined recently by the Nuclear Regulatory Commission for failure to take care of that waste. There's no place to put it; by the way, there's no place to move it. (**0002-14-13** [Schwartz, Matthew])

Comment: I'd also like to say that from what I've learned at school, that uranium transportation and storage is very dangerous and not something that we should be risking people and the environment's well-being for. (**0002-8-2** [O'Katy, Jessica])

Comment: I am not a nuclear scientist, but my understanding at this time is that the main concern regarding nuclear energy is how to safely store the waste material. If there is a scientific answer to this problem that is safe, I think America would be wise to pursue increasing our use of nuclear energy. (**0005-2** [Bass, Ken])

Comment: [T]he economic and ecological risks associated with the entire nuclear power fuel cycle, are vast, including the long term of safeguarding nuclear waste produced at Turkey Point. (**0012-13** [Payne, Nkenga])

Comment: It is unacceptable to even think of disposing highly toxic and radioactive substances anywhere on or in our beautiful Earth as we do not know the consequences - and there is nothing to stopgap or in place in case these substances have a dire reaction on the earth. (**0028-5** [DiNuzzo, Laura])

Comment: On the surface, the "greener" than dirty coal theme sounds good. Given there are positives and negatives to most situations, this green theme would be the positive. However, all of us involved, including FP&L, would be remiss if we did not consider the negative. In this case, the negative is the stored, on site radioactive waste generated by the Turkey Point plant, and more reactors mean more radioactive waste. This negative must be factored into the greener theme to reflect the true cost of the nuclear facility. Has FP&L factored in this critical cost of how to dispose of radioactive nuclear waste, or will they just continue to store it on site (in a hurricane prone, sea level environment)? Will FP&L send it to an undetermined repository (if one is ever mandated) and at what cost? While the front end looks green, the back end looks dirty. Objectively, the big picture must be duly considered. Decisions that are narrow, short-sighted and reactionary lead to a vulnerable position that can escalate into insurmountable problems (think BP oil, Chernobyl, 3 Mile). Until the above mentioned negatives are resolved, expansion magnifies potential problems. (**0029-3** [Guendelsberger, Debra])

Response: *These comments concern the transportation and disposal of high-level radioactive waste, such as spent fuel. The impact of the uranium fuel cycle, including disposal of high-level radioactive waste and spent fuel, will be addressed in Chapter 6 of the EIS.*

Comment: That's just the tip of the iceberg. There are so many different aspects to a building of these two additional nuclear power plants at Turkey Point. When they built them in 1972 they had never heard of anything such as global warming, such as rising sea levels. Out of their consciousness. Presently, five miles from here is over 2 million pounds of nuclear waste. Five miles from here. As soon as the sea level covers all that up, God knows what's going to happen. (**0001-2-4** [Harris, Walter])

Comment: When sea level rises, what's that going to do to a nuclear plant built in the middle of Biscayne Bay, with storage -- with nuclear waste that cannot be moved because there's nowhere to put it. So this is an extreme danger to our community. (**0002-14-8** [Schwartz, Matthew])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse radiological impacts of spent fuel storage as a result of a sea level rise of 10 meter. (**0022-4-13** [Reynolds, Laura])

Response: *The environmental impacts of operating and decommissioning proposed Turkey Point Units 6 and 7, including potential impacts associated with sea level rise, will be considered in Chapters 5, 6, and 7 of the EIS.*

Comment: One thing we should consider is, this is not an energy source that gives so-called energy independence. The great bulk of the uranium comes from outside the United States, and there are greenhouse gas emissions in the process of the extraction and processing of that uranium. (**0002-16-5** [Shlackman, Mara])

Comment: In the big environmental picture, companies like FPL that want to build nuclear plants are trying to sell the idea that nuclear energy is a solution to global warming. In fact, the opposite is true. Nuclear energy is neither carbon-free nor emission-free throughout its entire life cycle, which includes a variety of wastes produced by mining uranium and making nuclear fuel, in addition to the aforementioned unsolved problem with spent fuel and other nuclear waste. This waste includes the plants themselves, which operate for a few decades, and then take, at a minimum, hundreds of years to be decommissioned. (**0021-10** [Wilansky, Laura])

Response: *These comments concern the greenhouse gas emissions of the entire fuel cycle and the operation of proposed Turkey Point Units 6 and 7. The impacts of greenhouse gas emissions from the life-cycle of fuel production, construction, operation, and decommissioning of the units will be presented in Chapters 4, 5, and 6 and an appendix of the EIS.*

Comment: We now have the technology to recycle spent nuclear rods. Look to France as a prime example as nuclear energy as a viable energy resource. (**0006-2** [Weins, Brian])

Response: *This comment concerns the potential for recycling spent nuclear fuel. The potential environmental impacts of the fuel cycle from recycling only the uranium from spent nuclear fuel will be addressed in Chapter 6 of the EIS. Recycling uranium and plutonium from spent nuclear fuel will not be addressed in the EIS. While Federal policy no longer prohibits recycling, additional research and development is needed before commercial recycling of spent fuel from U.S. nuclear power reactors would occur.*

Comment: I feel that uranium is not a long-term answer and so that expansion of Turkey Point would not start until a long term after we need it, and that it wouldn't last for that long because we do not have uranium here and we don't have enough of it. (**0002-8-7** [O'Katy, Jessica])

Response: *This comment concerns the availability of uranium to fuel proposed Turkey Point Units 6 and 7. The irretrievable and irreversible commitment of resources, such as uranium, will be addressed in the context of the resources availability in Chapter 10 of the EIS.*

Comment: I ask you to include the true costs of nuclear plants throughout their entire life cycle in your environmental calculations, including the cost of hundreds of years of plant

decommissioning; and the cost of nuclear waste storage for thousands of years to come. (**0021-21** [Wilansky, Laura])

Response: *This comment concerns the cost of the entire fuel cycle including decommissioning and waste disposal. The costs of proposed Turkey Point Units 6 and 7 throughout their entire life cycle, including the costs of decommissioning and nuclear waste storage, will be discussed in Chapter 10 of the EIS.*

D.1.19 Comments Concerning Decommissioning

Comment: This site will also be under SEVERAL FEET of water if global warming continues as it has, or worsens, as scientists predict. If you think killing an oil well is difficult underwater, try decommissioning a nuclear plant! (**0021-6** [Wilansky, Laura])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse radiological impacts of decommissioning units 6&7 as a result of a sea level rise of 10 meters. (**0022-4-14** [Reynolds, Laura])

Response: *The potential environmental impacts of decommissioning proposed Turkey Point Units 6 and 7 will be addressed in Chapter 6 of the EIS. The EIS will include citations for documents used in its preparation.*

D.1.20 Comments Concerning Related Federal Projects

Comment: The Comprehensive Everglades Restoration Project is a major priority for the Federal and State Government. (**0002-6-4** [Grosso, Richard])

Comment: Models and study explaining how preliminary design of the water management project will tie to the CERP Environmental Restoration Project (Alternative O) missing. (**0023-3-9** [LaFerrier, Marc])

Comment: [The National Park Service has] identified a number of concerns regarding potential adverse impacts of the proposed facilities to the resources and values of Biscayne and Everglades National Parks, to regional water resources and to the Biscayne Bay Coastal Wetlands project, a component of the Comprehensive Everglades Restoration Plan (CERP). (**0025-1-1** [Kimball, Dan] [Lewis, Mark])

Comment: The CERP Biscayne Bay Coastal Wetlands preferred plan, Alternative 0, includes plans to rehydrate wetlands in the vicinity of the proposed Turkey Point power plant site and poses a conflict with the COL application proposal to extract up to 124 million gallons per day from Biscayne Bay. The restoration project objective is to re-establish both overland freshwater flow and subsurface flow, which is intended to improve ecosystem function by stabilizing seasonal salinity patterns. Therefore, it appears likely that the withdrawal of Biscayne Bay water for cooling water supply is incompatible with the restoration goals, since it will intercept a percentage of the freshwater intended for restoration. (**0025-2-14** [Kimball, Dan] [Lewis, Mark])

Comment: The SFWMD is currently reviewing a Site Certification Application (SCA) for this project, pursuant to the State of Florida's Power Plant and Electrical Transmission Line Siting Act (Sections 403.501-403.539, Florida Statutes). During the SCA review process, the SFWMD has identified a number of issues that have the potential to result in significant adverse regional water resource-related impacts, including potential impacts to specific CERP projects and related restoration initiatives. (**0032-1** [Golden, James])

Comment: The SFWMD recommends that the following issues be addressed in the Environmental Impact Statement: Reclaimed Water Pipeline - The potential for adverse impacts to the CERP Biscayne Bay Coastal Wetlands Project. (**0032-18** [Golden, James])

Comment: The SFWMD recommends that the following issues be addressed in the Environmental Impact Statement: Electrical Transmission Lines - The potential for adverse impacts to the construction schedule for the U.S. Army Corps of Engineers (USACE) Seepage Management Pilot Project, which is a component of the CERP Project. The work on the USACE project will take place within the western levees of the SFWMD's L-30 and L-31N Canals, which are located within the West Preferred Corridor. The SFWMD is a participating partner with the USACE in this project. Work is scheduled to begin soon and may still be ongoing when FPL commences construction of the proposed transmission lines. (**0032-20** [Golden, James])

Response: *The review team has been consulting with, and will continue to consult with, State and Federal agencies in preparing the EIS. The USACE is a cooperating agency on the development of the EIS and is a key agency in the implementation of the CERP. The cumulative impact of the proposed action when added to the impacts of other past, present, and reasonably foreseeable projects, including the CERP and proposed Turkey Point Units 6 and 7, will be considered in Chapter 7 of the EIS.*

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts of operation of the Turkey Point FPL power station on Biscayne National Park, in the past, currently, and in the future, please provide them. To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts of operation of the Turkey Point FPL power station on Everglades National Park, in the past, currently, and in the future, please provide them. To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts of operation of the Turkey Point FPL power station on Comprehensive Everglades Restoration Plan (CERP) Projects and CERP related projects, in the past, currently, and in the future, please provide them. To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts of operation of the Turkey Point FPL power station on the Everglades Mitigation Bank, in the past, currently, and in the future, please provide them. (**0022-1-13** [Reynolds, Laura])

Comment: Construction and operation of transmission lines, pads and access roads in either corridor within ENP is likely to adversely affect park operations such as fire management, exotic

vegetation management and law enforcement. 2. Specific adverse effects to fire management would include increased fire activity due to the inherent threat of uncontrolled ignitions from transmission lines, limited accessibility to areas to engage in fire suppression activities due to gates and security issues on FPL land, and an increase in staffing levels based on fire danger rating. Transmission lines in either corridor would limit the park's ability to use aircraft for fire suppression in the area, especially along the eastern boundary. (**0025-3-42** [Kimball, Dan] [Lewis, Mark])

Comment: Inappropriate use of park lands could become an issue. Construction of access roads would introduce new areas for unauthorized all terrain vehicle use, dumping and other unforeseen uses which would result in adverse impacts to park law enforcement operations and sensitive natural resources. (**0025-3-44** [Kimball, Dan] [Lewis, Mark])

Response: *The potential impacts of building and operating the proposed units on nearby parks, the CERP, and the Everglades Mitigation Bank will be discussed in Chapters 4 and 5 of the EIS, respectively. The cumulative impacts of the proposed action when added to the impacts of other past, present, and reasonably foreseeable actions including those identified in this comment will be presented in Chapter 7. The EIS will include citations for documents used in its preparation.*

Comment: In addition the proposed rock mining project, which is planned within the Biscayne Bay Coastal Wetlands footprint, violates Miami-Dade County's comprehensive development master plan and interferes with the planned restoration project and could worsen saltwater intrusion and chloride contamination in Biscayne aquifer which is, of course, South Florida's primary drinking water supply. (**0001-7-6** [MacLaren, Kaitlin])

Comment: No data provided to assess groundwater Impact as a result of the fill extraction and construction of the water management feature. (**0023-3-11** [LaFerrier, Marc])

Comment: No mitigation plan found for possible salt front advancement as a result of rock pit mining. Planned fill source lies approximately 4 miles to the northeast of MDWASD Newton Wellfield. (**0023-3-12** [LaFerrier, Marc])

Comment: The application does not contain sufficient water quality and geotechnical information needed in order to evaluate the proposed FPL fill source. Given that the salt front exists at the proposed rockmining site, FPL must provide data including modeling under normal and drought conditions. (**0023-3-15** [LaFerrier, Marc])

Comment: The application does not provide sufficient information to determine that the proposed excavation will not extend into groundwater containing 250 mg/L or greater chloride. (**0023-3-17** [LaFerrier, Marc])

Comment: Application does not provide the following data/information related to the FPL-filed CDMP amendment application for rock mining in Agriculturally designated land: 1. Plan and data for the design of the leave-behind water management project, including technologies to be used during and after excavation to ensure that the project's waters are isolated from any present or future salt intruded groundwater. (**0023-3-3** [LaFerrier, Marc])

Comment: Sufficient water quality data for the site not provided. (**0023-3-7** [LaFerrier, Marc])

Comment: No studies provided to assess project's impact to surrounding agricultural wells or public wellfields under worst case conditions. (**0023-3-8** [LaFerrier, Marc])

Comment: The COLA proposes the excavation of fill material for the construction of the Units 6&7 Plant from a nearby FPL owned site behind the Homestead Air Force Base (HAFB) and adjacent to Biscayne National Park, although the FPL fill-source is no longer part of the State of Florida SCA. FPL intends to excavate a large amount of rock fill (approximately 300 acres) to elevate the proposed reactor construction site from approximately 1 foot above mean sea level to 26.5 feet above mean sea level. These activities will result in a large man-made lake, as a by-product of rock mining operations. The presence of this new lake would conflict with CERP design features planned for the Biscayne Bay Coastal Wetlands project because the lake would inhibit groundwater flow to the southeast and possibly exacerbate salt water intrusion inland. (**0025-2-16** [Kimball, Dan] [Lewis, Mark])

Response: *Available information about the fill source will be provided in Chapter 3 of the EIS. The impacts of obtaining fill material will be presented in Chapter 4; and the cumulative impacts of the proposed action by FPL to build and operate proposed Turkey Point Units 6 and 7, along with other past, present, and reasonably foreseeable future actions by other agencies, will be presented in Chapter 7, including the impacts associated with the CERP.*

Comment: Location and design approval from the Homestead Air Reserve Base for the project's conformance with AICUZ recommendations regarding bird strikes and other potential navigational hazards has not been provided. (**0023-3-10** [LaFerrier, Marc])

Response: *This comment refers to the SCA submitted to the State of Florida by FPL, but it indicates an interest in FPL's proposed plant design. A description of the site layout, the reactor type, and the cooling-water systems will be described in Chapter 3 of the EIS.*

Comment: The applicant shall also address how road construction and operation would compromise the ability of the EEL Program and other agencies to appropriately manage public lands. (**0023-1-51** [LaFerrier, Marc])

Comment: Please provide amended maps showing EEL projects, along with a complete analysis of the effects of linear feature construction and operation on nearby EEL Projects. (**0023-3-21** [LaFerrier, Marc])

Comment: Environmentally Endangered Lands (EEL) owned and/or managed preserves exist along proposed corridors. Please provide an analysis of the potential impacts to EEL Preserves from any work related to the transmission lines, including but not limited to development of corridors, acquisition to corridors, acquisition of additional easements, etc. (**0023-3-28** [LaFerrier, Marc])

Comment: Maps in the site certification application fail to depict conservation lands held and/or managed by the Environmentally Endangered Lands (EEL) Program. For example, the maps depicting jurisdictions fail to include MDC EEL holdings. Direct, indirect and cumulative impacts

to these lands associated with any of the proposed work or changes in hydrology is not addressed and needs to be detailed. (**0023-3-45** [LaFerrier, Marc])

Comment: Permitted land use within EEL acquisition project areas must be compatible with the environment and objectives of the Comprehensive Everglades Restoration Plan (CERP) and shall not adversely affect the long-term viability, form or function of these ecosystems. Any land use or site alteration should be carefully evaluated on a case by case basis by federal, state, regional and county agencies for conformity with all prevailing environmental regulations and compatibility with the objectives of CERP. Land Use Element LU-3B states that all significant natural resources and systems shall be protected from incompatible land use. Conservation Objective CON-4 and Policy CON-4A of the CDMP recognize the importance of these wetlands for their aquifer recharge and storage capacity and states these values shall be maintained, enhanced or restored. Objective CON-7 and related policies state that Miami-Dade County shall protect and preserve the biologic and hydrologic functions of the Future Wetlands identified in the Land Use Element. (The Future Wetlands includes all of the South Dade Wetlands area). Some of the proposed features are within Environmental Protection Sub Areas E and F of the CDMP which both require that the approval of any use and access roads or easements should be conditioned on demonstrated consistency of that use with the adopted goals, objective and policies of the CDMP and conformity with all prevailing environmental regulations. (**0023-3-46** [LaFerrier, Marc])

Response: *These comments refer to the SCA submitted to the State of Florida by FPL but they indicate an interest in how activities associated with building and operating proposed Turkey Point Units 6 and 7 would affect efforts being taken under the Environmentally Endangered Lands (EEL) Program. The EIS will address the cumulative impacts from the combination of the proposed action and past, present, and reasonably foreseeable actions, regardless of who takes the actions. The cumulative impacts associated with building and operating the proposed units will be evaluated for each affected resource.*

Comment: The SFWMD recommends that the following issues be addressed in the Environmental Impact Statement: Temporary Roadway Improvements for Construction of Units 6 & 7 - The potential for adverse impacts to the CERP Biscayne Bay Coastal Wetlands Project. (**0032-15** [Golden, James])

Response: *The EIS will address the cumulative impacts from the combination of the proposed action and past, present, and reasonably foreseeable actions, regardless of who takes the actions. The cumulative impacts associated with building and operating the proposed units will be evaluated for each affected resource.*

D.1.21 Comments Concerning Cumulative Impacts

Comment: In addition to the ongoing problems from the existing facility, the combination of losing wetlands and worsening saltwater intrusion could significantly impact the habitats, water quality, surface flow, projected restoration of water levels, and groundwater hydrology functions that are the object of the Everglades restoration. Construction of the plant itself, as well as the operation of the facility, will have adverse impacts on water quality, ecology, and aesthetics of

the Biscayne National Park. It will negatively impact the areas' protected species, wetlands, and much-needed fresh groundwater input into Biscayne Bay. (**0001-2-3** [Harris, Walter])

Comment: A final comment is that the -- the current -- the existing, in Units 4 and 5, as the previous speaker mentioned, are impacting our groundwater supply. And it is suspected that they are contributing to saltwater intrusion. And so we would like you to consider the cumulative effects of existing plants and then consider what additional impact a new plant will have. (**0001-7-8** [MacLaren, Kaitlin])

Comment: One of the most important things that the NRC can do as a function of the environmental review of this application is to evaluate the cumulative environmental impacts from all of these plants. After all, the reactors are called 6 and 7, not 1 and 2. Just evaluating this application as if the proposed plants exist in a vacuum, as the State is doing through their permitting process, would be a disservice to the community and to our environment. The NRC needs to evaluate the impacts of the two new reactors. Direct impacts like wetland losses, dredge fill pads, permanent onsite nuclear waste storage and temporary 20-year roads through an Everglades Restoration Project, in the context of the impact already caused by the existing power plant complex. (**0002-1-2** [Sorenson, Katy])

Comment: The Draft EIS should discuss the cumulative impacts to the environment associated with FPL's past, present, and future expansion in the south Florida region. (**0014-14** [Mueller, Heinz])

Comment: FPL has reportedly received all of the necessary approvals from FDEP to proceed with the uprate project. Construction activities for this project will occur primarily during two scheduled outages per unit, with each outage lasting approximately 50 days. Construction activities for Unit 3 and 4 are anticipated to conclude in the fall of 2011 and 2012, respectively. After completion, the cooling water flow rate will remain unchanged, although the temperature rise across the condensers is anticipated to increase by 2.5F. FPL proposes that Units 6 and 7 will have their cooling water needs provided by cooling towers as opposed to the existing canal system. Make-up for the towers is to be provided by reclaimed water. The Draft EIS should assess the cumulative effects of the uprated Units 3 and 4 combined with construction of new Units 6 and 7. Also, any increased removal of water from area basins as a result of operations of the interceptor ditch pumps should be discussed. (**0014-7** [Mueller, Heinz])

Response: *Cumulative impacts result from the combined effects of the proposed action and past, present, and reasonably foreseeable actions, regardless of who takes the actions. The appropriate geographic area and time period for considering cumulative impacts depend on the resource being affected and will be determined for each resource as part of the review team's evaluation. The impacts of building and operating proposed Turkey Point Units 6 and 7 on Biscayne Bay and adjacent lands will be added to other known or reasonably foreseeable actions and stressors within the defined geographic area of interest, including known or planned upgrades of other units on the Turkey Point site, if appropriate. The results of the analysis of impacts of the proposed units operations on water quality, ecology, and aesthetics will be presented in Chapter 5 of the EIS. The results of cumulative impact analyses will be presented in Chapter 7.*

Comment: What we are now finding in our communities is that there are significant risks to those of us who still have residents on well water. We have 1,000 homeowners, just in the Village of Pinecrest, still on well water. And we risk, with those residents on well water, the specter of saltwater intrusion at any time and the balance of what may happen as a result of the continued impositions of construction and what the nuclear plants would do, likely due to the balance and the risk that that would place. That all of our homes that are still on well water may be contaminated through saltwater intrusion is a very serious issue that we -- none of us have the financial wherewithal, nor does our county, who is facing a $400 million deficit, nor does the State of Florida which is facing an additional -- I think it is 3 to $6 billion deficit in the coming year, have any resources to come in and help put the infrastructure in place for those homes that are on -- continue to be on well water. (**0001-21-3** [Lerner, Cindy])

Comment: Another suggestion would be that they take the cooling water from deep within the bottom of Biscayne Bay and Card Sound, what they call the boulder zone. No one has the foggiest notion what that would do to the surface water. Would it create a cone of water? And if it did, how would that affect the inshore current that existed for thousands of years? (**0001-6-5** [Miller, Lloyd])

Comment: Our first major concern has to do with water impact. FPL proposes to place radial collector wells 40 feet below Biscayne Bay Aquatic Preserve in the upper levels of the Biscayne aquifer. And this step -- we hope you will consider whether this step may be within the take zone of the Biscayne aquifer. (**0001-7-1** [MacLaren, Kaitlin])

Comment: The Turkey Point expansion would require either 90 million gallons a day of reclaimed water, 124 million gallons a day from radial wells, or a combination of both. This is a huge amount of water and, as I'm going to discuss later, there are other better uses for this water. (**0001-7-2** [MacLaren, Kaitlin])

Comment: At least 3 percent of the water to be used in the radial collector wells will come from the Biscayne aquifer. This will result in a reduction of more than 3 million gallons a day of groundwater flow needed to support the flora and fauna of Biscayne Bay. (**0001-7-4** [MacLaren, Kaitlin])

Comment: This proposed expansion is in direct conflict with Biscayne Bay Coastal Wetland Project, which is part of the Everglades restoration. The availability of reused water to meet both the projected needs of FPL to operate the new plant and the needs of Everglades restoration is questionable. There was water, reused water earmarked for Biscayne Bay Coastal Wetlands Project that could be used for this project. (**0001-7-9** [MacLaren, Kaitlin])

Comment: Some of the other speakers have already talked about water. Nuclear plants consume more water and withdraw more water than coal plants, natural gas plants, and certainly far more so than wind or solar as forms of energy. As other speakers have alluded to, we already have water shortage issues with drinking water. (**0002-16-1** [Shlackman, Mara])

Comment: And we have to consider the socioeconomic impacts of this. The Redlands and Homestead are still an area that have agricultural businesses. There's been an effort to cultivate agritourism with such things as the Schnebly Winery, the Fruit and Spice Park,

Paradise Farms. And if we have all of this water being withdrawn for the nuclear plant, these agricultural businesses will suffer that much more. (**0002-16-2** [Shlackman, Mara])

Comment: Miami-Dade County is on permanent water rationing; we are only permitted to water our lawns twice a week. In the winter, winter that can go down to zero. We do not flush our toilets after every use; if it's yellow, let in mellow, if it's brown, flush it down. 3,000,000 people in Miami-Dade County live like this and you are going to build a power plant here that uses 125,000,000 gallons of water per day????!!!!. (**0016-14** [White, Barry])

Comment: The drawdown of water will be a threat to our water supply, creating salt water intrusion, increased salinity, and challenge our continued existence on this endangered land not to mention the impact on the nearby national parks, their flora and fauna. (**0016-5** [White, Barry])

Comment: The proposed use of radial wells to draw water from 40 feet under Biscayne Bay is a major threat to the water supply of the area. There is lateral movement of water in the aquifer so that the water will be drawn from all of the surrounding area including the aquifer to the west, the source of the Florida Keys water. (**0016-6** [White, Barry])

Comment: We in Florida, where water is already scarce, and rationed many months of the year, cannot afford to give up the additional millions of gallons of water required for these new nuclear plants' operation. The existing plants at Turkey Point have already contaminated our groundwater, like nuclear plants have all over our country, and caused saltwater intrusion into our freshwater wetlands and drinking water sources. Please do not further risk our irreplaceable Florida water resources by allowing these new plants to be built. (**0021-4** [Wilansky, Laura])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts of utilizing water from Radial Wells to the Turkey Point FPL power station in the future, including any cost-benefit analyses please provide them. (**0022-1-9** [Reynolds, Laura])

Comment: The operation of the RCWs would result in hydrologic impacts, including ground... water, on Biscayne Bay due to geological disturbances, resulting in water volume and quality alterations... The cone of influence during the operation of the RCWs extends into Biscayne National Park boundaries. Therefore, a large portion of the nearly 124 million gallons of Biscayne Bay water will originate from within Biscayne National Park boundaries, which is a protected water body. (**0025-1-12** [Kimball, Dan] [Lewis, Mark])

Response: *The impact of consumptive water use on both the local and regional water resources associated with building and operating proposed Turkey Point Units 6 and 7 will be presented in Chapters 4 and 5 of the EIS. Both current and future conditions, including changes in water demands to serve the needs of the future population and changes in water supply, will be considered. Cumulative impacts will be addressed in Chapter 7; and system design alternatives, including cooling water system designs and alternative cooling water sources will be presented in Chapter 9.*

Comment: Turkey Point is situated between two national parks and over the water supply for the entire Florida Keys and much on southern Miami-Dade County; and salt water intrusion and

increased levels of water salinity from the operation of Turkey Point Reactors 3 & 4 are already major concerns in the area. (**0012-6** [Payne, Nkenga])

Comment: [T]he construction of the additional nuclear power plants, as well as the operation of the existing facilities, will have adverse impacts on water quality, ecology, farm lands, cause salt water intrusion, as well as adversely impact the habitat of protected species, wetlands and much needed fresh groundwater input to Biscayne Bay. (**0012-9** [Payne, Nkenga])

Response: *The impacts on water quality, including the effects of saltwater intrusion during building and operation of the proposed units will be discussed in Chapters 4 and 5 of the EIS. The impacts of the proposed actions on the local ecology and nearby farm land will also be addressed in Chapters 4 and 5. Saltwater intrusion resulting from the combined effects of the proposed action and past, present, and reasonably foreseeable actions will be addressed in Chapter 7.*

Comment: Ensure an analysis of the possible impacts of sea level rise on the proposed project with all of its associated facilities, consistent with the range of potential increases adopted by the Miami-Dade County Climate Change Advisory Task Force. FPL's assessment is based historical information on sea level rise in Miami-Dade County. Current discussions of sea level rise suggest that a much more significant rise could occur during the useful life of the proposed project, initially from 2020 to 2060, with a possible extension of 20 years, taking us out as far as 2080. (**0019-3** [Hamilton, Karen])

Comment: The impacts of sea level rise due to climate change should be addressed as they pertain to the operation and maintenance of the RCWs and the hydrologic modeling, which is being used to forecast the percentage of water derived from Biscayne Bay versus freshwater from the Biscayne Aquifer. The effects of climate change should also address major storm events and cooling canal functionality over the projected lifespan of Units 6&7. Peer reviewed and governmental references should be part of this analysis, including the [PCC Fourth Assessment Report: Climate Change 2007; the Miami-Dade Climate Change report; and the Army Corps of Engineers, engineering circular - sea level rise 1165-2-211.
(**0025-2-13** [Kimball, Dan] [Lewis, Mark])

Comment: The SFWMD recommends that the following issues be addressed in the Environmental Impact Statement: Hurricanes/Climate Change/Sea Level Rise - The potential for adverse impacts related to the siting and design of the proposed plant and associated facilities directly on the coast in an area subject to the direct effects of hurricane tidal surge, climate change, and sea level rise. (**0032-28** [Golden, James])

Comment: The sighting of the proposed Florida Power & Light (FPL) nuclear reactors 6 and 7 adjacent to FPL's existing power plants on the sight abutting Biscayne Bay approximately 25 miles south of the city of Miami, is ill conceived and short sighted. According to the latest United Nations Intergovernmental Panel on Climate Change (IPCC) estimates, a sea level rise between 18 and 59 cm (7.1 to 23.2 inches) can be expected before the turn of the century. Unfortunately the IPCC did not factor in global land ice melt into this equation. The new IPCC report, due to be released in 2014, will include land ice melt sea level rise forcings.
(**0034-1** [Kipnis, Daniel])

Comment: This scenario may not be the reality of the situation. Dr. Stefan Rahmstorf, a leading and respected authority on the subject notes that, “land ice (glacial melt) has, in fact, contributed 80 per cent of the observed sea level rise over the past five years”, and, “if two-thirds of glacier ice were lost, this would add 40 centimeters to the global sea level”, then, “The big ice sheets would then need to contribute only about 50 centimeters (19.7 inches) — corresponding to less than one per cent of their mass — to bring sea level rise up to 114 centimeters (44.9 inches)”. This does not include any thermal expansion of ocean water which the IPCC admits will increase due to rising global temperatures. The only debate among climate scientists is not if, but when these changes will occur. Additionally and closer to home, the Science Committee of the Miami Dade County Climate Change Advisory Task Force (CCATF), Co-chaired by Dr. Hal Wanless, Chairman of the University of Miami’s Geology Department and Dr. Stephen Leatherman, Director of the International Hurricane Center at Florida International University, have predicted that sea level rise will be between 91.4 cm and 152.4 cm (3 to 5 Feet) by the end of the century and possibly as early as 2070. (**0034-2** [Kipnis, Daniel])

Comment: It should be plain to see, especially when sighting a 23 billion dollar facility with a useful working life of up to 100 years, that the proposed site presents inherent risks that place not only the financial investment of FPL’s rate payers but also their safety in extreme jeopardy. A sea level rise of just one foot would inundate 17% of Miami Dade County’s land mass, most of which would be in south Dade, including the area around Turkey Point and the access road to the facility. A two foot rise covers 28% of Miami Dade County’s land mass. Turkey Point generating facility effectively becomes an island. The current cooling canals for the existing nuclear generating facility become unusable as they are breached by rising bay waters. (**0034-3** [Kipnis, Daniel])

Comment: At the full predicted 5 foot range of sea level rise, occurring sometime between 2070 and the turn of the century, only 54% of Miami Dade County remains high and dry. FPL’s proposed power lines running down the western side of the County’s Urban Development Boundary (UDB) are miles from dry land as that part of the Everglades is flooded with both fresh water, used to hold back the rising sea, and salt water which is fast encroaching. The coastal ridge is now divided by tidal channels into a series of independent islands displacing a million or more county residents. The effect of any hurricane storm surge will force an additional million or more residents to leave the county for higher ground as they have already had to do on the barrier islands of Miami Beach and Key Biscayne. Even as bad as this scenario seems, it will get worse. Sea levels are expected to continue to rise for centuries to come and if they reach historic levels of past melts, could exceed 20 meters (66.61 feet). This may happen faster than expected due to accelerated climate forcings as countries have not only failed to reduce greenhouse gas emissions, but actually have accelerated them. (**0034-4** [Kipnis, Daniel])

Comment: The bottom line, the Nuclear Regulatory Commission and the Army Corps of Engineers should withhold permitting for FPL’s proposed generating facilities 6 and 7 due to concerns that: (1) Predicted sea level rise would first, isolate the facility on an island, then (2) Cause the access road to be undermined and overrun by sea water causing it to become unstable and unusable, then (3) Overrun and alter the current cooling canals and possibly cause the proposed cooling-water radial wells to function differently than now proposed and possibly cease to function as planned, then (4) Increase the effects of storm surges from

hurricanes and other tropical events on the facilities and access roads, then (5) Place maintenance constraints on power transmission lines that now will be water bound, then (6) Unfairly burden rate payers in funding a project that will not reach its projected life span, then (7) Have an insufficient client base to support the facilities operations when much of south Florida's population is forced to relocate due to sea level rise, tidal surge events, pollution concerns, altered wet and dry seasons, increased chance of tropical diseases and all the other predicted effects of climate change. (**0034-5** [Kipnis, Daniel])

Response: *The impact of sea level rise on the safe operation of the proposed units is considered in the NRC's safety review and is not within the scope of environmental review. Results of the safety review can be found in the Safety Evaluation Report (SER). However, sea level rise will be considered as one of the contributing factors to the cumulative impact of the proposed action and other past, present, and reasonably foreseeable actions in Chapter 7 of the EIS.*

Comment: The application proposed the discharges of potentially contaminated industrial waste from the maintenance of boiler, equipment closed cooling water system maintenance, and other areas to cooling canals. Although the use of oil-water separators is mentioned, no information was provided to allow for evaluation of potential impacts to sensitive ecological receptors, and surface and groundwater quality. No information was provided to show that no contamination will result from such discharges. (**0023-1-10** [LaFerrier, Marc])

Response: *This comment refers to the SCA submitted to the State of Florida by FPL, but it indicates an interest in the potential impacts of the proposed plant on Federally and State-listed endangered or threatened species and surface water and groundwater quality. The potential impacts of building and operating proposed Turkey Point Units 6 and 7 on Federally and State-listed endangered or threatened species and surface water and groundwater quality will be discussed in Chapters 4 and 5 of the EIS, based on the affected environment described in Chapter 2. The cumulative impacts of the proposed action and other past, present, and reasonably foreseeable future actions will be assessed in Chapter 7.*

Comment: The Summary of Measures and Controls to limit Adverse Impacts during Construction (Table 4.6-1, COL, Environmental Report, Part 3, Ch. 4) assesses the cumulative impacts to land use, hydrology, water use, subsurface flow, ecology, and socioeconomics, as a result of the construction of the entire Unit 6&7 plant (pre and post construction). FPL lists most impacts as small in this analysis, compared to moderate or large. Small is defined by FPL as Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute or resource. A striking aspect of this analysis is the incorporation of CERP features as either a contributable negative or positive impact to Units 6&7 construction. FPL appears to use benefits from the proposed Biscayne Bay Coastal Wetlands/CERP project to mitigate the environmental impacts of the Units 6&7 construction. This appears highly inappropriate in the determination of total impacts from the FPL project. Therefore, the NPS requests that this analysis be carefully evaluated to consider the impacts Unit 6&7 combined construction will have on Biscayne Bay Coastal Wetlands/CERP implementation, as well as, all other associated impacts to the environment. (**0025-1-15** [Kimball, Dan] [Lewis, Mark])

Response: *Cumulative impacts result from the combined effects of the proposed action and past, present, and reasonably foreseeable actions, regardless of who takes the actions. The results of cumulative impact analyses will be presented in Chapter 7 of the EIS; and in that analysis the contribution of proposed Turkey Point Units 6 and 7 to the cumulative impact will be identified. In addition, the respective impacts of building and operating the proposed units will be presented in Chapters 4 and 5.*

Comment: Please state the amount of greenhouse gases units 6&7 will contribute to the atmosphere. Please state the amount of climate change units 6&7 will make to the environment. (**0022-2-17** [Reynolds, Laura])

Response: *The potential impacts of the airborne emissions from building and operating proposed Turkey Point Units 6 and 7 will be discussed in EIS Chapters 4 and 5, respectively. The potential cumulative impacts of the proposed nuclear power generation on climate change will be addressed in Chapter 7.*

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to adverse impacts of climate change as a result of direct heating of the atmosphere, please provide them. (**0022-4-17** [Reynolds, Laura])

Response: *The potential impacts of building and operating proposed Turkey Point Units 6 and 7 on climate change will be discussed in Chapters 4, 5, and 7 of the EIS, based on the affected environment described in Chapter 2. The EIS will include citations for documents used in its preparation.*

Comment: The proposed plant and associated facilities are located within project areas for the Comprehensive Everglades Restoration Plan (CERP), which proposes to restore regional wetland functions in the region, including functions that provide direct benefits to Miami-Dade County's population through protection of surface and groundwater resources. The EIS should examine the compatibility of the plant and associated facilities, including transmission lines, with CERP and CERP restoration goals for this area. (**0015-5** [Espinosa, Carlos])

Response: *The cumulative impacts associated with building and operating proposed Turkey Point Units 6 and 7 will be evaluated for each affected resource. Past, present, and reasonably foreseeable actions taken under the CERP will be considered in the cumulative impact analyses presented in Chapter 7 of the EIS.*

D.1.22 Comments Concerning the Need for Power

Comment: Like the previous speakers of the Greater Miami Chamber, the Mayor of the Florida City, Mr. Bill Diggs, efficient supply of power is essential to sustain economic growth and sustainability in South Florida. Business and industries is what we are predominantly, as an economic development council, concerned with. People that come to our community need to know that there is power provided by Florida Power & Light that is second to none, along with the infrastructure of roads, education, and other things that are climbing at an enormous rate in our community. Just the expansion of roads alone in the last two years is astronomical. Why?

Because there's a need. There's a lot of people coming into our communities. We need to keep up with that capacity, and that's what this is all about. As well, Barry Johnson, with the Greater Miami Chamber, talked about the fact that we've been accustomed to a quality of life, which is true. That quality dictates the need for additional infrastructure and utilities, power, all those things that we depend on in our daily lives. (**0001-25-2** [Horton, Richard])

Comment: The addition of the two new reactors to Turkey Point provide the energy which we will need in South Florida as our community continues to grow; 5, 6, 7 million people projected in the not too distant future. We've got to provide the kind of services that everyone expects and demands (**0001-5-2** [Johnson, Barry])

Comment: According to the Waxman-Markey Bill, we would probably need about 45 new nuclear reactors to meet the expectation, and I think 6 and 7 is the start of that. (**0001-9-3** [Martinelli, Tom])

Comment: I believe our electrical energy use is going to continue to grow in South Florida. I was walking the Hollywood Broadwalk this morning, and there were two large cranes I saw right at Sheridan Street and A1A. And what I found out they were doing is they were installing a new cellular tower on the top of the condominium building for wireless 4G/3G for the new smartphones. And we're more and more, as consumers, using electric. And to be competitive in this world we're not going to cut back on our electric use. However, there were some good points that were brought up, and it kind of ties into what I think is very important. (**0002-17-2** [Eney, Douglas])

Comment: If you look across the country, a lot of your nuclear power plants have reached the end of their life expectancy. Over the last, say, 10 years, America has been rebuilding, revamping them, making them capable of going on another 20, 30 years. You have a lot of coal fired power plants that have reached their life expectancy. As far as America as an industrial nation, we need this power to power our factories. Look at it. You go throughout the United States -- when you go to stores you don't see hardly anything made in America anymore. So if you look at it from an economic standpoint, if you see that these power plants have reached the end of their life expectancies, big industry is looking at this. (**0002-7-2** [Snelson, Richard])

Response: *These comments express agreement with the FPL application's assertion that the area needs additional power. The need-for-power analysis will be addressed in Chapter 8 of the EIS.*

Comment: FPL and Florida should be the leader in renewable and nuclear energy. So much that supply is greater than demand and we can sell it to other states. (**0006-5** [Weins, Brian])

Comment: Please state the "Need for Power" where units 6&7 is at the distant end of the electrical grid and is unable to send excess power to the east, the south, or the west. (**0022-3-6** [Reynolds, Laura])

Response: *The need-for-power evaluation will be presented in Chapter 8 of the EIS.*

Comment: If you Google FP&L, PSC -- Public Services Commission -- you'll find a lot of data, you'll find a lot of interesting articles. And I would direct you primarily to a writer for the Sun Sentinel in Fort Lauderdale called Julie Patel, for whom FP&L is her beat. And look at the long history of the relationship between PSC and FP&L. Why do I mention PSC at the beginning? Because they're the ones who did the needs analysis. Remember, this project starts with a needs analysis, where the PSC determined that there was a need for this power plant. Is there a need for this power plant? (**0002-14-1** [Schwartz, Matthew])

Response: *The need-for-power evaluation will be presented in Chapter 8 of the EIS. The determination of the need for power within a given area is not under the NRC's regulatory purview. However, for the purpose of its NEPA analysis, where another regulatory body has made a need-for-power determination, the NRC staff reviews the applicable regulators need-for-power analysis to determine if it is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. If the need-for-power evaluation is found to be acceptable under these criteria, no additional independent review by the NRC is needed.*

Comment: Is the Florida population growing? Are we getting to the -- what was it, 15 million people we're going to have living in South Florida? Nowhere near there. In fact, population is not growing, it's static. There's a reason for that, there's a reason why the population isn't growing. But at any rate, this project does not take that into consideration. (**0002-14-2** [Schwartz, Matthew])

Comment: I'd first like to say that I know that we're saying there's a new need for energy. The last I've heard there's been a population decrease in this area. (**0002-8-1** [O'Katy, Jessica])

Comment: Please state the "Need for Power" in Florida in light of a population decrease of 58,294 from April 1, 2008 to April 1, 2009. (**0022-3-4** [Reynolds, Laura])

Response: *The need for power in light of population growth and electrical demand in the FPL service area will be analyzed and addressed in Chapter 8 of the EIS.*

Comment: The alternative analysis is based on an archaic assumption that base load power is needed. Last April, Federal Energy Regulatory Commission Chief Jon Wellington told the U.S. Energy Association that saying we need base load energy is like saying we need mainframe computers. The technology currently exists for distributed energy systems that negate the need for base load power. Further, the NRC must use updated information to reevaluate FPL's 2008 analysis for the new reactors in terms of the need for power given -- for the need for power, given the economic downturn and significant reduction in demand. (**0001-14-5** [Hancock, Mandy])

Comment: The electricity generated is not even needed in South Florida where the plants are proposed to be built, endangering all of us in this area for something we will neither use nor need. And the electricity these proposed plants could generate is not needed, period - this amount of energy and more could easily be saved by simply increasing conservation and efficiency, at a saving of billions of dollars to consumers, with NO risk to the environment whatsoever. (**0021-3** [Wilansky, Laura])

Response: *Decisions regarding which generation sources and alternatives to deploy are made by the applicant and regulatory bodies such as the public utility commission. The impacts of energy efficiency and demand-side management on the need for power and load forecasts will be addressed in Chapter 8 of the EIS. Alternative actions such as the no-action alternative, new generation alternatives, purchased electrical power, energy efficiency, alternative technologies (including renewable energy such as wind and solar), and the combination of alternatives will be considered in Chapter 9. The determination for the need for power is not under NRC's regulatory purview. However, for the purpose of its NEPA analysis, where another regulatory body has made a need-for-power determination, the NRC staff will review the applicable regulators need for power and determine if it is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. If the need-for-power evaluation is found to be acceptable under these criteria, no additional independent NRC review is needed.*

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to the "50-year electrical demand projections for the FPL service area" considering various climate change and sea level rise scenarios, please provide them. (**0022-1-5** [Reynolds, Laura])

Comment: Please state the "Need for Power" in the light of sole source municipal wellfields being contaminated with salt water by a sea level rise of 1 foot or less. Please state the "Need for Power" in the light of large areas of infrastructure, residential and commercial real estate being flooded by a sea level rise of 1 foot or less. (**0022-3-5** [Reynolds, Laura])

Comment: To the extent that you are aware of any documents or reports by any federal, state, local or regional government agency, FPL or any of its employees or contractors that relate to the permanent closure of solid fueled electrical generating plants as a result of units 6 & 7 becoming operational, please provide. (**0022-4-24** [Reynolds, Laura])

Response: *The determination for the need for power within a given area is not under the NRC's regulatory purview. However, for the purpose of its NEPA analysis, where another regulatory body has made a need-for-power determination, the NRC staff reviews the applicable regulators need-for-power analysis to determine if it is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. If the need-for-power evaluation is found to be acceptable under these criteria, no additional independent review by the NRC is needed. The need-for-power discussion will be included in Chapter 8 of the EIS. Chapter 8 will include a discussion of planned retirements of other generating facilities within the FPL service territory. The potential cumulative impacts associated with sea level rise will be discussed in Chapter 7.*

Comment: There is growing evidence that the thousands of acres of cooling canals designed for Turkey Point 3 and 4 are exacerbating saltwater intrusion in the area, and is believed to be impeding the flow of groundwater to Biscayne National Park. If no solutions to these impacts are addressed in this application review, then you will have contributed to the degradation of our national parks and our quality of life in Miami-Dade. (**0002-1-3** [Sorenson, Katy])

Response: *The purpose of the EIS is to disclose the environmental impacts of proposed Turkey Point Units 6 and 7. This comment addresses the impact of the existing power plants on*

the Turkey Point site which is outside the scope of the environmental review. The cumulative impact of the proposed action when added to the impact of past, present, and reasonably foreseeable future actions discussed in Chapter 7 of the EIS will consider the impact of the existing units on resources affected by the proposed units.

D.1.23 Comments Concerning Alternatives – Energy

Comment: It is not okay to build a nuclear power plant. If Germany can take and stop with all their nuclear power plants, planned by the year 2020 because they have found solar to be that efficient, and they get 50 percent less sunlight per year than we do, then certainly we can come up and do the same thing. (**0001-11-11** [Amor, Valerie])

Comment: This is the Sunshine State. We should be using sunshine as our source of energy. This is almost Neanderthal that we're still considering building more nuclear power as a way to solve our energy crisis. We have not gone beyond this point and it's very disappointing. There have been studies done by Broward County, a targeted industry study that said, solar is to be the next industry. (**0001-11-7** [Amor, Valerie])

Comment: There are more affordable ways for FPL to meet energy demand while protecting the environment and tackling global warming. As SACE and the NRDC testified to the PSC in 2009, simply increasing energy efficiency goals by 1 percent could save enough energy to estimate the need -- to eliminate the need for new reactors, while saving ratepayers money. Additionally, investing more resources in solar and clean bio-energy, instead of costly new reactors, would benefit FPL and offer economic development opportunities for Florida, without draining our water resources or pocketbooks. The NRC must evaluate updated information using a combination of these sustainable energy choices, including energy efficiency, before allowing FP&L to commit billions of dollars, billions of gallons of water, and nearly an entire decade to building these reactors when that time and money could be better spent on less risky options. (**0001-14-3** [Hancock, Mandy])

Comment: Energy efficiency measures preserve our water resources, save customers money, and also pose no health or safety risks to the public. Florida utilities have significant resources to tap in these areas as outlined in a recent extensive report, Energy Efficiency in the South, by Georgia Tech and Duke University, and our report, Yes We Can: Southern Solutions for a National Renewable Standard. Renewable energy technologies, such as solar and wind, do not require extreme manipulation of our precious water resources. The environmental report overlooks the potential for FPL to pursue a combination of wind and solar resources within its service territory and states there is no renewable technology alternative that could mitigate the need for nuclear power (**0001-14-4** [Hancock, Mandy])

Comment: It's imperative that the U.S. invest in a safe, sustainable energy paradigm for the 21st Century that can also help revitalize our economy and create vastly more jobs than Turkey Point could ever dream of. The nuclear industry claims that it is a necessary piece of that energy future. On the contrary, studies indicate that the energy mix will not require a nuclear component. In the ten years it takes to bring a new plant online, we could've been developing a new truly Green energy technologies. Because the nuke industry cannot compete on its own

without massive government subsidies, it threatens our bright Green future by drawing public investment away from it. (**0001-16-8** [Showen, Steve])

Comment: As Florida Power & Light staff was helping us build this house and advising us, my wife and I would say: Why are they helping you not pay them so much money? It doesn't quite make sense. So we asked them one time and the gentleman I asked said, Albert, you don't understand. If everyone built like this we would never need to build another nuclear power plant. (**0001-24-4** [Harum-Alvarez, Albert])

Comment: I know it isn't the Nuclear Regulatory Commission's place to determine need, but I do believe that there is a deep reservoir of available energy if we would only embrace energy efficiency. A recent report by Duke University and Georgia Tech concluded that the southern states could meet our future energy demand through aggressive energy conservation programs. There are a lot more jobs to be had putting people to work now, not 5, 10, or 15 years from now retrofitting homes and business throughout our community, and we don't have to pay for these jobs and reduced energy bills through an early cost recovery fee. (**0002-1-4** [Sorenson, Katy])

Comment: This project, from what I can see, it's about a $20 billion project. What's the problem with that? Because we are in an era where renewable, true renewable resources are now available to us; ocean power, solar, wind. Insolation is the measurement of how much sun reaches a given area of the earth. Florida is the Sunshine State for a reason. Look at insolation maps of the United States. South Florida is equivalent to parts of the Southwest; Arizona, New Mexico. We have the energy here, we are not using any of it. We are not making use of the solar. (**0002-14-3** [Schwartz, Matthew])

Comment: I think we keep looking at fossil fuel and I don't think we really understand how dependent we are on it and what a nasty thing it can be. And, yes, it would be wonderful and -- really wonderful. I don't think it's pie in the sky. I don't think that solar power is a magical thing. I think it's a coming thing, and I do think FP&L uses. I know they do. They use wind power. (**0002-15-4** [Finlan, Mary])

Comment: But solar installations on rooftops would create green jobs that would provide a viable alternative for the community. (**0002-16-4** [Shlackman, Mara])

Comment: Looking at reports that have been done in the name of efficiency, and we've heard a lot of about efficiency and renewables, there were a couple -- the Southern Alliance for Clean Energy and the Natural Resource Defense Council both testified to the Public Service Commission last year that simply increasing energy efficiency goals by 1 percent could negate the need for any nuclear power reactors. I think the NRC should really look at this option while they're doing the consideration of the scoping process. Obviously, renewables in conjunction with that would even further negate the need for new nuclear reactors. The NRC must evaluate updated information using a combination of this sustainable energy choices, including energy efficiency, before allowing FP&L to commit billions of dollars, billions of gallons of water, and nearly an entire decade to building these reactors when that time and money could be better spent on less risky options. (**0002-18-3** [Hancock, Mandy])

Comment: I, instead, would like to propose that we focus on truly renewable energy and clean energy answers as well as efficiency in Miami. (**0002-8-3** [O'Katy, Jessica])

Comment: So, I'd like to ask that we focus on truly clean and renewable energy sources like solar or wind, and most of all efficiency, and definitely take into consideration all of the environmental impacts that we can when making this decision. (**0002-8-9** [O'Katy, Jessica])

Comment: FPL should be exploring wind farms off the coast of Florida not oil drilling. Every new structure built should be required to use a minimum of 25% solar energy. (**0006-4** [Weins, Brian])

Comment: Opting to pursue energy resources that would not involve such irreversible damage to the surrounding environment is necessary to ensure the safety of the surrounding community. Renewable energy resources such as wind and solar power are a much wiser alternative for the State of Florida. (**0007-7** [Burris, Jessica])

Comment: Solar power is growing and Florida is known as the sunshine state. If we charged each homeowner for the installation and maintenance of the solar panels on their homes, then we could probably power the whole state. Also solar power does not emit green house gases or any other harmful side effects either. (**0009-2** [Hogsed, Daniel])

Comment: If we installed solar panels on every home in Florida we could generate more jobs than the nuclear power plant expansion would and inspire other countries to follow our lead. (**0009-4** [Hogsed, Daniel])

Comment: The City of South Miami supports energy policies based on investment in the rapid development of solar and wind energy, and all other proven renewable energy solutions, combined with a comprehensive program promoting energy efficiency and conservation. (**0012-18** [Payne, Nkenga])

Comment: South Miami supports energy policies based on investment in the rapid development of solar and wind energy, and all other proven renewable energy solutions, combined with a comprehensive program promoting energy efficiency and conservation. (**0012-2** [Payne, Nkenga])

Comment: The Draft EIS should discuss other alternative sources of energy that may available to serve the project purpose that would have less impact on sensitive wetland resources. (**0014-16** [Mueller, Heinz])

Comment: We can do better through major investments in energy efficiency, conservation, and renewables. No health risks involved if a solar panel breaks. (**0017-3** [Troner, Susannah])

Comment: I am fairly certain that FPL has done less than any other utility to try to curb electrical usage in our community through demand side management. They have no true incentive to do so. (**0017-5** [Troner, Susannah])

Comment: With so many truly clean, safe, renewable and sustainable technologies now available and in development, there is no reason to build new nuclear plants, which will only

drain much-needed resources from full development of better, safer technologies. Florida in particular has abundant solar energy that is not being used. (**0021-12** [Wilansky, Laura])

Comment: Please STOP THIS DISASTEROUS AND GREEDY EXPANSION OF ELECTRIC COMPANIES AND OTHER BIG BUSINESSES SET ON 21ST CENTURY ABUSE OF OUR PLANET. Our government must not turn its back - and should immediately go in the green direction - so that Americans, and especially our children, can look back with pride on the governmental leaders with this kind of foresight that protected the earth for future generations instead of allowing greed to continue its destructive pattern. (**0028-6** [DiNuzzo, Laura])

Comment: What about solar and wind power as safe alternatives? (**0031-6** [De Villiers, Elena])

Response: *The EIS will be prepared in accordance with 10 CFR 51.75(c). Alternative energy sources, including energy conservation and renewable energy sources, will be considered in Chapter 9 of the EIS.*

Comment: I could say the same thing that's been said for this nuclear power plant: I can bring you 4,000 new jobs and I can build a solar power plant. Would you all still be so happy? And I hope you would because if there is a problem with a solar plant, millions of people will not die; or the water will not be contaminated; the air will not be jeopardized; we would not worry about our aquifers. (**0001-11-8** [Amor, Valerie])

Comment: Now, aside from saddling the taxpayers with extraordinary risks, the nuclear power will crowd out dramatically energy-efficient competition from decentralized co-generation such as the 21 megawatt plant that provides the entire campus at Massachusetts Institute of Technology with electricity, heating, and cooling by extracting twice as much useful energy and using half as much fuel as a conventional power plant. (**0001-13-8** [Smilan, Stan])

Comment: In light of the recent Gulf oil spill, which upsets me very much, do you think it's a good idea of taking more risks with new technologies? I don't and that's why I'm here today. Why risk so much when there is other, better technologies such as solar? Energy efficiency and clean renewable energy should be our main focus right now. It will save money in the long term so that future generations have a chance. (**0001-19-4** [Ryan, Megan])

Response: *The evaluation of potential health impacts of operating additional nuclear plants on the Turkey Point site will presented in Chapter 5 of the EIS. In addition, the applicants safety assessment for the proposed licensing action was provided as part of the application. The NRC is in the process of developing an SER that analyzes all aspects of construction and operational safety. The NRC will only issue a license if it can conclude that there is reasonable assurance that (1) the activities authorized by the license can be conducted without endangering public health and safety, and (2) such activities will be conducted in compliance with the rules and regulations of the NRC. In addition, energy efficiency and renewable energy alternatives to the proposed action will be evaluated in Chapter 9 of the EIS.*

Comment: When comparing energy types -- when comparing types of energy generation, nuclear power has higher rates of both water withdrawal and consumption than coal and natural gas and far more than renewable energy sources, such as wind and solar. The 2010 report I

mentioned earlier by Georgia Tech and Duke University examined the energy efficiency in the South and it illustrated ways to substantially reduce energy needs, while simultaneously reducing water consumption. According to the report: In the North American Electric Reliability Council regions in the South, 8.6 billion gallons of freshwater could be conserved in 2020, which is 56 percent of the projected growth in cooling needs. And in 2030 this could grow to 20.1 billion gallons of conserved water, which is 45 percent of projected growth. Instead, we see FP&L projected figures for water demand in 2025 to include a 35 percent increase for public and commercial needs and a whopping 3,224 percent increase for thermoelectric power generation. The NRC needs to fully evaluate less water- intensive energy alternatives -- efficiency and renewables -- including using a combination of these energy sources. The NRC also needs to analyze the impacts such a drastic increase in water demand from the power sector could cause to this area. (**0001-14-7** [Hancock, Mandy])

Comment: As a mayor who has signed on the U.S. Conference of Mayors Climate Protection Agreement, I am committed to, as we all are -- we have major sustainable and clean energy initiatives that we are going forward with. But we don't see the cost benefit analysis that you are to do as one that could in any way sustain or support an additional nuclear power infrastructure being placed. We would love to see, as other speakers have said, additional solar manufacturing. We've got the land throughout South Florida to do the manufacturing of the solar panels, to see Florida Power & Light do what they've done in Arcadia, and put in more solar fields. But the adverse impact of the potential for bringing in additional nuclear power plants would interfere with residential, and commercial, and environmental interest to a significant degree. (**0001-21-5** [Lerner, Cindy])

Comment: Wouldn't any energy technology create jobs? Developing solar and wind energy systems would involve construction and permanent jobs. FP&L's job creation theme is an emotional ploy at best. Is enticement of jobs in trying economic times a good enough reason for expansion? We need direction from something much smarter and more thoughtful. That takes us to "greener" than coal fired plants. (**0029-2** [Guendelsberger, Debra])

Response: *Alternative energy sources, including coal, natural gas, energy conservation, and renewable-energy sources, will be considered in Chapter 9 of the EIS. The impact of consumptive water losses on the sustainability of both the local and regional water resources will be presented in Chapters 4, 5, and 7 for building and operation, respectively.*

Comment: I ask you to include the true costs of nuclear plants throughout their entire life cycle in your environmental calculations, including the diversion of resources from the desperately-needed development of truly safe and sustainable energy technologies.
(**0021-20** [Wilansky, Laura])

Response: *The assumptions of reactor life span and costs used in this analysis will be provided in Section 10 of the EIS. Costs for all phases of reactor building and maintenance will be discussed. The license period for a combined license is 40 years. A licensee can request renewal for an additional 20 years. The benefit-cost analysis is done for the license period of 40 years. It would not be appropriate to assume additional cost or benefit for an additional* 20 years *of license renewal when that action has not been requested or approved.*

Comment: As was said, we're referring to Units 6 and 7, because there are five operating units at the site. There are three fossil units and there's two nuclear units. So FPL has a well balance of fuel diversity but it's important that we increase, from a diversity standpoint, our reliance on nuclear energy and renewables. FPL currently is the largest generator of electricity from wind in the United States, and we have the largest solar power facility in the country. We're the third largest generator of electricity from nuclear in the United States currently today, without the addition of Units 6 and 7. (**0001-3-3** [Kiley, Mike])

Response: *This comment expresses support for the applicant's COL application. It does not provide specific information relating to the environmental effects of the proposed action and will not be evaluated in the EIS. It is listed to compile a complete record of comments received.*

Comment: [T]he estimated cost of thirty billion dollars or more which the public is expected to prepay, would be much better spent on creating and/or subsidizing an alternative energy industry. This industry will create many thousands of permanent jobs, as opposed to the relatively few which would be created by establishing new nuclear power plants. (**0012-15** [Payne, Nkenga])

Comment: The article [in the "Free Press"] mentioned that the nuclear plants rely almost 50% on natural gas - my question to you, Mayor, is why not go in the more "green" direction of "natural gas" for all future energy needs - which is abundant and cheap - I believe we are not even considering other alternatives because of the following: Big Business, FPL, and its well-trodden path of making the American people more and more electricity-, dependent (prices never going down or stabilizing to benefit the American people, even though FPL grows bigger and bigger every year) - and then - influencing our government by threatening loss of jobs = two ways coercing the American people/government into "feeding" this greedy monster AND IS NOT THE WAY TO GO IN THE 21ST CENTURY. (**0028-3** [DiNuzzo, Laura])

Comment: Regarding the coercing of the American people and our government by suggesting that thousands of jobs would be lost if the nuclear plants were not constructed, I propose the following green outlook: If, for instance, your office, Mayor, turned its back on FPL and our government refused to allow this typical example of Big Business 20th Century greed and inconsideration for the American people, and decided that America needs to be more self-sufficient and its individual homes more self-efficient - I can promise you with millions of homes proceeding in this Green Direction, thousands if no millions of jobs would be created by: Independent American-home generators, Independent American-home solar panels, Independent American-home, cistern-like water supplies. Thereby creating endless jobs in manufacturing, sales, installations, maintenances, repairs, and so many other job-related ramifications therewith - making Americans more dependent upon each other rather than big business and the world for our needs, and more importantly, moving in the right green direction to protect this planet from any further exploitation by big business. As far as fossil fuels are concerned: It is not the fossil fuels that have caused so many problems, it is Big Business Greed that has gotten out of control and must be stopped in the 21st Century. (**0028-4** [DiNuzzo, Laura])

Response: *The NRC does not establish public policy regarding electric power supply alternatives nor does it promote the use of nuclear power as a preferred energy alternative.*

Decisions regarding which generation sources and alternatives to generation to deploy are made by the applicant through least-cost planning and integrated resource plans. Additional regulatory purview is provided by bodies such as State energy planning agencies and commissions. However, the discussion of various alternatives to the proposed project is pertinent to the extent that an energy alternative must reasonably be expected to replace the base load energy supplied by the proposed project, whether individually or in combination. The alternatives must be technically viable, feasible, and competitive. Chapter 9 of the EIS will include the no-action alternative (energy efficiency and demand-side management), new generation alternatives, purchased electrical power, alternative energy technologies (including renewable energy such as wind and solar), and the combination of alternatives. For acceptable alternatives, the potential for environmental and economic impacts will be assessed against the proposed project. If one of the potentially viable alternatives is environmentally preferable to the proposed action, economic impacts will also be compared.

Comment: YOU HAVE THE OPTIONS OF DECIDING TO PUT TP 6&7 SOMEWHERE ELSE AND/OR TO SUGGEST THE USE OF ALTERNATIVE (AND DECENTRALIZED) ENERGY SOURCES AND PRODUCTION. FOR THE SAKE OF OUR GRANDCHILDREN, CHOOSE ONE OF THOSE OPTIONS. (**0016-12** [White, Barry])

Response: *The NRC staff carefully reviews each application it receives by using an acceptance review process to ensure all required components are provided by the applicant. Each application then receives additional scrutiny during the safety and environmental review processes. Examining alternative energy sources and alternative sites is a function of the environmental review process and these topics will be discussed in Chapter 9 of the EIS.*

D.1.24 Comments Concerning Alternatives – System Design

Comment: Application fails to provide an alternatives analysis for routing of the proposed reuse pipeline. Please provide an alternatives analysis that considers and compares the benefits and impacts of all feasible alternative routes for this pipeline, including but not limited to wetland impacts, impacts to state and federally protected species, impacts to existing water management features. Alternatives evaluated should include but not be limited to options that minimize wetland impacts. (**0023-1-25** [LaFerrier, Marc])

Comment: Application fails to provide an alternatives analysis for the proposed access road network, both for construction access to the plant and access to the transmission line corridors, and to adequately demonstrate that impacts to resources are minimized and avoided. Please provide an analysis of alternatives for the access roads that considers and compares the benefits and impacts of all feasible alternative routes for ingress-egress, and demonstrates minimization and avoidance of impacts including but not limited to wetlands, impacts to state and federally protected species, impacts to existing water management features, impacts to Environmentally Endangered Lands projects, Natural Forest Communities, and tree resources protected by Chapter 24, Miami-Dade Code. Alternatives evaluated for ingress-egress to Turkey Point should include but not be limited to utilization of the existing Palm Drive (SW 344 Street) corridor with and without shift change modifications, and alternative construction entrances including but not limited to utilizing the existing plant entrance with shift change modifications or making improvements to the L-31 East levee for use as a temporary

construction entrance by backfilling a section of the L-31 E borrow canal. (**0023-2-7** [LaFerrier, Marc])

Comment: Should the NPS decided to acquire FPL's property within ENP and not exchange lands, it is assumed that FPL would not abandon its objective to obtain a western route from Turkey Point to the Levee substation. FPL would, therefore, likely resume investigation of alternate route(s). These new route(s) could affect the local socioeconomic environment including people, property values, employment, and construction-related expenditures in Miami-Dade County. These impacts should be evaluated in the EIS. (**0025-3-47** [Kimball, Dan] [Lewis, Mark])

Response: *The potential impacts of building and operating proposed Turkey Point Units 6 and 7 and ancillary facilities and corridors on wetlands, Federally and State-listed species, and other terrestrially important resources will be discussed in Chapters 4 and 5 of the EIS, based on the affected environment described in Chapter 2. However, alternatives to the roads, pipelines, and transmission corridors proposed by FPL will not be considered in the NRC staffs analysis in the EIS because they are not alternatives to the proposed action (issuance of combined licenses) before the NRC. However, the Corps of Engineers, and perhaps the National Park Service, will be cooperating with the NRC on the EIS. To the extent that a cooperating agency addresses such alternatives for its NEPA analysis, those alternatives would likely be included in this EIS in order to support the cooperating agency's environmental review.*

Comment: Given the value of utilizing the treated reclaimed water as a part of the cooling process, it seems beneficial to store or reroute this by-passed water for beneficial use rather than disposal. Where possible, recycling/reuse efforts should be utilized to maximize the use of the reclaimed waters to supplement operations that have traditionally utilized other surface water or groundwater as sources for cooling and/or for environmental enhancement. (**0023-3-48** [LaFerrier, Marc])

Comment: Hence, underground injection is not a proven, reliable method of wastewater disposal in southern Miami-Dade County, most likely due to differences in regional geology. Therefore, FPL should investigate alternative methods of cooling water blowdown and wastewater disposal. What is FPL's contingency should FDEP not approve a Class I underground injection control permit for Units 6&7 operation? A feasibility analysis of treating wastewater for the benefit of the Biscayne Bay Coastal Wetlands/CERP project should be performed. (**0025-3-22** [Kimball, Dan] [Lewis, Mark])

Response: *A description of the site layout, the reactor type, and the cooling-water systems will be included in Chapter 3 of the EIS. Alternatives to the proposed method of disposal of wastewater will be presented in Chapter 9.*

Comment: [T]he foregoing discussion, the NPS recommends that the EIS identify and evaluate alternative Western Transmission Corridors outside the existing boundary of Everglades National Park and connecting wetland habitats. The National Environmental Policy Act mandates that reasonable alternatives to a proposed action be evaluated. Consistent with this requirement, the EIS should evaluate other corridors that could be considered as reasonable alternatives to the segments of the West Preferred and West Secondary Corridors that run

through Everglades National Park (and Water Conservation Area 3B). The NPS recommends this analysis focus on the zone between Krome Avenue and the Miami-Dade County Urban Development Boundary in order to identify potential corridors that would avoid and minimize adverse impacts to people, wildlife in the Everglades ecosystem, special status species and other natural and cultural resources. (**0025-2-12** [Kimball, Dan] [Lewis, Mark])

Response: *The potential impacts from building and operating transmission lines associated with proposed Turkey Point Units 6 and 7 will be addressed in the Chapters 4, 5, and 7 of the EIS. However, alternatives to the roads, pipelines, and transmission corridors proposed by FPL will not be considered in the NRC staffs analysis in the EIS because they are not alternatives to the proposed action (issuance of combined licenses) before the NRC. However, the Corps of Engineers, and perhaps the National Park Service, will be cooperating with the NRC on the EIS. To the extent that a cooperating agency addresses such alternatives for its NEPA analysis, those alternatives would likely be included in this EIS in order to support the cooperating agency's environmental review.*

Comment: What alternatives are being investigated to avoid use of radial collector wells, even as a backup system? In particular, we recommend that the applicant address the ability of the project to use reclaimed water technology either in part or in full. (**0018-14** [Poole, Mary Ann])

Comment: What contingency plans are considered for alternative water sources if fish and wildlife resources demonstrate negative responses to this technology? We would expect FPL to provide for a contingency plan in their Conditions-of-Certification, should monitoring indicate that this technology is counter-productive to the recovery of Biscayne Bay. (**0018-9** [Poole, Mary Ann])

Comment: Please provide a more detailed justification (including all supporting data and assumptions) in selecting the Biscayne Aquifer Radial Collector Well alternative instead of the Floridan Aquifer and offshore (marine surface) water alternatives as secondary. (**0023-1-49** [LaFerrier, Marc])

Response: *These comments are directed at the applicant and refer specifically to the SCA submitted to the State of Florida by FPL, but they indicate an interest in the cooling-water supply for proposed Turkey Point Units 6 and 7. The cooling-water source for the proposed units will be described in Chapter 3 of the EIS. Alternative water supplies will be considered in Chapter 9.*

D.1.25 Comments Concerning Alternatives – Sites

Comment: We are not opposed to nuclear energy but we don't support additional reactors next to the national parks that we're trying to restore and preserve. (**0001-15-1** [Cornick, Lance])

Comment: My next concern is the risk of building nuclear reactors so close to Miami and the Everglades. (**0001-19-3** [Ryan, Megan])

Comment: I understand there are alternate locations that are being looked at and considered. So I would implore the Regulatory Commission to come back with a recommendation that an alternate site that doesn't have the fragile environmental community that Turkey Point is faced with and all of the adverse impacts, take it somewhere else. (**0001-21-6** [Lerner, Cindy])

Comment: If they're sending this power north -- and somebody said we need this power here in Florida City. My God, we don't need two nuclear plants worth of power in Florida City. And if the power lines are going north, why don't they just leave them go up there and build a power plant up north instead of putting it down here? (**0001-6-9** [Miller, Lloyd])

Comment: Turkey Point is probably the most environmentally unlikely nuclear installation in the nation. If we had to do it all over again, would we really put a massive power plant complex on the border of a national park in the middle of sensitive wetlands and then convert thousands of acres of coastal mangroves into a giant radiator for two nuclear reactors? We may not have the chance to do it over, but we can certainly think better about making things worse. The environmental review of an expanding nuclear facility abutting a national park, in the middle of wetlands, that the Federal, State, and local governments have spent millions working to restore and protect, deserves extra scrutiny. (**0002-1-1** [Sorenson, Katy])

Comment: The EIS should include a comprehensive evaluation of the potential impacts of constructing and operating two nuclear power plants and related facilities at the four alternate sites located in Glades, Martin, Okeechobee and St. Lucie Counties. This analysis will enable the applicant, stakeholders, decisionmakers and the general public to identify the environmentally preferable alternative and if there is an obviously superior site for the construction and operation of the proposed facilities. (**0025-1-10** [Kimball, Dan] [Lewis, Mark])

Comment: A review of the Florida Power & Light Company Project Bluegrass Nuclear Power Plant Site Selection Study Report (summarized in COL Environmental Report, Section 9.3), leads the National Park Service (NPS) to question the adequacy of the site selection study. Please note that only excerpts from the site selection study report referenced above were included as pat1 of Section 9.3 of the COL Environmental Report. For instance, the Cooling Water Supply Criterion, PI, is based on an ocean intake water source (to avoid Biscayne Bay) approximately seven miles offshore as a back-up water supply source (Pages B-3, B-4, C- 93, and C-99). Therefore, it appears that the RCWs, proposed for use as a water source in the COL, may not have been evaluated as part of the site selection process. (**0025-1-6** [Kimball, Dan] [Lewis, Mark])

Comment: [T]he land use rating issued to Turkey Point was the highest (most favorable) among the eight site locations evaluated even though ecologically sensitive habitats were identified. The Report simply assumed that the Biscayne National Park would not be affected by the plant since land is owned by FPL and existing power plants/nuclear units are located there now (Page C-95). However, the RCW operation and use of the area for the CERP Biscayne Bay Coastal Wetlands project was not considered during that analysis. Furthermore, the Turkey Point location was issued the highest possible index score for possible risk of groundwater contamination, compared to the other locations evaluated (Page C-51). The Ecology/Federal RTE Species Criterion, P5, identified Turkey Point as having the highest number of threatened and endangered (T&E) species (Page B-19). The evaluation of disruption to important species was based on the Federally protected species list (22 aquatic and terrestrial species); this review did not consider State of Florida T&E species. If the NPS is to be a cooperating agency on the EIS, then impacts to state-listed and locally-listed species would need to be evaluated in this document as well (NPS Management Policies 2006 sec. 4.4.2.3). Moreover, the Wetlands Criterion, P6, did not include estuarine, marine, riverine,

or freshwater pond wetland acreage in the evaluation (page B-21), all of which are required to be considered due to the potential impacts associated with the RCW operation. (**0025-1-7** [Kimball, Dan] [Lewis, Mark])

Comment: Of particular concern is the fact that the Turkey Point location received an average score during the initial screening site selection evaluation (Page 16), yet that score was changed to the highest favorable score in the final general criteria evaluation (Page 23). The reason for the increase in favorability is unclear. It appears that the Turkey Point location was given additional weight based on non-quantified socioeconomic factors. (**0025-1-8** [Kimball, Dan] [Lewis, Mark])

Comment: [T]he NPS recommends that the site selection process be re-evaluated, reflect the actual proposed features of the COL application, and consist of a more detailed and accurate comprehensive analysis that accounts for the RCW operation, state and federal T &E listed species and their habitats, conflicts with CERP Biscayne Bay Coastal Wetlands projects, and a quantifiable socioeconomic analysis. It is important that these factors be carefully considered in the process because they could significantly affect the results. (**0025-1-9** [Kimball, Dan] [Lewis, Mark])

Comment: It's location and proximity to Everglades National Park, Biscayne National Park, John Pennekamp Coral Reef State Park, and the Florida Keys National Marine Sanctuary makes it an eyesore on the coastline and a drain on the environment, not to mention the potentially catastrophic damage that would occur if there should be a radioactive release. (**0027-2** [Moses, Dorothy])

Response: *The alternative site-selection process will be reviewed to determine whether it is systematic, employs reasonable selection criteria, and constitutes an acceptable number of reasonable sites for consideration. The alternative sites will be compared against the proposed site to determine whether any of the alternative sites are environmentally preferable to the proposed site. The process and results will be provided in Chapter 9 of the EIS.*

Comment: The Mayors from our surrounding cities gathered and together put forth information about their concerns on the environmental impact, not just the site of the reactors, but also the transmission lines. I'm here this evening just so I can add my voice to their concerns. (**0002-2-1** [Meerbott, Tim])

Response: *The impacts of building proposed Turkey Point Units 6 and 7 and transmission lines will be considered in Chapter 4 of the EIS, and the impacts of operating the units and transmission lines will be considered in Chapter 5.*

D.1.26 Comments Concerning Benefit-Cost Balance

Comment: The NRC should be aware that FPL's ratepayers aren't happy about the tens of millions they have already been forced to pay in advance given the pre-payment scheme in place to finance new reactors in Florida. And FP&L is asking again the troubled Florida Public Service Commission for tens of millions more with hearings set for the end of August. (**0001-14-2** [Hancock, Mandy])

Comment: The FP&L has garnered several hundred millions from its ratepayers at this early stage through the Florida's Early Cost Recovery Program awarded by the Public Service Commission. Under the program, FP&L could conceivably recoup the cost of -- the entire cost of the plant, estimated to be between 14 and 30 billion, and may not actually be required to ever build that plant. (**0001-16-6** [Showen, Steve])

Comment: Determine how public investment costs will be equitably shared by all FPL rate holders, no matter what delivery system is ultimately constructed. (**0019-11** [Hamilton, Karen])

Comment: Outrageous monetary costs to rate payers. FPL is now collecting $18 billion from its 4.5 million customers to provide nuclear electricity for 750,000 homes. (**0031-4** [De Villiers, Elena])

Response: *The costs of power generation are passed on to customers. The NRC's responsibility is to regulate the nuclear industry to protect the public health and safety within existing policy. The NRC is not involved in establishing the rates paid by customers; therefore, these comments are outside the scope of the NRC's authority and will not be evaluated further.*

Comment: This should be our choice, the ratepayers. Me, my family, my neighbors, we have already seen an increase in our bills to start paying for these reactors. These risky projects have a history of going over budget and taking longer than promised. (**0001-19-5** [Ryan, Megan])

Comment: Are you aware that Wall Street will not finance nuclear power plants? TP will cost around $35,000,000,000. Divided by 4.4 million homes, that is $8,000 per home, and then FPL will own them and we will pay 10.5% annually on FPL's free asset until they are depreciated. No wonder they want to build them, on the public's money. It will more than triple their market cap. And before I will do that, I will put in solar and go off the grid and reduce my FPL bill to about $40 per month, and if enough people do that, who will pay for those carbuncles on the bay? Power companies have gone bankrupt. Or would Uncle Sam have to bail them out too? (**0016-7** [White, Barry])

Response: *Issues related to costs associated with previous projects are outside the scope of the proposed action and will not be addressed in the EIS. The estimated overall costs and environmental impacts of the proposed project will be addressed in Chapter 10 of the EIS. The benefit-cost balance for the project will rely on the best available estimate of project timing and duration, while noting possible uncertainties that may affect those estimates.*

Comment: In reality, nuclear energy is a dinosaur that would be extinct if left to market forces except for its resuscitation by huge infusions of public cash. Wall Street considers nuke power too risky to invest in and nuclear energy is the most expensive form of energy. It can't make it on its own. Hence, we see the political influence of the industry in the halls of government. (**0001-16-5** [Showen, Steve])

Comment: If nuclear energy was truly sustainable, cost-effective and truly a profitable business, the companies trying to build new nuclear plants would not have to keep going back to Congress for loan guarantees, liability insurance and tax breaks. The fact that this industry cannot obtain operating insurance by any means other than Congressional action is extremely

telling! Nuclear plants are uninsurable!!!! Does that sound like an environmentally safe, economically sound business to you?! It surely doesn't to me! (**0021-15** [Wilansky, Laura])

Response: *The NRC is not involved in establishing energy policy. Rather, it regulates the nuclear industry to protect the public health and safety and the environment within existing policy. Determining whether nuclear power should be subsidized is outside of the NRCs mission and authority and will not be addressed in the EIS.*

Comment: I ask you to include the true costs of nuclear plants throughout their entire life cycle in your environmental calculations, including the guaranteed damage to Florida's environment. (**0021-18** [Wilansky, Laura])

Response: *The benefit-cost balance for proposed Turkey Point Units 6 and 7 will rely on the best available estimate of project timing and duration, with uncertainties noted. The estimated overall costs and environmental impacts of the proposed project during both building and the 40-year operations period will be discussed in Chapter 10 of the EIS.*

Comment: I am disheartened to see that a new facility can cost 10's of billions of dollars to build but we have sat around for the past 30 years so we must do something. (**0004-2** [Singer, Craig])

Response: *The costs and benefits of building and operating proposed Turkey Point Units 6 and 7 will be addressed in Chapter 10 of the EIS.*

Comment: I would like to first address the issue of jobs. If, in fact, the 15 to $30 billion that Steve mentioned were manna from heaven that we would only get if we built these power plants, then I think it's worthwhile to consider, in isolation, the construction jobs and the 800 jobs that would be ongoing. If not -- and of course it's not manna from heaven -- we have to compare what 15 to $30 billion could do spent in other ways. So I suggest that it's very much in scope to consider a cost benefit analysis that compares other ways of spending that money. (**0001-24-1** [Harum-Alvarez, Albert])

Comment: And so I would like to propose that the NRC include a cost benefit analysis that compares this proposed expansion of Turkey Point to distributed generation because, of course, that would get around the whole issue of transmission lines completely, including distribution of small nukes; building efficiency, which would create the largest number of jobs across the region; and finally, a no-build option which I suggest should always be in your comparisons because, of course, if we got to keep the 15 to $30 billion ourselves, we would find some way to spend it or invest it, and that would have an economic impact as well. Could very well give us our own efficiency by having us work on our houses individually. (**0001-24-3** [Harum-Alvarez, Albert])

Response: *Job creation during the building and operation of proposed Turkey Point Units 6 and 7 will be discussed in the socioeconomic sections of Chapters 4 and 5 of the EIS. The benefit-cost balance for the project will rely on the best available estimate of project timing and duration, while noting possible uncertainties that may affect those estimates. The NRC benefit-cost analysis in Chapter 10 is confined to an analysis of the as-proposed facilities at the proposed location. Alternatives will be considered in Chapter 9.*

Comment: The new reactors are too costly and will require too much water. (**0017-1** [Troner, Susannah])

Response: *This comment expresses opposition to the cost of the project. An evaluation of the benefit-cost balance of building proposed Turkey Point Units 6 and 7 will be discussed in Chapter 10 of the EIS. Water usage will be discussed in the hydrology sections of Chapters 4 and 5.*

Comment: [CASE submitted an article titled, "Proposed Turkey Point Nuclear Reactor Units 6 & 7 -Financially Prudent?" by George Cavros, Esq. The article expressed concerns about the benefit/cost balance of building nuclear reactors.] (**0003-2-2** [White, Barry])

Comment: The applicant should consider both monetary and societal costs when making decisions about infrastructure location and technology. Special attention should be given to limiting environmental, health, economic and social impacts to the surrounding communities. (**0019-8** [Hamilton, Karen])

Response: *The benefit-cost balance will be discussed in Chapter 10 of the EIS and will include environmental, health, social, and monetary costs along with benefits.*

Comment: [T]he two additional nuclear power plants: will take ten to fifteen years to become operational, which will make them technologically obsolete before completion. (**0012-14** [Payne, Nkenga])

Response: *The long-term benefits associated with the cost of building proposed Turkey Point Units 6 and 7 will be presented in Chapter 10 of the EIS.*

Comment: Please state the life-cycle costs of the water management feature(s). (**0022-3-16** [Reynolds, Laura])

Response: *Hydrology will be discussed in Chapters 4 and 5 of the EIS. The costs and benefits of building and operating proposed Turkey Point Units 6 and 7 will be addressed in Chapter 10.*

Comment: Please state the costs and benefits of constructing and operating Class I UIC wells for units 6&7. Please state the costs and benefits of constructing and operating Class V UIC wells for units 6&7 (**0022-2-10** [Reynolds, Laura])

Response: *Class I injection wells are used to inject wastewater below the lowermost underground source of drinking water and have been proposed for disposal of cooling-system blowdown water by FPL. The proposed system will be presented in Chapter 3 of the EIS. Alternatives for wastewater disposal will be presented in Chapter 9. Benefit-cost analysis for the proposed units will be presented in Chapter 10.*

Comment: Everglades Restoration, Biscayne Bay Restoration, is about restoring that area for its economic value, for its environmental value, and that has to be considered. This is two National Parks. Two National Parks that could be impacted by this. Biscayne Bay, and for the transmission siting aspect of it, Everglades National Park. Again, not one, but two National Parks that we're spending billions of dollars to restore because of their economic value, and the

economic value of restoring them. So, again, that negative economic cost has to be considered in your analysis. (**0002-6-8** [Grosso, Richard])

Response: *Impacts on Biscayne National Park and Everglades National Park from building and operating proposed Turkey Point Units 6 and 7 will be discussed in Chapters 4, 5, and 7 of the EIS. The costs and benefits of the proposed project will be presented in Chapter 10.*

D.2 References

10 CFR Part 52. 2012. *Code of Federal Regulations*, Title 10, *Energy*, Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants." Washington, D.C. TN251.

36 CFR Part 800. 2012. *Code of Federal Regulations*, Title 36, *Parks, Forests, and Public Property*, Part 800, "Protection of Historic Properties." Washington, D.C. TN513.

75 FR 33851. June 15, 2010. "Florida Power & Light Company; Turkey Point, Units 6 and 7; Combined License Application, Notice of Intent To Prepare an Environmental Impact Statement and Conduct Scoping Process." *Federal Register*, Nuclear Regulatory Commission, Washington, D.C. TN511.

42 USC 4321 et seq. National Environmental Policy Act (NEPA) of 1969, as amended. TN661.

NRC (U.S. Nuclear Regulatory Commission). 2010. Staff Memorandum from T. Terry to R. Whited dated August 31, 2010, regarding "Summary of Public Meetings to Support the Review of the Turkey Point, Units 6 and 7, Combined License Application." Washington, D.C. Accession No. ML102170529. TN514.

NRC (U.S. Nuclear Regulatory Commission). 2010. Staff Memorandum from A.J. Kugler to R. Whited, dated December 1, 2010, regarding "Scoping Summary Report Related to the Environmental Scoping Process for the Turkey Point Units 6 and 7 Combined License Application." Washington, D.C. Accession No. ML103130610. TN515.

NRC (U.S. Nuclear Regulatory Commission). 2010. *Environmental Impact Statement Scoping Process Summary Report Turkey Point Units 6 and 7 Combined Licenses Miami-Dade County, Florida*. Rockville, Maryland. Accession No. ML103130612. TN516.

NRC (U.S. Nuclear Regulatory Commission). 2010. *Official Transcript of Proceedings for Turkey Point Site License Public Meeting: Afternoon Session*. Neal R. Gross and Co., Inc., Washington, D.C. Accession No. ML102150591. TN518.

NRC (U.S. Nuclear Regulatory Commission). 2010. *Official Transcript of Proceedings for Turkey Point Site License Public Meeting: Evening Session*. Neal R. Gross and Co., Inc., Washington, D.C. Accession No. ML102150597. TN519.

APPENDIX E

DRAFT ENVIRONMENTAL IMPACT STATEMENT COMMENTS AND RESPONSES

APPENDIX E

DRAFT ENVIRONMENTAL IMPACT STATEMENT COMMENTS AND RESPONSES

Note: Appendix E, Draft Environmental Impact Statement Comments and Responses can be found in Volume 4 of NUREG-2176, Environmental Impact Statement for Combined Licenses (COLs) for Turkey Point Nuclear Plant Units 6 and 7.

APPENDIX F

KEY CONSULTATION CORRESPONDENCE

APPENDIX F

KEY CONSULTATION CORRESPONDENCE

Table F-1 identifies correspondence received during the evaluation process for the combined construction permits and operating licenses (COLs) application for the siting of two new nuclear units, Turkey Point Nuclear Plant Units 6 and 7, in Miami-Dade County, Florida. The initial biological assessment for the U.S. Fish and Wildlife Service is provided in Appendix F-2; the initial biological assessment for the National Marine Fisheries Service is provided in Appendix F-3; the essential fish habitat assessment submitted to National Marine Fisheries Service is provided in Appendix F-4. Follow on correspondence with the agencies is listed in Table F-1. The correspondence documents can be found in the Agencywide Documents Access and Management System (ADAMS) electronic public reading room accessible at http://www.nrc.gov/readingrm/adams.html, using the accession numbers listed under Date of Document. If you encounter issues accessing ADAMS, call the U.S Nuclear Regulatory Commission at 1800-397-4209 or 301-415-4737, or send an e-mail to pdr.resource@nrc.gov.

Table F-1. Key Combined License Consultation Correspondence

Source	Recipient	Date of Letter
U.S. Nuclear Regulatory Commission (Ms. Laurel Bauer)	Advisory Council on Historic Preservation (Mr. Reid Nelson)	June 23, 2010 (ML101610537)
U.S. Nuclear Regulatory Commission (Ms. Laurel Bauer)	Muscogee (Creek) Nation (Ms. Joyce Bear)	June 24, 2010 (ML101690496)
U.S. Nuclear Regulatory Commission (Ms. Laurel Bauer)	Poarch Band of Creek Indians (Mr. Robert Thrower, Tribal Historic Preservation Officer)	June 24, 2010 (ML101690503)
U.S. Nuclear Regulatory Commission (Ms. Laurel Bauer)	Seminole Nation of Oklahoma (Ms. Natalie Deere, Tribal Historic Preservation Officer)	June 24, 2010 (ML101690497)
U.S. Nuclear Regulatory Commission (Ms. Laurel Bauer)	Seminole Tribe of Florida (Mr. W.S. Steele)	June 24, 2010 (ML101690499)
U.S. Nuclear Regulatory Commission (Ms. Laurel Bauer)	Florida Deputy State Historic Preservation Officer (Ms. Laura Kammerer)	June 29, 2010 (ML101690480)
U.S. Nuclear Regulatory Commission (Ms. Laurel Bauer)	Archaeological and Historical Conservancy, Inc. (Mr. Robert Carr)	July 1, 2010 (ML101690462)
U.S. Nuclear Regulatory Commission (Ms. Laurel Bauer)	City of Coral Gables, Historic Preservation Administrator (Ms. Simone Chin)	July 1, 2010 (ML101730494)
U.S. Nuclear Regulatory Commission (Ms. Laurel Bauer)	City of Homestead Community Redevelopment Agency (Mr. Dan Wick)	July 1, 2010 (ML101730511)
U.S. Nuclear Regulatory Commission (Ms. Laurel Bauer)	City of Miami Historic Preservation Officer (Ms. Ellen Uguccioni)	July 1, 2010 (ML101690472)

Table F-1. Key Combined License Consultation Correspondence

Source	Recipient	Date of Letter
U.S. Nuclear Regulatory Commission (Ms. Laurel Bauer)	City of South Miami (Mr. Sanford Youkilis)	July 1, 2010 (ML101730515)
U.S. Nuclear Regulatory Commission (Ms. Laurel Bauer)	Florida Office of Historic & Archaeological Resources (Ms. Kathleen Kauffman)	July 1, 2010 (ML101690468)
Advisory Council on Historic Preservation (Ms. Caroline Hall)	U.S. Nuclear Regulatory Commission (Ms. Laurel Bauer)	July 8, 2010 (ML101900325)
Florida Deputy State Historic Preservation Officer (Ms. Laura Kammerer)	U. S. Nuclear Regulatory Commission	July 28, 2010 (ML102220345)
Miami-Dade County Historic Preservation Chief (Ms. Kathleen Kauffman)	U. S. Nuclear Regulatory Commission	August 12, 2010 (ML102390102)
Seminole Tribe of Florida (Mr. Willard Steele)	U.S. Nuclear Regulatory Commission (Mr. Andrew Kugler)	September 14, 2010 (ML102660296)
U.S. Nuclear Regulatory Commission (Mr. Andrew Kugler)	U.S. Nuclear Regulatory Commission (Mr. Ryan Whited)	September 21, 2010 (ML101880786)
U.S. Nuclear Regulatory Commission (Mr. Andrew Kugler)	Seminole Tribe of Florida (Mr. W.S. Steele)	December 8, 2010 (ML103420623)
U.S. Nuclear Regulatory Commission (Ms. Jennifer Dixon-Herrity)	Advisory Council on Historic Preservation (Mr. Reid Nelson)	October 23, 2014 (ML14269A049)
U.S. Nuclear Regulatory Commission (Ms. Jennifer Dixon-Herrity)	Archaeological and Historical Conservancy, Inc. (Mr. Robert Carr)	October 23, 2014 (ML14269A067)
U.S. Nuclear Regulatory Commission (Ms. Jennifer Dixon-Herrity)	City of Coral Gables (Ms. Dona Spain)	October 23, 2014 (ML14283A127)
U.S. Nuclear Regulatory Commission (Ms. Jennifer Dixon-Herrity)	City of Homestead Community Redevelopment Agency (Mr. Rick Ammirato)	October 23, 2014 (ML14281A316)
U.S. Nuclear Regulatory Commission (Ms. Jennifer Dixon-Herrity)	City of Miami Preservation Officer (Ms. Megan Cross Schmitt)	October 23, 2014 (ML14283A175)
U.S. Nuclear Regulatory Commission (Ms. Jennifer Dixon-Herrity)	City of South Miami Planning Director (Mr. Christopher Brimo)	October 23, 2014 (ML14283A124)
U.S. Nuclear Regulatory Commission (Ms. Jennifer Dixon-Herrity)	Cultural and Historical Programs Compliance Review Supervisor (Dr. Tim Parsons)	October 23, 2014 (ML14296A592)
U.S. Nuclear Regulatory Commission (Ms. Jennifer Dixon-Herrity)	Florida Division of Historical Resources (Mr. Robert F. Bendus)	October 23, 2014 (ML14269A082)
U.S. Nuclear Regulatory Commission (Ms. Jennifer Dixon-Herrity)	Florida Office of Historic & Archaeological Resources (Ms. Kathleen Kauffman)	October 23, 2014 (ML14281A278)

Table F-1. Key Combined License Consultation Correspondence

Source	Recipient	Date of Letter
U.S. Nuclear Regulatory Commission (Ms. Jennifer Dixon-Herrity)	Muscogee (Creek) Nation Tribal Historic Preservation Officer (Mr. Emman Spain)	October 23, 2014 (ML14283A151)
U.S. Nuclear Regulatory Commission (Ms. Jennifer Dixon-Herrity)	Seminole Tribe of Florida Tribal Historic Preservation Officer (Dr. Paul Backhouse)	October 23, 2014 (ML14283A141)
U.S. Nuclear Regulatory Commission	Seminole Tribe of Florida Tribal Historic Preservation Office	June 23, 2015 (ML16266A254)
U.S. Nuclear Regulatory Commission	Miccosukee Tribe of Indians of Florida Tribal Historic Preservation Office	June 24, 2015 (ML16266A255)
Department of Army, Jacksonville District Corps of Engineers (Ms. Megan Clouser)	Seminole Tribe of Florida Tribal Historic Preservation Officer (Mr. Bradley M. Mueller)	October 5, 2015 (ML15289A368)
Department of Army, Jacksonville District Corps of Engineers (Ms. Ingrid Gilbert)	Miccosukee Tribe of Indians of Florida Tribal Historic Preservation Officer (Mr. Fred Dayhoff)	March 7, 2016 (ML16172A120)
Florida Power & Light (Mr. Matthew J. Raffenberg)	Department of Army, Jacksonville District Corps of Engineers (Ms. Megan Clouser)	March 31, 2016 (ML16095A127)
Department of Army, Jacksonville District Corps of Engineers (Mr. Jacob Hemingway)	Seminole Tribe of Florida Tribal Historic Preservation Officer (Mr. Bradley M. Mueller)	August 2, 2016 (ML16266A253)
U.S. Nuclear Regulatory Commission (Dr. Allen Fetter)	U.S. Fish and Wildlife Service (Mr. Larry Williams)	September 28, 2016 (ML16237A212, ML16237A213, ML16237A214)

Appendix F-2

The U.S. Nuclear Regulatory Commission (NRC) has not reproduced the "Biological Assessment for the U.S. Fish and Wildlife Service" in the paper reproduction of the Environmental Impact Statement for Combined Licenses (COLs) for Turkey Point Units 6 and 7. This document can be found in the Agencywide Documents Access and Management System (ADAMS) electronic public reading room accessible at http://www.nrc.gov/reading-rm/adams.html, using accession number ML15028A372. If you encounter issues accessing ADAMS, call the NRC at 1800-397-4209 or 301-415-4737, or send an e-mail to pdr.resource@nrc.gov.

Appendix F-3

The U.S. Nuclear Regulatory Commission (NRC) has not reproduced the "Biological Assessment for the National Marine Fisheries Service" in the paper reproduction of the Environmental Impact Statement for Combined Licenses (COLs) for Turkey Point Units 6 and 7. This document can be found in the Agencywide Documents Access and Management System (ADAMS) electronic public reading room accessible at http://www.nrc.gov/reading-rm/adams.html, using accession number ML15028A378. If you encounter issues accessing ADAMS, call the NRC at 1800-397-4209 or 301-415-4737, or send an e-mail to pdr.resource@nrc.gov.

Appendix F-4

The U.S. Nuclear Regulatory Commission (NRC) has not reproduced the "Comment Draft Essential Fish Habitat Assessment for the National Marine Fisheries Service" in the paper reproduction of the Environmental Impact Statement for Combined Licenses (COLs) for Turkey Point Units 6 and 7. This document can be found in the Agencywide Documents Access and Management System (ADAMS) electronic public reading room accessible at http://www.nrc.gov/reading-rm/adams.html, using accession number ML15028A395. If you encounter issues accessing ADAMS, call the NRC at 1800-397-4209 or 301-415-4737, or send an e-mail to pdr.resource@nrc.gov.

APPENDIX G

SUPPORTING DOCUMENTATION

APPENDIX G

SUPPORTING DOCUMENTATION

G.1 Supporting Socioeconomic Documentation

Workforce estimates reflect direct labor estimated by the applicant to be employed in preconstruction, construction, and operations of the Turkey Point Nuclear Power Plant (Turkey Point) Units 6 and 7. In Table G-1, months are numbered starting from the beginning of the construction phase, with negative numbers indicating preconstruction, and the peak workforce is expected to occur in month 42.

Table G-1. Estimated Workforce by Month During Preconstruction, Construction, and Operation of Proposed Turkey Point Units 6 and 7 (FPL 2014-TN4058)

	Number of Employees				
		Operations			
Month	Construction	Unit 6	Unit 7	Total	Total
Preconstruction Activities					
-39	40	-	-	-	40
-38	45				45
-37	55				55
-36	60	-	-	-	60
-35	70	-	-	-	70
-34	75	-	-	-	75
-33	90	-	-	-	90
-32	100	-	-	-	100
-31	110	-	-	-	110
-30	130	-	-	-	130
-29	150	-	-	-	150
-28	180	-	-	-	180
-27	230	-	-	-	230
-26	280	-	-	-	280
-25	320	-	-	-	320
-24	390	-	-	-	390
-23	465	-	-	-	465
-22	540	-	-	-	540
-21	575	-	-	-	575
-20	650	-	-	-	650
-19	740	-	-	-	740
-18	825	-	-	-	825
-17	900	-	-	-	900
-16	1,000	-	-	-	1,000
-15	1,020	-	-	-	1,020
-14	1,090	-	-	-	1,090

Table G-1. (contd)

	Number of Employees				
		Operations			
Month	Construction	Unit 6	Unit 7	Total	Total
-13	1,180	-	-	-	1,180
-12	1,200	-	-	-	1,200
-11	1,220	-	-	-	1,220
-10	1,240	-	-	-	1,240
-9	1,300	-	-	-	1,300
-8	1,320	-	-	-	1,320
-7	1,340	-	-	-	1,340
-6	1,350	-	-	-	1,350
-5	1,375	-	-	-	1,375
-4	1,400	-	-	-	1,400
-3	1,425	-	-	-	1,425
-2	1,450	-	-	-	1,450
-1	1,475	-	-	-	1,475
Unit 6 Construction Begins					
1	1,500	-	-	-	1,500
2	1,525	-	-	-	1,525
3	1,550	-	-	-	1,550
4	1,600	-	-	-	1,600
5	1,625	-	-	-	1,625
6	1,650	-	-	-	1,650
7	1,675	-	-	-	1,675
8	1,700	-	-	-	1,700
9	1,725	-	-	-	1,725
10	1,750	-	-	-	1,750
11	1,775	-	-	-	1,775
12	1,800	-	-	-	1,800
Unit 7 Construction Begins					
13	1,825	-	-	-	1,825
14	1,850	-	-	-	1,850
15	1,900	-	-	-	1,900
16	1,950	-	-	-	1,950
17	2,000	-	-	-	2,000
18	2,100	-	-	-	2,100
19	2,250	-	-	-	2,250
20	2,350	-	-	-	2,350
21	2,450	-	-	-	2,450
22	2,600	-	-	-	2,600
23	2,750	-	-	-	2,750
24	2,900	-	-	-	2,900
25	3,050	-	-	-	3,050
26	3,200	-	-	-	3,200
27	3,350	-	-	-	3,350
28	3,500	-	-	-	3,500
29	3,650	-	-	-	3,650
30	3,850	-	-	-	3,850

Table G-1. (contd)

	Number of Employees				
		Operations			
Month	Construction	Unit 6	Unit 7	Total	Total
31	3,950	-	-	-	3,950
32	3,950	-	-	-	3,950
33	3,950	-	-	-	3,950
34	3,950	-	-	-	3,950
35	3,950	-	-	-	3,950
36	3,950	-	-	-	3,950
37	3,950	-	-	-	3,950
38	3,950	-	-	-	3,950
39	3,950	-	-	-	3,950
40	3,950	-	-	-	3,950
41	3,950	16	-	16	3,966
42	3,950	33	-	33	3,983
43	3,925	49	-	49	3,974
44	3,900	66	-	66	3,966
45	3,870	82	-	82	3,952
46	3,850	99	-	99	3,949
47	3,825	115	-	115	3,940
48	3,800	132	-	132	3,932
49	3,775	148	-	148	3,923
50	3,750	164	-	164	3,914
51	3,725	181	-	181	3,906
52	3,700	197	-	197	3,897
53	3,675	214	16	230	3,905
54	3,650	230	33	263	3,913
55	3,625	247	49	296	3,921
56	3,600	263	66	329	3,929
57	3,575	280	82	362	3,937
58	3,550	296	99	395	3,945
59	3,525	313	115	428	3,953
60	3,500	329	132	461	3,961
61	3,450	345	148	493	3,943
62	3,400	362	164	526	3,926
63	3,300	378	181	559	3,859
64	3,200	395	197	592	3,792
65	3,100	403	214	617	3,717
66	3,000	403	230	633	3,633
67	2,900	403	247	650	3,550
68	2,800	403	263	666	3,466
69	2,700	403	280	683	3,383
70	2,600	403	296	699	3,299
71	2,500	403	313	716	3,216
72	2,400	403	329	732	3,132
73	2,300	403	345	748	3,048
74	2,200	403	362	765	2,965
75	2,100	403	378	781	2,881

Table G-1. (contd)

Month	Number of Employees				
		Operations			
	Construction	Unit 6	Unit 7	Total	Total
76	1,900	403	395	798	2,698
77	1,700	403	403	806	2,506
78	1,500	403	403	806	2,306
79	1,300	403	403	806	2,106
80	1,100	403	403	806	1,906
81	800	403	403	806	1,606
82	550	403	403	806	1,356
83	450	403	403	806	1,256
84	375	403	403	806	1,181

Source: (FPL 2014-TN4058)

G.2 Supporting Radiological Dose Assessment

The U.S. Nuclear Regulatory Commission (NRC) staff performed an independent dose assessment of the radiological impacts resulting from normal operation of the proposed nuclear Units 6 and 7 at the Florida Power & Light Company (FPL) Turkey Point site. The results of that assessment are presented in this section in comparison to the results of the FPL Environmental Report (ER) Section 5.9 (FPL 2014-TN4058). This section is divided into five sections: (1) dose estimates from the deep-well injection exposure scenario, (2) dose estimates to the public from gaseous effluents, (3) cumulative dose estimates, (4) dose estimates to construction workers from Units 3, 4, and 6 during construction of Unit 7, and (5) dose estimates to biota other than humans.

G.2.1 Dose Estimates from the Deep-Well Injection Exposure Scenario

Hydrologic alterations affecting the Boulder Zone of the Lower Floridan aquifer would result from the deep-well injection of blowdown water and other liquid waste streams from the proposed Turkey Point Units 6 and 7. The injected water would include effluent from the sanitary waste-treatment plant, wastewater-retention basin, and liquid radioactive-waste-treatment system. The Boulder Zone is isolated from the Upper Floridan aquifer which can be used as an underground source of drinking water (USDW). However, although a normal operation exposure pathway is not expected, because of the unique nature of the radioactive effluent discharge and in response to NRC requests for additional information (NRC 2013-TN3937), FPL evaluated three potential dose scenarios in Final Safety Analysis Report (FSAR) Section 11.2.3.5 (FPL 2015-TN4502) and ER Section 5.4.1.1 (FPL 2014-TN4058) based on potential groundwater flow pathways of the injected radioactive liquid effluent that could result in inadvertent radioactive exposure to the general public. Therefore, FPL included an analysis of the potential liquid effluent pathways for radiological impacts from this waste disposal method (FPL 2014-TN4058), which was reviewed by the NRC staff for this environmental impact statement. The NRC staff reviewed and evaluated FPL's deep-well injection of radioactive liquid effluent and determined that the applicant's analyses met the regulatory requirements for such releases. The detailed results of the NRC staff's review are provided in Chapter 11, Radiological Waste Management, of the Advanced Safety Evaluation Report (NRC 2016-TN4776).

This discussion is concerned with the dose estimates of the scenarios, not with the hydrology model of the injectate transport. The hydrology model is discussed in Section G.3.

The results of the evaluation are summarized in the following sections.

G.2.1.1 Scope

As discussed in Sections 5.9.2.1 and 5.9.3.3, three exposure scenarios were postulated. However, does analysis was not performed for one scenario, the Ocean Reef Club scenario (located approximately 7.7 mi south-southeast of the deep-well injection analysis centerpoint), because the injectate plume never reached that far. Therefore, the only scenarios for which dose analysis was performed were the so-called "child" and "driller" scenarios located at a private parcel of land (located approximately 2.2 mi north-northwest of the deep-well injection analysis centerpoint).

G.2.1.2 Resources Used

The NRC staff calculated the postulated liquid pathway doses from the so-called child and driller conceptual scenario using a personal computer (PC) version of the LADTAP II code—NRCDose, Version 2.3.20 (ORNL 2012-TN4556)—obtained through the Oak Ridge Radiation Safety Information Computational Center (RSICC).

G.2.1.3 Input Parameters

Table G-2G-2 provides a list of the major parameters used in calculating dose to certain members of the public from liquid effluent releases into the Boulder Zone for retained scenarios during normal operation. Appendix G, Section G.3.3, discusses the hydrology groundwater confirmatory calculations of the potential for upward migration of injectate from the Boulder Zone of the lower Floridan aquifer, which forms the technical basis for the radiological source term input parameters.

G.2.1.4 Comparison of Results

The results documented by FPL in its ER (FPL 2014-TN4058) and the FSAR (FPL 2015-TN4502) for doses from accessing groundwater with infiltration from the Boulder Zone are compared in Table G-3 with the results calculated by the NRC staff. The largest dose to a member of the public calculated for this scenario was from an inadvertent intrusion by a subsistence driller. The doses calculated by the NRC staff are uniformly two-thirds of the doses calculated by FPL.

Table G-2. Parameters Used in Calculating Dose for Retained Scenarios

Parameter	NRC Values		Comments
Intrusion well source term (Ci/yr)	H-3	2.76×10^{1}	Scenario-specific values based on FSAR Section 11.2.3.5 (FPL 2015-TN4502) and ER Section 5.4.1.1 (FPL 2014-TN4058).
	Sr-90	4.99×10^{-7}	
	Cs-134	6.86×10^{-6}	
	Cs-137	6.78×10^{-4}	

Table G-2G-2. (contd)

Parameter	NRC Values	Comments
Discharge flow rate (ft^3/s)	1.0	Scenario-specific values based on FSAR Section 11.2.3.5 (FPL 2015-TN4502) and ER Section 5.4.1.1 (FPL 2014-TN4058).
Source term multiplier	1	Source term already accounts for two units discharging into the deep-well injection
Site type	Fresh water	Discharge is to surface freshwater sources
Reconcentration model	Fully Mixed	Scenario-specific
Total 50-mi population	1	Scenario-specific to one individual.
Dilution factors for aquatic food and boating, shoreline and swimming, and drinking water	1	LADTAP II code default values (NRC 1977; Strenge et al. 1986)
Transit time (hr)	0 (all uses)	Scenario-specific values
Consumption and usage factors for adults, teens, children, and infants	Shoreline usage (hr/yr) 12 (adult) 67 (teen) 14 (child) 0 (infant) Water usage (L/yr) 730 (adult) 510 (teen) 510 (child) 330 (infant) Fish consumption (kg/yr) 21 (adult) 16 (teen) 6.9 (child) 0 (infant)	LADTAP II code default values (NRC 1977; Strenge et al. 1986).
Irrigation rate (L/m^2/month)	38.7	Scenario-specific values based on FSAR Section 11.2.3.5 (FPL 2015-TN4502) and ER Section 5.4.1.1 (FPL 2014-TN4058).
Fraction of animal feed and water not contaminated	1.0	Scenario-specific values based on FSAR Section 11.2.3.5 (FPL 2015-TN4502) and ER Section 5.4.1.1 (FPL 2014-TN4058).
Total production within 50 miles (kg/yr)	1000.0	Scenario-specific values based on FSAR Section 11.2.3.5 (FPL 2015-TN4502) and ER Section 5.4.1.1 (FPL 2014-TN4058).
Irrigated growing period (days)	60	Scenario-specific values based on FSAR Section 11.2.3.5 (FPL 2015-TN4502) and ER Section 5.4.1.1 (FPL 2014-TN4058).
Crop yield (kg/yr)	2.0	Scenario-specific values based on FSAR Section 11.2.3.5 (FPL 2015-TN4502) and ER Section 5.4.1.1 (FPL 2014-TN4058).

(a) Only radionuclides included in Regulatory Guide 1.109 are considered (NRC 1977).

Table G-3. Comparison of Doses to the Public from Intrusion Well Above Boulder Zone

Type of Dose	FPL ER or FSAR[(a)]	NRC Staff Calculation	Percent Difference
Total body (mrem/yr)	5.6 (child)	3.63 (adult)	35
Other organ (mrem/yr)	7.8 (child's liver)	5.15 (adult's liver)	34

(a) ER Table 5.4-3 (FPL 2014-TN4058) and FSAR Table 11.2-209 (FPL 2015-TN4502). For conservatism, FPL used the parameters of a child for the driller's dose based on the radiological liquid effluent releases from two AP1000 units.

G.2.2 Dose Estimates to the Public from Gaseous Effluents

The NRC staff used the dose-assessment approach specified in Regulatory Guide 1.109 (NRC 1977-TN90) and the GASPAR II computer code (Strenge et al. 1987-TN83) to estimate doses to the maximally exposed individual (MEI) from the gaseous effluent pathway and to the population within the 50 mi radius of the Turkey Point site from the gaseous effluent pathway as recommended by NUREG-1555 (NRC 2000-TN614) for proposed Units 6 and 7.

G.2.2.1 Scope

The NRC staff and FPL independently calculated the maximum gamma air dose, beta air dose, total body dose, maximum organ dose, thyroid dose, and skin dose to receptors located at the maximum exposure point for each pathway discussed in Section 5.9. The maximum atmospheric dispersion factor and the maximum ground deposition occur in the north direction. In ER Section 5.4, the MEI is assumed to be located at 2.69 mi N (FPL 2014-TN4058). Dose to the MEI was calculated for the following exposure pathways: plume immersion, direct shine from deposited radionuclides, inhalation, ingestion of local farm or garden vegetables, and ingestion of locally produced beef, chicken, and cow's milk.

The NRC staff reviewed the input parameters and values used by FPL for appropriateness, including references made to AP1000 pressurized water reactor Design Control Document (DCD) Revision 19 (Westinghouse 2011-TN261). When site-specific input parameters were not available, default values from Regulatory Guide 1.109 (NRC 1977-TN90) were used. The NRC staff verified that FPL used reasonable exposure pathways, DCD input parameters (including source term), and recommended RG 1.109 input parameter values, and used those pathways and parameters in its independent calculation using GASPARII as summarized below.

Joint frequency-distribution data of wind speed and wind direction by atmospheric-stability class for the Turkey Point site (FPL 2014-TN4058) were used as input to the XOQDOQ code (Sagendorf et al. 1982-TN280) to calculate long-term average atmospheric dispersion factor (χ/Q) and atmospheric deposition factor (D/Q) values for routine releases. Based on 2 years of meteorological data, the NRC staff's independent results are similar to those reported by FPL in ER Tables 2.7-16 through and 2.7-18 (FPL 2014-TN4058). The NRC staff calculated population doses for all types of releases (i.e., noble gases, iodines, particulates, tritium, and carbon-14) for the applicable exposure pathways (i.e., plume immersion, direct shine from deposited radionuclides, ingestion of meat, vegetables, and goat milk) using the GASPAR II code.

G.2.2.2 Resources Used

The NRC staff calculated doses to the public from gaseous effluents using a PC version of the XOQDOQ and GASPAR II codes—NRCDose Version 2.3.20 (ORNL 2012-TN4556)—obtained through the Oak Ridge RSICC.

G.2.2.3 Input Parameters

Table G-4G-4, Table G-5G-5, and Table G-6G-6 list the major parameters used in calculating dose to the public from gaseous effluent releases during normal operation. For population dose assessment, FPL used the population projection for the year 2090. These population projections are presented in ER Table 2.5-1 (FPL 2014-TN4058). However, Section 5.4.1 of the

NRC's Environmental Standard Review Plan (ESRP) (NRC 2000-TN614) recommends "projected population for 5 years from the time of the licensing action under consideration." Assuming the combined construction permit and operating license action occurs in year 2018, adding 5 years yields year 2023. Because the population is increasing, the year 2030 was selected as being more conservative than recommended by the ESRP and has been used herein. In addition, staff also applied the population doses in the year 2090, selected by FPL as the likely end of operation.

Table G-4. Gaseous Effluent Source Term

Parameter	Staff Value		Comments
New unit gaseous effluent source term (Ci/yr)	Ar-41	3.4×10^{1}	Values from Westinghouse AP1000 DCD Table 11.3-3 , Rev 19 (Westinghouse 2011-TN261).
	Kr-85m	3.6×10^{1}	
	Kr-85	4.1×10^{3}	
	Kr-87	1.5×10^{1}	
	Kr-88	4.6×10^{1}	
	Xe-131m	1.8×10^{3}	
	Xe-133m	8.7×10^{1}	
	Xe-133	4.6×10^{3}	
	Xe-135m	7.0×10^{0}	
	Xe-135	3.3×10^{2}	
	Xe-138	6.0×10^{0}	
	I-131	1.2×10^{-1}	
	I-133	4.0×10^{-1}	
	H-3	3.5×10^{2}	
	C-14	7.3×10^{0}	
	Cr-51	6.1×10^{-4}	
	Mn-54	4.3×10^{-4}	
	Co-57	8.2×10^{-6}	
	Co-58	2.3×10^{-2}	
	Co-60	8.7×10^{-3}	
	Fe-59	7.9×10^{-5}	
	Sr-89	3.0×10^{-3}	
	Sr-90	1.2×10^{-3}	
	Zr-95	1.0×10^{-3}	
	Nb-95	2.54×10^{-3}	
	Ru-103	8.0×10^{-5}	
	Ru-106	7.8×10^{-5}	
	Sb-125	6.1×10^{-5}	
	Cs-134	2.3×10^{-3}	
	Cs-136	8.5×10^{-5}	
	Cs-137	3.6×10^{-3}	
	Ba-140	4.2×10^{-4}	
	Ce-141	4.2×10^{-4}	

Table G-5. NRC Staff GASPAR Parameters and Selected Inputs

GASPAR Code Entry, Site Specifics	Input Value	Reference
Source Term: annual average gaseous release	Table G-3	Westinghouse AP1000 DCD Table 11.3-3, Rev 19 (Westinghouse 2011-TN261)
Source multiplication factor	1.0	
Distance from site to NE corner of the United States	1,800 mi	Estimate
50 mi milk production[(a)]	1.70×10^5 L/yr	Milk cows in the four counties within 50 mi represent approximately 0.0154 percent of the State total (USDA 2012-TN4523). The annual production of milk in the State (FDACS 2015-TN4526) was multiplied by 0.0154 percent to estimate the production within 50 mi as 1.70×10^5 L/yr.
50 mi meat production[(a)]	2.81×10^5 kg/yr	Cows and broilers sold in the four counties within 50 mi represent approximately 0.53 percent and 0.00012 percent, respectively, of the State totals (USDA 2012-TN4523). The annual productions of red meat (USDA 2013-TN4525) and broiler (FDACS 2015-TN4526) in the State were multiplied by these percentages and summed to estimate the total meat production within 50 mi as 2.81×10^5 kg/yr.
50 mi vegetable production[(a)]	2.52×10^8 kg/yr	The harvested vegetable land area in the four counties within 50 mi represents approximately 14.6 percent of the State total (USDA 2012-TN4523). The annual production of vegetables in the State (USDA 2014-TN4524) was multiplied by 14.6 percent to estimate the production within 50 mi as 2.52×10^8 kg/yr.
Fraction of leafy vegetables grown	1	This is the most conservative value.
Fraction of year milk cows on pasture	1	This is the most conservative value.
Fraction of maximum individual's vegetable intake from own garden	0.76	This is the default value in GASPAR II.
Fraction of milk-cow feed from pasture	1	This is the most conservative value.
Average absolute humidity for growing season	8 g/m^3	This is the default value in GASPAR II.
Fraction of year goats on the pasture	1	This is the most conservative value.
Fraction of goat feed from pasture	1	This is the most conservative value.
Fraction of year beef cattle at pasture	1	This is the most conservative value.
Fraction of beef cattle feed from pasture	1	This is the most conservative value.

(a) These values differ from the FPL ER input selections put into GASPAR II. This is discussed in detail in Section G.2.2.3.

Table G-6. Gaseous Effluent Exposure Pathway Receptor Locations

Nearest Receptor[(a)]	Direction	Distance (mi)
Site boundary	SSE	0.35
Residence	N	2.7
Vegetable garden	NW	4.8
Meat	N	2.7
Biota	SSE	0.25

(a) There are no milk animals within 5 mi of Turkey Point Units 6 and 7.

The NRC review guidance from the ESRP (NRC 2000-TN614) also states that present-day annual milk, meat, and vegetable consumption should be used. To model 2030 dose the NRC staff used the agricultural production estimates specified in Table G-5G-5. In its ER (FPL 2014-TN4058), FPL provided estimates for dose at the projected end of plant life—2090. FPL's estimates are derived from agricultural data from the years 2004 through 2008 (USDA 2004-TN1390; USDA 2007-TN1391; USDA 2008-TN1393). FPL's ER also projects food production to increase linearly with population growth, so production estimates were multiplied by 1.81. The NRC staff was able to replicate FPL's GASPAR II dose results using the assumptions stated in the ER, but the staff applied data based on current agricultural production statistics specified in Table G-5G-5. The staff used current production estimates to model dose in the year 2030 and multiplied these values by 1.81 to estimate production in 2090.

Population dose projections by FPL and the NRC staff differ due to differences in population and agricultural production assumptions.

G.2.2.4 Comparison of Doses to the Public from Gaseous Effluent Releases

Table G-7G-7, Table G-8G-8, and Table G-9G-9 present dose estimates to the MEI for each gaseous pathway as calculated by FPL and the NRC staff. Table G-7G-7 shows that the maximum doses from each unit occur at the Turkey Point site boundary and that most of the dose is derived from the external pathways. The maximum total body dose per unit is 3.9 mrem/yr to the adult and the teen, while the maximum organ doses per unit are 14 mrem/yr to the skin and 7.5 mrem/yr to the thyroid of the child based on conservative assumptions. In ER Table 5.4-5 (FPL 2014-TN4058), FPL provided comparable doses from the operation of Units 3 and 4 showing that the doses are less than 0.01 mrem/yr, based on the bounding values in 5 years of annual effluent reports, and thus are considered negligible. The doses provided by FPL in its ER and those calculated by the NRC staff were identical.

Table G-7. Gaseous Pathway Doses for Maximally Exposed Individuals for One Unit

	Dose (mrem/year) per Unit							
Pathway	**Total Body**	**GI-Tract**	**Bone**	**Liver**	**Kidney**	**Thyroid**	**Lung**	**Skin**
Site Boundary								
External								
Plume	2.6	2.6	2.6	2.6	2.6	2.6	2.7	13
Ground	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2
Total	3.6	3.6	3.6	3.6	3.6	3.6	3.8	14
Inhalation								
Adult	0.28	0.28	0.046	0.29	0.29	2.7	0.37	0
Teen	0.28	0.29	0.055	0.29	0.30	3.3	0.42	0
Child	0.25	0.25	0.067	0.26	0.27	3.9	0.36	0
Infant	0.15	0.14	0.034	0.16	0.16	3.5	0.22	0
Total								
Adult	3.9	3.9	3.6	3.9	3.9	6.3	4.1	14
Teen	3.9	3.9	3.7	3.9	3.9	6.9	4.2	14
Child	3.9	3.8	3.7	3.9	3.9	7.5	4.1	14
Infant	3.7	3.7	3.6	3.8	3.8	7.1	4.0	14
Residence								
External								
Plume	0.0067	0.0067	0.0067	0.0067	0.0067	0.0067	0.0074	0.046
Ground	0.0066	0.0066	0.0066	0.0066	0.0066	0.0066	0.0066	0.0077
Total	0.013	0.013	0.013	0.013	0.013	0.013	0.014	0.053
Inhalation								
Adult	0.0012	0.0012	0.00016	0.0012	0.0012	0.0096	0.0015	0
Teen	0.0012	0.0012	0.00019	0.0012	0.0012	0.012	0.0016	0
Child	0.0010	0.0010	0.00023	0.0011	0.0011	0.014	0.0014	0
Infant	0.00059	0.00058	0.00012	0.00063	0.00063	0.012	0.00087	0
Vegetable								
Adult	0.0064	0.0065	0.033	0.0064	0.0061	0.086	0.0055	0
Teen	0.0092	0.0093	0.050	0.0096	0.0091	0.11	0.0083	0
Child	0.020	0.019	0.11	0.021	0.020	0.21	0.018	0
Meat								
Adult	0.0026	0.0036	0.011	0.0027	0.0026	0.0094	0.0025	0
Teen	0.0021	0.0027	0.0095	0.0022	0.0021	0.0070	0.0020	0
Child	0.0038	0.0040	0.018	0.0039	0.0038	0.011	0.0037	0
Total MEI Dose[(a)]								
Adult	0.023	0.025	0.058	0.023	0.023	0.12	0.023	0.053
Teen	0.026	0.026	0.073	0.026	0.026	0.14	0.026	0.053
Child	0.038	0.037	0.15	0.039	0.038	0.24	0.037	0.053
Infant	0.014	0.014	0.013	0.014	0.014	0.025	0.015	0.053

FPL Source: ER Table 5.4-7 (FPL 2014-TN4058)
(a) Total MEI dose per unit is the sum of the residence, vegetable, and meat pathways.

Table G-8. FPL and NRC Staff Results Annual Individual Doses to the Maximally Exposed Individual from Gaseous Effluents for One Unit

Pathway	Location	Age Group	FPL and NRC Staff Total Body Dose (mrem/yr)	FPL and NRC Staff Max Organ Dose (mrem/yr)	FPL and NRC Staff Skin Dose (mrem/yr)	FPL and NRC Staff Thyroid Dose (mrem/yr)
Plume	Residence	All	0.00671	0.00738 (lung)	0.0455	0.00671
Ground	Residence	All	0.00655	0.00655 (lung)	0.00770	0.00655
Inhalation	Residence	Adult	0.00115	0.00145 (lung)	0.0/0.00112[b]	0.00956
		Teen	0.00116	0.00163 (lung)	0.0/0.00113[b]	0.0119
		Child	0.00103	0.00142 (lung)	0.0/0.000994[b]	0.0137
		Infant	0.0592	0.000865 (lung)	0.0/0.000572[b]	0.0122
Vegetable	Vegetable	Adult	0.00638	0.0329 (bone)	0.0/0.00541[b]	0.0855
	garden	Teen	0.00916	0.0499 (bone)	0.0/0.00811[b]	0.108
		Child	0.0197	0.114 (bone)	0.0/0.0182[b]	0.206
Meat	Residence	Adult	0.00264	0.0114 (bone)	0.0/0.00247[b]	0.00938
		Teen	0.00211	0.00954 (bone)	0.0/0.00201[b]	0.00702
		Child	0.00377	0.0179 (bone)	0.0/0.00367[b]	0.0112
Total MEI Dose[a]		Adult	0.0234	0.0577 (bone)	0.0/0.0622[b]	0.118
		Teen	0.0257	0.0729 (bone)	0.0645	0.140
		Child	0.0378	0.145 (bone)	0.0761	0.244
		Infant	0.0139	0.0134 (bone)	0.0538	0.0255

FPL Source: ER Table 5.4-7 (FPL 2014-TN4058)
(a) Total MEI dose is a sum of the residence, vegetable, and meat pathways.
There are no milk cows/goats within 5 mi of the Turkey Point site.
Assumes the MEI's food comes from nearest meat and vegetable sources to the Turkey Point site.
(b) The first value is the FPL-calculated dose and the second value is the NRC staff-calculated dose.

Table G-9. Dose to the Nearest Resident (2.69 mi N) Assuming the Resident Began Producing and Consuming Milk, Meat, and Vegetables[a] for One Unit

Pathway	Age Group	FPL and NRC Staff Total Body Dose (mrem/yr)	FPL and NRC Staff Max Organ Dose[b] (mrem/yr)	FPL and NRC Staff Skin Dose (mrem/yr)	FPL and NRC Staff Thyroid Dose (mrem/yr)
Plume	All	0.0067	0.0074 (lung)	0.046	0.0067
Ground	All	0.006	0.006 (lung)	0.0077	0.0066
Inhalation	Adult	0.0012	0.00145 (lung)	0.0	0.0096
	Teen	0.0012	0.0016 (lung)	0.0	0.012
	Child	0.0010	0.0014 (lung)	0.0/0.04[c]	0.014
	Infant	0.00059	0.00087 (lung)	0.0	0.012
Vegetable	Adult	0.0064	0.033 (bone)	0.0	0.086
	Teen	0.0092	0.050 (bone)	0.0	0.11
	Child	0.00	0.114 (bone)	0.0	0.21

Table G-9G-9. (contd)

Pathway	Age Group	FPL and NRC Staff Total Body Dose (mrem/yr)	FPL and NRC Staff Max Organ Dose[b] (mrem/yr)	FPL and NRC Staff Skin Dose (mrem/yr)	FPL and NRC Staff Thyroid Dose (mrem/yr)
Meat	Adult	0.0026	0.011 (bone)	0.0	0.0094
	Teen	0.0021	0.0095 (bone)	0.0	0.0070
	Child	0.0038	0.018 (bone)	0.0	0.011
Milk	Adult	0.00438	0.0144 (bone)	0.00306	0.198
(cow)[d]	Teen	0.00680	0.0262 (bone)	0.00527	0.313
	Child	0.0140	0.0634 (bone)	0.0122	0.623
	Infant	0.0274	0.120 (bone)	0.0247	1.51
Milk	Adult	0.00705	0.0176 (bone)	0.00377	0.237
(goat) [d]	Teen	0.00966	0.0314 (bone)	0.00619	0.376
	Child	0.0171	0.0751 (bone)	0.0136	0.746
	Infant	0.0313	0.137 (bone)	0.0269	1.81

FPL Source: ER Table 5.4-7 (FPL 2014-TN4058)
(a) Hypothetical dose estimates to worst-case scenario if current parameters were to change.
(b) Maximum organ dose excludes skin and thyroid because they are subsequently listed.
(c) The first value is the FPL-calculated dose and the second value is the NRC staff-calculated dose.
(d) Doses for milk animal pathways are from FPL's GASPAR II output file (FPL 2010-TN4151).

G.2.2.5 Comparison of Liquid and Gaseous Doses with 10 CFR Part 50, Appendix I

Table G-10G-10 presents noble gas, radioiodine, and particulate matter dose estimates at the Turkey Point site boundary, as calculated by both FPL and the NRC staff, which are compared with dose design objectives from 10 CFR Part 50 (TN249), Appendix I. All gaseous doses were less than the 10 CFR Part 50 Appendix I design objectives.

Table G-10. Comparisons of the Dose Estimates from Liquid and Gaseous Effluents to 10 CFR Part 50, Appendix I Design Objective at the Turkey Point Site Boundary

Radionuclide Releases/Dose (from site boundary)	FPL and NRC Staff Calculations[a]	Appendix I Design Objectives
Gaseous Effluents		
Beta air dose	18 mrad	20 mrad
Gamma air dose	4.2 mrad	10 mrad
External whole body dose	3.6 mrem	5 mrem
Skin dose	14 mrem	15 mrem
Liquid Effluents		
Total body dose from all pathways	0 rem[b]	3 mrem
Critical organ dose from all pathways	0 rem[b]	10 mrem

(a) This is the dose for a single unit (i.e., either Unit 6 or Unit 7) from FPL 2014-TN4058.
(b) There are no exposure pathways for liquid effluents to reach a population under normal operating conditions as discussed above in Section G.2.1. Under the calculated theoretical release scenario, Appendix I criteria were met and are considered bounding.

G.2.2.6 Comparison of Population Dose from Liquid and Gaseous Exposures

Table G-11G-11 presents the population dose estimates to individuals living within the 50 mi radius of the Turkey Point site. FPL estimated the population dose based on an extrapolated

population estimate for the year 2090. The NRC staff evaluated the population dose based on the estimated population for the year 2030 and the year 2090.

The NRC population dose estimates as presented in Table G-11G-11 also presents person-rem dose estimates to individuals living within the 50 mi radius of the Turkey Point site, applying the assumptions specified by FPL in its ER (FPL 2014-TN4058) with updated agricultural production values as specified in Table G-5G-5. FPL's agricultural production estimates were based on U.S. Department of Agriculture data from 2004 through 2008 (USDA 2004-TN1390; USDA 2007-TN1391; USDA 2008-TN1393). FPL and staff production estimates were multiplied by 1.81 to reflect linear production increases to be in line with population increases out to the year 2090. As discussed in Section G.2.2.3, the NRC estimate of population total body dose estimates for vegetable, cow milk, and meat consumption for the year 2090 differs from the FPL estimate because the staff estimate is based on a greater amount of agricultural production.

Table G-11. Calculated Doses to the Population Within 50 mi of the Turkey Point Site from Gaseous and Liquid Pathways (Two AP1000 Units)

	Total Body Dose (person-rem/yr)		
Pathway	**FPL Estimate[a] for 2090**	**NRC Staff Estimate for 2090**	**NRC Staff Estimate for 2030**
Gaseous			
Plume	4.28	4.28	2.64
Ground	2.44	2.44	1.49
Inhalation	0.872	0.872	0.542
Vegetable	0.572	2.40	1.32
Cow Milk	2.78×10^{-4}	1.34×10^{-3}	5.98×10^{-4}
Meat	6.64×10^{-4}	2.80×10^{-3}	1.54×10^{-3}
Liquid Effluents	0	0	0

(a) Single AP1000 values from FPL 2016-TN4511 multiplied by 2.

Population doses resulting from natural background radiation to individuals living within the 50 mi radius of Turkey Point site are presented in Table G-12G-12. Table G-12G-12 shows that the calculated person-rem/yr exposure from Turkey Point Units 6 and 7 would be much less than the estimated person-rem/yr exposure from natural radiation.

Table G-12. Natural Background – Estimated Whole Body Dose to the Population Within 50 mi of the Turkey Point Site

Source	Annual Individual Dose (mrem/yr)	Annual population Dose (person-rem/yr)
FPL Estimates	300[a]	2.5×10^{6}[a,c]
NRC Staff Estimates	311[b]	1.3×10^{6} [d]

(a) Taken from FPL ER Table 5.4-10 (FPL 2014-TN4058) based on NCRP 1987-TN2258.
(b) NCRP 2009-TN420.
(c) 2090 population estimate from FPL ER Table 2.5-1 (FPL 2014-TN4058).
(d) Annual Population Dose based on projected residential population of 4,012,989 in the year 2030 from FPL ER Table 2.5-1) (FPL 2014-TN4058).

G.2.3 Cumulative Dose Estimates

Table G-13G-13 presents the comparison of doses for Turkey Point Units 6 and 7 with the dose standards of 40 CFR Part 190 (TN739). The table shows the NRC staff's assessment of total doses to the MEI from FPL liquid and gaseous effluents. The assessment shows that the 40 CFR Part 190 (TN739) standards would be met.

Table G-13. Cumulative Site Dose to MEI from FPL Units 6 and 7 Combined with Units 3 and 4

Type of Dose (mrem/yr)	FPL Units 3 and 4[(a)]	FPL Units 6 and 7 Liquid Dose (child)[(b)]	FPL Units 6 and 7 Gaseous Dose (child)[(c)]	Combined Maximum Individual Dose	40 CFR 190 Dose Standards
Total Body	0.0029	0	7.8	7.8	25
Thyroid	0.0059	0	15.0	15.0	75
Other Organ (Bone)	0.0059	0	8.4	8.4	25

(a) Bounding values from 5 years of effluent reports; theoretical values (thyroid, bone, and skin dose assumed to be the same).
(b) Under normal operating conditions expected to be zero.
(c) Values from table representing dose from both AP1000 units.

G.2.4 Dose Estimates During Construction

The NRC staff used the dose-assessment approach specified in Regulatory Guide 1.109 (NRC 1977-TN90) and the GASPAR II computer code (Strenge et al. 1987-TN83) to estimate doses to construction workers. Construction workers would be exposed to several potential sources of radiation. Workers would receive dose during the construction of Units 6 and 7 from the operation of Units 3 and 4. Unit 6 is planned to be operational 1 year prior to Unit 7. During that year, Unit 7 construction workers would be exposed to radiation from Units 3, 4, and 6.

Gaseous effluent and direct radiation were considered as possible routes of exposure. Liquid effluents were not considered a likely route of exposure because drinking water to Units 6 and 7 workers is to be supplied from the Miami-Dade Water and Sewer Department and liquid effluents from Units 3 and 4 are expected to be managed to ensure dose is negligible.

G.2.4.1 Scope

The NRC staff and FPL independently calculated the dose to construction workers working on Units 6 and 7 from Units 3 and 4, and dose to Unit 7 workers while Units 3, 4, and 6 are in operation. The NRC staff and FPL independently calculated the maximum gamma air dose, beta air dose, total body dose, maximum organ dose, and thyroid dose and skin dose to receptors located at the construction site. Dose to construction workers was calculated for the following exposure pathways: plume immersion, direct shine from deposited radionuclides, and inhalation.

The NRC staff reviewed the assumed exposure pathways and input parameters and values used by FPL in ER Section 4.5 (FPL 2014-TN4058) for appropriateness, including references made to AP1000 DCD Revision 19 (Westinghouse 2011-TN261). Default parameters from Regulatory Guide 1.109 (NRC 1977-TN90) were used when site-specific input values were not

available. As a result of this independent review, the NRC staff verified that the assumed exposure pathways by FPL were reasonable and that the Turkey Point Units 3 and 4 source term input parameters and RG1.109 values used by FPL were appropriate. NRC staff used these exposure pathways and input parameters in its independent calculation using GASPARII as summarized below.

Joint frequency-distribution data of wind speed and wind direction by atmospheric-stability class for the Turkey Point site (FPL 2014-TN4058) were used as input to the XOQDOQ code (Sagendorf et al. 1982-TN280) to calculate long-term average χ/Q and D/Q values for routine releases. Based on 2 years of meteorological data, the NRC staff's independent results are similar to those reported by FPL in ER Tables 2.7-16 through 2.7-18 (FPL 2014-TN4058).

G.2.4.2 Resources Used

The NRC calculated doses to the public from gaseous effluents using a PC version of the XOQDOQ and GASPAR II codes—NRC Dose Version 2.3.20 (ORNL 2012-TN4556)—obtained through the Oak Ridge RSICC.

G.2.4.3 Input Parameters

Table G-4G-4 and Table G-5G-5 list the major parameters used in calculating dose to the construction workers from gaseous effluent releases during normal operations at the site. Units 3 and 4 radiological releases are summarized in the annual reports entitled *Turkey Point, Units 3 and 4, Annual Radioactive Effluent Release Report* and *Turkey Point, Units 3 and 4, Annual Radiological Environmental Operating Report*. The limits for all radiological releases are specified in the Turkey Point Offsite Dose Calculation Manual (ODCM), and these limits are designed to meet Federal standards and requirements. The radiological environmental monitoring program (REMP) includes monitoring of the aquatic environment (fish, invertebrates, and shoreline sediment), atmospheric environment (airborne radioiodine, gross beta, and gamma), and terrestrial environment (vegetation) and direct radiation. The NRC staff reviewed these annual reports for calendar years 2002 through 2015 (the references for these reports can be found in Section 2.11). The maximum annual release was assumed to be 35 Ci (FPL 2014-TN4058). Unit 6 effluent releases were estimated for an AP1000 unit in DCD Table 11.3-3 (Westinghouse 2011-TN261). As discussed in DCD Section 12.4.2.1 (Westinghouse 2011-TN261), direct radiation exposure from Unit 6 is expected to be shielded such that the direct dose rate would be negligible.

The calculated annual dose rate, 0.013 mrem/yr, from a fully loaded independent spent fuel storage installation is negligible. To be conservative, the dose rate for the Unit 7 construction area from Units 3 and 4 is assumed to be 1 mrem. Construction workers were assumed to be at the construction site for 40 hours per week and 52 weeks per year. This constitutes an exposure time of 2,080 hours per year. Adjusted for 2,080-hour occupancy time per year, the direct radiation dose from Units 3 and 4 is not significant at 0.47 mrem/yr.

For dose calculation purposes, the average location of the Unit 7 worker was assumed to be at the center of Unit 7 reactor. Table 3.10-2 from the ER (FPL 2014-TN4058) estimates the maximum workforce for Unit 7 during any month to be 3,950 people. This size workforce is expected to last less than a year. To be conservative, the maximum size was assumed to last

the entire year for calculating the maximum annual workforce dose. Total effective dose equivalent (TEDE) was calculated by multiplying the thyroid dose by 0.03 and adding it to the total body dose.

G.2.4.4 Comparison of Doses to Construction Workers

Table G-14G-14 and Table G-15G-15 present dose estimates to the construction workers for each gaseous pathway as calculated by FPL and the NRC staff. Prior to Unit 6 operation, only gaseous effluents and direct radiation from Units 3 and 4 would be expected. Table G-16G-16 presents dose estimates to construction workers from direct exposure and effluent releases. The doses provided by FPL in its ER and those calculated by NRC are nearly identical.

Table G-14. Comparison of FPL and NRC Staff Estimated Dose Rates in Construction Area from Unit 6 Gaseous Effluents

	Construction Area Dose Rates (mrem/yr)					
	Total Body		Thyroid		Skin	
Pathway	FPL	Staff	FPL	Staff	FPL	Staff
Plume	12	12.0	12	12.0	60	60.3
Ground	8.7	8.74	8.7	8.74	10	10.3
Inhalation	1.3	1.32	13	12.5	1.3	1.28
Total	22	22.06	33	33.24	72	71.88

Table G-15. Comparison of FPL and NRC Staff Estimated Gaseous Effluent Doses to Unit 7 Construction Workers

	Annual Dose (mrem)							
	Total Body Dose		Thyroid Dose		Skin Dose		TEDE[(c)]	
Source	FPL	Staff	FPL	Staff	FPL	Staff	FPL	Staff
Units 3 and 4[(a)]	0.0022	0.0022	0.0022	0.0022	0.0031	0.0022	0.0023	0.0022
Unit 6[(b)]	5.2	5.24	7.9	7.89	17	17.07	5.5	5.47
Total	5.2	5.24	7.9	7.89	17	17.07	5.5	5.48

(a) Based on annual effluent reports from 2002 through 2015 (the references for these reports can be found in Section 2.11) and adjusted for 2,080 hr/yr occupancy.
(b) Adjusted from Table G-14G-14 values to account for 2,080 hr/yr occupancy.
(c) Calculated by multiplying the thyroid dose by 0.03 and adding it to the total body dose.

Table G-16. Estimated Total Dose to Unit 7 Construction Workers

	Annual Worker Dose (mrem)							
	Total Body Dose		Thyroid Dose		Skin Dose		TEDE	
Pathway	FPL	Staff	FPL	Staff	FPL	Staff	FPL	Staff
Direct Radiation[(a)]	0.47	0.47	0.47	0.47	0	0	0.47	0.47
Gaseous Effluents[(b)]	5.2	5.24	7.9	7.89	17	17.07	5.5	5.5
Total	5.7	5.71	8.4	8.36	17	17.07	6	5.95
Annual Workforce Dose (person-rem)								
Total[(c)]	23	22.55	33	33.02	67	67.43	24	23.50

(a) Staff calculated values from Section G.2.4.
(b) Total gaseous effluent calculated in Table G-15G-15
(c) Calculated by multiplying the total annual worker dose by the maximum expected number of workers (i.e., 3,950 people).

G.2.4.5 Comparison of Construction Workers Dose Estimates to 10 CFR 20

Table G-17G-17 presents estimated construction worker dose as calculated by both FPL and the NRC staff along with the dose criteria for members of the public as stipulated in 10 CFR 20.1301 (TN283).

Table G-17. Comparison of Construction Worker Doses with 10 CFR 20.1301 Criteria for Members of the Public

Criteria	Worker	Limit
Annual Dose (TEDE mrem)	6	100
Unrestricted area dose rate (mrem/h)	0.0029	2

G.2.5 Dose Assessments to Biota Other Than Humans

To estimate doses to the biota from the liquid and gaseous effluent pathways, the NRC staff used the LADTAP II code (Strenge et al. 1986-TN82), the GASPAR II code (Strenge et al. 1987-TN83), and input parameters supplied by FPL in its ER (FPL 2014-TN4058).

G.2.5.1 Scope

The dose assessments discussed herein are for the operation of Turkey Point Units 6 and 7 and from the combined operation of Turkey Point Units 3, 4, 6, and 7 (i.e., cumulative site dose). Due to the deep-well injection of Units 6 and 7 radioactive liquid effluent, only gaseous effluent is considered from these units. When considering the cumulative site dose, the gaseous and liquid effluents from Units 3 and 4 are also considered.

Liquid effluent doses to both terrestrial and aquatic biota were calculated using the LADTAP II code. Aquatic biota include fish, algae, and invertebrate species. Terrestrial biota include muskrats, raccoons, herons, and ducks. The LADTAP II code calculates an internal dose component and an external dose component and sums them for a total body dose. Terrestrial biota could also be exposed via the gaseous effluent pathway. These values would be based on the MEI calculations using the GASPAR II code.

G.2.5.2 Resources Used

To calculate the doses to biota, the NRC staff used PC versions of the LADTAP II and GASPAR II computer codes—NRCDose, Version 2.3.20 (ORNL 2012-TN4556). These codes were obtained through the Oak Ridge RSICC.

G.2.5.3 Input Parameters

Gaseous effluents would contribute to the total body dose of the terrestrial surrogate species (i.e., muskrat, raccoon, heron, and duck). The exposure pathways include inhalation of airborne radionuclides, external exposure because of immersion in gaseous effluent plumes, and surface exposure from deposition of iodine and particulates from gaseous effluents. The dose calculated to the MEI from gaseous effluent releases in Section 5.9.3 would also be applicable to terrestrial surrogate species with two modifications. One modification defined in ER Section 5.4.4 (FPL 2014-TN4058) was increasing the ground-deposition factors by a factor of

two because terrestrial animals would be closer to the ground than a member of the public. The second modification was to use the biota location delineated in ER Table 5.4-6 (FPL 2014-TN4058). The gaseous effluent releases used in estimating dose are discussed in ER Section 3.5.2 (FPL 2014-TN4058).

In addition to the modifications applied by FPL for modeling biota, the NRC staff elected to make adjustments based on the diet of the organism. For example, because the muskrat is an herbivore, the meat ingestion pathway was omitted from the dose calculation for the species. In addition, the NRC staff chose to consider potential dose to the American crocodile, which is found in the canals surrounding the plant and is a Federally threatened species and on the Florida threatened species list. Because of the size of the American crocodile, a surrogate species model cannot be applied. The American crocodile can be up to approximately 2,006 lb (910 kg) and about 15 ft (4.6 m) long (National Geographic 2012-TN2577). Internal dose was adjusted to account for the size differential and a modification factor of 4 was applied to the ground-deposition factor. In captivity, an 11.5 ft (350 cm) crocodile eats 500 g per day (FAO 2012-TN2580). It was not possible to find the food consumption rate for a crocodile in the wild, but it is likely less for a wild crocodile that has to hunt for food. Since the American crocodile can be up to 15 ft long, a consumption rate of 3 times larger was assumed (1.5 kg/d) to be bounding. Therefore, in the calculations, the meat ingestion pathway was modified to assume 1,213 lb/yr (550 kg/yr), and assumed to be terrestrial rather than aquatic or riparian. Total body dose estimates to the surrogate species and the American crocodile from the gaseous pathway for either Unit 6 or Unit 7 are listed in Table G-18G-18.

Table G-18. NRC Staff Estimate of Non-Human Biota Doses for Proposed Turkey Point Units 6 and 7 for One Unit

	Doses from Gaseous Effluents	
Surrogate Species of Non-Human Biota	**Internal Dose (mrad/yr)[(a)]**	**External Dose (mrad/yr)[(a)]**
Saltwater Fish	0.0	0.0
Invertebrate	0.0	0.0
Algae	0.0	0.0
Muskrat	13.9	11.8
Raccoon	15.6	11.8
American Crocodile	155.7	19.0
Heron	2.2	11.8
Duck	15.6	11.8

(a) Radiological doses to non-human biota are expressed in units of absorbed dose (rad).

The NRC staff has done an estimate of the cumulative dose to biota from the proposed operation of Turkey Point Units 3, 4, 6, and 7. For the gaseous effluent doses, the gaseous effluent assumptions discussed above were still used. With respect to the American crocodile gaseous effluent dose, it was assumed that the crocodile spends 100 percent of the time on the shoreline. For the liquid effluent doses from Units 3 and 4, it was assumed that the American crocodile spends 50 percent of the time on the shoreline and 50 percent of the time swimming. There is no definitive information available on the makeup of the American crocodile's diet. It is

known that they will eat mammals that come to the shoreline (even deer) and that they also eat fish, snails, and crustaceans (Mazzotti 2003-TN1499), but not in what proportions. A study of American alligators (Fogarty and Albury 1967-TN2581) provided more definitive diet information; however, this was for alligators not crocodiles, which have different feeding habits. Based on the above information, the assumption was made, when modeling dose from the Units 3 and 4 liquid effluents, that 12 percent of the crocodile's diet is fish and the remaining 88 percent is invertebrates. These adjustments bound the potential effluent exposure to the American crocodile because they only consider food sources that were in the water (which would thus have a higher concentration of radionuclides) and that the majority of the diet was from invertebrates (whose bottom-feeding habits would further concentrate radionuclides). By using different assumptions for the American crocodile behavior and diet the with respect to the gaseous versus liquid effluents, the resulting cumulative dose estimates provide a conservative upper bound.

G.2.5.4 Comparison of Results

Operation of Turkey Point Units 6 and 7

Total body dose estimates to the surrogate species and the American crocodile from the gaseous pathway for one unit are shown in Table G-18G-18.

Cumulative Dose from Turkey Point Units 3, 4, 6, and 7

The results of the cumulative dose estimates are provided in Table G-19G-19. Based on these dose estimates, the NRC staff concludes that the cumulative radiological impact on biota would not be significant.

Table G-19. NRC Staff Estimate of the Cumulative Biota Doses from the Proposed Operation of Turkey Point Units 3, 4, 6, and 7 Compared to the IAEA/NRCP Guidelines for Biota Protection

	Liquid Effluent Dose (mrad/d)[a]				Gaseous Effluent Dose (mrad/d)[a]				Total Dose from Gaseous and Liquid Effluent (mrad/d)[a]	IAEA/NCRP Guidelines for Protection of Biota Populations (mrad/d)[a][b]
Biota	Unit 3	Unit 4	Units 6 & 7	Total	Unit 3	Unit 4	Units 6 & 7	Total		
Saltwater Fish	0.0337	0.0337	—	0.0674	—	—	—	—	0.0674	1,000
Invertebrate	0.0337	0.0337	—	0.0674	—	—	—	—	0.0674	1,000
Algae	0.00507	0.00507	—	0.0101	—	—	—	—	0.01517	1,000
Muskrat	0.00729	0.00729	—	0.01458	0.0302	0.0239	0.141	0.1951	0.20968	100
Raccoon	0.00323	0.00323	—	0.00646	0.0343	0.0275	0.150	0.2118	0.21826	100
American Crocodile	0.0322	0.0322	—	0.0644	0.365	0.319	0.957	1.641	1.7054	100
Heron	0.00948	0.00948	—	0.01896	0.00412	0.00368	0.0768	0.08460	0.10356	100
Duck	0.00808	0.00808	—	0.01616	0.0343	0.0275	0.150	0.2118	0.22796	100

Source: IAEA 1992-TN712; NCRP 1991-TN729

(a) Radiological doses to non-human biota are expressed in units of absorbed dose (rad).

(b) Guidelines in NCRP and IAEA reports expressed in Gy/d (1 mGy/d equals 100 mrad/d).

G.3 Supporting Hydrologic Documentation

G.3.1 Review of FPL's Aquifer Performance Test of the Biscayne Aquifer on the Turkey Point Peninsula

FPL performed and analyzed a relatively large-scale aquifer performance test (APT) to determine hydraulic properties of the Biscayne aquifer in the vicinity of the proposed radial collector wells (RCWs). The RCWs are proposed as a backup source of cooling water for proposed Units 6 and 7 and would be constructed horizontally between 25 and 40 ft beneath the bed of Biscayne Bay adjacent to the Turkey Point peninsula. Hydraulic property estimates for the Biscayne aquifer were needed to support modeling which was performed to estimate the potential effects of pumping the proposed RCWs on the aquifer and on the hydraulically connected Biscayne Bay. The design, performance, and analyses of the test are described in FPL 2009-TN1263.

FPL completed the pumped well (PW-1) on the Turkey Point peninsula as an open borehole from 22 to 46 ft below ground surface and with cemented casing above that depth. They also constructed a dual-zone monitoring well (MW-1) with two vertically isolated monitoring zones at depth intervals of 24 to 60 ft (WM1-DZ-PI) and 65 to 70 ft (WM1-DZ-Deep) below ground surface. Four additional observation wells (MW-2, MW-3, MW-4, and MW-5) were completed with open intervals in the production zone interval, as follows: the top of the open interval was at a depth of 22 ft in each of the four wells, and the bottom of the open interval was at depths varying between 41 and 46 ft. The production interval observation wells were at distances ranging from 80 to 2,700 ft away from the pumped well. However, FPL did not detect a measurable response at the most distant observation well, MW-5. The APT was performed by pumping at a rate of 7,100 gpm for 7 days. Measured observation-well data were corrected for influence of both ocean tides and earth tides.

G.3.1.1 Hantush-Jacob Solution

Response at the observation wells indicated an aquifer separated from a constant-head water source by a thin (low storage capacity) semi-confining layer that allows some water to leak through the semi-confining layer and recharge the pumped aquifer. This recharge caused water level drawdowns (s) measured by FPL in the observation wells to stabilize within 2 to 10 min from the start of the APT, depending on radial distance (r) from the production well (Figure G-1). The method used to evaluate the test results and determine aquifer parameters is dependent on the response of the water levels in the wells to pumping. FPL (2009-TN1263) appropriately determined that the drawdown response from APT in the observation wells indicates that the Hantush and Jacob (1955-TN4094) "leaky-aquifer" analysis method should be used to estimate the hydraulic properties transmissivity (T) and storativity (S) of the Biscayne aquifer. The leaky-aquifer analysis method relies on matching the observation-well drawdown data to type curves based on the dimensionless leaky-aquifer well function defined by:

$$W(u,r/B) = 4\pi Ts/Q$$

and plotted vs. $4Tt/r^2S$, where t is elapsed pumping time. Different leaky aquifer type-curves were created by plotting the well function using different values of the dimensionless parameter,

r/B (where u is fixed). B is defined as the square root of Tb′/K′, where b′ and K′ are the thickness and hydraulic conductivity, respectively, of the semi-confining layer separating the aquifer from the overlying water source. Q is defined as the pumping rate. Therefore, the shape of the generated type-curves vary depending on thickness and hydraulic conductivity of the semi-confining layer

The NRC staff found that precise analysis of the data was challenging because the period between the start of the pumping test and the start of the period of steady drawdown is very short, and is possibly affected by early-time variations in pumping rate. This resulted in a situation where data from any of the four observation wells could be equally well matched to any of several of the r/B-type curves from Hantush and Jacob (1955-TN4094). The shape of the drawdown curves is very similar after drawdown in the wells reaches a near steady value. However, when data are available from wells at different distances, an additional constraint

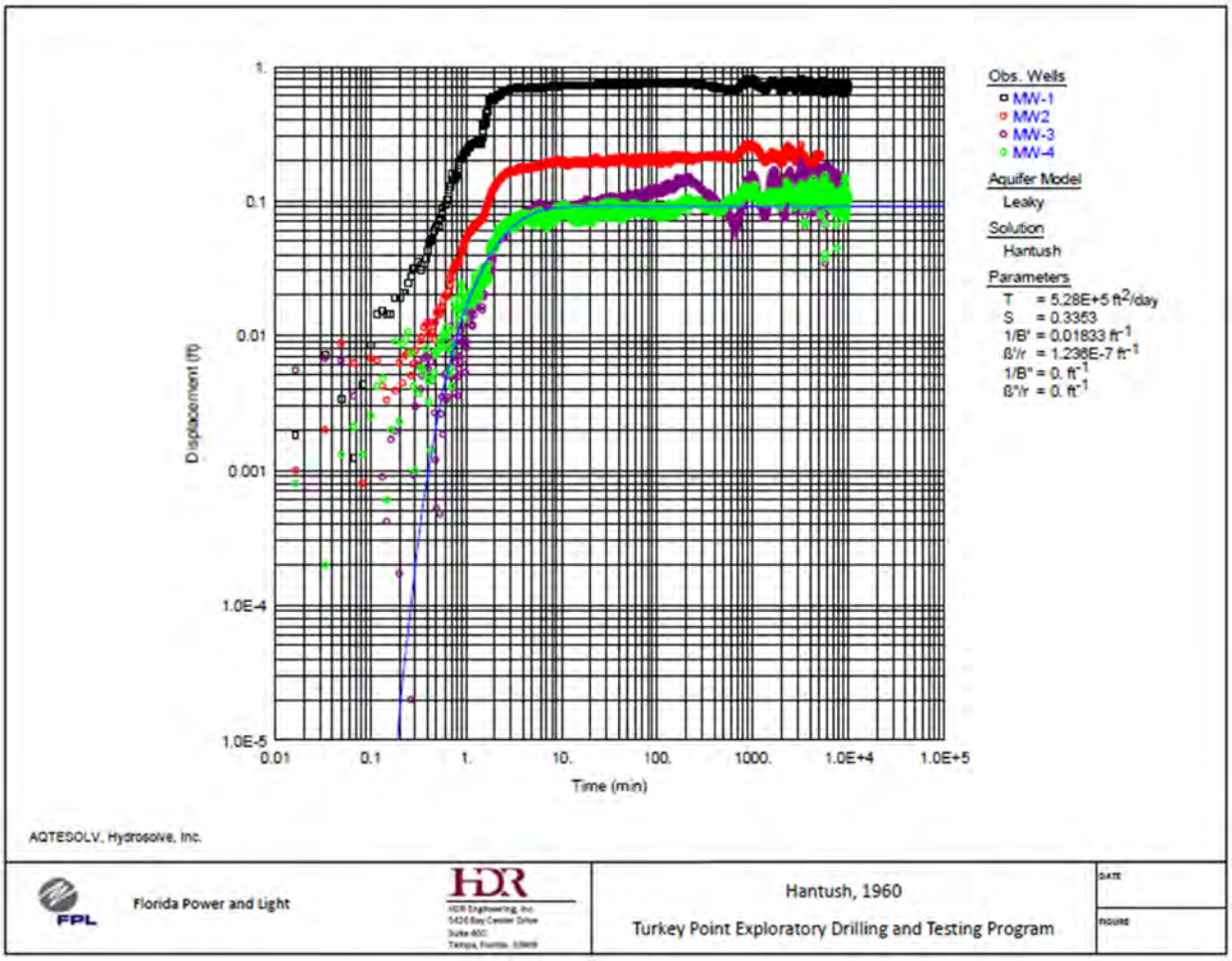

Figure G-1. Composite Graph of Drawdown Data vs. Time for the Turkey Point Aquifer Test. ***Graph shows match to data for well MW4, but listed values are for data for well MW-1 (FPL 2009-TN1263).***

may be added that allows the drawdown data from wells with different r values to match type curves which have proportional r/B values. To illustrate, the observation wells, their distance

from the production well, and the steady drawdowns interpreted by the staff for each well are listed in Table G-20. The flat portions of the data curves for wells MW1, MW2, MW3, and MW4 should match different type curves where the ratio of the r/B values are 0.4, 0.52, 0.94, and 1.0, respectively, compared to the *r/B* value calculated for MW4. The staff tested this approach by plotting straight lines representing the drawdowns for each well listed in Table G-20 on log-log paper at the same scale as the leaky-aquifer-type curves provided by Lohman (1972-TN4095). The staff found that using r/B = 1 to match the data for the nearest observation well (MW4) provided matches of data for the other wells to type curves having r/B values that are close to the expected r/B ratios. Using this approach the staff calculated relatively consistent values of K′/b′ with an average value of 0.265 (Table G-20) and estimated a vertical hydraulic conductivity of approximately 0.5 ft/d for the confining layer based on a thickness (b') of 2 ft.

Table G-20. Well Data Used in and Results from the Test Reinterpretation

Well Name	r (ft)	r/r MW4	s (ft)	s_{aq} (ft)	r/B	B (ft)	K′/b′ (day^{-1})
MW1	80	0.039	0.75	0.715	0.04	2,000	0.25
MW2	925	0.45	0.20	0.188	0.52	1,780	0.31
MW3	1,810	0.88	0.10	0.083	0.94	1,930	0.27
MW4	2,065	1.0	0.09	0.079	1.0	2,065	0.23
All Wells					Average	1,940	0.265

The staff's results differ substantially from those presented in FPL 2009-TN1263 Table 5.2, which, based on the listed K′ values, resulted from matching drawdown data from each of the observation wells to the r/B = 1 type curve. These matches resulted in low estimates of T and very high estimates of K′/b′ for the close-in wells. FPL noted this discrepancy in FPL 2009-TN1263, which summarizes:

> Calculated transmissivity (T) values … range from approximately 368,000 $feet^2$/day to 1,000,000 $feet^2$/day … The lowest T value was calculated at MW-1 DZ PI near the pumping well, and the higher T values were calculated at far-field wells MW-3 and MW-4 … The noted increase in hydraulic conductivity with scale is likely a natural consequence of the aquifer heterogeneity…. (FPL 2009-TN1263)

The hypothesized scale effect instead arises because drawdown data from the wells at different distances from the production well should match proportional r/B curve values, as described above.

G.3.1.2 K_0(r/B) Distance-Drawdown Solution

FPL (2009-TN1263) also performed a distance-drawdown an analysis using the Aqtesolv™ software package (HydroSOLVE, Inc. 2007-TN4091) This approach helps to avoid the problem of selecting the appropriate r/B curve, which are discussed in the preceding sub-section. The Aqtesolv™ solution provides an estimate of T of 8E5 ft^2/d and a K′/b′ value of 0.5 day^{-1}. The K′/b′ value is about twice the values determined from the composite plot analysis (discussed in the sub-section above), prompting a separate distance-drawdown analysis for this review. This analysis is based on the theory of de Glee (1930, not referenced), as summarized by Ferris et

al. (1962-TN4092), and involves use of a log-log-type curve of the steady-state, leaky-aquifer well function, $K_0(r/B) = 2\pi Ts/Q$, plotted vs. r/B. $K_0(x)$ is the modified Bessel function of second order and zero kind. NRC staff plotted the steady-state drawdowns listed in Table G-20 as x's, and a match was obtained, as shown in Figure G-2. For type curve parameters $K_0(r/B)$ and r/B = 1, the type-curve match provided values of s = 0.25 ft and r = 1,700 ft (Table G-21). These values result in a T of 870,000 ft^2/d and a K′/b′ of 0.3/d. Results for this analysis are closer to those determined from the time-drawdown analysis than the Aqtesolv distance-drawdown solution. To further test that solution, staff interpolated drawdown values from the Aqtesolv™ graph, listed as s_{aq} in Table G-20 and plotted these values as *'s, and shifted to match the type curve (Figure G-2). The same value of r = 1,700 ft at r/B = 1 was obtained, but the value of s determined from the type-curve match was 0.23 ft, resulting in T = 950,000 ft^2/d and K′/b′ = 0.33/d. Thus, uncertainties of a few hundredths of a foot in estimated steady drawdown can result in 10 percent or larger variations in estimated hydraulic properties.

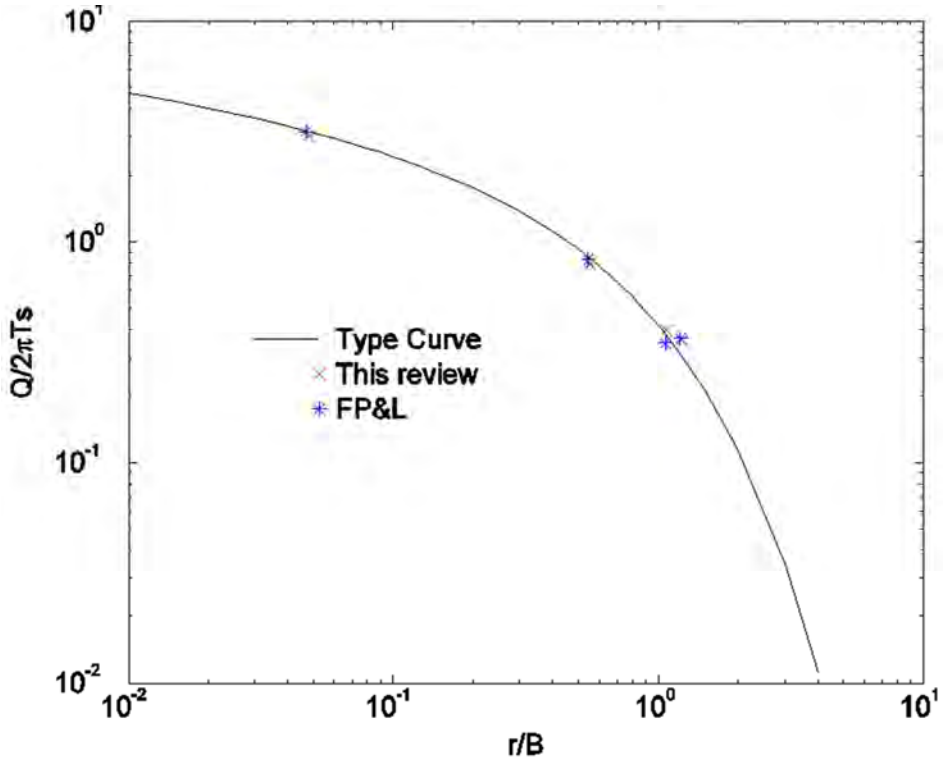

Figure G-2. Match of Drawdowns at Four Different Observation Wells to the Steady-State Distance vs. Drawdown Curve

Table G-21. Summary of Distance-Drawdown Solutions, Compared to Average of Hantush-Jacob Solution

Solution	T (ft^2/d)	B (ft)	K′/b′ (day^{-1})
Aqtesolv™	8.0E-05	1,230	0.53
$K_0(r/B)$, s	8.7E-05	1,700	0.30
$K_0(r/B)$, s_{aq}	9.5E-05	1,700	0.33
Hantush-Jacob (ave)	1.0E-06	1,940	0.265

Source: Hantush and Jacob 1955-TN4094

G.3.1.3 Summary

The Biscayne aquifer transmissivity (T) and the vertical hydraulic conductivity (kv) of the confining zone above the Biscayne aquifer are important because they control the rates at which water will flow into the RCWs from the aquifer and the bay and impact the amount that is drawn from each potential source. The NRC staff's analyses resulted in K′/b′ values that vary from 0.23 to 0.53 d^{-1}, and average about 0.3 d^{-1}. If all the vertical resistance to flow is imposed by the muck layer, which averages in thickness (b') of 2 ft, then its vertical hydraulic conductivity is about 0.6 ft/d. This value is close to that determined by FPL (2009-TN1263).

The NRC staff found that values of T between about 800,000 and 1,000,000 ft^2/d are obtained from time-drawdown analysis of the APT using consistent r/B values, or from distance-drawdown analysis. Differences in the calculated T values arise because of uncertainty in steady-state drawdowns of only a few hundredths of a foot. Values from the staff's analysis are comparable with values determined by FPL (2009-TN1263), which states "The mean for the calculated T values using drawdown data is approximately 700,000 $feet^2$/day." Also, "The calculated T value using a distance-drawdown method is 800,000 ft^2/d." Thus, in spite of some inconsistency in analysis methods, results from the analysis prepared by FPL are similar to those determined in the NRC staff review.

G.3.2 Description of Groundwater Modeling Performed to Help Evaluate Effects of Excavation Dewatering and Radial Collector Well Operation on the Biscayne Aquifer

This appendix describes three separate modeling efforts performed to estimate the effects of radial collector well (RCW) pumping on the Biscayne aquifer, Biscayne Bay, and other portions of the hydrologic environment including nearby drainage canals and the cooling canals of the industrial wastewater facility (IWF). Two of these modeling efforts were performed before the NRC issued the draft environmental impact statement (EIS) in 2015, while the third was performed afterwards. The staff also used the two earlier studies to simulate the effects of dewatering the Units 6 and 7 plant excavations. To further confirm their understanding of the groundwater hydrodynamics and to consider whether certain actions proposed after the two earlier modeling studies were completed would alter the earlier conclusions documented in the draft EIS (EIS, NRC 2015-TN4444), the review team performed a third modeling analysis (Oostrom and Vail 2016-TN4739).

FPL conducted modeling (FPL 2014-TN4069) using a local-scale groundwater model of the Biscayne aquifer including the portion of the aquifer underlying Biscayne Bay near the Turkey Point site. The NRC commissioned the U.S. Geological Survey (USGS), to conduct additional modeling to help identify the potential effects of RCW pumping (NRC 2014-TN3078). As indicated above, after the Draft EIS was issued, the review team itself performed a third modeling analysis.

Each of these hydrologic models provides an estimation of the effects of building and operating the proposed plants, however these estimations are imperfect due to a number of uncertainties. Uncertainty in groundwater models has been described as arising from 1) uncertainty in model parameters, and 2) uncertainty in the definition of the conceptual model framework including the

spatial and temporal variation in hydrologic variables (Neuman and Wierenga 2003-TN4090). Therefore, examining the results of the three modeling efforts provides a better understanding of the possible range of effects of building and operating Units 6 and 7.

The model used by the USGS model is a submodel of an existing regional-scale (Miami-Dade County) coupled surface-water/groundwater model originally created to evaluate then-recent hypersalinity events in Biscayne Bay, at the county scale, during 1996−2004 (NRC 2014-TN3078). The USGS model domain encompassed Biscayne Bay and included freshwater flows into Biscayne Bay through the offsite drainage canal system, exchange of groundwater between Biscayne aquifer and surface waterbodies including the Biscayne Bay, drainage canals, and the cooling canals of the IWF. It also included precipitation input to the bay, precipitation recharge to the Biscayne aquifer, evapotranspiration (ET) effects on bay salinity, and the effects of ET on recharge to the Biscayne aquifer. The USGS modified their existing model to include the cooling canals of the IWF, the proposed excavation dewatering wells, and four proposed RCW locations.

Both of the modeling efforts are approximations of the real physical system, and each has shortcomings that result in uncertainty in the modeling results. The FPL model assumes constant density fluid and does not represent the differences in density between fresh and saline water that can result in “density-driven” groundwater flow. The FPL model was strictly a groundwater model with surface-water features represented as boundary conditions. The FPL model area is much smaller than the USGS model and does not include as many offsite canals. However, the USGS model has much lower spatial resolution with 500 × 500 m cell size compared to FPL’s model which is variable and is refined to a 5 ft spacing in the area around the radial collector wells (FPL 2014-TN4069). Therefore, the USGS model’s representation of smaller-scale features is not as accurate as FPL’s model.

G.3.2.1 Summary of FPL Modeling

FPL performed groundwater modeling in support of its application for building and operating Units 6 and 7 at the Turkey Point site. The model was created using Visual MODFLOW, a commercial implementation of the USGS-developed MODFLOW 2000, and was a steady-state three-dimensional model that assumes constant density of the fluid being modeled. Measured heads applied in the model for non-seawater waterbodies (e.g., freshwater canals and hypersaline cooling canals) were corrected to equivalent seawater heads based on the fluid density ratio. The model and results are described in detail in Appendix CC of the FSAR (FPL 2014-TN4069). Therefore, only a brief summary and assessment are provided here.

The objectives of the model were to evaluate groundwater impacts of activities related to the building and operation of two new nuclear units by simulating groundwater flow in the Biscayne aquifer. The primary issues evaluated with the model were the following:

- expected rates of groundwater infiltration into excavations for the new reactor buildings
- origin of water pumped from the RCW, and
- sea water approach velocities to the bay floor during RCW pumping.

FPL calibrated the model by matching the groundwater level response to aquifer pumping tests performed at two wells (PW-7L and PW-7U) near the proposed plant locations and a well (PW-

1) near the proposed RCW on the Turkey Point peninsula. An additional aquifer test near the proposed plant locations (PW-6U) was simulated by the model as a "validation run."

FPL used the calibration process to estimate a variety of parameters which were included in their model. These included the horizontal hydraulic conductivity (Kh) and anisotropy (Kv/Kh; ratio of vertical (Kv) to horizontal (Kh) hydraulic conductivity) values for each of the 10 hydrogeologic units included in the model and the conductance values applied to head-dependent boundary conditions (cooling canals, regional canals, Biscayne Bay and model sides). The calibration parameters were varied manually until a model result was obtained that showed satisfactory agreement between simulated and observed pumping test drawdowns at monitored observation wells, as well as a reasonable match to understood directions and amounts of regional groundwater flow.

Model Results – Radial Collector Wells

Determining the environmental impacts of operating the proposed RCWs is the ultimate focus of the FPL groundwater model. The base case model results indicated that approximately 98 percent of water extracted from the RCWs originates in Biscayne Bay with most of the remainder coming from the cooling canals (industrial wastewater facility). Only 0.2 percent of the water produced was predicted by the base case model to come from the freshwater portion of the Biscayne aquifer. This is the water entering the model domain from head-dependent boundaries along the northwest corner of the model. With an assumed RCW continuous withdrawal of 120 Mgd, the predicted volume of water removed from the inland Biscayne aquifer was 0.36 Mgd or 250 gpm according to the base case FPL model. The worst-case sensitivity analysis conducted by FPL regarding extraction of water from the Biscayne aquifer was based on assuming values of vertical conductivity that were 50 percent of the values applied in the base case for all the model layers. This “worst-case” analysis predicted that 1.4 percent or 1,250 gpm would be continuously extracted from the Biscayne aquifer.

The model results indicated that the velocity of water moving downward from Biscayne Bay into the seabed is very low at less than 0.001 cm/s for all sensitivity cases.

The base case model predicted that 2.0 percent of the water extracted by the RCW would come from the industrial wastewater facility. A "worst" case of 3.2 percent of the extracted water coming from the industrial wastewater facility was predicted by cutting the vertical conductivity of all layers in half.

Assessment – Radial Collector Wells

The FPL model provides a reasonable, although uncertain, prediction of the impact of the RCWs on the Biscayne Bay and freshwater resources within the Biscayne aquifer. Parameter uncertainty in the FPL model prediction for the RCW water source is caused by several factors including the following:

- limited area of the pumping test observations used for calibration compared to the extent of the model
- large number of model parameters compared to the limited amount of calibration data

- limited data on the site-specific hydraulic properties of hydrogeologic units except at the pump test locations used in calibration
- lack of data on the hydraulic conductivity of the sediment at the bottom of Biscayne Bay.

Incomplete knowledge of the hydrogeologic system being modeled, the impacts of assuming constant density fluid, the assumption of a steady-state flow system, and problems related to discretization of the model into a cellular grid also cause conceptual model and structural uncertainty in the FPL model results.

One of the most significant uncertainties in the model is the hydraulic conductivity assigned to the sediment at the bottom of Biscayne Bay. The bay bottom was characterized as either "offshore sediment" or exposed "Miami limestone." Water entering the RCW from the bay must pass through one of these materials to enter the higher conductivity "upper high flow zone (UHFZ)" where the RCW are placed.

The NRC staff identified the following issues of potential concern with the FPL model setup:

- Specified heads for the "general head boundary conditions" at the northwest and southwest corners of the model were inconsistent. For the calibration simulations, the western boundary ends at the northwest corner with a specified head of 0.85 ft, while the northern boundary ends at that corner with a value of 0.65 ft. The western boundary ends at the southwest corner with a specified head of -0.2 ft, while the southern boundary ends at that corner with a value of -0.95 ft.
- The non-uniform lateral model discretization (row and column widths) exhibits moderately larger changes than the commonly accepted practice for finite-difference models. The accepted standard practice is for an increase in width between adjacent rows (or columns) to be 50 percent (width ratio of 1.5) or less, whereas the FPL model has increases of 100 percent.
- While the layer elevations mostly vary in a smooth fashion, there are places where adjacent cells of the same layer are offset vertically with no overlap, which differs from the accepted standard practice of 50 percent overlap. The lack of overlap is a result of the magnitude in elevation change over distance combined with the thinness of the layer.

However, the NRC staff expects that the impact of these issues is relatively minor in comparison to the uncertainty in the model parameter calibration.

FPL's base case model predicted that 2.0 percent of the water extracted by the RCW would come from the industrial wastewater facility. This prediction is also regarded as uncertain because of the parameter calibration uncertainty mentioned above and because of the potential effects of variable density fluid on the migration of the hypersaline plume. If the RCWs are operated continuously, then it is likely that the hypersaline water flow induced by the RCW from the industrial wastewater facility would be captured by the RCW. However, intermittent operation could result in an increase of hypersaline flow into the aquifer beneath the bay that could migrate into the bay when the RCW is not operating. The steady-state nature of the FPL model and the assumption of constant density fluids make the model inadequate for modeling this potential scenario.

The NRC staff performed limited runs of the FPL model to verify performance and check some additional sensitivity cases of interest. The main item of interest was the volume of water captured from the inland portion of the Biscayne aquifer along the northwestern corner of the model. A sensitivity case of 10X the base case offshore bay sediment hydraulic conductivity combined with 10X the base case Miami limestone sediment hydraulic conductivity and 10X lower general head boundary conductance was performed. The results showed that approximately 15 percent more water would be captured through the general head boundary along the northwestern corner of the model under these conditions.

Model Results – Inflow to the Power Block Excavations

The FPL model predicted that pumping rates of 96 gpm would be necessary for dewatering each of the excavations at Units 6 and 7. This is based on installation of essentially impermeable grout curtains at the sides of the excavations and grouting of the rock at the base of the excavation.

Assessment– Inflow to the Power Block Excavations

The model results for the dewatering calculations are also affected by model uncertainties discussed above. However, the NRC staff expects the impact of model uncertainty on these calculations to be less significant because of the smaller scale of the focus area. The permeability of the grouted base rock and side walls for the excavation are the primary parameters controlling inflow, and are easier to estimate than the large-scale hydrogeologic parameters that control the source of water captured by the RCW. Engineering controls are also feasible for mitigation of any adverse conditions that are encountered during the excavation activities.

Conclusions

The environmental impact of operating the proposed RCW system is the most important issue addressed by the groundwater model. The FPL model results indicate that continuous operation of the RCW results in extraction of a relatively small volume of water from the inland portion of the Biscayne aquifer and that the velocity of water moving downward from Biscayne Bay into the seabed is very low at less than 0.001 cm/s. The NRC staff's largest concern with the model is caused by uncertainty in the model parameters, especially in light of the limited area of calibration data and the large number of parameters that must be estimated. This may have a significant impact on the predicted volumes of water that would be extracted from the inland potion of Biscayne aquifer along the northwest corner of the model area and the amount captured from the industrial wastewater system. The NRC staff regards model estimates of inflow to the proposed excavations as more accurate than estimates of RCW captured water sources because of the knowledge of hydraulic parameters in that immediate area of the planned excavations.

G.3.2.2 Summary of USGS Modeling

The NRC commissioned the USGS to perform a numerical modeling study of the effects of the operation of a proposed RCW system at the Turkey Point site on surface and groundwater

salinity. The resulting report (NRC 2014-TN3078) represents part of the review team's technical basis in its impact determination in this environmental impact statement (EIS).

Purpose of the Study

FPL proposes installing the RCWs at the Turkey Point site for use as a backup source of cooling water for proposed Units 6 and 7 in case of the loss of the normal water supply (reclaimed water from Miami-Dade County waste water treatment system). Neither the reclaimed water nor the water from the RCW system provides a safety-related function. The design of the RCW system and the flow from it are described in Chapter 3 of this EIS. Because of the potential during operation of the RCWs to alter the salinity of two sensitive and significant local water resources—the Biscayne Bay and the Biscayne aquifer—the review team commissioned the USGS independent modeling study. Salinity in Biscayne Bay is a concern because of the ongoing actions under the Comprehensive Everglades Restoration Plan (CERP) to restore freshwater flows to Biscayne Bay National Park (USACE/SFWMD 2011-TN1038). The Biscayne aquifer has been designated a sole-source aquifer by the U.S. Environmental Protection Agency and is critical to the region's freshwater supply.

Unique from other numerical modeling studies included in the review team's assessment, the USGS model explicitly considered density effects on the flow within and between the groundwater and the surface-water systems. The spatial and temporal patterns of salinity are primarily controlled by the flow of water. Therefore, an understanding of various processes resulting in flow is required for the review team to understand the plausible impacts of the RCW operation.

The commissioned study discussed herein relied on a numerical model developed and applied previously to this domain by USGS (NRC 2014-TN3078). This numerical model was used to simulate specific conditions that are understood to exist at the Turkey Point site and under boundary conditions consistent with the operation of the RCW system. The site conceptual model and the numerical model are discussed below.

Conceptual Model

The conceptual model of the region is consistent with a coastal freshwater-saltwater interface. Freshwater results from precipitation that infiltrates into the groundwater system and flows down gradient toward the ocean. As it approaches the seawater, the less dense freshwater tends to flow over the more dense seawater forming a saltwater wedge. The location of this saltwater wedge can move in response to increases and decreases in groundwater recharge from precipitation and also in response to groundwater pumping. Excess precipitation that does not enter the groundwater system through recharge can enter the ocean via sheet flow and channel flow. Several canals discharge freshwater during the wet season (summer to fall). However, along a portion of the area to the south of Turkey Point, the cooling canals prevent sheet flow from discharging to Card Sound and Biscayne Bay directly east of the cooling canals. The warm, hypersaline water in the unlined cooling canals also creates a plume of dense hypersaline groundwater under the cooling canals. Therefore, the site conceptual model reflects these conditions unique to the Turkey Point site. Further discussion of the hydrologic environment including the cooling canals can be found in Section 2.3 of this EIS.

The analysis considered the surface water (notably Biscayne Bay) to be vertically mixed (NRC 2014-TN3078). The review team considered this assumption and determined that because of the shallow depths of Biscayne Bay, particularly near Turkey Point, this assumption was not unreasonable for the examination of potential RCW impacts on salinity in Biscayne Bay. While localized areas of salinity stratification may develop, wind mixing is expected to keep Biscayne Bay well mixed. The analysis used two-dimensional circulation, which is driven in response to wind forcing and tidal elevation boundary conditions (NRC 2014-TN3078). The analysis also assumed that the tidal boundary had a typical seawater salinity of 35 practical salinity units (psu).

Given that one of the motivations for this study was to consider density-driven flow within the groundwater system, the conceptual model explicitly allows for multiple layers and for both vertical variations in hydrogeologic flow-related parameters and for salinity variations. The boundary conditions for the groundwater portion of the model are the freshwater piezometric heads at the boundary of the domain and the areal recharge rates over the extent of the land surface of the domain, which vary seasonally.

The conceptual model explicitly considers the surface-water/groundwater interface with exchange allowed in both directions depending on pressure gradients from upgradient freshwater inflows to groundwater, water-surface elevation differences along canals, well pumping, seepage of cooling canal waters to groundwater, and tidal head variation (NRC 2014-TN3078). For instance, marine waters of Biscayne Bay water can percolate into the bed, enter the groundwater system, and enter the RCWs, and freshwater can enter the Bay through groundwater discharge.

Evaporation of seawater results in increases of salinity. Poorly mixed shallow marine areas without sufficient freshwater inflow are likely to become hypersaline as a result of evaporation. The study included the effect of evaporation on salinity (NRC 2014-TN3078).

As described in Section 2.3 of this EIS, the groundwater underneath Biscayne Bay has salinity levels similar to the marine surface waters. Below the freshwater layer landward of Biscayne Bay, there is a wedge of saline water that intrudes inland. The freshwater underlying the land has a somewhat higher piezometric head than the groundwater underlying Biscayne Bay; hence, there is a flux of freshwater eastward toward Biscayne Bay. Seasonal rainfall patterns also influence the flux of freshwater with increased runoff and surface-water discharge to Biscayne Bay and increased infiltration into the surface layers of the groundwater. Additional components of the surface-water/groundwater system that exist at present include water-supply pumping around population centers, drainage ditches that intercept shallow groundwater, and the cooling canals at Turkey Point. Inland water-supply pumping withdraws freshwater from the groundwater, thereby reducing the piezometric head that drives the salinity wedge seaward. Drainage ditches intercept shallow groundwater and transport it for discharge to Biscayne Bay. These processes are included in the conceptual model.

Numerical Model

The USGS model is based on a previously developed regional-scale model (Lohmann et al. 2012-TN1429) that integrated surface-water and groundwater processes to study flows into and out of Biscayne Bay (Figure G-3). The original model's intent was to examine regional-scale processes that influence Biscayne Bay salinity.

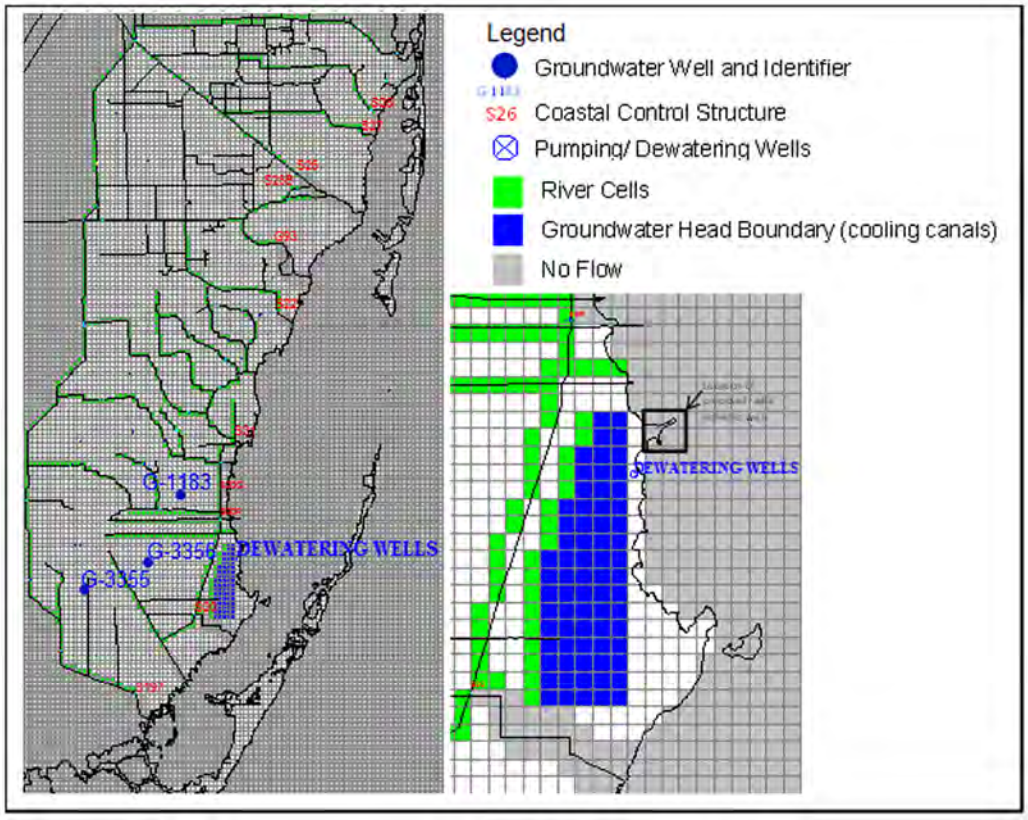

Figure G-3. USGS Model Domain and Grid Used for Salinity Analysis of RCW Pumping at Turkey Point. ***An inset of the grid in the vicinity of Turkey Point is included. (Taken from NRC 2014-TN3078, Figure 2)***

Both model studies (Lohmann et al. 2012-TN1429; NRC 2014-TN3078) covered the period January 1996 through December 2004, a duration of 9 years. This simulation period was chosen because the Lohmann et al. model was calibrated for this period. The canal inflows, precipitation, and meteorology applied in the NRC-commissioned study are the same as those used by Lohmann et al. (2012-TN1429). For the regional-scale analysis, the model used a 500 m by 500 m grid spacing to define the physical features of the model domain. The model uses 20 vertical layers that represent the whole aquifer, with one of those layers representing Biscayne Bay. The surface layer is 4 m thick, the second layer is 1.5 m thick, and the remaining layers are 2.75 m thick. The NRC commissioned study (NRC 2014-TN3078) updated the previously developed model to include (1) the cooling canals and (2) the representation of two temporary dewatering wells during the construction period at the proposed site for the Unit 6 and 7 reactors for the scenarios. Pumping from the dewatering wells was only included in the base case. The cooling canals were represented in the model by 70 cells for which the water-surface elevations were specified and the salinity was set to a constant 65 psu. The two dewatering wells were represented in the model in one cell and were set to pump for a 6-month period (June 2001 through December 2001). The inclusion of these two updates into the Lohmann et al. (2012-TN1429) model constituted the base case of the analysis.

For the evaluation of RCW pumping, the entire RCW system was represented in the model by four grid cells. When active, the total RCW pumping rate was set to 490,536 cubic meters per

day (m^3/d) (90,000 gpm). Model inputs that were varied in the commissioned study were (1) the RCW withdrawal layer (layer 3 or layer 5) in the scenarios, (2) the distribution of RCW well intakes in model, (3) the RCW pumping period, and (4) vertical hydraulic conductivities and leakage of the subsurface layers (NRC 2014-TN3078). The commissioned report did not present results for all combinations of the varied inputs because the modeling results of some scenarios were not significantly different from the ones that were included in the report. The analyses ultimately included were for RCW groundwater extraction from layer 3 and for the well intakes distributed along the RCW intake pipes (NRC 2014-TN3078).

In regard to the RCW pumping periods, the commissioned study examined (1) continuous pumping (the most conservative pumping option), (2) 90-day pumping during the annual dry period, and (3) alternating periods of 30 days pumping and 90 days no pumping (NRC 2014-TN3078). Each of these pumping periods is longer than the 60 days mentioned in Section 5.2.1.2 of this EIS as the limit currently proposed by FDEP as the permit condition for operating the wells. Consequently, each pumping period analyzed by the commissioned study (NRC 2014-TN3078) is more conservative than the FDEP conditions would actually permit. Ultimately, the review team included only the continuous-pumping and 90-day-pumping scenarios, because they were the most conservative of the three pumping scenarios examined by USGS. Continuous pumping does not allow any time for system recovery as would occur with the alternating pumping and no-pumping scenarios.

In regard to vertical conductivities, the NRC (2014-TN3078) study examined (1) the values used in the previous study (Lohmann et al. 2012-TN1429), which were used in the base case, (2) decreased vertical conductivity in the subsurface layers plus decreased leakage between surface-water and groundwater layers, and (3) decreased vertical conductivity in all subsurface layers except layers 3, 4, and 5 (RCW extraction layers). The review team only included the first of these realizations because it was based on the calibrated model of the Biscayne Bay and aquifer system. Also, the review team expects that any reduction of vertical conductivity would decrease the effect of RCW pumping on Biscayne Bay salinity.

The commissioned study specified that initial conditions used to start the scenario analyses be the same as the final state of the base case in order to provide each of the scenarios with a common starting point. The specified initial conditions include heads, water levels, and salinity.

Results

The alterations on the salinity in the groundwater and in Biscayne Bay predicted by the USGS model are discussed in the following sections.

RCW Pumping Effects on Groundwater Salinity

At the end of the base case run, the predicted potentiometric surface showed a slight depression along the coast near Turkey Point that is the result of pumping the RCWs in the area that is included in the model (Figure G-4; NRC 2014-TN3078). Layers 2 and 3 were selected for plotting because they are just below Biscayne Bay and any canals, so that any groundwater effects from RCW pumping on Biscayne Bay will be transmitted through these two layers. For the continuous-RCW-pumping scenario, the USGS model predicted a cone of depression that surrounded the RCWs and extended laterally for several hundred meters (NRC 2014-TN3078).

The model predicted that the cone of depression for the continuous-pumping case would be present at the end of the simulation because there was no opportunity for recovery. For the 90-day-pumping case, the model predicted that the cone of depression would not be evident at the end of the simulation because the system would have fully recovered after 275 days of no pumping.

The effect on regional groundwater potentiometric head to the northwest and west of the RCWs and Turkey Point site was predicted to be minimal. Sensitivity tests with vertical conductivity predicted there could be slightly larger changes in potentiometric head, which were attributed to a slightly landward movement of higher density (higher salinity) groundwater (NRC 2014-TN3078). The review team notes that these ranges of potentiometric head were within the range of uncertainty and predictive error of the model.

The salinity results at the end of the simulations for layers 2 and 3 within the groundwater system are shown in Figure G-5 (NRC 2014-TN3078). The blue regions landward of the coast represent freshwater. The green regions are where the marine water was predicted to infiltrate into the first two groundwater layers. The red zones are the hypersaline (high density) plume originating from the cooling canals.

For the area north of the hypersaline plume Figure G-5 the model predicts that in the continuous-pumping case, salinity would decrease landward of Turkey Point in comparison with the base case, while in the 90-day-pumping case, there would be a smaller decrease in salinity. For the continuous-pumping case the model predicts an increase in salinity in layer 3 (Figure G-5) directly under Turkey Point (essentially in a single grid cell), and a decrease in salinity north of the hypersaline plume. For the 90-day-pumping scenario, a decrease in salinity north of the hypersaline plume was also predicted, though the decrease was smaller than for continuous pumping. The smaller change results from the 9 months of recovery per year that is modeled in the 90-day-pumping scenario.

The change in groundwater salinity predicted by the model was assessed by finding the greatest differences for each grid cell between a scenario and the base case (NRC 2014-TN3078). The results at the end of the simulations of the greatest salinity differences for the continuous-pumping and 90-day-pumping scenarios are shown in Figure G-6. Note that the maximum predicted salinity differences for each model grid cell would not necessarily occur in the same layer, but this analysis provided an overall trend of salinity change. The predicted penetration into the groundwater system of the hypersaline plume from the cooling canals produced the ring of high positive change that surrounds the Turkey Point facilities. The model predicted greater freshening of the groundwater under the continuous-pumping scenario than under the 90-day-pumping scenario. The freshening is shown by a negative change in salinity centered northwest of Turkey Point. The predicted change, with the inclusion of RCW pumping, likely results from the withdrawal of a portion of the hypersaline plume from the groundwater system. Because the model conserves mass, withdrawal of groundwater results in water being drawn from other sources to replace it, and the freshening in this region could be due to predicted inflow from either freshwater or marine waters.

Examination of the total volumetric exchange between surface waters and groundwater showed that for the base case the model predicted a tendency toward discharge from the aquifer to Biscayne Bay (Figure G-7), though the base case rates were small (<500 m^3/d). Landward of

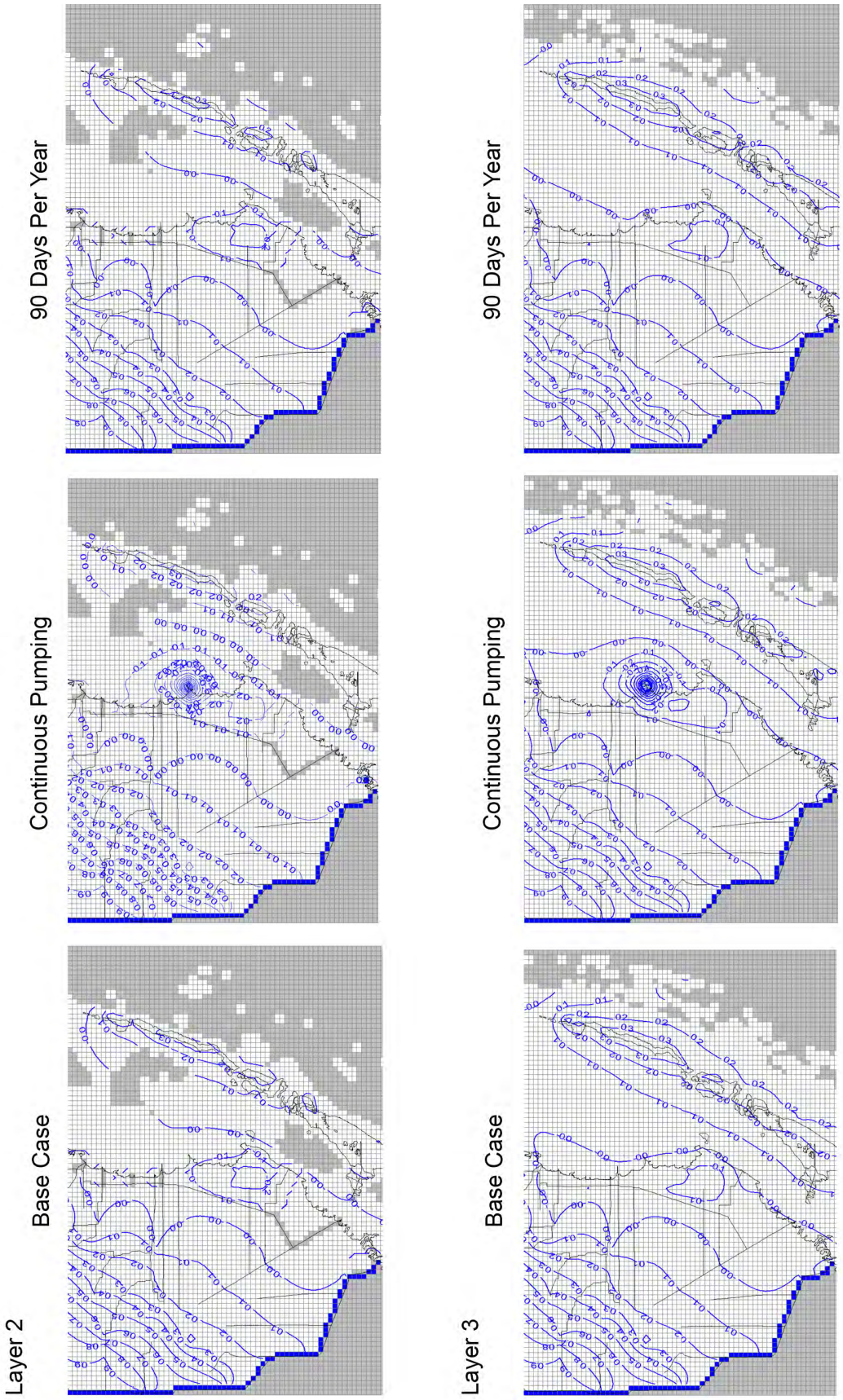

Figure G-4. Potentiometric Surfaces for Base Case and Continuous-Pumping and 90 d/yr Pumping Scenarios at the End of the 9-Year Simulations. *Units are meters of elevation (NAVD88). (Taken from NRC 2014-TN3078, Figure 5, Figure 6A, and Figure 7)*

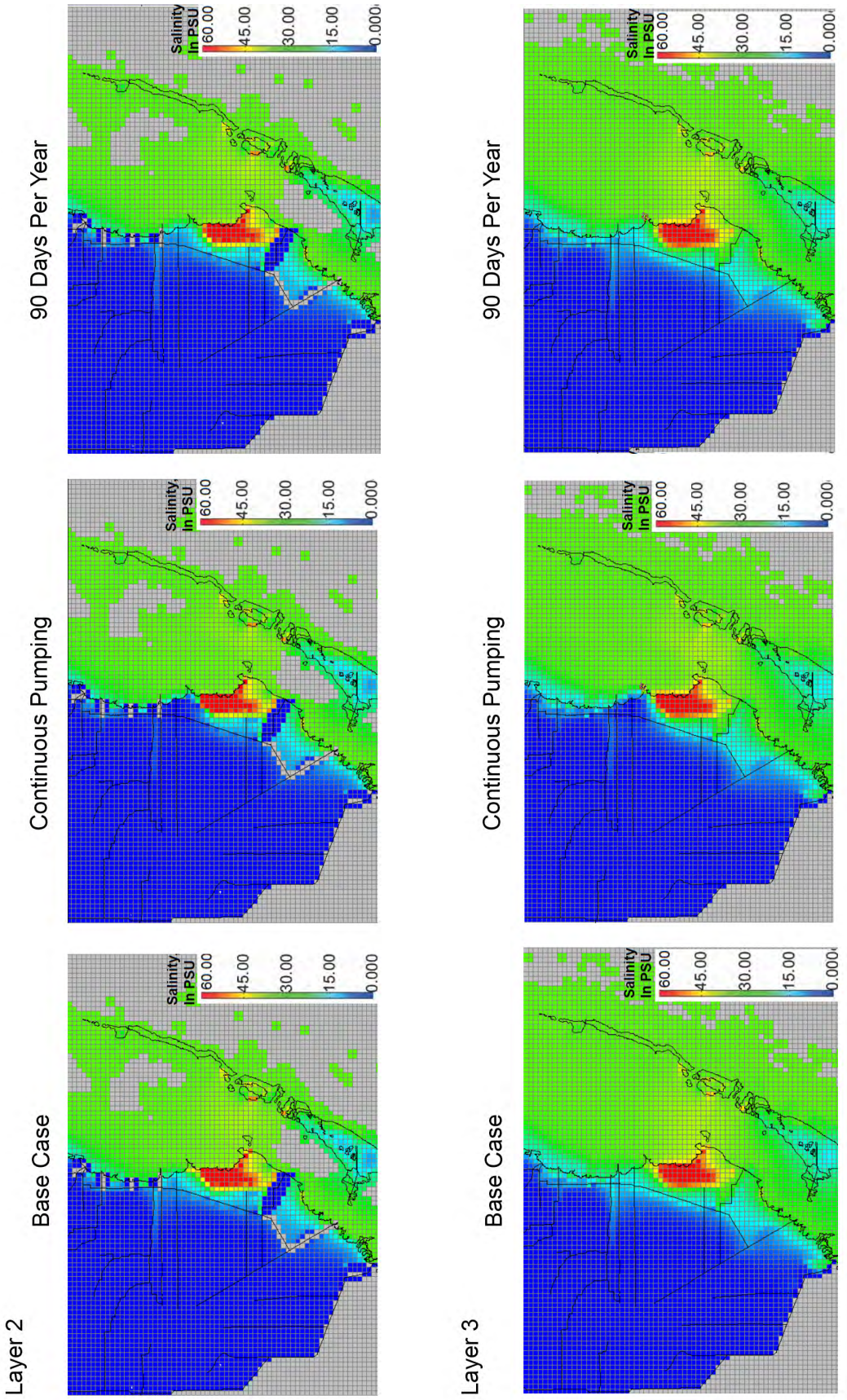

Figure G-5. Salinities for Base Case, Continuous-Pumping, and 90 d/yr Pumping Scenarios at the End of the 9-Year Simulations. *Units were practical salinity units. (Taken from NRC 2014-TN3078, Figure 17, Figure 18A, and Figure 19)*

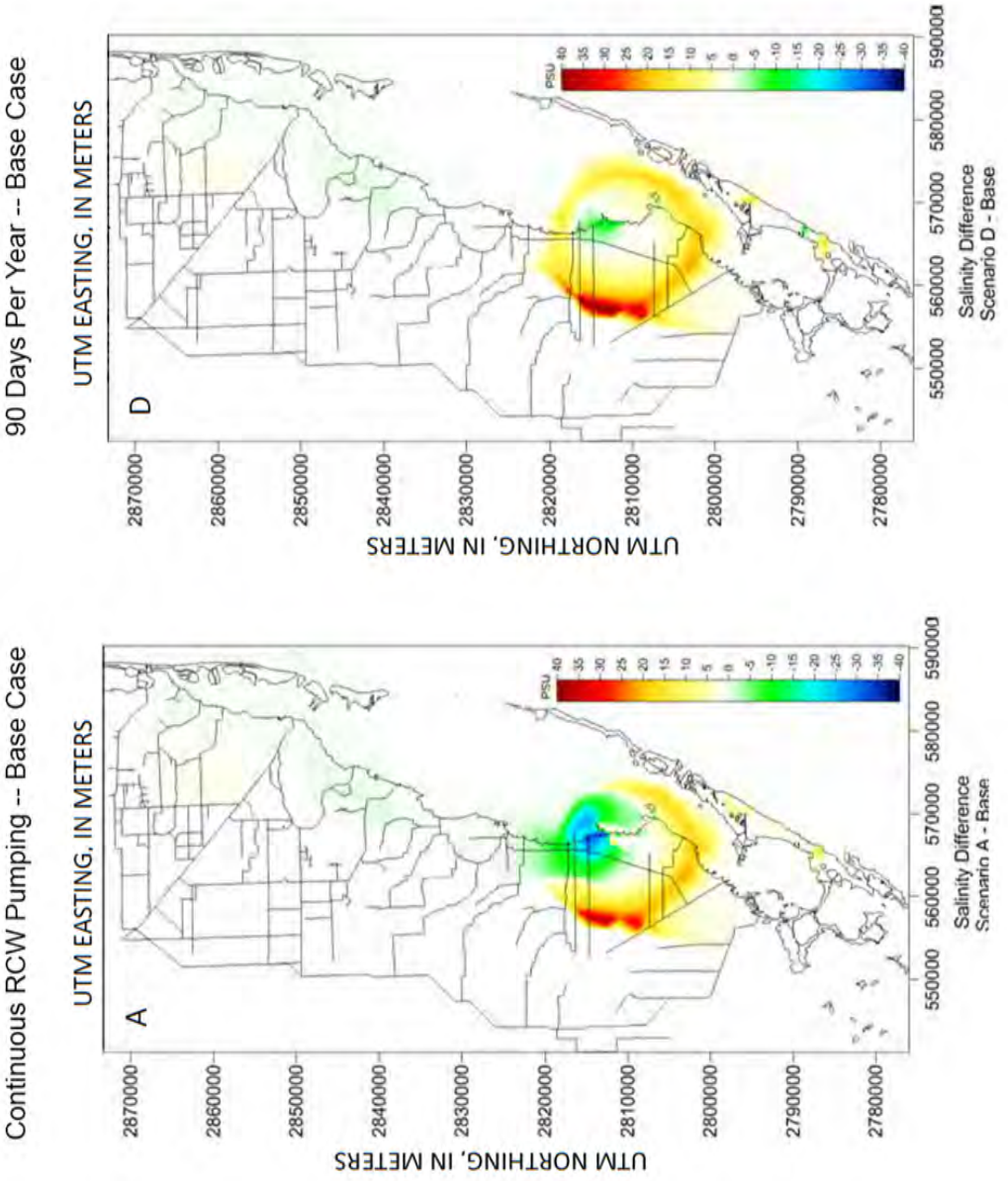

Figure G-6. Differences between Maximum Salinities between the Continuous RCW-Pumping Case and the Base Case and between the 90 d/yr Pumping Case and the Base Case (Taken from NRC 2014-TN3078, Figure 16b)

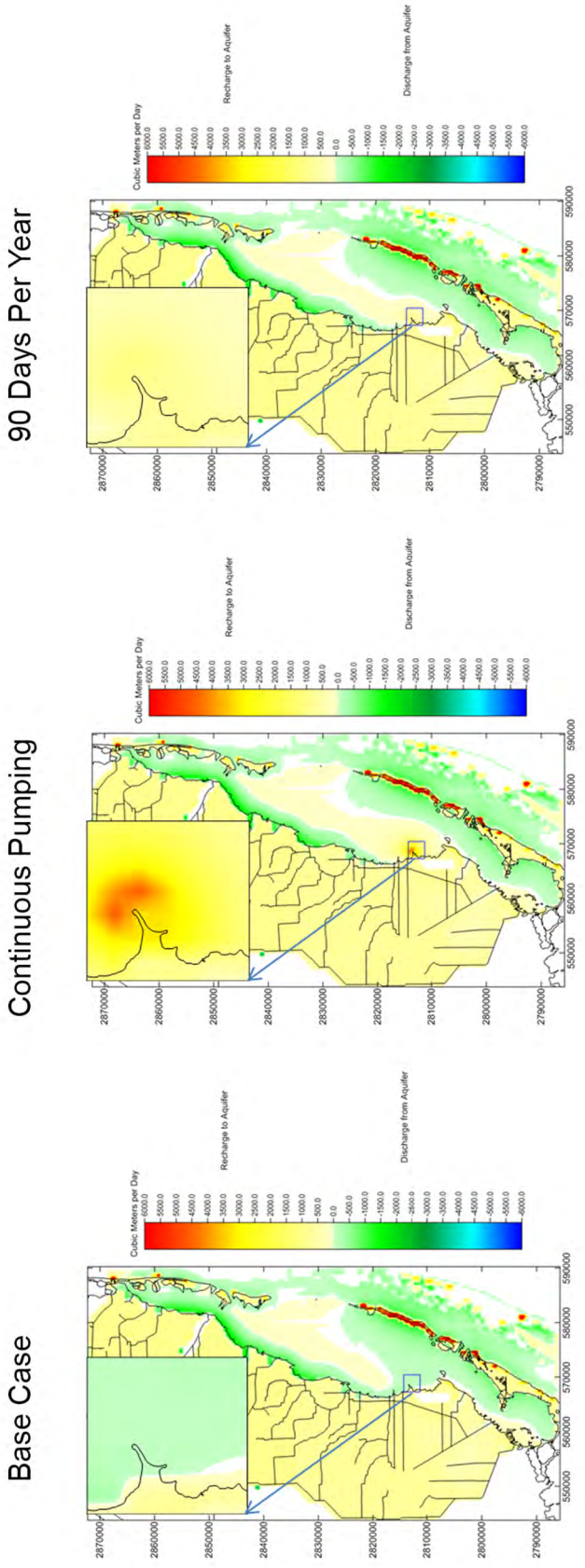

Figure G-7. Total Leakage (m^3/d) at the End of the Simulation for the Base Case, Continuous RCW-Pumping, and 90 d/yr Pumping. (Taken from NRC 2014-TN3078, Figure 26 and Figure 27)

Biscayne Bay, the total volumetric exchange predicted for the base case tended toward recharge, as expected with the occurrence of precipitation and infiltration into the land. For the continuous-pumping case, the model predicted a tendency for high recharge (inflow) from Biscayne Bay into the aquifer, as expected with RCW pumping, with rates locally around 5,000 m^3/d. For the 90-day-pumping scenario, the results tended toward recharge but without the higher localized recharge rate predicted with continuous pumping.

RCW Pumping Effects on Biscayne Bay Salinity

To investigate the salinity response in Biscayne Bay to RCW pumping, the review team examined model output results at locations near Turkey Point (NRC 2014-TN3078) corresponding to the measurement stations reported in this EIS Table 2-9, as well as three additional stations further north and close to Turkey Point (Figure G-8). Only the continuous-pumping scenario was included in the examination of Biscayne Bay salinity because the USGS model predicted the largest effects on groundwater for this scenario and it provided an upper bound of salinity variation of all potential RCW-pumping scenarios.

Time series of salinity results and salinity differences for the seven stations are shown in Figure G-9. Generally, the model predicted that salinity would exhibit seasonal variation due to freshwater inflows from drainage canals into Biscayne Bay, while increases in salinity would result from evaporative losses. For both the base and continuous-pumping cases, the largest seasonal variations were predicted at the northernmost locations (station A and B), with the smallest seasonal variations around Turkey Point (station C). Model results for locations closest to the measurement stations exhibited an intermediate range of seasonal variation. The north-south differences in seasonal salinity variation was likely caused by the northern portion of the region receiving relatively larger inputs of freshwater inflows from canals during the wet season.

The review staff computed the summary statistics (Table G-22) for salinity time series for the stations shown in Figure G-9. As suggested by the variation seen in the time-series plots, the standard deviations were largest for the northernmost stations examined. The minimum and maximum salinities also varied by location, with the largest maximum and smallest minimum predicted for the northernmost stations. For the tidal boundary, the primary source of water for Biscayne Bay, the model had the salinity set to 35 psu (Lohmann et al. 2012-TN1429). In comparison with the measured stations (EIS Table 2-9), the maximum salinities from the NRC commissioned study were smaller than observed at the measured stations (NRC 2014-TN3078). However, the periods from which the data were available were not the same between the measured data (2005 onward) and model results (2004 and earlier), so that direct comparisons are not possible.

The review team finds that the salinity differences between the continuous-pumping and base cases varied between +2 psu to -2 psu, but with most variations between +1 psu and -1 psu (Figure G-9). The model predicted an anomalous increase within the first year (1996) because of the onset of pumping, but this was wiped out by the start of 1997. Variations beyond +2 psu and -2 psu were predicted to be of very short duration.

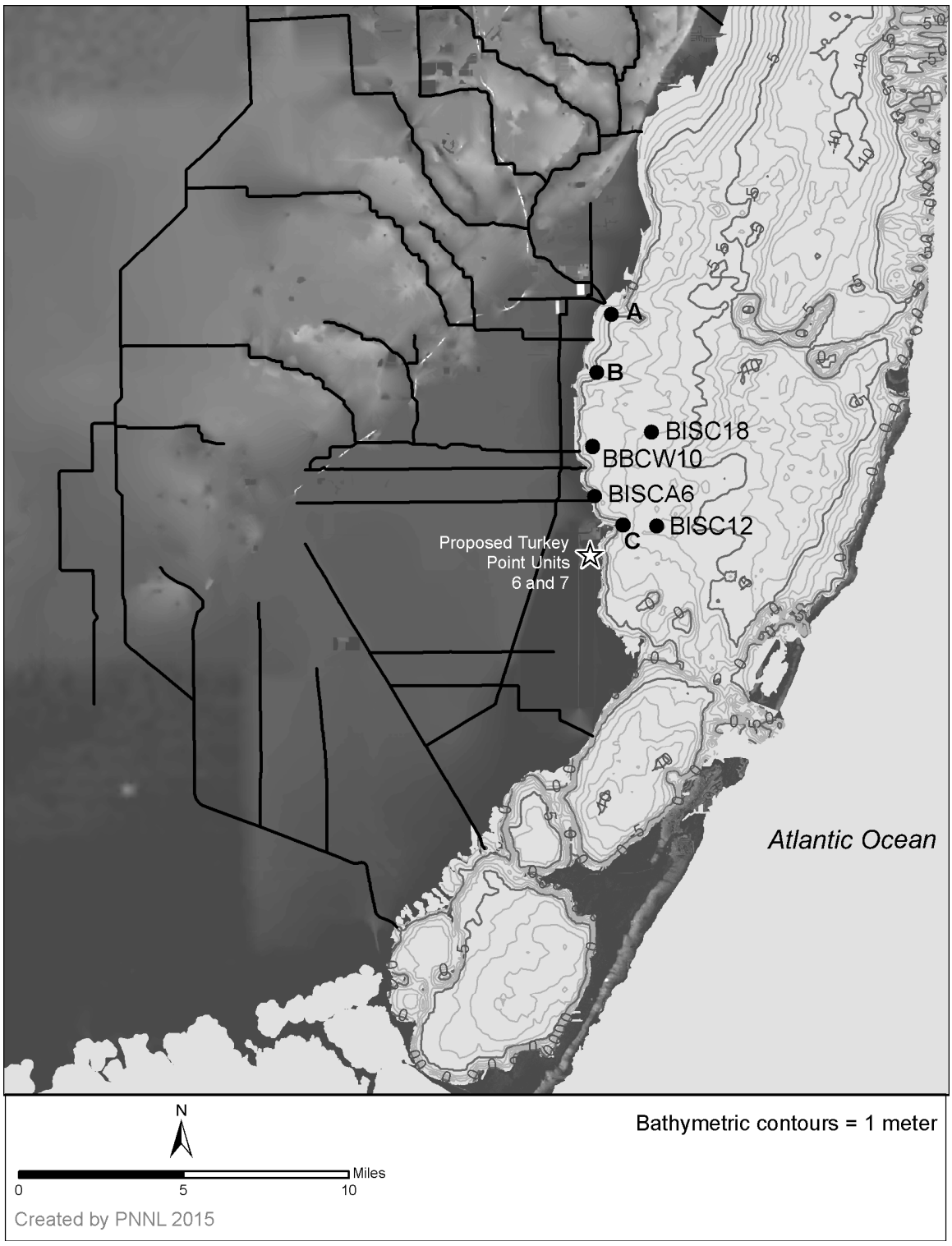

Figure G-8. Locations Where Salinity Time Series from USGS Model Were Examined

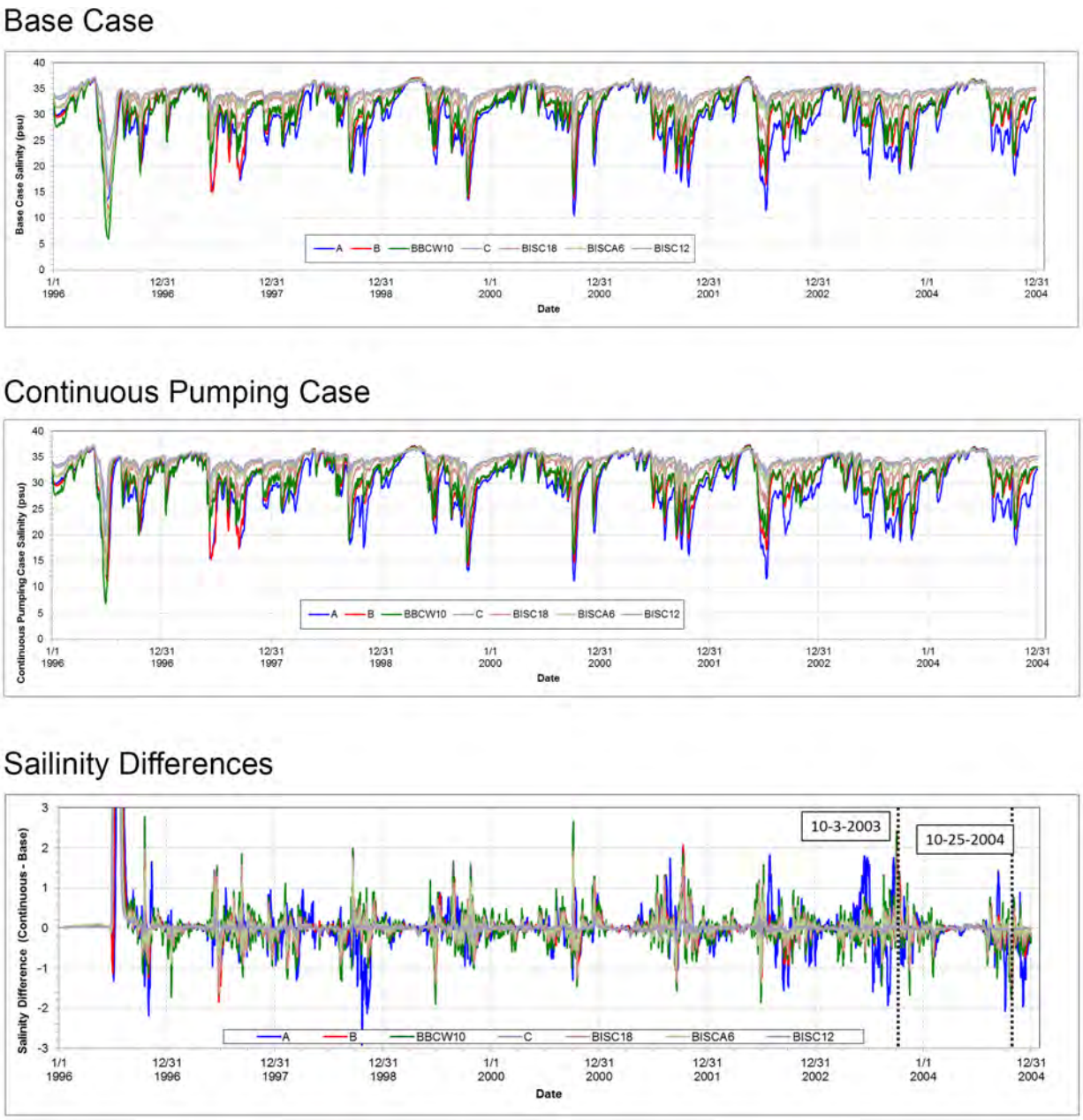

Figure G-9. Salinity and Salinity Differences (psu) from USGS Model at Locations Indicated in Table G-22. ***The dashed lines indicate the times for which spatial variations were examined (see Figure G-10 and Figure G-11).***

Table G-22. Summary of Predicted Salinity for the Period January 1, 1997 through December 31, 2004 near the Turkey Point Site at Stations Shown in Figure G-9

Station	Number of Time Intervals	Mean (psu)	Standard Deviation (psu)	Minimum (psu)	Median (psu)	Maximum (psu)
Base Case						
A	2,922	29.62	5.08	10.48	30.18	37.35
B	2,922	31.24	4.21	13.81	31.84	37.24
BBCW10	2,922	31.66	3.62	14.36	32.02	37.05
BISC18	2,922	33.56	2.34	20.92	33.98	36.91
BISCA6	2,922	34.41	1.48	24.75	34.62	36.97
C	2,922	34.67	1.14	28.26	34.81	36.90
BISC12	2,922	34.76	0.94	29.27	34.86	36.65
Continuous-Pumping Case						
A	2,922	29.58	5.09	11.19	30.13	37.32
B	2,922	31.22	4.20	14.02	31.81	37.24
BBCW10	2,922	31.65	3.60	14.68	31.95	37.06
BISC18	2,922	33.55	2.32	21.03	33.97	36.93
BISCA6	2,922	34.41	1.46	25.20	34.62	36.99
C	2,922	34.67	1.13	28.26	34.81	36.92
BISC12	2,922	34.76	0.94	29.24	34.86	36.70

psu = practical salinity units

Source: NRC 2014-TN3078

To investigate the spatial distribution of salinity and salinity differences, the review team examined salinity at two different characteristic periods. One was selected that had positive salinity differences as shown in Figure G-9, and another was selected that had negative salinity differences as shown in Figure G-9. During both of these periods, the salinities along the nearshore north of Turkey Point were lower than those typically found for marine waters, being on the order of 20 psu compared to 35 psu specified at the model's tidal boundary with the Atlantic Ocean (Figure G-10 and Figure G-11). Examination of the salinity differences from the October 3, 2003 results showed a small increase in salinity in southern Biscayne Bay (Figure G-10), with only a small patch of nearshore water predicted to have a salinity increase on the order of +2 psu. In contrast, the results for the October 25, 2003 period showed a small decrease in salinity (Figure G-11), with a small patch of nearshore water predicted to have a salinity decrease on the order of -1.5 psu.

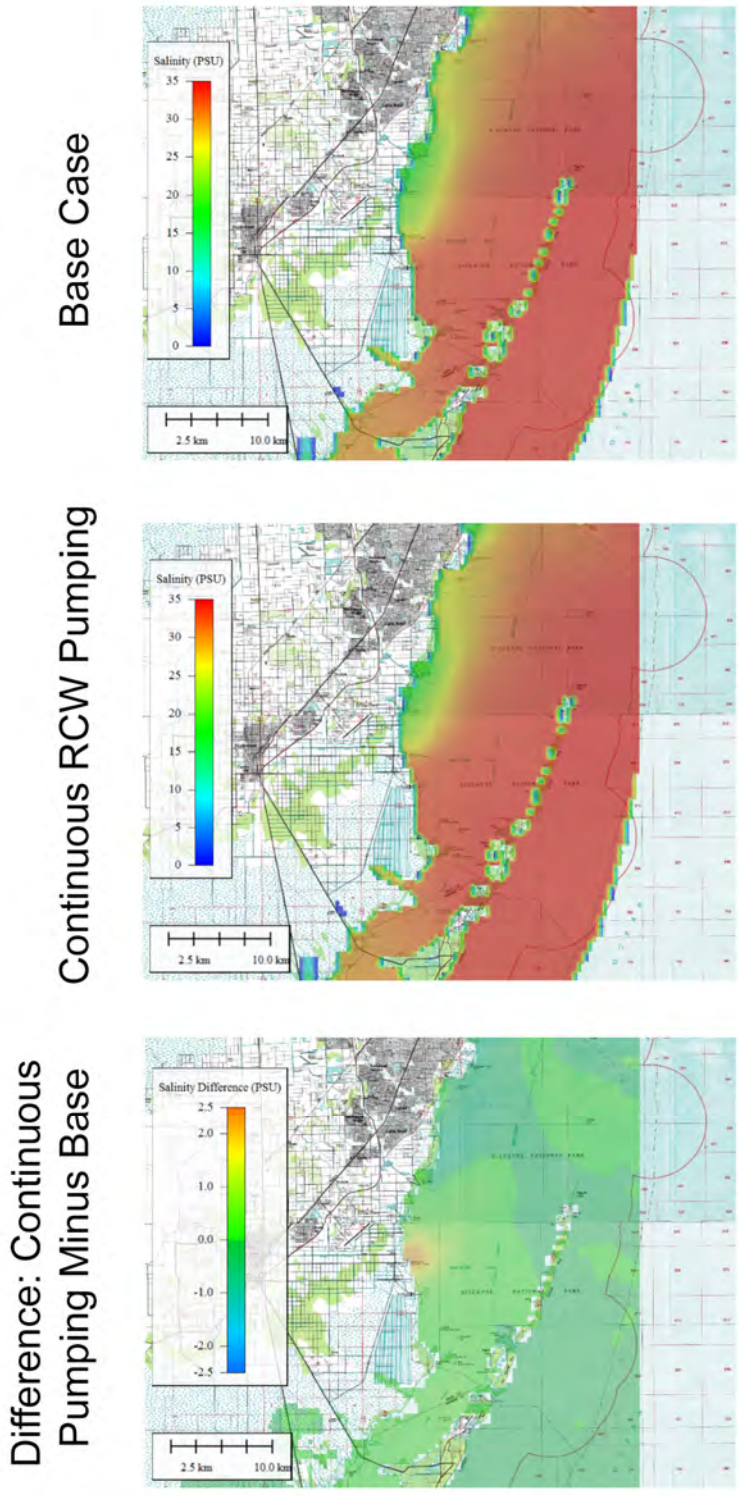

Figure G-10. Surface-Water Salinities at the Time with the Largest Difference North of Turkey Point between the Base Case and Continuous-Pumping Scenario on October 3, 2003. ***Units are psu (practical salinity units).***

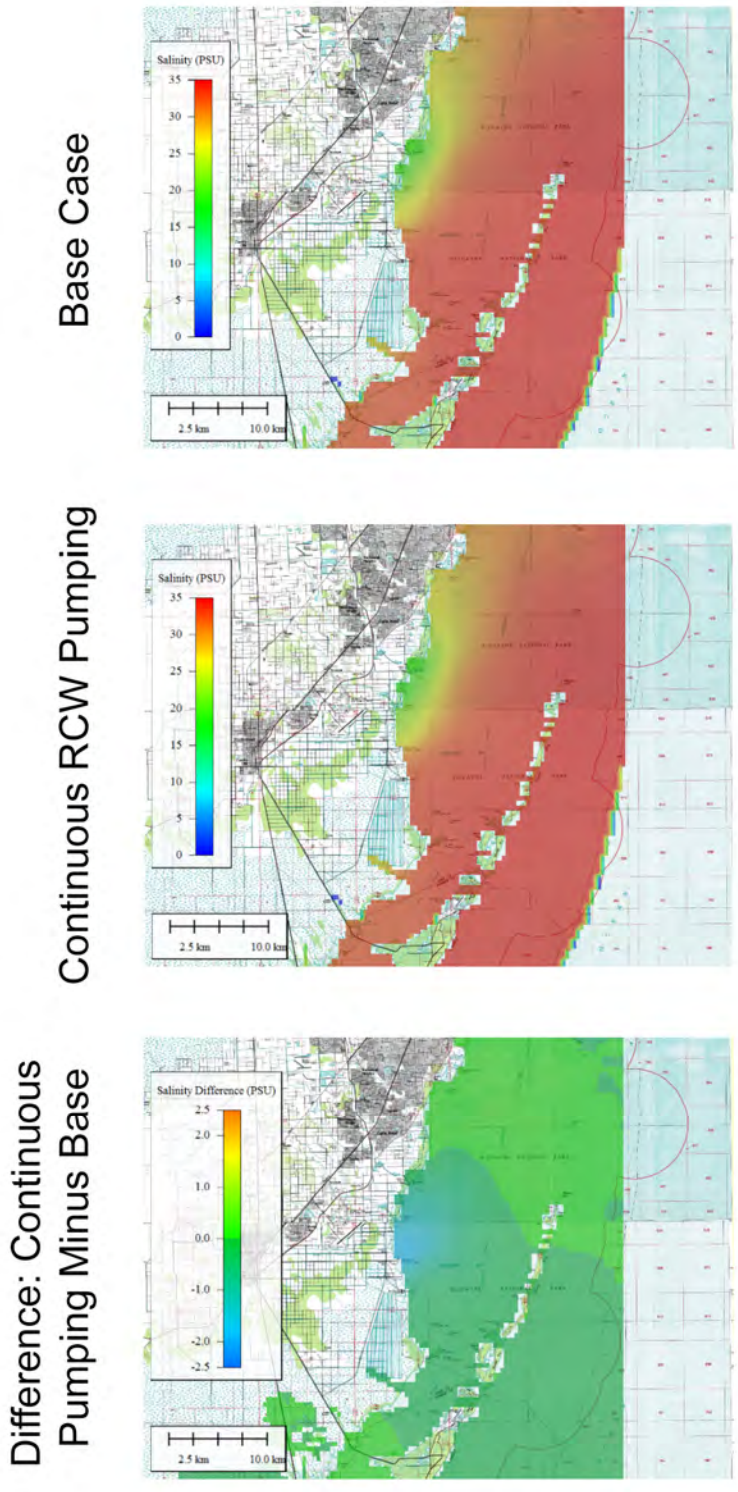

Figure G-11. Surface-Water Salinities at the Time with Largest Decreases North of Turkey Point between the Base Case and Continuous-Pumping Scenario on October 25, 2004. ***Units are psu (practical salinity units).***

G.3.2.3 Summary of Review Team Focused Modeling

To further confirm the review team's understanding of the groundwater hydrodynamics and to consider whether certain actions proposed after the two earlier modeling studies were completed would alter the earlier conclusions documented by the review team in their draft environmental impact statement (EIS, NRC 2015-TN4444), the review team performed a third modeling analysis. This third modeling analysis is discussed in this section and presented in detail by Oostrom and Vail (2016-TN4739).

The review team used the water-salt-energy mode of the STOMP (Subsurface Transport Over Multiple Phases) simulator to perform the simulations (White and Oostrom 2006-TN4808). The applicable governing equations are the component mass-conservation equation for water and salt and the energy conservation equation. The simulator allows for the consideration of density-driven flow and temperature effects caused by the seepage of warm hypersaline water from the unlined cooling-canal system (CCS) into the saline Biscayne aquifer. The review team based the model configuration on an earlier cross-sectional model published by Hughes et al. (2010-TN1545). The two-dimensional (2D) model is 46 km long and extends 35 m vertically. To facilitate simulation of the effects of radial collector well operation, the review team also developed a three-dimensional (3D) model, which represents a 2 km wide extension of the 2D model.

The review team performed a steady-state simulation with a Biscayne Bay hydraulic head of 0.2 m and a west boundary head of 1.05 m to obtain the initial conditions for both the 2D and 3D simulations. The long-term (10,000-year) simulations yielded a typical salt intrusion front, which extends below the CCS. For the subsequent hypersaline water infiltration simulations, the review team used the same boundary conditions as those proposed by Hughes et al. (2010-TN1545) for hydraulic heads and temperature.

The 2D simulations predict several main observations, as follows:

- CCS operation with warm 70 g/L hypersaline water leads to the development of a large subsurface plume.
- Reducing the CCS salt concentration leads to a stable displacement of hypersaline water from the CCS subsurface.
- Increasing the hydraulic head in the L-31E Canal limits westward migration of the hypersaline plume.
- Increasing the west boundary hydraulic head (indicative of increased recharge) results in a compression of the hypersaline plume at the west side of the CCS.
- Decreasing the west boundary hydraulic head (indicative of reduced recharge) has the opposite effect, and leads to additional migration of the hypersaline plume in the western direction.
- During sea-level rise, infiltrating saltwater from the Biscayne Bay pushes the hypersaline water toward the CCS subsurface. Over time, the interface between hypersaline water originating from the CCS and seawater becomes more sharply defined and more vertical.

The 3D simulations predict several main observations, as follows:

- Periodic extraction using the RCW system leads to fluctuating salt concentrations in the radial collector wells.
- During pumping, the salt concentrations initially increase because of advective transport of hypersaline water through the Upper Higher Flow Zone; the salt concentrations then decrease because of the influence of extracted Biscayne Bay saltwater.
- During intervals between periods of pump operation, salt concentrations slightly increase due to diffusion of hypersaline water eastward; the radial collector well salt concentrations do not change significantly from year to year.
- RCW pumping increases the concentration gradients between the hypersaline plume below the CCS and Biscayne Bay saltwater in the upper parts of the aquifer and removes some of the hypersaline water from the Fort Thompson formation; the extracted volumes originate largely from Biscayne Bay (>95 percent); pumping rate reduction (up to 10 percent of maximum) and duration reduction (50 percent) do not considerably influence collector well salt concentrations. This result indicates that the proposed RCW operation with a 86,400 gal/min withdrawal rate over 60 days per year would completely dominate flow and transport adjacent to the RCWs, because reasonable variations in the rate and duration do not considerably influence collector well salt concentrations.
- Boundary condition modifications (i.e., L-31E Canal head and west boundary head increases) applied to the west of the CCS do not influence RCW extraction behavior.
- Seawater rise in Biscayne Bay leads to decreasing RCW saltwater concentration over time because the increasing Biscayne Bay hydraulic head displaces hypersaline water toward the CCS subsurface.
- Operation of remediation wells in the Lower Higher Flow Zone below the Interceptor Ditch does not influence extracted RCW salt concentrations.
- Salt concentrations in the remediation wells are predicted to increase to CCS salt levels within a year of remediation pumping.
- Freshening of the CCS surface water results in reduced RCW salt concentrations with relatively minor (<1 g/L) fluctuations.

Without doubt, some perturbations of the baseline boundary conditions result in significantly altered environmental baselines. However, while the operation of the RCWs would change the incremental impacts of the RCWs on the salinity distribution of the Biscayne aquifer, the alterations would remain at levels that may only be detectable within the immediate vicinity of the RCWs. While the numerical model analysis predicts a slight westward movement of some hypersaline water as a result of the operation of the RCWs, there is no plausible upward impelling force above the RCWs that would result in hypersalinity moving into the Bay as a result of RCW operation. As the review team acknowledged in the EIS Section 2.3.1, when the water-surface elevation in the cooling canals exceeds that in the Bay, the water will follow the gradient of the impelling force into the Bay and may contribute to salinity in the Bay. Both of the above effects also apply for other dissolved constituents in the hypersaline plume, including nutrients and tritium.

Although the primary focus of the modeling reported here is on the incremental effects of the RCWs on the Biscayne Bay, the review team also acknowledges the cumulative impacts of other changes, including those from sea-level rise and possible future regulatory actions. While the scenarios considered in this analysis were designed to be bounding for sea-level rise and possible regulatory actions, they also provide a basis for assessing the cumulative impacts. NRC lacks authority to impose additional mitigation measures regarding surface water conditions subject to State regulation. However, additional mitigation actions proposed by state and county agencies would presumably improve the baseline environment. Because the modeling results predict that the incremental effect of the operation of the RCWs remains minor, the cumulative effects would also remain minor.

The review team's modeling predicts minor localized alterations in salinity distribution due to RCW operation, and these results suggest that the operation of the RCWs is unlikely to interfere with any of the mitigation measures proposed to address the conditions in the cooling canals or the underlying Biscayne aquifer.

G.3.3 Confirmatory Calculations of Potential Upward Migration of Injectate from the Boulder Zone of the Lower Floridan Aquifer

As described in Chapter 5 of the EIS, blowdown and other liquid wastes from the proposed plants would be injected into the Boulder Zone of the Lower Floridan aquifer. Use of reclaimed water as a makeup water source would result in injectate that is buoyant because of its lower density compared to the saline water in the Boulder Zone. FPL conducted performance assessment modeling of potential upward migration of injectate based on the reclaimed water source (FPL 2014-TN4069) in support of the safety and environmental analysis of the proposed plants. The analyses consisted of two main scenarios that were considered feasible:

- Normal Operation Scenario: Upward migration of contaminants through a competent middle confining unit (MCU) under expected hydrogeologic conditions. The normal operation scenario assumes that no system failures occur, e.g., no injection well failure or subsurface loss of confinement beyond the FPL property area.
- Off-Normal Operation and Inadvertent Intrusion Scenario: Bypass of the MCU at a location 2.2 mi from the wastewater injection site through a hypothetical high-conductivity channel or failed well (conduit), where a water-supply well is withdrawing water from the upper Floridan aquifer directly above the MCU conduit. The hypothetical water-supply well provides direct access to the upper Floridan aquifer, bypassing the intermediate confining unit and the Biscayne aquifer.

The FPL analyses were focused on the fate and transport of radionuclides in the injectate, but also demonstrate the potential movement of chemical species in the injectate. The FPL analyses were based on conservative assumptions that would tend to maximize the migration of effluent. The off-normal and inadvertent intrusion scenario "bounded" some other feasible scenarios such as bypass of the MCU at the injection site because it resulted in shorter travel times.

The review team performed a separate confirmatory analysis of these scenarios, which resulted in concentrations of radionuclides at receptor locations similar to those calculated by FPL. The confirmatory analyses were performed through spreadsheet calculations as described below.

G.3.3.1 Normal Operations: Upward Migration through a Competent MCU Layer Scenario

The confirmatory calculation was based on transport equations described by Post et al. (2007-TN4145) and used the parameters shown in Table G-23. The effective vertical hydraulic conductivity of the MCU was based on the harmonic mean of the values determined from testing of core samples from the MCU at the EW-1 exploratory well (FPL 2012-TN1577). The harmonic mean is the most appropriate hydraulic conductivity value for fluid flow perpendicular to a layered system (Freeze and Cherry 1979-TN3275). Lower porosity decreases travel time in the calculations, so a conservatively low porosity value of 0.2 was used. The core analysis results from EW-1 are shown in Table G-24.

Table G-23. Parameters and Results for the Confirmatory Analysis of Upward Migration through a Competent MCU Layer

Parameter	Value	Description
$z1^{(a)}$	-2,900 ft	top of injection zone (referenced to sea level [positive upward])
$z2^{(b)}$	-1,400 ft	bottom of USDW aquifer (referenced to sea level [positive upward])
$\rho1^{(c)}$	62.230 lb_m/ft^3	water density at top of injection zone
$\rho2^{(d)}$	62.792 lb_m/ft^3	water density at bottom of USDW aquifer
$h1^{(e)}$	328.1 ft	piezometer head elevation at top of injection zone
$h2^{(f)}$	188.6 ft	piezometer head elevation at bottom of USDW aquifer
$Keff^{(g)}$	1.82E-07 ft/s	effective hydraulic conductivity
ρa	62.5 lb_m/ft^3	calculated average density over the migration interval
hf1	328.1 ft	fresh water head at top of injection zone
hf2	203.0 ft	fresh water head at bottom of USDW aquifer
Δhf	-125.1 ft	calculated freshwater head difference
Δz	1,500 ft	calculated elevation difference
$\Delta hf/\Delta z$	-0.0834	calculated fresh water gradient
$(\rho a-\rho f)/\rho f$	0.0045	calculated density gradient
qz	1.24E-3 ft/d	calculated groundwater flux (positive upward)
$\Theta eff^{(h)}$	0.2	effective porosity along flow path
tt	663 yr	calculated travel time from z1 to z2
Distance in 100 yr	226 ft	calculated vertical migration distance in 100 yr
Linear Velocity	0.00619 ft/d	calculated
C1	1	unit concentration of injectate at top of injection zone
t-half	12.3 yr	tritium half-life
C2	5.92E-17	calculated fraction of unit tritium concentration after 663 yr

Note: flux calculated based on Post et al. (2007-TN4145)
(a) FSAR Fig. 2.4.12-245
(b) FSAR Fig. 2.4.12-246
(c) minimum FSAR value assumed to be freshwater density = 62.2 lb_m/ft^3
(d) 10,000 mg/l TDS @ 20°C
(e) Starr et al. (2001-TN1251), Injection Zone High Value
(f) Starr et al. (2001-TN1251), Upper Monitoring Low Value (wells being purged were not considered)
(g) Approximate maximum MCU Property Estimate
(h) Minimum value from Reese (1994-TN1439)

Source: FPL 2014-TN4069 unless otherwise noted

Results of the “normal operations” scenario confirmed the FPL result that the injectate would move less than 300 ft upward into the MCU over a 100 yr period. The calculations also resulted in radionuclide concentrations at receptor locations similar to those calculated by FPL (2014-TN4069).

Table G-24. Core Analyses from the EW-1 Exploratory Well

Sample Depth (ft bpl)	Vertical Hydraulic Conductivity (cm/sec)	Horizontal Hydraulic Conductivity (cm/sec)	Specific Gravity	Total Porosity (%)
2026.4-2027.0	3.30E-06	3.20E-06	2.71	27.4
2027.0-2027.5	3.70E-04	7.80E-04	2.70	35.0
2029.4-2030.4	1.00E-05	2.80E-05	2.71	33.6
2030.4-2031.3	3.00E-05	1.30E-04	2.71	36.6
2036.2-2036.7	7.60E-05	1.10E-04	2.72	35.5
2036.7-2037.9	NA	NA	NA	NA
2295.2-2296.0	1.90E-04	1.00E-04	2.74	39.5
2296.0-2296.75	8.40E-05	5.90E-04	2.72	37.9
2296.75-2297.5	1.00E-04	1.00E-04	2.72	38.5
2399.9-2400.9	5.40E-04	5.40E-04	2.70	38.7
2576.0-2577.0	1.90E-04	2.50E-04	2.71	41.4
2639.3-2639.7	1.60E-06	8.40E-05	2.69	33.7
2639.7-2640.2	NA	NA	NA	NA
2645.1-2645.5	1.40E-05	6.20E-06	2.70	36.9
2645.5-2646.5	NA	NA	NA	NA
2652.0-2652.8	2.80E-06	4.60E-06	2.71	34.5
2652.8-2653.5	2.30E-06	2.50E-05	2.71	33.2
2675.1-2675.6	2.70E-04	2.90E-04	2.71	39.5
2675.6-2676.1	NA	NA	NA	NA
2676.1-2677.0	1.10E-06	5.30E-04	2.72	43.4
Arith. Mean	**1.18E-04**			
Geom. Mean	**2.86E-05**			
Harmonic Mean	**5.54E-06**			

Source: FPL 2012-TN1577

G.3.3.2 Off-Normal Operation and Inadvertent Intrusion Scenario:

FPL’s safety analysis (FPL 2014-TN4069) also considered a case with a hypothetical water-supply well being drilled into the upper Floridan (USDW) aquifer and a simultaneous bypass/failure of the MCU at the same location 2.2 mi from the wastewater injection site. The 2.2 mi distance is based on the nearest privately owned parcel. This scenario makes the off-normal operation assumption that there is a high-permeability connection through the MCU between the injection zone and the upper Floridan aquifer located 2.2 mi from Turkey Point wastewater injection site. This is combined with an inadvertent intrusion scenario that places a water-supply well in the upper Floridan aquifer directly above the conduit through the MCU. The FPL analysis showed that the transit time through the Boulder Zone from the Turkey Point

injection wells to the offsite location 2.2 mi away would be 21 years (FPL 2014-TN4069). The staff's confirmatory calculation showed that at the expected injection rate of 12,460 gpm, and a conservatively low porosity of 0.2, the injectate plume would reach the hypothetical offsite location in 23.5 years.

The safety analysis was conservative in that it did not account for transit time through the MCU and it did not account for dilution of contaminants within the Upper Floridan aquifer. It assumed that 100 percent of the water pumped by the water-supply well would be from the Boulder Zone with no dilution in the APPZ or the Upper Floridan aquifer.

The staff performed a calculation of expected flux through the MCU and dilution in the Upper Floridan aquifer using the maximum MCU hydraulic conductivity from the range of values shown in Table G-24 for the area of the enhanced vertical flow pathway. This calculation assumed a pathway size of 0.3 m^2 to match the approximate size of a failed borehole seal. The results of the leakage calculations for this scenario were an upward velocity of 1,245 m/yr and eventual discharge of 54 gpd of injectate into the Upper Floridan aquifer. It was assumed that this volume of injectate would mix over a width of 10 m and 1 percent of the Upper Floridan aquifer depth before being brought to the surface through a water-supply well. This was based on an Upper Floridan aquifer transmissivity equal to the minimum of the range of values, which would minimize the calculated dilution factor. This very conservative mixing scenario results in a dilution factor of 0.93, meaning that 93 percent of the water from the well would be injectate. This calculation represents a conservative case in multiple ways, including the assumption that a water-supply well would be placed such that it would exclusively be pumping water from the assumed mixing zone directly above a high-conductivity conduit from the injection zone. An upward velocity of 262 ft/yr was estimated by Maliva et al. (2007-TN1483) for an enhanced vertical flow feature at an injection site in Palm Beach County compared to the 1,245 ft/yr upward velocity from this analysis.

Table G-25. Parameters and Results for the Confirmatory Analysis of Upward Migration Through a Conduit in the MCU and into the Upper Floridan Aquifer

Parameter	Value	Description
$z1$[(a)]	-2,900 ft	top of injection zone (referenced to sea level [positive upward])
$z2$[(b)]	-1,400 ft	bottom of USDW aquifer (referenced to sea level [positive upward])
$\rho 1$[(c)]	62.230 lb_m/ft^3	water density at top of injection zone
$\rho 2$[(d)]	62.792 lb_m/ft^3	water density at bottom of USDW aquifer
$h1$[(e)]	328.1 ft	piezometer head elevation at top of injection zone
$h2$[(f)]	188.6 ft	piezometer head elevation at bottom of USDW aquifer
Keff[(g)]	3.28E-04 ft/s	effective hydraulic conductivity
ρa	62.5 lb_m/ft^3	calculated average density over the migration interval
hf1	328.1 ft	fresh water head at top of injection zone
hf2	203.0 ft	fresh water head at bottom of USDW aquifer
Δhf	-125.1 ft	calculated freshwater head difference
Δz	1,500 ft	calculated elevation difference
$\Delta hf/\Delta z$	-0.0834	calculated fresh water gradient

Table G-25. (contd)

Parameter	Value	Description
(ρa-ρf)/ρf	0.0045	calculated density gradient
qz	2.24 ft/d	calculated groundwater flux (positive upward)
Θeff(h)	0.2	effective porosity along flow path
tt	134.2 d	calculated travel time from z1 to z2
Linear Velocity	11.18 ft/d	calculated
C1	1	unit concentration of injectate at top of injection zone
t-half	12.3 yr	tritium half-life
C2	0.980	calculated fraction of unit tritium concentration at discharge to USDW aquifer after decay
Discharge Area	0.98 ft^2	assumed failed well (leakage) area through MCU
Discharge Rate	0.67 ft^2/d (54 gal/d)	volumetric discharge rate of injectate through failed well
UFA Mixing Width	32.81 ft	width of UFA over which MCU discharge is mixed
UFA Discharge	4.97 ft^3/d	horizontal volumetric discharge over depth of UFA based on minimum UFA transmissivity and gradient
Mixing Fraction	0.010	assumed fraction of UFA over which MCU discharge is mixed
Dilution Factor	0.931	MCU discharge/(MCU discharge + Mixing Fraction*UFA discharge)

Note: flux calculated based on Post et al. (2007-TN4145)
(a) FSAR Fig. 2.4.12-245
(b) FSAR Fig. 2.4.12-246
(c) minimum FSAR value assumed to be freshwater density = 62.2 lb_m/ft^3
(d) 10,000 mg/L TDS @ 20°C
(e) Starr et al. (2001-TN1251), Injection Zone High Value
(f) Starr et al. (2001-TN1251), Upper Monitoring Low Value (wells being purged were not considered)
(g) Approximate maximum MCU Property Estimate
(h) Minimum value from Reese (1994-TN1439)

Source: FPL 2014-TN4069 unless otherwise noted.

G.4 SAMDA Sensitivity Evaluation and Supporting Documentation

G.4.1 Introduction

FPL performed a SAMDA evaluation and determined that none of the severe accident design alternatives (SAMDAs) can be justified to further reduce the risk of severe accidents. NRC's review of the FPL submittal is detailed in Section 5.11.3. The SAMDA evaluation by FPL and the confirmatory evaluation by NRC identified the self-actuating containment isolation valves design alternative as the only design alternative with a value comparable to the maximum attainable benefit for the Turkey Point site. The results of the FPL analysis indicate that the maximum attainable benefit if the total risk for the AP1000 at the Turkey Point site were reduced to zero would have a value of about $55,513. The cost of implementing the self-actuating containment isolation valves design alternative is estimated to be $33,000. Thus, this SAMDA would be potentially cost-beneficial. To evaluate the maximum benefit of implementing the self-actuating containment isolation for the risk that this SAMDA would actually affect the Containment Isolation severe accident release category of Table 5-18 would be eliminated by this SAMDA and its contribution would be added to the Intact Containment release category. This would result in a benefit associated with this SAMDA of approximately $994. As was

applied for the NRC staff confirmatory calculations, the NRC staff used the population and the property value estimates from the latest census data of 2010 and the results of case runs made by using the latest version of SECPOP 2010 software (NRC 2003-TN3152; Bixler et al. 2003-TN3636). This information was consistent with the estimated population and property values used in the FPL evaluation.

With the Commission's ruling regarding two MELCOR Accident Consequence Code System (MACCS) decontamination input parameter values as presented in the severe accident mitigation alternative (SAMA) ruling of CLI-16-07 (NRC 2016-TN4631), the staff determined that a sensitivity study would be appropriate for the Turkey Point Units 6 and 7 COL SAMDA assessments. Two of the MACCS input parameters are related to decontamination cost and duration. The basis, results, and conclusions for this SAMDA sensitivity analyses are documented here.

G.4.2 Basis for Sensitivity Analysis

The two parameters that are considered for the sensitivity analysis are the decontamination time (TIMDEC) and the cost for decontamination of non-farmland (CDNFRM), as discussed in CLI-16-07. CDNFRM input values are usually taken from NUREG-1150 (NRC 1990-TN525) and adjusted for their present values using the Consumer Price Index (CPI) from 1986. The TIMDEC input value defines the time required to complete decontamination to a specified degree or level. The longer the TIMDEC value, the greater the dose that would be received by decontamination workers, and the longer duration that residents would be away from their homes. Both of these outcomes would entail higher costs to be assessed in the SAMDA analysis. TIMDEC input values and the associated decontamination levels are also taken from NUREG-1150.

The Commission in CLI-16-07 concluded that these two MACCS input parameters for decontamination are not fully vetted and could be uncertain; therefore, sensitivity analyses should to be performed to ensure that the conclusion of a SAMA evaluation would not be affected by any such uncertainties. CLI 16-07 provides a detailed account of the technical basis and specifies the reasonably high values for these two parameters for the purpose of sensitivity evaluation. With the Commission's ruling regarding this matter, the NRC staff used the same basis as CLI-16-07, to perform SAMDA sensitivity analysis and compare the results to those reported in FPL's ER (FPL 2014-TN4058).

G.4.3 Sensitivity Analysis and the Results

Two decontamination levels are considered for evaluating the risks of the postulated accidents. An effectiveness factor (effective dose reduction factor) is associated with each decontamination level. For example, a dose reduction factor of 3 means that the resulting population dose at that location would be reduced to one-third of what it would be without decontamination. The two values for decontamination effectiveness (DF) were left unchanged at 3 and 15. The variable TIMDEC, which defines the time required for completion of each of the DF levels, was changed to 3.15E+07 seconds (i.e., the maximum allowable duration of 1 year in MACCS input) for both DF levels.

The CDNFRM input parameter defines the cost (on a per person basis) of decontaminating non-farmland to a specified level. To obtain the cost of decontaminating non-farmland areas, the code multiplies the specified CDNFRM parameter by the population residing in the areas ("grid elements") that require decontamination. In footnote 122 of CLI 16-07, the intervenor asserts that the input values for CDNFRM range from $15,422 to $23,952 per person for light decontamination (level 3), and from $71,255 to $112,856 per person for heavy decontamination (level 15). Based on this information and the Commission's recommendation, the sensitivity analysis was performed using CDNFRM values of $24,000 and $100,000 for decontamination levels of 3 and 15, respectively.

The results of the sensitivity analysis in comparison to the base case runs are shown in Table G-26 for the undiscounted offsite cost, which includes the increase decontamination cost. The results in Table G-26 show the effect of the TIMDEC and CDNFRM sensitivity analysis. The table shows that for the sensitivity case, the undiscounted offsite cost can increase by a factor of about 2. Table G-27 shows the maximum attainable benefit and the benefit associated with implementing the self-actuating containment isolation valves design alternative for two cases of 7% and 3% annual discount rate. This table shows the benefit of implementing the self-actuating containment isolation valves design alternative can increase by a factor of about 2 for the sensitivity analysis at both the 3% and 7% annual discount rates.

Table G-26. Undiscounted Offsite Cost for the Base Case and the Sensitivity Cases

Undiscounted Offsite Cost	Present Dollar Value
Base Case as reported in ER	1346.2[(a)]
Sensitivity (TIMDEC of one year and CDNFRM of $24000 for $100,000 for Decontamination Levels 3 and 15)	2890.27

(a) ER value of $636 was multiplied by the ratio of the total CDF from both external and internal hazards over CDF of internal hazards only

Table G-27. Maximum Attainable Benefit and the Benefit of Implementing the Most Cost Beneficial SAMDA for the Base and Sensitivity Cases

	Maximum Attainable Benefit		Benefit of Implementing Self-Actuating Containment Isolation Valves SAMDA	
Case Studies	7% Discount Rate	3% Discount Rate	7% Discount Rate	3% Discount Rate
Base Case FPL-ER	$ 55,513	$ 123,602	$ 994	$ 1,965[(a)]
Sensitivity Case	$ 77,588	$ 167,220	$ 1,965	$ 3,896

(a) This value was estimated based on information from FPL's MACCS calculation (FPL 2014-TN3660) but it is not specifically reported in the ER.

G.4.4 Conclusion

The cost of implementing the self-actuating containment isolation valves design alternative for the AP1000 reactor design is estimated to be $33,000 (see Table 5-22). A sensitivity analysis was performed using conservative values for two MACCS decontamination input parameter values (i.e., TIMDEC and CDNFRM). This analysis showed that the maximum benefit from implementing this particular SAMDA is less than $3,896, which is below the $33,000 cost of this

particular SAMDA. This reconfirms the staff's conclusion that no cost–beneficial SAMDAs remains valid for the AP1000 reactor design located at the Turkey Point site.

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APPENDIX H

AUTHORIZATIONS, PERMITS, AND CERTIFICATIONS

APPENDIX H

AUTHORIZATIONS, PERMITS, AND CERTIFICATIONS

This appendix contains a list of environmental-related authorizations, permits, and certifications potentially required by Florida Power and Light Company (FPL) from Federal, State, regional, and local agencies related to the combined construction permits and operating licenses (combined licenses or COLs) for proposed Turkey Point Units 6 and 7 in Miami-Dade County, Florida. Table H-1 is based on Table 1.2-1 of the Environmental Report (ER), Revision 6 (FPL 2014-TN4058), submitted on October 29, 2014 by FPL to the U.S. Nuclear Regulatory Commission (NRC).

Table H-1. Federal, State, and Local Environmental Permits and Authorizations

Jurisdictional Agency	Authority, Law, or Regulation	Description of Requirement	License/Permit and/or Applicability[a]	Date of Application and/or Date Issued	Activity Covered
Federal					
NRC	10 CFR Part 30	By-product license	(3)	Application submitted 06/30/2009	Possession of by-product material.
NRC	10 CFR Part 40	Source material license	(3)	Application submitted 06/30/2009	Possession of source material.
NRC	10 CFR Part 50	Licensing of nuclear power plant	(3)	Application submitted 06/30/2009	Approval for construction and/or operation of nuclear power plant.
NRC	10 CFR Part 51, 10 CFR Part 52	NRC approval of an environmental report	(2)	Application submitted 06/30/2009	Evaluation of environmental impacts from construction and operation of a nuclear power plant.
NRC	10 CFR Part 52	COL	(3)	Application submitted 06/30/2009	Safety review of the nuclear power plant site.
NRC	10 CFR Part 61	Licensing requirements for land disposal of radioactive wastes	(2)	Application submitted 06/30/2009	Land disposal of radioactive waste that contains by-product source and special nuclear material.
NRC	10 CFR Part 70	Special nuclear material license	(3)	Application submitted 06/30/2009	Possession of special nuclear material.
NRC	10 CFR Part 71	Packaging and transportation of radioactive material	(3)	Application submitted 06/30/2009	Packaging and transportation of licensed radioactive material.
NRC	10 CFR 72	General License for Storage of Spent Fuel at Power Reactor Sites	(3)	Authorized if Combined License Issued	Storage of power reactor spent fuel and other associated radioactive materials in an independent spent fuel storage installation

Table H-1. (contd)

Jurisdictional Agency	Authority, Law, or Regulation	Description of Requirement	License/Permit and/or Applicability[a]	Date of Application and/or Date Issued	Activity Covered
Federal					
DOE	Nuclear Waste Policy Act (42 U.S.C. 10101 et seq.) and 10 CFR Part 961	Spent fuel contract	No. DE-CR01-09RW9012 (Unit 6) No. DE-CR01-09RW09013 (Unit 7) (3)	11/14/2008 11/14/2008	Disposal of spent nuclear fuel.
USACE	Clean Water Act of 1976 33 U.S.C. section 1344	Section 404 Permit	(1)	06/30/2009, modified 05/07/2010	Discharge of dredge and fill materials into waters of the United States.
USACE (request is made through SFWMD)	Rivers and Harbors Act of 1899/33 U.S.C. section 14	Section 408 Permit	(1)	Application date to be determined	Public works alteration request for facilities that are proposed on, over, under, or adjacent to a canal or levee constructed by the USACE and operated and maintained by SFWMD.
USACE	Rivers and Harbors Appropriations Act of 1899 (33 U.S.C. section 401 et seq.)	Section 10 — Rivers and Harbors Act Permit	(1)	Application submitted 06/30/2009	Excavation or filling within navigable waters of the United States.
USACE	Secretary of the Army	Modified water deliveries to Everglades National Park	DACW-17-3-08-0006 Amendment No.1 Amendment No. 2 Amendment No. 3 Amendment No. 4 (each Amendment extended the license agreement for an additional year, currently expires 6/20/2013)	06/20/2008 06/20/2009 06/20/2010 06/20/2011 06/27/2012 Renewal application submittal date to be determined	Use of Government-owned lands for the purpose of onsite investigations in support of a Phase 1 ESA, Wetland delineation, preparation of legal description and soil borings.

Table H-1. (contd)

Jurisdictional Agency	Authority, Law, or Regulation	Description of Requirement	License/Permit and/or Applicability[a]	Date of Application and/or Date Issued	Activity Covered
Federal Aviation Agency.	14 CFR Part 77 - Safe, Efficient Use, and Preservation of Navigable Airspace	FAA Obstruction Permit for Unit 6 Containment Building	2012-ASO-7115-OE	08/24/2012	FAA Obstruction Permit for Unit 6 Containment Building.
Federal Aviation Agency	14 CFR Part 77 - Safe, Efficient Use, and Preservation of Navigable Airspace	FAA Obstruction Permit for Unit 7 Containment Building	2012-ASO-7116-OE	08/24/2012	FAA Obstruction Permit for Unit 7 Containment Building.
Department of the Interior	RE-DO-53	Temporary Construction Easement	EVER SUP 08-38	07/28/2008	Provide access to delineate wetland boundaries within the proposed utility line ROW relocation in Everglades National Park.
Department of the Interior	RE-DO-53	Temporary Construction Easement	EVER SUP 08-39	07/28/2008	Provide access to conduct visual and pedestrian surveys for Phase I environmental assessment within the proposed utility line ROW relocation in Everglades National Park.
FWS	16 U.S.C. 1539(a)(1)(A); 50 CFR Parts 13, 17	Endangered species permit to take American crocodile during monitoring	TE092945-2 (1)	01/29/2010	Provides authorization to take (capture, examine, weigh, sex, collect tissue samples, mark, radio-tag, radio-track, relocate, release) endangered American crocodile individuals during population monitoring.

Table H-1. (contd)

Jurisdictional Agency	Authority, Law, or Regulation	Description of Requirement	License/Permit and/or Applicability[a]	Date of Application and/or Date Issued	Activity Covered
FWS	16 U.S.C. 703-712	Special purpose salvage permit, migratory birds	MB697722-0 Amendment (1)	04/01/2012	Provides authorization to: salvage dead migratory birds, abandoned nests, and addled eggs after nesting season; dead bald or golden eagles; and possess live migratory birds for transport to permitted rehabilitator.
State of Florida Authorizations					
FDEP, Siting Board	FS 403.501-.518	Power plant site certification[b]	(2)	06/30/2009, Amendment submittals 05/07/2010 11/12/2012 12/21/2012 Errata submitted 03/22/2013 Final Conditions of Certification issued 5/19/2014 Remanded to FSB[b] 4/20/2016	Construction and operation of a power plant with more than 75 MW of steam generated power and associated facilities.
FDEP, USEPA Region IV review	FAC 62-621	NPDES storm water operations permit for industrial activities	(3)	06/30/2009	Operation of an industrial facility.
FDEP	Chapter 403 FS	Exploratory well construction permit	0293962-001-UC (1)	05/05/2010	Allows for the construction of the exploratory well and dual-zone monitor well.

Table H-1. (contd)

Jurisdictional Agency	Authority, Law, or Regulation	Description of Requirement	License/Permit and/or Applicability[(a)]	Date of Application and/or Date Issued	Activity Covered
FDEP	Chapter 403 FS	UIC well construction permit	(1)	07/29/2013. Final Conditions of Certification issued May 19, 2014	Allows for the conversion of the exploratory well to an injection well and perform operational testing for up to 2 years.
FDEP	Chapter 403 FS	UIC well construction permit	(1)	Application date to be determined. A decision to move forward and submit the permit application will be made at a later date.	Allows for the construction and operational testing of additional injection and dual zone monitoring wells.
FDEP	Chapter 403 FS	Class I well operation permit	(3)	Application date to be determined. A decision to move forward and submit the permit application will be made at a later date.	Allows for the operation of the injection wells. This permit must be renewed every 5 years.
FDEP, USEPA Region IV review	FAC 62-212	Prevention of significant deterioration construction permit	PSD-FL-409 (1)	05/28/2010. final Conditions of Certification issued May 19, 2014	Construction and operation of facilities that generate air emissions.
FDEP, USEPA Region IV review	403.0885 FS	Modification of Industrial Wastewater Treatment Facility permit	FL0001562 (2)	06/30/2009. Final Conditions of Certification issued May 19, 2014	Construction of Units 6 and 7 within the industrial wastewater facility.
FDEP/USEPA	FAC 62-25, 62-40	NPDES construction storm water permit	(1)	To be submitted 2 days prior to beginning construction Final Conditions of Certification issued May 19, 2014	Construction of any facility that disturbs 1 acre or more.

Table H-1. (contd)

Jurisdictional Agency	Authority, Law, or Regulation	Description of Requirement	License/Permit and/or Applicability[a]	Date of Application and/or Date Issued	Activity Covered
FDEP	403.087, FS and FAC 62-4, 62-520, 62-522, 62-528, 62-550, 62-600, 62-601	Operation of Class V, Group 3 domestic wastewater injection (gravity flow) well	0127512-006-UO (3)	08/14/2012. Final Conditions of Certification issued May 19, 2014	Operation of IW-1.
FDEP	403, FS and FAC 62-600, 62-601, 62-602, 62-620, 62-640, 62-699	Operation of domestic wastewater treatment facility	FLA013612- 003-DW3P (3)	09/28/2010. Final Conditions of Certification issued May 19, 2014	Operation of Turkey Point Power Plant wastewater treatment facility.
FDEP	FAC 62-213	Title V Operations Permit	0250003-010-AV (3)	01/01/2009. Final Conditions of Certification issued May 19, 2014	Operation of facilities that generate air emissions.
FDEP	FAC 62-213	Title V Operations Permit	0250003-021-AV (3)	Effective 01/01/2014. Final Conditions of Certification issued May 19, 2014	Operation of facilities that generate air emissions.
FDEP	403 FS	Nuclear Replacement of Emergency Diesel Engines	0250003-020-AC	04/02/2013	Replacement of diesel engines.
FDEP, South Florida Water Management District	FAC 40B-3	Well Construction Permit	13-59-3795 to 13-59-3814 (2)	01/14/2008. Final Conditions of Certification issued May 19, 2014	Construct, repair, modify, or abandon a well.
South Florida Water Management District	FAC 40E-3	Well Abandonment Permit	#SF092308E, #SF092308F, #SF092308G, #SF092308H (2)	05/05/2009 Cancelled	Well abandonment permits.
State of Florida	FAC 40E-3	Well Abandonment Permit	13-59-2241 through 13-59-2259 (2)	02/19/2008	Application to construct, repair, modify, or abandon well.
FWCC	FAC 68A-9.002, 68A-27.005	Removal of nests and ospreys	LSNR-1100026 (1)	02/02/2011	Removal and replacement of inactive nests of ospreys and other migratory birds.

Table H-1. (contd)

Jurisdictional Agency	Authority, Law, or Regulation	Description of Requirement	License/Permit and/or Applicability[a]	Date of Application and/or Date Issued	Activity Covered
FWCC	FAC 68A-9.002, 68A-9.025, 68A-27	Carcass Salvage Permit	LSSC-11-00021 (1)	02/02/2011	Salvage, mount, and display wildlife carcasses upon encounter for educational and scientific purposes.
Florida Division of Historical Resources (SHPO)	National Historic Preservation Act (54 U.S.C. 300101 et seq.) and 36 CFR 800	Cultural Resources Review and Consultation	(1), (2), and (3)	07/28/2010. Final Conditions of Certification issued May 19, 2014	Identification, description, and evaluations of cultural resources on and in the site vicinity with the potential to be impacted by construction and operations.
Other States Authorizations					
Utah Department of Environmental Quality Division of Radiation Control	R313-26 of the Utah Radiation Control Rules	Revision of existing general site access permit	(3)	Annual authorization	Transport of radioactive materials into the State of Utah.
Tennessee Department of Environment and Conservation Division of Radiological Health	TDEC Rule 1200-2-10.32	Revision of existing Tennessee radioactive waste license-for-delivery	(3)	Annual authorization	Transport of radioactive waste into the State of Tennessee.

Table H-1. (contd)

Jurisdictional Agency	Authority, Law, or Regulation	Description of Requirement	License/Permit and/or Applicability[a]	Date of Application and/or Date Issued	Activity Covered
Local Authorizations					
Miami-Dade County	Chapter 163 FS; Miami-Dade County Comprehensive Plan and adopted regulations and Miami-Dade County Ordinances, Chapter 33	Land use and zoning approval (unusual use approval)	Miami-Dade County Board of County Commissioners Resolution Z-56-07 (1)	12/24/2007	Unusual use (zoning approval) to permit a nuclear power plant (atomic reactors) and ancillary structures and equipment.
Miami-Dade County	Chapter 163 FS; Miami-Dade County Comprehensive Plan and adopted regulations and Miami-Dade County Ordinances, Chapter 33	Land use and zoning approval (unusual use approval)	Miami-Dade County Board of County Commissioners Resolution Z-1-13 (1)	01/13/2013	Unusual use (zoning approval) to permit a reclaimed water treatment facility, radial collector wells, and a parking area associated with Turkey Point Units 6 and 7.
Miami-Dade County	Chapter 163 FS; Miami-Dade County Comprehensive Development Master Plan and adopted regulations	Comprehensive Development Master Plan text amendment	(1)	Application submitted 10/31/2008; withdrawn 03/05/2010	Excavation for fill source.
Miami-Dade County	Chapter 163 FS; Miami-Dade County Comprehensive Development Master Plan and adopted regulations	Comprehensive Development Master Plan text amendment	(1)	04/30/2009	Temporary access roads.
Miami-Dade County	Miami-Dade County Ordinances	IW6 permit (industrial well field) for site investigation	Permit Numbers: 13-59-2241 through 13-59-2259 (1)	02/19/2008	Land use — nonresidential, within major well field protection areas not served by sanitary sewers.

Table H-1. (contd)

Jurisdictional Agency	Authority, Law, or Regulation	Description of Requirement	License/Permit and/or Applicability[a]	Date of Application and/or Date Issued	Activity Covered
Miami-Dade County Health Department	Chapter 373 FS	Water well construction permits	13-59-2241 to 13-59-2259 13-59-3795 to 13-59-3814 (1)	02/19/2008 01/14/2008	Well installation for hydrologic investigation.
Miami-Dade County	Miami-Dade County Code Chapter 24	Domestic wastewater annual operating permit	DWO-000010-20130-2014 (2)	04/15/2013	Stabilization treatment facility.
Miami-Dade County	Miami-Dade County Code Chapter 24	Operation of pollution control facility permit	IW5-006229-2012-2013 (2)	05/01/2013	Operation of fleet vehicle maintenance facility that generates waste oil, coolant, and used batteries with a solvent wash tank and served by septic tank.
State of Florida	Department of Agriculture	Burn Permit	1373498 (2)	01/24/2011	Onsite combustion of construction debris. Annual permit issued.
Miami-Dade County	Miami-Dade County Ordinances, Section 24-35	IW5 Permit (or waiver)	IW-000016-2012/2013	06/01/2013	Hazardous materials or hazardous waste-large user or generator. Hazardous waste permit issued 10/01/2008.
Miami-Dade County	Miami-Dade County Code Chapter 24	Stratospheric Ozone Protection Annual Operations Permit	APCF-001747-2012-2013 (1)	07/01/2012	Use of refrigerants R-12, R-22, R-502 for Robinair Recovery Units, Models 25200, 25200A, 25200B.

Table H-1. (contd)

Jurisdictional Agency	Authority, Law, or Regulation	Description of Requirement	License/Permit and/or Applicability[a]	Date of Application and/or Date Issued	Activity Covered
Miami-Dade County	Miami-Dade County Code Chapter 24	Industrial Waste Annual Operations Permit	IW-000003-2013-2014 (2)	06/01/2013	Onsite disposal of Class III industrial solid waste consisting of earth and earth-like products, concrete, rock, bricks, and land clearing debris.
Miami-Dade County	Miami-Dade County Ordinance 89-104	Marine Facilities Annual Operations Permit	MOP-000072-2013/2013 (2)	10/01/2012	Operation of 1 wet slip, 1 dry slip, 2 commercial vessels.
Miami-Dade County	Miami-Dade County Ordinances, Chapter 8	Turkey Point Units 6 and 7 Site Investigation-Construction trailers	2008-026502	01/29/2008	Construction Trailers.
Miami-Dade County	Miami-Dade County Ordinances, Chapter 8	Turkey Point Units 6 and 7 Exploratory Well-Electrical permits	2011-028574 2011-031469	03/28/2011 04/13/2011	Exploratory well electrical permit.
State of Florida; Miami-Dade County	Miami-Dade County Ordinances, Chapter 8; FAC 64E-6	Turkey Point Units 6 and 7 Exploratory Well-Construction Trailer permits	2011-031471 2011-031529 2011-031532 13-SC-1307746 2011-031470 2011-031530 2011-031531 13-SC-1307751	04/13/2011 04/13/2011 04/13/2011 03/18/2011 04/13/2011 04/13/2011 04/13/2011 03/18/2011	Exploratory well construction trailer permit.
State of Florida	FAC 40D-3	Turkey Point Units 6 and 7 Exploratory Well and Dual Zone Monitoring Well-Pad monitor well permits	13-59-6664-71	04/14/2011	Exploratory well pad monitor well permits.
South Florida Water Management District	FAC 40D-3	Turkey Point Units 6 and 7 Exploratory and Dual Zone Monitoring Well-Pad monitoring well abandonment	13-59-8020 to 8027	07/24/2012	Pad monitor wells abandonment permit.

Table H-1. (contd)

Jurisdictional Agency	Authority, Law, or Regulation	Description of Requirement	License/Permit and/or Applicability[a]	Date of Application and/or Date Issued	Activity Covered
Miami-Dade County	Miami-Dade County Ordinances, Chapter 33	Unusual Use Resolution	Resolution Z-56-07	12/24/2007	Unusual use resolution.
Miami-Dade County	Not available	Fencing permit around EW-1 and DZMW-1	2012059049	09/06/2012	
South Florida Water Management District	Chapter 373 FS	Water well construction permits	SF092308A-SF092308D	9/23/2008	Pump test for test wells.
			SF123008A-SF123008E	12/23/2008	

(a) Applicability of the license or permit to the project activity type, i.e., (1) activities not requiring a COL, (2) construction activities requiring a COL, and (3) plant operation activities.

(b) Pursuant to the Florida Electrical Power Plant Siting Act all State, regional and local permits, except for certain local land use and zoning approvals and certain State issued licenses required under Federally delegated or approved permit programs, are covered under a single "Certification". Because the Certification is the sole license of the State and any agency required for construction and operation of the proposed electrical power plant, it is not necessary to apply for permits individually. *On June 30, 2009, FPL submitted a Site Certification Application (SCA) to the State of Florida Department of Environmental Protection for the proposed Turkey Point Units 6 and 7 and ancillary facilities (FPL 2010-TN1231). The SCA process provides a Certification that encompasses all licenses and permits needed for affected Florida State, regional, and local agencies. It also includes any regulatory activity that would be applicable under these agencies' regulations for proposed Turkey Point Units 6 and 7 (FDEP 2013-TN2629). On May 19, 2014, the State of Florida issued final Conditions of Certification to FPL authorizing construction, operation, and maintenance of proposed Turkey Point Units 6 and 7 and associated facilities (State of Florida 2014-TN3637). The final Conditions of Certification issued are binding and subject to the requirements listed in State of Florida 2014(TN3637). The NRC staff is aware that on April 20, 2016, a Florida court issued an opinion in which it ruled that the Florida Siting Board should have considered whether to require FPL to bury a portion of the transmission lines, and that the record was inadequate to support certain mitigation measures associated with transmission lines in the East Everglades. [State of Florida 2016-TN4781] Although the opinion remands the Conditions of Certification to the Florida Siting Board for consideration of the possibility of burying a portion of the transmission lines and reconsideration of the specified mitigation measures, the NRC staff understands that the court's opinion is not yet final as of this writing (October 3, 2016). Accordingly, for the purposes of the FEIS evaluation of impacts, the NRC staff considers the transmission line route and conditions reviewed and approved by the Florida Siting Board as the most current information regarding the transmission line and associated potential mitigation measures. Even if the Conditions of Certification are revisited, the NRC staff considers it reasonable to expect that Conditions of Certification similar to or no less effective than those originally issued will be in place before construction and operation of the proposed units begins.*

CFR = *Code of Federal Regulations*.
DOE = U.S. Department of Energy.
ESA = Endangered Species Act of 1973, as amended.
FAC = Florida Administrative Code.
FS = Florida Statute.
FAA = Federal Aviation Administration.
FDEP = Florida Department of Environmental Protection.
FWCC = Florida Fish and Wildlife Conservation Commission.
FWS = U.S. Fish and Wildlife Service.
IW = Industrial Well or Industrial Waste
MW = Megawatt.
NPDES = National Pollutant Discharge Elimination System.
NRC = U.S. Nuclear Regulatory Commission.
ROW = Right of Way
TDEC = Tennessee Department of Environment and Conservation.

Table H-1. (contd)

Jurisdictional Agency	Authority, Law, or Regulation	Description of Requirement	License/Permit and/or Applicability[a]	Date of Application and/or Date Issued	Activity Covered

TP = Turkey Point.
UIC = Underground Injection Control.
USACE = U.S. Army Corps of Engineers.
U.S.C. = United States Code.
USEPA = U.S. Environmental Protection Agency.

APPENDIX I

THE EFFECT OF CLIMATE CHANGE ON THE EVALUATION OF ENVIRONMENTAL IMPACTS

APPENDIX I

THE EFFECT OF CLIMATE CHANGE ON THE EVALUATION OF ENVIRONMENTAL IMPACTS

The review team has determined that it is reasonably foreseeable that climate change may substantially alter the affected environment described in Chapter 2 of this environmental impact statement (EIS). Climate change is a global phenomenon that the construction and operation of the proposed two-unit plant will not appreciably alter. However, climate change will provide a new environment that the operation of the proposed units will affect.

The objective of this appendix is to document the review team's consideration of the potential changes in impacts that may occur as a result of the new future environment. This appendix is not intended to be a comprehensive climate change assessment for the affected region. It documents the review team's qualitative determination of the likely changes in the impacts described in Chapter 5, if the environment is altered in a manner consistent with the predictions in current climate change literature.

The Nuclear Regulatory Commission staff documents the review of the safety of the plant in the Safety Evaluation Report (SER) expected to be published in November 2016 (NRC 2016-TN4619). If the NRC grants the FPL COL application, the staff will inspect and otherwise moniter plant construction and operation. This safety oversight process includes collection and analysis of information regarding changes in the severity or frequency of natural hazards, such as flooding from storm surge and sea level rise, as discussed in SECY-15-0137 (NRC 2015-TN4731). When warranted, the NRC can request licensee study and analysis of changing natural hazards, and can impose additional design or operation requirements to address those changing hazards.

In this appendix, the review team assessed the potential effects of climate change on its evaluation of the environmental impacts of the proposed action. The results of this assessment are presented below in three sections: (1) description of the assessment process, (2) potential climate change impacts in the region, and (3) assessment summary. The appendix also discusses the USACE's consideration of climate change in the context of the USACE Public Interest Review.

I.1 Description of the Assessment Process

As part of its National Environmental Policy Act (42 U.S.C. 4321 et seq.) (TN661) review, the U.S. Nuclear Regulatory Commission (NRC) staff analyzes greenhouse gas emissions and the potential effects of climate change for all resource areas in all new reactor licensing proceedings. In guidance dated August 1, 2016 on greenhouse gas emissions and climate change, the Council on Environmental Quality (CEQ) states "action agencies need not undertake new research or analysis of potential climate change impacts in the proposed action area, but may instead summarize and incorporate by reference the relevant scientific literature."

In this regard, this EIS incorporates by reference the U.S. Global Change Research Program report (GCRP 2014-TN3472; CEQ 2016-TN4732)."

In the first step of the NRC staff's process a master table was created identifying plausible nexuses between nuclear power station resource area issues related to operation and likely climate change impacts as identified in the most recent climate change impacts report issued by the GCRP (2014-TN3472). The interagency GCRP was established under the Global Change Research Act of 1990 (P.L. 101-606) (15 U.S.C. § 2921 et seq.) (TN3330) "to understand, assess, predict, and respond to human-induced and natural processes of global change" and is the authoritative U.S. government source on likely climate change impacts in the United States. The master table was used to develop a list of questions for each resource area to assist the NRC staff in addressing whether GCRP-identified climate change impacts were likely to increase, decrease, or leave unchanged the assessed impact of a proposed facility on the environment, or to identify areas where scientific uncertainty precludes a definitive assessment. The comprehensive master table and question list can be found in the NRC's Agencywide Documents Access and Management System (ADAMS), which is accessible from the NRC website at www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room) under the following accession number ML5026A470 (NRC 2014-TN4149). A table, termed the site-specific resource table, and list of questions specific to the proposed site of Turkey Point Units 6 and 7 were then generated by removing non-relevant GCRP climate impacts and NRC resource area issues, and by using specific Southeast regional predictions identified by the GCRP. For example, the review team determined GCRP-identified direct impacts related to declining ice volume and extent were not relevant to the Turkey Point environment. The review team used the site-specific resource table and question list (NRC 2014-TN4150) in its assessment of the effects of climate change on relevant resource areas given in Section I.3. A combined construction permit and operating license (COL) is valid for 40 years (10 CFR 52.103) (TN251). In conducting its assessment, the NRC staff noted that if COLs are granted to the proposed facilities, baseline changes are more likely to be noticeable during operation (Chapter 5) than during preconstruction and construction (Chapter 4). The review team's efforts thus focused on assessing the potential effects of climate change on the resource area impact levels assigned in Chapter 5. While general scientific consensus exists that climate change is occurring and will continue to occur for the foreseeable future, significant uncertainty remains about the magnitude of the changes for specific regions and the precise magnitude and form of the impacts on the environment from climate change. The review team acknowledges this situation, explicitly noting in this appendix where uncertainty in future climate predictions and uncertainty in impacts may make it impossible at this time to conclude qualitatively the influence of climate change on a specific resource area or issue. The review team also acknowledges that the Southeast Florida Regional Climate Change Compact, which includes Miami-Dade County, has established a Regional Climate Action Plan that discusses goals to reduce greenhouse gas emissions and adapt to regional and local impacts of a changing climate. Some of the climate change impacts discussed in this appendix could be further reduced with the efforts of this Regional Compact.

I.2 Potential Climate Change Impacts in the Region

Climate change is a subject of national and international interest. The recent compilation of the state of knowledge in this area—GCRP's climate change impacts report (GCRP 2014-

TN3472)—has been considered in the preparation of this EIS. Most GCRP projections are expressed as a change expected for the later part of the 21st century (2071–2099) relative to average conditions existing in the later part of the 20th century (1970–1999). Projected changes are also dependent on future emissions of heat-trapping gases. The GCRP's climate change impacts report includes projections for wide-ranging scenarios where such emissions are rapidly reduced and where they continue to increase.

Florida Power & Light Company (FPL) has indicated that, if the COLs are granted, it expects to initiate commercial operations in the second quarter of 2027 and second quarter of 2028 for Units 6 and 7, respectively (FPL 2015-TN4502). The Atomic Energy Act (42 U.S.C. § 2011 et seq.) (TN663) and NRC regulations (10 CFR 52.103) (TN251) limit commercial power reactor licenses to an initial 40 years. If granted, under FPL's proposed schedule the COLs would be valid until 2067 and 2068. The NRC staff considers use of GCRP impacts report projections for the 2071–2099 period under a continued increasing emissions scenario to be a conservative proxy for likely future conditions encompassing the licensing action, and for assessing the effects of climate change on the resource area impact levels presented in this EIS. Unless otherwise stated, projected climate changes discussed in this section are taken from the impacts report (GCRP 2014-TN3472) and refer to changes for the 2071–2099 period relative to the 1970–1999 period under an increasing emissions scenario.

Projected changes in the climate for southeastern Florida include an increase in average surface air temperature of 5°F to 6°F. The number of days with maximum temperatures above 95°F is expected to increase, rising by 50 or more days per year for the 2041–2070 period relative to 1971−2000. The hottest and coldest days expected in a 20-year period at the end of this century (2081–2100) are both projected to be 6°F to 7°F warmer than those experienced at the turn of the last century (1986–2005); in other words, both the hottest and the coldest days will be warmer. Southeastern Florida is projected to experience no days with temperatures below 32°F during the 2070–2099 period; currently, the low-temperature extreme for the proposed Turkey Point site is 25°F (Section 2.9.1.2). Projected precipitation changes in southeastern Florida vary seasonally, increasing by 0 percent–10 percent in winter, decreasing by 0 percent–10 percent in spring, decreasing by 20 percent–30 percent in summer, and increasing by 10 percent–20 percent in fall. Extreme heavy precipitation events are expected to increase in both frequency and intensity; an event that now occurs once in 20 years is projected to occur 2 to 3 times as often by the end of the century. Heavy precipitation events are expected to have a 20 percent increase in the amount of precipitation falling. The climate change impacts report indicates that the number of tropical storms occurring around the globe will decrease, but those that occur will be stronger in force, yielding more Category 4 and 5 storms. Rainfall rates associated with tropical storms are expected to be greater, "…with projected increases of about 20 percent averaged near the center of hurricanes" (GCRP 2014-TN3472).

Sea level is projected to rise 1 to 4 ft globally by 2100 (GCRP 2014-TN3472). However, the review team acknowledges that, at the extreme high end, global sea level is predicted to rise by 8.2 ft by 2100 relative to 2000. Should this extreme high range of sea level rise occur, much of South Florida would be uninhabitable and millions of people would likely be displaced. Sea level rise, however, occurs gradually, so that adaptation is possible. As explained in the

impacts report, the amount of sea-level rise experienced in any one location "depends on whether and how much the local land is sinking…or rising, and changes in offshore currents." In its report, the GCRP rates the vulnerability of the Turkey Point area to sea-level rise as "high" to "very high," and notes an "imminent threat of increased inland flooding during heavy rain events in low-lying coastal areas such as southeastern Florida, where just inches of sea level rise will impair the capacity of stormwater drainage systems to empty into the ocean." Sea-level rise also is expected to "…accelerate saltwater intrusion into freshwater supplies from rivers, streams, and groundwater sources near the coast" and agricultural areas around Miami-Dade County "…are at risk of increased inundation and future loss of cropland with a projected loss of 37,500 acres in Florida with a 27-inch sea level rise." Water demand in southeastern Florida is projected to increase by more than 50 percent by 2060, relative to 2005, based on combined changes in population, socioeconomic conditions, and climate. The GCRP cites the Southeast Florida Regional Compact as an "excellent example" of regional cooperative efforts among local, state, and federal agencies to develop "a comprehensive action plan" to adapt to impacts from climate change and sea-level rise.

The NRC staff also considered localized sea level rise associated with changes in regional ocean currents (Ezer et al. 2013-TN4734; Park and Sweet 2015-TN4733). The NRC staff determined that these localized changes were adequately bounded by the 1 to 4 ft sea level rise projected in the GCRP report.

The Southeast region currently contains "…existing power plant capacity to produce 32 percent of the nation's electricity," but also currently consumes 27 percent of the nation's total capacity, more than any other GCRP-defined region. Higher temperatures and increased use of air conditioning are projected to increase regional energy demand, "potentially stress[ing] electricity generating capacity, distribution infrastructure, and energy costs" (GCRP 2014-TN3472).

Other climate change impacts in the Southeast region identified in the GCRP report and relevant to the Turkey Point area include ecosystem exposure to risks from sea-level rise, particularly in tidal marshes, swamps, and wetlands; compromised protection of coastal lands and people against storm surge due to tidal wetland loss; effects on fisheries and fishery habitats due to wetland loss; spread of non-native plants; decreased crop production and livestock yield; increased formation of allergens and air pollutants, including ozone; and increases in harmful algal blooms and other surface-waterborne disease-causing agents. In addition, the GCRP indicates the potential for ocean warming leading to changes in local species composition, growth rates, spawning seasons, and/or migratory patterns; increased wildfire frequency, intensity, and size; effects on vector-borne and zoonotic (animal to human) disease transmission; increased insurance costs or unavailability of insurance coverage due to increased flooding incidents; stresses on society and infrastructure due to movement of people from vulnerable areas; effects of changes in energy costs on lower income households, the elderly, native tribes, and other vulnerable communities; and damage to transportation infrastructure.

I.3 Assessment Summary

This section summarizes the review team's assessment of the effects of climate change on relevant resource areas using the process outlined in Section I.1.

I.3.1 Land Use

I.3.1.1 Land-Use Summary

Climatological changes are not likely to influence, or lead to, any plant operational impacts on local/regional land-use classifications or economic development plans. Climate change could lead to changes in the distribution of land use in Miami-Dade County and sea-level rise could lead to the loss of some inhabitable land in the county. However, once the operational workforce is housed in the initial years of operation, operation of a reactor is not expected to alter land use. Therefore, there is little potential for interaction between land-use changes resulting from climate change and land-use changes caused by later operational years of the reactor.

I.3.1.2 Land-Use Conclusion

Climatological changes are not expected to affect the land-use operational impact level assigned in Chapter 5.

I.3.2 Hydrology

I.3.2.1 Summary

Climatological changes are not expected to affect the anticipated hydrologic alterations resulting from station operation, or influence (or lead to) plant operations impacts on other water uses and users. Sea-level rise will result in greater depth of Biscayne Bay near the Turkey Point site. Because of the current very shallow conditions of Biscayne Bay in this vicinity even a modest increase in sea level may help to improve circulation (reducing the hypersalinity of water entering the radial collector well system). Circulation is also controlled by flow conditions away from the site. The review team presumed that the cooling canals' water-surface elevation would likely also rise in response to the rise in sea level. This rise would increase the volume of water in the canals, but it is not expected to appreciably change the gradient between Biscayne Bay and the cooling canals. Therefore, no change in the interface between the canals and the Bay is expected.

Sea-level rise will also push the freshwater–seawater interface further inland. This will put further stresses on freshwater resources inland. However, because the proposed Units 6 and 7 would use reclaimed wastewater for most of its water needs, this would not alter the impact of the plant. Groundwater modeling analyses performed by the NRC staff explicitly considered the changes in impacts of operation of the radial collector wells that would occur with reduced inland recharge (e.g. drought) and increased sea level (see Appendix G.3). While saltwater intrusion is shown to move farther inland under both of these scenarios, the radial collector wells are shown to not have contributed to the saltwater intrusion.

Sea-level rise combined with more frequent Category 4 and 5 storms will increase the potential for damaging storm surge events at the Turkey Point site (Little et al. 2015-TN4729). The final SER discusses the safety of the proposed plants in regard to natural flooding hazards, including hazards from extreme hurricanes combined with other factors such as sea level rise. An extreme natural flood at the site, however, could damage features at the site, including the IWF

for the existing units, piles of spoils from muck removal for the construction of the proposed units, and non-safety related structures built for the proposed units. While storm surge damage to these features would result in the release of sediment and nutrients to Biscayne Bay, such damage would not be localized to the Turkey Point site. The contribution of the Turkey Point site to the release of sediment and nutrients to Biscayne Bay as result of an extreme flood would likely be a small fraction of the total sediment and nutrient load that would enter the local waterways.

As discussed in Section I.2, precipitation amounts in South Florida are projected to shift in different directions in different seasons. Even if total precipitation increases, if the majority of this increase is in response to intense storms it would not result in a proportional increase in recharge to groundwater. The increase in temperature may also increase evapotranspiration, thereby further reducing recharge. The review team determined that overall recharge to the Biscayne Bay aquifer may be reduced as a result of climate change. However, because the proposed plant would use reclaimed wastewater for most of its water needs, this would not alter the plant's impact on the environment.

The review team could not determine whether an increase in temperature or changes in precipitation patterns would result in any change in the supply of wastewater for the plant's cooling system. A substantial increase in sea level rise, however, could impact the wastewater treatment plant that provides the primary source of cooling water for proposed Units 6 and 7. Given the abundance of wastewater in this region, the review team determined that a sufficient supply of wastewater would remain available regionally. In the event of substantial sea level rise, Miami Dade County may adapt some of its wastewater treatment infrastructure. Given the critical public health role of these facilities, the review team determined that such adaptations are reasonably foreseeable.

I.3.2.2 Conclusion

The review team identified no shift in the Chapter 5-assigned impacts on water use and water quality caused by the operation of the proposed plant due to a reasonably foreseeable alteration in the environmental baseline associated with climate change.

I.3.3 Terrestrial & Wetland Ecology

I.3.3.1 Summary

Climatological changes could affect the impact of plant operations from facility and landscape maintenance, noise, and traffic on terrestrial habitats and wildlife. In particular, climate change could increase stress on terrestrial habitats, especially the freshwater and brackish water wetlands comprising the Everglades, the mangrove wetlands adjoining Biscayne Bay, and the tree islands and remnant patches of pine rocklands that dot the surrounding landscape. Climate change could result in longer periods between precipitation events, drier conditions during some seasons, and more frequent wildfires that could facilitate introduction of new diseases and pests. Sea-level rise could stress mangrove forests due to inundation and could stress surviving wetland vegetation by introducing brackish water farther inland, while the expected tendency to armor fastlands could prevent concurrent establishment of more inland mangrove

forests and other coastal wetlands. Climate change would place additional stress on the same habitats and wildlife affected by the operational impacts discussed in Section 5.3.1. Particularly noteworthy is that the stresses on wetlands and other terrestrial habitats caused by climate change could result in greater introduction of exotic species such as Melaleuca, Australian pine, and the Burmese python.

The expected climatological changes could exacerbate the effects of plant operations (discussed in Section 5.3.1) on terrestrial habitats, wetlands, and species. In particular, climate change could lead to drier conditions due to longer periods between precipitation events and wildfires. Climate change could reduce the extent of mangrove forests primarily due to coastal inundation and sawgrass in the Everglades primarily due to alteration of hydroperiod, stressing vegetation and wildlife. Increased introduction of exotic species could further reduce the ecological and hydrological function of wetlands and reduce the suitability of various upland and wetland habitats to threatened, endangered, and rare species.

The expected climatological changes could worsen the minor effects of plant and transmission line operations on birds, bats, and other wildlife due to collisions, electrocution, or electromagnetic radiation effects (discussed in Section 5.3.1). Climate change could substantially alter the hydroperiod of habitats traversed by the proposed corridors for the two transmission lines, including the eastern Everglades and remnant pine rockland patches. These changes could stress wildlife dependent on the affected habitats, including birds, bats, and other wildlife. Even though the effects on wildlife from collisions, electrocution, and electromagnetic radiation are typically minor (see Section 5.3.1), the stresses could be exacerbated when combined with the effects of climate change.

Although climate change could potentially interact synergistically with plant operations to raise impact levels on terrestrial wildlife from plant operations and influence the impact of the proposed units on terrestrial resources and wetlands, the ability to coordinate with other agencies should not be noticeably impeded. The importance of close coordination would, however, be greater.

The expected climatological changes could affect the overall impact of plant operations on regional standing stocks of important terrestrial species, including plant impacts on species' tolerance of environmental changes and their natural survival rates. The increased potential for substantial adverse effects on the sensitive wetland and upland habitats surrounding the Turkey Point site and proposed new offsite corridors would concurrently place increased stresses on species using those habitats, including important species. The increased stresses caused by climate change could reduce the tolerance of some important species to collisions, noise, and other plant operational impacts. Furthermore, many of the identified important species are species whose populations have already been severely lowered by recent decades of drainage and development, and thus are less capable of recovery from new stresses.

The stresses placed on terrestrial habitats by climate change could lead to a greater potential for introduction of disease organisms and invasive species. Climate change could stress those habitats by decreasing the hydroperiod and by inducing the introduction of exotic species adapted to warmer climates and seasonally drier habitats. The subject habitats have already

been stressed by a history of introduction of numerous invasive species. Additional stresses to native vegetation can be expected to encourage the further establishment of invasive species.

I.3.3.2 Conclusion

Climate change could place multiple new stresses on wetlands and other terrestrial habitats, especially the hydrologically sensitive Everglades and Everglades National Park, the extensive mangrove forests bordering Biscayne Bay, including those within Biscayne National Park, and other unique ecological communities such as pine rocklands. Climate change would place additional stress on the same habitats and wildlife stressed by plant operations and could cause an increase in the impacts on terrestrial resources discussed in Section 5.3.1.

I.3.4 Aquatic Ecology

I.3.4.1 Summary

Climatological changes would have minimal influence on the impact of the operation of proposed Units 6 and 7 on aquatic resources using either reclaimed water or radial collector wells. A change in sea level would not influence the availability of reclaimed water, so an increase of cooling-water withdrawal by the radial wells is not expected. Sea-level rise will increase the depth of Biscayne Bay but it is not expected to affect the operation of the radial wells. Entrainment, entrapment, and impingement are highly unlikely due to the use of reclaimed water and RCW operation, and there is no evidence operation would directly affect aquatic resources. There is no evidence that proposed Units 6 and 7 would affect species tolerance or natural survival rates, or contribute to an increase in invasive or introduced species. Given the proposed cooling-system configurations, influence on the water quality of nearby receiving water would be negligible. Changes in baseline conditions due to climate change are not expected to alter this result. Climate change is not expected to noticeably impede the ability of agencies to coordinate on the protection of aquatic species. The importance of close coordination would, however, be greater.

I.3.4.2 Conclusion

The review team identified no shift in the Chapter 5-assigned impacts on aquatic ecology caused by the operation of the proposed plant due to a reasonably foreseeable alteration of baseline conditions associated with climate change.

I.3.5 Socioeconomics

As discussed in Section 5.4 and summarized in Section 10.2.2, within the area of socioeconomics the categories of physical impacts, demographic impacts, economic impacts, and impacts on infrastructure and community services are assessed separately, and individual category impact levels are assigned. These same categories are discussed here.

I.3.5.1 Summary

The review team determined that all of the expected physical impacts during operations (noise, air quality, buildings, roads, waterways, and aesthetics) would be SMALL and would warrant no

mitigation. During the life of the proposed license the review team expects physical impacts on the listed categories would not be exacerbated by the effects of climate change and would remain at negligible levels.

The impacts on the demographic makeup of the area surrounding the proposed site would be SMALL and would not warrant mitigation. If the speculated climate change impacts were to occur during the life of the proposed license, the review team believes the demographic impact would be an out-migration of residents to other areas with higher elevations. Consequently, the operations-related impacts on the demographic makeup of the area would be reduced even further.

All economic impacts from operations of the proposed project would be beneficial and SMALL for Miami-Dade County, Homestead, and Florida City. In the event of climate change-induced sea-level rise, which is likely to occur gradually, the NRC requires licensees of nuclear power plants to implement corrective actions to mitigate conditions adverse to safety. The applicant would need to take measures to mitigate the effects of global climate change such that the proposed nuclear power plants would continue to be operated safely in accordance with 10 CFR Part 50 (TN249). Therefore, the review team anticipates the economic impacts of operations of the proposed project would continue unchanged.

There are four major subsections in the review team's assessment of the operations-related impacts on infrastructure and community services from the proposed project: traffic, recreation, housing, and public services.

- **Traffic**. The review team determined that the operations-related impacts of traffic would be moderate. While the long-term effects of global climate change would have a deleterious impact on the current level of infrastructure in the area, the review team believes it is not unreasonable to expect decision makers in the area to incrementally adapt to the climate change effects (e.g., sea-level rise) by incorporating mitigating measures that would prevent the deterioration of infrastructure services (e.g., raising the elevation of roads). Such adaptive measures would impose significant costs on local communities, the funds for which would either have to come from increased revenues (taxes and tolls) or be diverted from other expenses (maintenance, personnel, services). Consequently, the review team expects that if the physical changes predicted by the GCRP report (GCRP 2014-TN3472) were to occur, the traffic-related impacts on the local communities would increase.
- **Recreation**. The primary receptors of recreational impacts due to operations are accessibility and aesthetics. The review team expects that, like traffic, the long-term effects of climate change would significantly change the aesthetic appeal of local recreation areas and the public's access to Biscayne Bay and the Everglades. However, the NRC portion of the total impact would remain unchanged.
- **Housing**. The review team expects that any physical change in the environment from global climate change would occur at a rate slow enough that home owners in low-lying areas could either adapt their homes to the new conditions or to move out of the area. Consequently, the cumulative impact of global climate change on housing in the economic impact area would decline as the local population migrated away from the 50 mi region.

- **Public Services**. The review team expects that any physical change in the environment from global climate change would occur at a rate slow enough that local governments could adapt to whatever negative impacts may arise. Consequently, the review team determined the global climate change impacts on community services would decline as the population migrated away from the 50 mi region.

I.3.5.2 Conclusion

As indicated in Chapter 5, the review team identified no significant shifts in socioeconomic impacts of operational impacts as a result of possible climatological changes in the environmental baseline. Potential impacts on socioeconomics including infrastructure and community services as a result of climate change would continue to be addressed through regional and local governmental strategic adaptive plans.

I.3.6 Environmental Justice

I.3.6.1 Summary

Climate change could present challenges to minority and low-income communities, which the GCRP climate change impacts report refers to as “socially vulnerable populations,” within the demographic region of the proposed project. The challenges include coping with climate change effects (e.g., sea-level rise), the capacity to adapt, and the ability to relocate. The review team believes it is not unreasonable to expect decision makers in the area to incrementally adapt to the climate change effects by implementing strategic adaptation plans and mitigating measures that would inform and assist minority and low-income communities. Therefore, the conclusions in Section 5.1.1 regarding environmental justice would remain unchanged.

I.3.6.2 Conclusion

Overall, the operational impact levels assigned to environmental justice in Chapter 5 did not change as a result of possible climatological changes in the environmental baseline. Potential impacts on environmental justice communities as a result of climate change would continue to be addressed through regional and local governmental strategic adaptive plans.

I.3.7 Historic and Cultural Resources

I.3.7.1 Summary

There are no known onsite historic and cultural resources at the Turkey Point site; therefore, there would be no shift in the impacts on historic and cultural resources caused by the operation and maintenance of the proposed plant due to a reasonably foreseeable alteration in the environmental baseline associated with climate change. It is not known whether the change in the environmental baseline would cause a shift in impacts of offsite facilities (e.g., transmission lines).

I.3.7.2 Conclusion

As previously discussed, the climatological changes would not affect the historic and cultural impact level assigned in Chapter 5 because of the lack of resources at the Turkey Point site. It is not known whether the change in the environmental baseline would affect offsite resources.

I.3.8 Meteorology

I.3.8.1 Summary

The expected climatological changes would largely be unlikely to affect cooling-system impacts from the operating plant on local weather. Projected temperature increases due to climate change may lead to an increase in fogging from the cooling tower. Changes in severe weather intensity or length of dry spells would be unlikely to change the current parameters.

I.3.8.2 Conclusion

Operational impacts from the cooling system on local weather are discussed in Section 5.7.2 and should not change as a result of reasonably foreseeable climate changes.

I.3.9 Air Quality

I.3.9.1 Summary

Climatological changes may affect the sources, types, and estimates of annual air emissions from the operating plant and transmission lines. For example, changes in climate such as sea-level rise and increased extreme weather events may lead to an increase in air emissions from emergency equipment, if additional emergency backup equipment is needed for the proposed plants and if testing of that equipment increases. Because of expected increases in temperature over the period of operation, the health impacts of operational air emissions may increase. In a higher temperature environment, the formation of ozone due to emissions of nitrogen oxides (NO_x) from the diesel generators and other equipment is likely to increase, thereby leading to an increase in health impacts.

I.3.9.2 Conclusion

Operational air-quality impacts are discussed in Section 5.7.1 and should not change as a result of reasonably foreseeable climate changes. It is unclear whether additional emergency equipment would actually be needed in a changing climate, or whether testing of that equipment would increase, causing an increase in air emissions. Any additional equipment would be subject to Clean Air Act (42 U.S.C. § 7401 et seq. (TN1141) Title V permitting requirements. Estimates of air emissions are likely to remain the same, with a possible increase in health impacts due to increased ozone formation from emergency equipment NO_x emissions in a higher temperature environment.

I.3.10 Nonradiological Health

I.3.10.1 Summary

It is not known how changes in climate will affect the presence of etiological agents associated with plant operations (receiving waters and cooling-tower operations). However, it is reasonable to expect that currently existing laws and regulations protecting workers and members of the public would continue, or would be adjusted as necessary, to be as protective as they are under current climate conditions.

Climatological changes are not likely to have an effect on noise produced by operating plants; therefore, there would be no change in the health impacts from noise discussed in Section 5.8.2.

It is not likely that climatological changes would affect potential health impacts from electromagnetic fields (EMFs) associated with plant operations because regulations protecting workers and members of the public from EMFs would likely be adjusted to avoid impacts.

It is not likely that climatological changes would affect occupational health risks for operational plants because regulations protecting workers would be adjusted to avoid impacts on workers.

As discussed in Section I.3.5.1, while the long-term effects of global climate change would have a deleterious impact on the current level of infrastructure in the area, the review team believes it is not unreasonable to expect decision makers in the area would incrementally adapt to the climate change effects (e.g., sea-level rise) by incorporating mitigating measures that would prevent the deterioration of infrastructure services (e.g., raising the elevation of roads, adjusting speed limits). The review team expects that if the physical changes predicted by the GCRP were to occur, such adaptive measures would limit potential health impacts from traffic-related accidents.

I.3.10.2 Conclusion

Overall, the expected climatological changes would not change the nonradiological health resource operational impact level assigned in Chapter 5. Potential impacts from noise, etiological agents, exposure to EMFs, and occupational injuries are and would continue to be regulated to be protective of human health. Although there is some uncertainty surrounding predicted climatological changes, it is likely that regulations governing occupational and public health would be adjusted accordingly if needed.

I.3.11 Radiological Impacts

I.3.11.1 Summary

The review team determined that the expected climatological changes would affect the possibility of exposure to radiation from the operating facility as follows:

- Existing low population exposures of humans from proposed Units 6 and 7 would remain low because the level of effluent releases and regulatory requirements should not significantly change over the time of the license.

- Existing low non-human biota exposures from proposed Units 6 and 7 should not change because the level of effluent releases and regulatory requirements should not significantly change over the time of the license.
- The level of effluent releases, regulatory requirements (including those for occupational doses), and existing low exposures should not significantly change over the time of the license.
- The level of the expected normal radioactive gaseous effluent releases would remain the same. Thus, monitoring activity should remain the same with the exception that the monitoring locations could change because of changes in the physical land and population distribution around the site. Normal radioactive liquid effluent releases should remain unchanged due to the use of deep-well injection.

I.3.11.2 Conclusion

The NRC staff identified no shift in the radiological impacts level caused by the operation of the proposed Units 6 and 7 due to reasonably foreseeable environmental alterations associated with climate change, because the level of effluent releases, regulatory requirements, and existing low population exposures should not significantly change over the time of the license.

I.3.12 Nonradioactive Waste

I.3.12.1 Summary

Sea-level rise and changes in land-use decisions may lead to changes in disposal options for nonradioactive waste and mixed wastes. However, solid, liquid, gaseous, hazardous, and mixed wastes generated during operation of the proposed Turkey Point Units 6 and 7 would still have to be handled, transported, stored, and disposed of according to County, State, and Federal regulations.

I.3.12.2 Conclusion

Because nonradioactive and mixed wastes would still be subject to applicable Federal, State, and local requirements, climatological changes are unlikely to influence the SMALL impact determination discussed in Section 5.10.4.

I.3.13 Accidents

I.3.13.1 Summary

Climatological changes are expected to affect the site-specific, 50th percentile atmospheric dilution factor (i.e., χ/Q) used to evaluate dose consequences from postulated design basis accidents (DBAs). The χ/Q around the site is dependent on local meteorological conditions (wind speed, direction and stability class). The expected variations for these parameters as a result of climate change may increase, likely leading to less stability, which would likely increase dispersion and decrease the corresponding radiological effects. However, the predominant wind direction could change such that higher χ/Qs could shift along the site boundary, low-population zone, and beyond to areas with higher population density, which would increase the

impact. Therefore, the overall impact is unknown. Climatological changes might affect the average environmental risks of severe accidents because of changes in either severe accident probabilities or associated consequences. While the potential severity of storms and other natural phenomena might increase, nuclear power plants must be designed to withstand all creditable natural events at the site of concern.

As discussed in Section I.2, climate change in general and rising sea level are expected to be gradual. If the NRC grants the FPL COL application, the staff will inspect and otherwise moniter plant construction and operation. This safety oversight process includes collection and analysis of information regarding changes in the severity or frequency of natural hazards, such as flooding from storm surge and sea level rise, as discussed in SECY-15-0137 (NRC 2015-TN4731). When warranted, the NRC can request licensee study and analysis of changing natural hazards, and can impose additional design or operation requirements to address those changing hazards. In particular, the NRC can request information from a licensee under 10 CFR 50.54(f), and can determine whether or not a license should be modified based on the information provided in response the request. Such information could include the impact of climate change on plant operation, emergency preparedness, and the availability of nearby structures used for plant operation and safety. If the NRC determines that additional safety enhancements are necessary based on information obtained in accordance with 10 CFR 50.54(f), the NRC can require that such enhancements be implemented in a timely manner to assure adequate protection of the public within the current NRC regulatory process. The NRC staff generally expects that the low core damage frequencies (CDFs) for the AP1000 pressurized water reactor design are unlikely to change appreciably due to climate change. Therefore, even if consequences of severe accidents slightly change as a result of climate change, severe accident risk is likely to remain SMALL because CDFs are maintained low.

The effects of climatological changes on the severe accident mitigation alternative (SAMA) cost-benefit analysis of the proposed facility are uncertain. While the averted costs have components that are based on local land values and the cost of evacuation and cleanup, these are typically not the major contributors to the total averted costs. Rather, the cost of replacement power has a larger effect and it is uncertain whether climate change would have an effect that would change the SAMA cost-benefit analysis. However, because the smallest difference between a cost-beneficial severe accident mitigation design alternative that was not studied further for the AP1000 design at the Turkey Point site (see Section 5.11.3) and the averted cost is approximately $400,000 (7 percent discount rate), it is difficult to see how climate change would affect the probability-weighted consequences from severe accidents in a manner to cause a finding different from SMALL for SAMAs.

I.3.13.2 Conclusion

The impact level assigned in Chapter 5 should remain SMALL for next-generation nuclear power plants like the AP1000 reactor design. The overall risks for severe accidents are significantly lower than the current generation of nuclear power plants and any climate change effect would have to change the risks by at least two orders of magnitude to result in a change in the impact level assigned in Chapter 5.

I.3.14 Transportation of Radiological Materials

I.3.14.1 Summary

The number and type of radioactive material shipments, regulatory requirements, and existing low maximally exposed individual and population exposures and risks from accidents for these types of shipments should not significantly change over the time of the license as a result of climate change. Radiological doses are strong functions of the radiation dose rate emitted from the shipment, exposure distance, and exposure duration. None of these parameters would be directly or disproportionately influenced by the impacts of climate change. Transportation accidents risks are a function of weather conditions. However, climate change may increase dispersion conditions in some areas as a result of more frequent storms and severe weather, but may also reduce dispersion in areas where climate change may result in more mild average conditions. As a result, the changes in transportation impacts potentially caused by climate change are not expected to be significant, but there are substantial uncertainties about impacts on weather conditions in specific areas and demographic changes that could affect transportation impacts in the region of interest.

I.3.14.2 Conclusion

Impact levels are not expected to change as a result of the effects of climate change, but there are significant uncertainties associated with the impacts of climate change on local weather conditions and demographics.

I.3.15 Benefit-Cost

I.3.15.1 Summary

Climatological changes could affect the estimated operational benefits and costs of the proposed facility. Proposed Turkey Point Units 6 and 7 would continue to provide benefits in the form of electricity generation and economic impacts to the region such as tax impacts and other spending. To the extent that summer peak demand load increases, the benefit of a large baseload power station such as Units 6 and 7 could increase.

Operating costs include maintenance costs, fuel costs, and annualized capital costs. Future climate change impacts would not affect the already incurred capital costs. However, to the extent that climate change events require repair or prolonged shutdown of Units 6 and 7, maintenance costs could increase.

I.3.15.2 Conclusion

Although climate change could increase or decrease the benefits and costs of the project, the review team expects the accrued benefits of construction and operation of Units 6 and 7 would still outweigh the associated costs.

I.3.16 U.S. Army Corps of Engineers Public Interest Review

I.3.16.1 Summary

Pursuant to NEPA and the USACE public interest review at 33 CFR 320.4, the USACE considers the effects of climate change and sea level rise on the proposed project in order to determine whether the proposed project is contrary to the public interest. As set forth below, the USACE has determined that the NRC Advanced Safety Evaluation (ASE) dated July 14, 2016, on the Florida Power & Light (FPL) application to the NRC considers the effects of sea level rise on the proposed project (NRC 2016-TN4775).

As background, the NRC determined that the structures, systems, components, and design features of the AP1000 standard design comply with applicable NRC regulations and therefore provide adequate protection to the health and safety of the public. The NRC based its evaluation of the AP1000 design in part on assumed physical and environmental site features, such as maximum flood height compared to plant elevation, used to design the standard plant. The NRC calls these site features assumed for design "site parameters," and they are specified in the Design Control Document (DCD) for the AP1000 standard design. In order for a company to obtain an NRC license to build and operate an AP1000 plant at an actual site, its application must show that the AP1000 design can handle the actual physical and environmental features of the proposed site, which the NRC calls "site characteristics." To do this, the applicant compares the actual site characteristics to the site parameters postulated for design. If the site characteristics fall within the site parameters used to design the plant, then the standard AP1000 design protects the plant from the effects of the environment on the plant at that site, as required by NRC regulations. If a site characteristic does not fall within a site parameter, the applicant must provide engineering analysis to justify why the plant is nevertheless acceptable to build and operate on the proposed site.

For the proposed Turkey Point Units 6 and 7 reactors, the FPL application to the NRC included information to demonstrate that the actual Turkey Point site characteristics fall within the site parameters in the AP1000 DCD, except for four site parameters. For these four site parameters, FPL proposed departures from the AP1000 DCD, as allowed under NRC regulations. The four site parameters for which FPL proposed departures are population distribution exclusion area (site), the operating basis wind speed, maximum safety wet-bulb (non-coincident) air temperature value, and maximum normal wet-bulb (non-coincident) air temperature value. The NRC staff evaluation of the application in the ASE for Turkey Point Units 6 and 7 concludes that the applicant (1) justified the four proposed departures from the DCD site parameters and (2) demonstrated that the other characteristics of the Turkey Point site fall within (are bounded by) the site parameters specified in the AP1000 DCD (NRC 2016-TN4775).

In assessing whether the actual site characteristics fall within the postulated site parameters in the DCD, both the application and the NRC ASE consider the effects of sea-level rise. In particular, the NRC staff evaluations in the ASE Sections 2.3.1.4.7, "Climate Change," 2.4.5.4.4, "Antecedent Water Level," 2.4.5.4.5, "Analysis of Probable Maximum Storm Surge," 2.4.5.4.6, "Wave Actions," 2.4.6.4.3, "Source Generator Characteristics," 2.4.6.4.5, "Tsunami Water Levels," and 2.4.9.4.3, "Shoreline Changes" explicitly consider the effects of sea-level rise in

connection with the NRC staff evaluation of the Turkey Point site characteristics. While the NRC staff did not explicitly consider sea level rise in its evaluation in ASE Section 2.4.12.4.12, "Site Characteristics for Subsurface Hydrostatic Loading," the NRC staff determined that the actual groundwater level was at least twenty (20) feet below the maximum allowable groundwater level specified in the DCD for the AP1000 design, and that no further evaluation was warranted (NRC 2016-TN4775).

I.3.16.2 Conclusion

In view of the foregoing, the USACE has determined that the NRC staff has evaluated the effects of sea level rise on the proposed Turkey Point Units 6 and 7 in the context of its flooding evaluations in the ASE.

I.4 References

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APPENDIX J

GREENHOUSE GAS FOOTPRINT ESTIMATES FOR A REFERENCE 1,000 MW(E) LIGHT-WATER REACTOR

APPENDIX J

GREENHOUSE GAS FOOTPRINT ESTIMATES FOR A REFERENCE 1,000 MW(E) LIGHT-WATER REACTOR

The review team has estimated the greenhouse gas (GHG) footprint of various activities associated with nuclear power plants. These activities include building, operating, and decommissioning a nuclear power plant. The estimates include direct emissions from the nuclear facility and indirect emissions from workforce transportation and the fuel cycle.

Preconstruction/construction equipment estimates listed in Table J-1 are based on hours of equipment use estimated for a single nuclear power plant at a site requiring a moderate amount of terrain modification (UniStar 2007-TN1564).

Table J-1. GHG Emissions from Equipment Used in Preconstruction/Construction and Decommissioning

Equipment	Preconstruction/ Construction Total[(a)] (MT CO_2e)	Decommissioning Total[(b)] (MT CO_2e)
Earthwork and dewatering	12,000	6,000
Batch plant operations	3,400	1,700
Concrete	5,400	2,700
Lifting and rigging	5,600	2,800
Shop fabrication	1,000	500
Warehouse operations	1,400	700
Equipment maintenance	10,000	5,000
Total[(c)]	39,000	19,000

(a) Based on hours of equipment usage over 7-year period
(b) Based on equipment usage over 10-year period
(c) Results are rounded

Preconstruction/construction equipment carbon monoxide (CO) emission estimates were derived from the hours of equipment use and carbon dioxide (CO_2) emissions were then estimated from the CO emissions using a scaling factor of 172 tons of CO_2 per ton of CO. The scaling factor is based on the ratio of CO_2 to CO emission factors for diesel fuel industrial engines as reported in Table 3.3-1 of AP-42 (EPA 2012-TN2647). A CO_2 to total GHG equivalency factor of 0.991 is used to account for the emissions from other GHGs such as methane (CH_4) and nitrous oxide (N_2O). The equivalency factor is based on non-road/construction equipment (Chapman et al. 2012-TN2644). Equipment emissions estimates for decommissioning are assumed to be one-half of those for preconstruction/construction. Data on equipment emissions for decommissioning are not available; the one-half factor is based on the assumption that decommissioning would involve less earth moving and hauling of material and fewer labor hours than preconstruction/construction.

Table J-2 lists the review team's estimates of the CO_2 equivalent (CO_2e) emissions associated with workforce transportation. Preconstruction/construction workforce estimates for new plant are conservatively based on estimates in various combined license applications (Chapman et al. 2012-TN2644); operational and decommissioning workforce estimates are based on Supplement 1 to NUREG–0586 (NRC 2002-TN665). Table J-2 lists the assumptions used to estimate total miles traveled by each workforce and the factors used to convert total miles to metric tons (MT) CO_2e. The workers are assumed to travel in gasoline-powered passenger vehicles (i.e., cars, trucks, vans, and sport utility vehicles) that get an average of 21.6 mi/gal of gasoline (FHWA 2012-TN2645). Conversion from gallons of gasoline burned to CO_2e is based on U.S. Environmental Protection Agency (EPA) emission factors (EPA 2012-TN2643).

Table J-2. Workforce GHG Footprint Estimates

	Preconstruction/ Construction Workforce	Operational Workforce	Decommissioning Workforce	SAFSTOR Workforce
Commuting trips (round trips per day)	1,000	550	200	40
Commute distance (miles per round trip)	40	40	40	40
Commuting days (days per year)	365	365	250	365
Duration (years)	7	40	10	40
Total distance traveled (mi)[(a)]	102,000,000	321,000,000	20,000,000	23,000,000
Average vehicle fuel efficiency[(b)] (mi/gal)	21.6	21.6	21.6	21.6
Total fuel burned[(a)] (gal)	4,700,000	14,900,000	900,000	1,100,000
CO_2 emitted per gal[(c)] (MT CO_2)	0.00892	0.00892	0.00892	0.00892
Total CO_2 emitted[(a)] (MT CO_2)	42,000	133,000	8,000	10,000
CO_2 equivalent factor[(c)] (MT CO_2/MT CO_2e)	0.977	0.977	0.977	0.977
Total GHG emitted[(a)] (MT CO_2e)	43,000	136,000	8,000	10,000

(a) Results are rounded
(b) FHWA 2012-TN2645
(c) EPA 2012-TN2643

Title 10 of the *Code of Federal Regulations* (CFR) 51.51(a) (TN250) states that every environmental report prepared for the combined license stage of a light-water-cooled nuclear power reactor shall take Table S–3 from 10 CFR 51.51(b) (TN250) as the basis for evaluating the contribution of the environmental effects of the uranium fuel cycle in licensing the nuclear power reactor. 10 CFR 51.51(a) (TN250) further states that Table S–3 shall be included in the environmental report and may be supplemented by a discussion of the environmental significance of the data set forth in the table as weighted in the analysis for the proposed facility.

Table S–3 does not provide an estimate of GHG emissions associated with the uranium fuel cycle; it only addresses pollutants that were of concern when the table was promulgated in the 1980s. However, Table S–3 does state that 323,000 MWh is the assumed annual electric

energy use for the reference 1,000 MW(e) nuclear plant and this 323,000 MWh of annual electric energy is assumed to be generated by a 45 MW(e) coal-fired power plant burning 118,000 MT of coal. Table S–3 also assumes approximately 135,000,000 standard cubic feet (scf) of natural gas is required per year to generate process heat for certain portions of the uranium fuel cycle. The review team estimates that burning 118,000 MT of coal and 135,000,000 scf of natural gas per year results in approximately 253,000 MT of CO_2e being emitted into the atmosphere per year due to the uranium fuel cycle (Harvey 2013-TN2646).

The review team estimated GHG emissions related to plant operations from a typical usage of various diesel generators onsite (UniStar 2007-TN1564). CO emission estimates were derived assuming an average of 600 hr of emergency diesel generator operation per year (i.e., four generators, each operating 150 hr/yr) and 200 hr of station blackout diesel generator operation per year (i.e., two generators, each operating 100 hr/yr). A scaling factor of 172 was then applied to convert the CO emissions to CO_2 emissions and a CO_2 to total GHG equivalency factor of 0.991 was used to account for the emissions from other GHGs such as CH_4 and N_2O.

Given the various sources of GHG emissions discussed above, the review team estimates the total life-cycle GHG footprint for a reference 1,000 MW(e) nuclear plant with an 80 percent capacity factor to be about 10,500,000 MT. The components of the footprint are summarized in Table J-3. The uranium fuel cycle component of the footprint dominates all other components. It is directly related to power generated. As a result, it is reasonable to use reactor power to scale the footprint to larger reactors.

Table J-3. Nuclear Plant Lifetime GHG Footprint

Source	Activity Duration (yr)	Total Emissions (MT CO_2e)
Preconstruction/construction equipment	7	39,000
Preconstruction/construction workforce	7	43,000
Plant operations	40	181,000
Operations workforce	40	136,000
Uranium fuel cycle	40	10,100,000
Decommissioning equipment	10	19,000
Decommissioning workforce	10	8,000
SAFSTOR workforce	40	10,000
Total[(a)]		10,500,000

(a) Results are rounded

The Intergovernmental Panel on Climate Change (IPCC) released a special report on renewable energy sources and climate change mitigation in 2012 (IPCC 2012-TN2648). Annex II of this IPCC report includes an assessment of previously published works on life-cycle GHG emissions from various electric generation technologies, including nuclear energy. In this assessment, the IPCC included only material that passes certain screening criteria for quality and relevance. The IPCC screening yielded 125 estimates of nuclear energy life-cycle GHG emissions from 32 separate references. The IPCC-screened estimates of the life-cycle GHG emissions associated with nuclear energy, as shown in Table A.II.4 of the report, ranged more than two orders of magnitude, from 1 to 220 g of CO_2e/kWh, with 25 percentile, 50 percentile,

and 75 percentile values of 8 g CO_2e/kWh, 16 g CO_2e/kWh, and 45 g CO_2e/kWh, respectively. The range of the IPCC estimates is due, in part, to assumptions regarding the type of enrichment technology employed, how the electricity used for enrichment is generated, the grade of mined uranium ore, the degree of processing and enrichment required, and the assumed operating lifetime of a nuclear plant.

The review team's life-cycle GHG estimate of approximately 10,500,000 MT CO_2e for the reference 1,000 MW(e) nuclear plant is equal to about 37.5 g CO_2e/kWh, which places the review team estimate between the 50 and 75 percentile values of the IPCC estimates given in Table A.II.4 of the report.

In closing, the review team considers the footprint estimated in Table J-3 to be appropriately conservative. The GHG emissions estimates for the dominant component (uranium fuel cycle) are based on 30-year-old enrichment technology assuming that the energy required for enrichment is provided by coal-fired generation. Different assumptions related to the source of energy used for enrichment or the enrichment technology that would be just as reasonable could lead to a significantly reduced footprint.

Emissions estimates presented in the body of this environmental impact statement have been scaled to values appropriate for the proposed project. The uranium fuel cycle emissions have been scaled by reactor power and plant capacity factor using the scaling factor determined in Chapter 6 and by the number of reactors to be built. Plant operations emissions have been adjusted to represent the number of large GHG emissions sources (e.g., diesel generators and boilers) associated with the project. The workforce emissions estimates have been scaled to account for differences in workforce numbers and commuting distance. Finally, equipment emissions estimates have been scaled by estimated equipment usage. As can be seen in Table J-3, only the scaling of the uranium fuel-cycle emissions estimates makes a significant difference in the total GHG footprint of the project.

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APPENDIX K

POTENTIAL USACE ALTERNATIVE TRANSMISSION LINE ROUTES

APPENDIX K

POTENTIAL USACE ALTERNATIVE TRANSMISSION LINE ROUTES

Analysis of Transmission Line Alternatives

On June 30, 2009, the U.S. Army Corps of Engineers (USACE or Corps) received a Department of the Army (DA) permit application from Florida Power & Light Company (FPL) to construct the proposed Turkey Point Units 6 and 7, reclaimed water facility, access roads, radial collector wells, pipelines, transmission lines, and other related infrastructure. The proposed work would require a DA permit for structures in/over and under navigable waters of the United States, and the discharge of dredged or fill material into waters of the United States, including wetlands. The USACE is participating as a cooperating agency with the U.S. Nuclear Regulatory Commission (NRC) in preparing this environmental impact statement (EIS).

Transmission line siting in Florida is regulated under the Florida Power Plant Siting Act (PPSA) (Fla. Stat. 29-403.501 2011-TN1068), and Chapter 62-17 of the Florida Administrative Code (Fla. Admin. Code 62-17-TN1247). The PPSA provides a centralized review process for new electrical generating facilities in Florida, involving a balancing of "the increasing demand for electrical power plants with the broad interests of the public." FPL undertook a route-selection process to select the transmission line corridors that were submitted for approval under the Florida PPSA (Fla. Stat. 29-403.501 2011-TN1068). Public comments requested that the transmission lines be buried under ground to minimize impacts. Underground transmission lines were considered but FPL indicated that the technology may not be available to support the high temperatures over long distances. This issue is currently being evaluated as part of the remand from the State of Florida to review the approved State Certification and will be considered as part of the Corps' Clean Water Act Section 404(b)(1) Guidelines analysis to determine the least environmentally damaging practicable alternative (LEDPA).

K.1 Summary of All Transmission Line Corridors Considered

FPL submitted two main transmission line corridors in their 2009 application to distribute the power generated from the proposed nuclear reactors. The first corridor, labeled the West corridor, proposes lines from Turkey Point and the Clear Sky substation to the Pennsuco substation. This corridor is generally located in the western half of Miami-Dade County, and is proposed in five (5) segments (Figure K-1). The second corridor, labeled the East corridor, proposes lines from Turkey Point and the Clear Sky substation to the Miami substation. This corridor is generally located in the eastern half of Miami-Dade County, and is proposed in one (1) segment (Figure K-1).

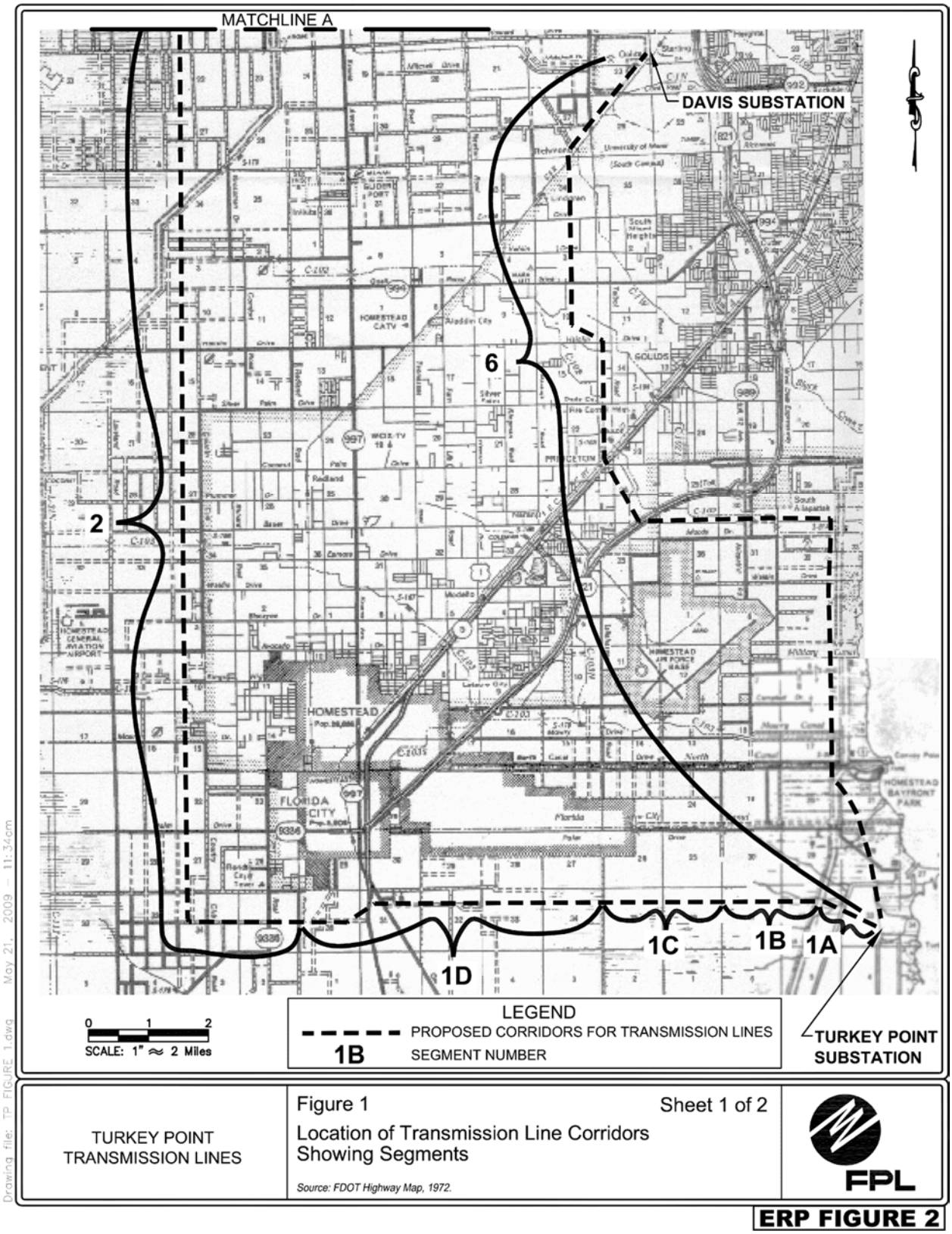


Figure K-1. Transmission Line Segments

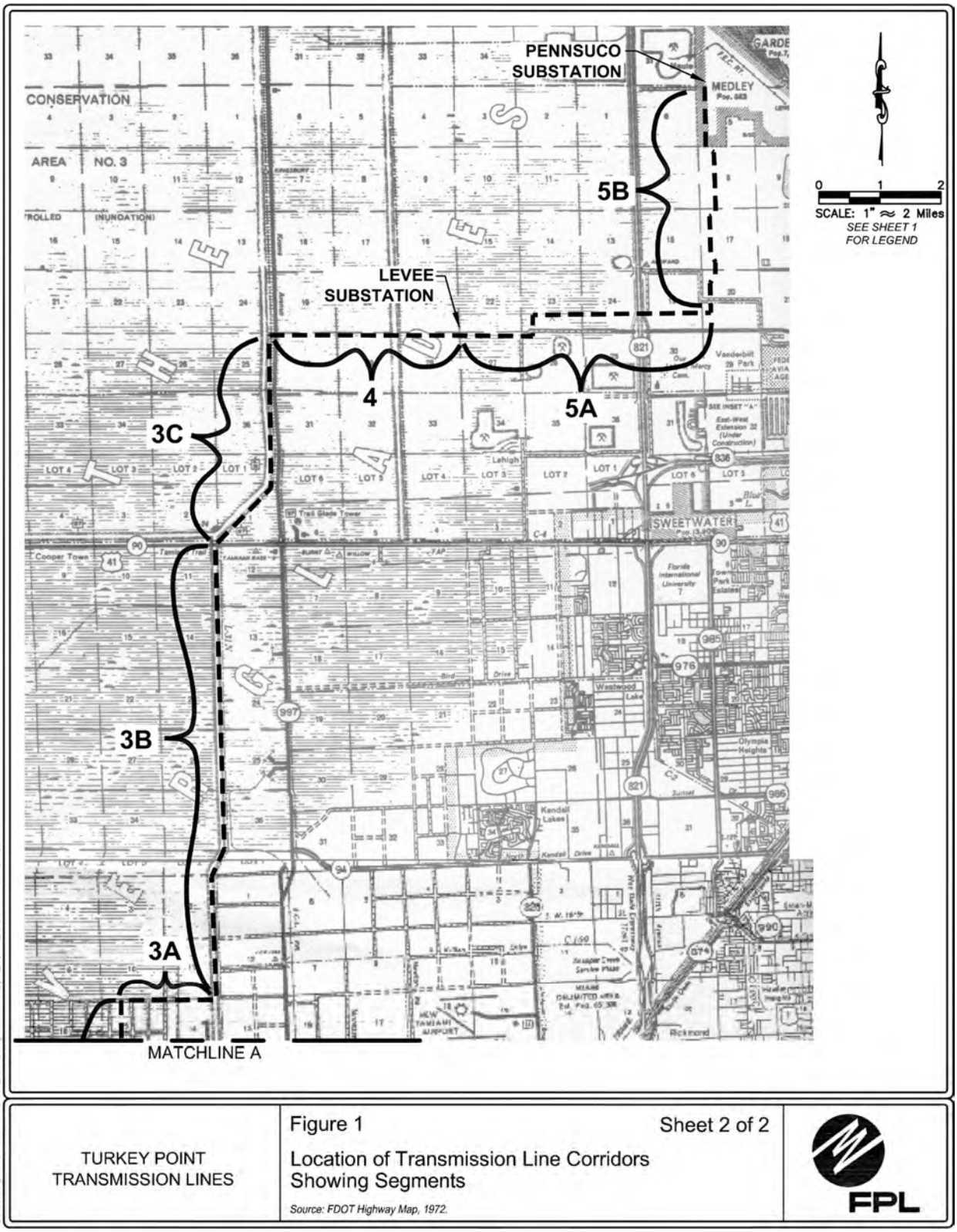


Figure K-1. (contd)

FPL originally considered several alignments within the northwest portion of the West corridor due to potential impacts on higher quality wetland areas, including Everglades National Park (ENP). In 2009, the application contained the East Preferred corridor, the West Secondary corridor, and the West Preferred corridor and the State of Florida Site Certification Application (SCA) contained a series of unnamed corridors associated with the East corridor (FPL 2010-TN272). In 2011, several options were submitted, including Agency Staff Alternative Routes 1, 2, 3; West Krome Avenue; and East Krome Avenue (Figure K-2). Via letter correspondence dated September 11, 2013, FPL provided the USACE with additional options for the West corridor, which included routes labeled Miami-Dade Limestone Products Association (MDLPA) 1, MDPLA 2, MDPLA 3, and National Parks Conservation Association (NPCA). In the September 11, 2013 letter, FPL did not modify the USACE application to include the West Consensus corridor because they could not yet determine the viability of the West Consensus corridor (using MDLPA Alternate Corridor 2) option (FPL 2013-TN4754). In December 2013, FPL introduced the West Consensus corridor to the USACE as a viable option (FPL 2013-TN4779). On July 8, 2016, FPL decided on and conveyed to the USACE their final option within the West corridor: the West Consensus corridor (Figure K-3; FPL 2016-TN4745). All of the above-listed options are within FPL's proposed segments 3 and 4 for the Western transmission line corridor. All commence at SW 120th Street and theoretical SW 204th Avenue, and end at the Levee substation.

FPL originally considered several alignments within the northern portion of the East corridor (Figure K-4; FPL 2010-TN272)) along existing transmission line corridors, established transportation corridors, and older neighborhoods where pipelines, sidewalks, and other residential infrastructure are already located. In October 2013, the Village of Pinecrest and the City of Coral Gables proposed the Village of Pinecrest/City of Coral Gables Alternate corridor. This alignment was submitted to the State of Florida as part of the SCA process but FPL never modified the Corps application and the State of Florida did not certify this transmission line corridor (Figure K-5). The segment connecting the Clear Sky and Davis substations traverses the same area as the East Preferred corridor. These unnamed routes follow the same route from the Clear Sky-to-Davis substation but start to diverge after that point. They all terminate at the Miami substation.

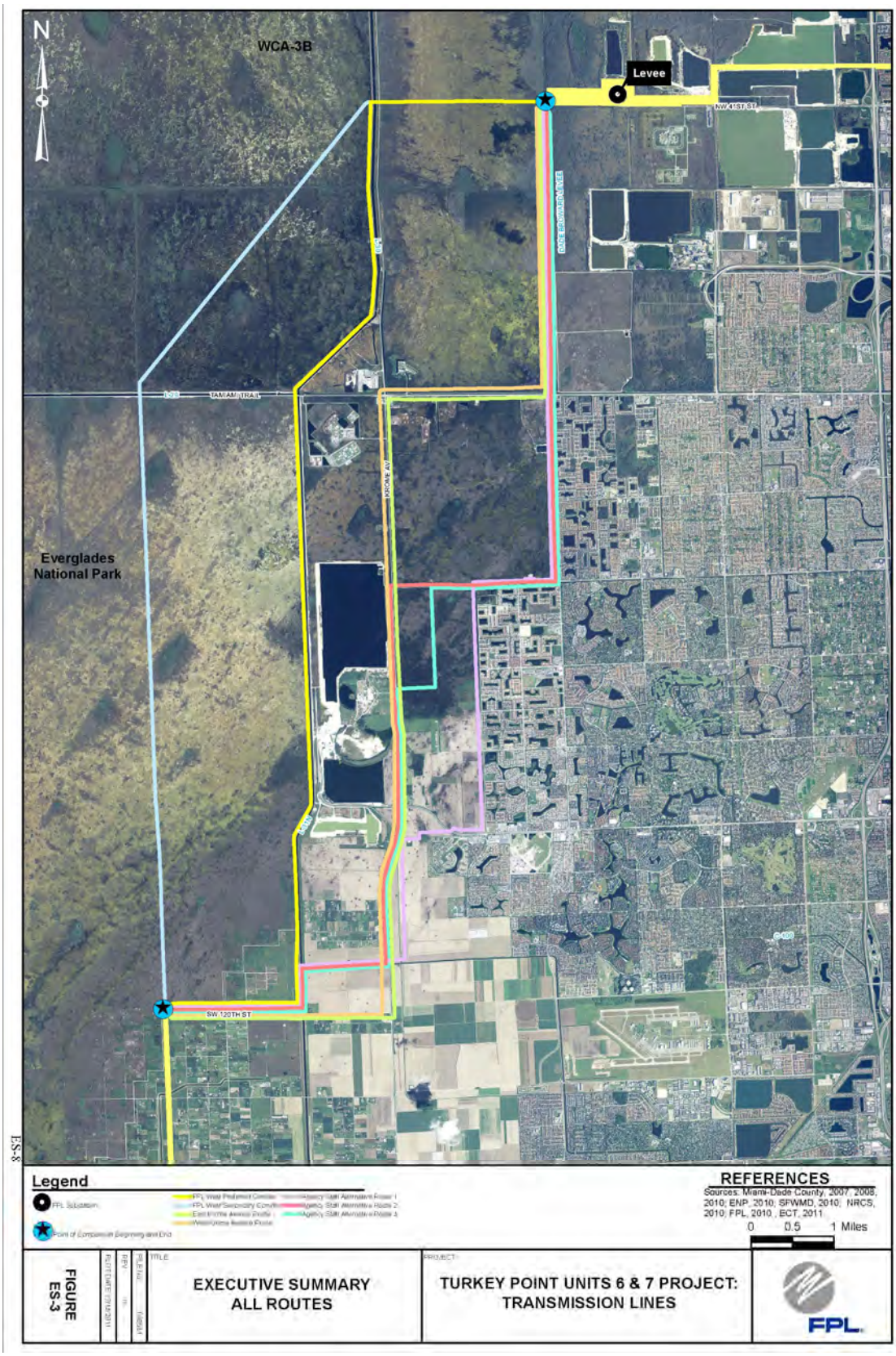


Figure K-2. FPL Turkey Point Transmission Line West Corridor – All Potential Routes

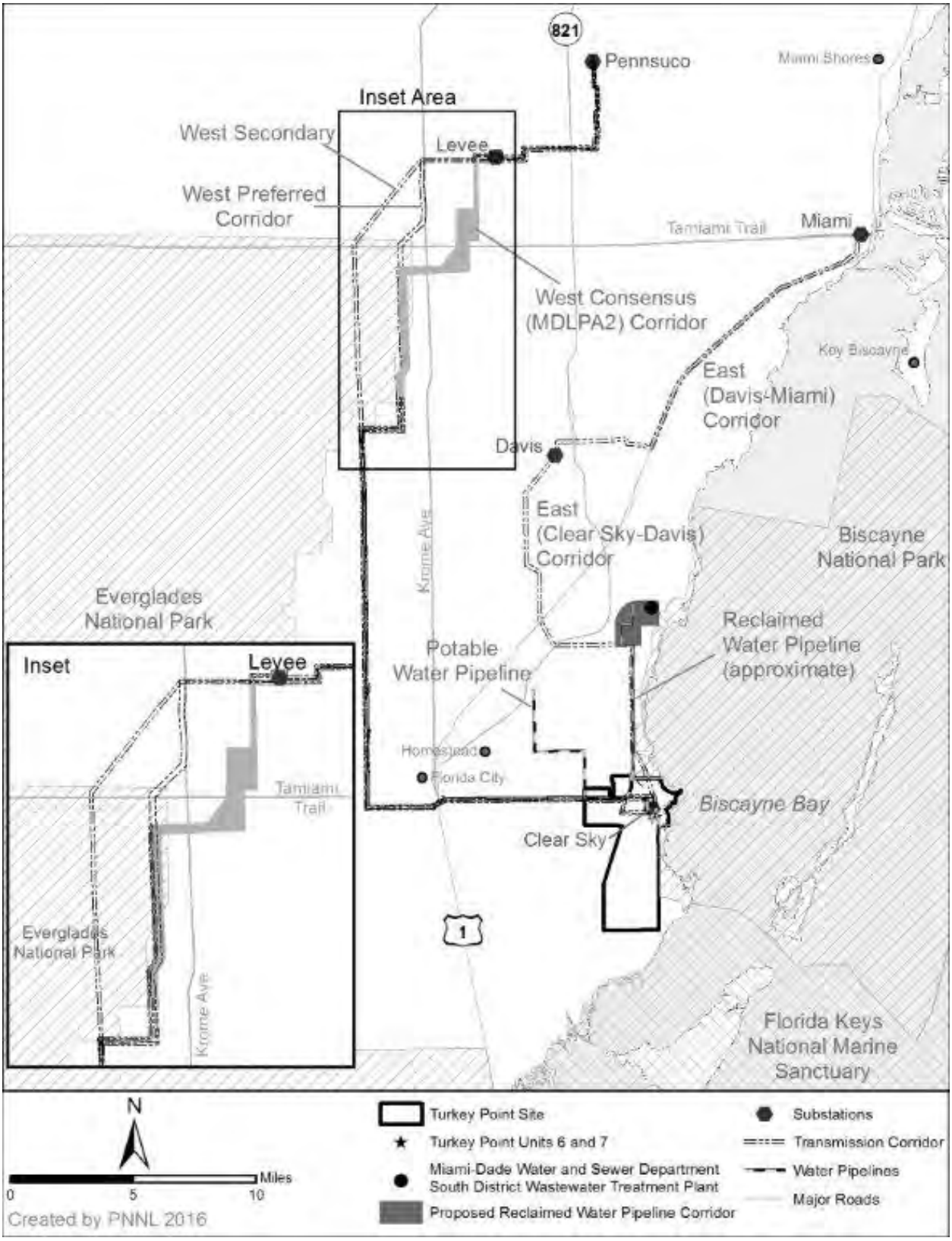


Figure K-3. FPL Turkey Point Transmission Line West Consensus Corridor

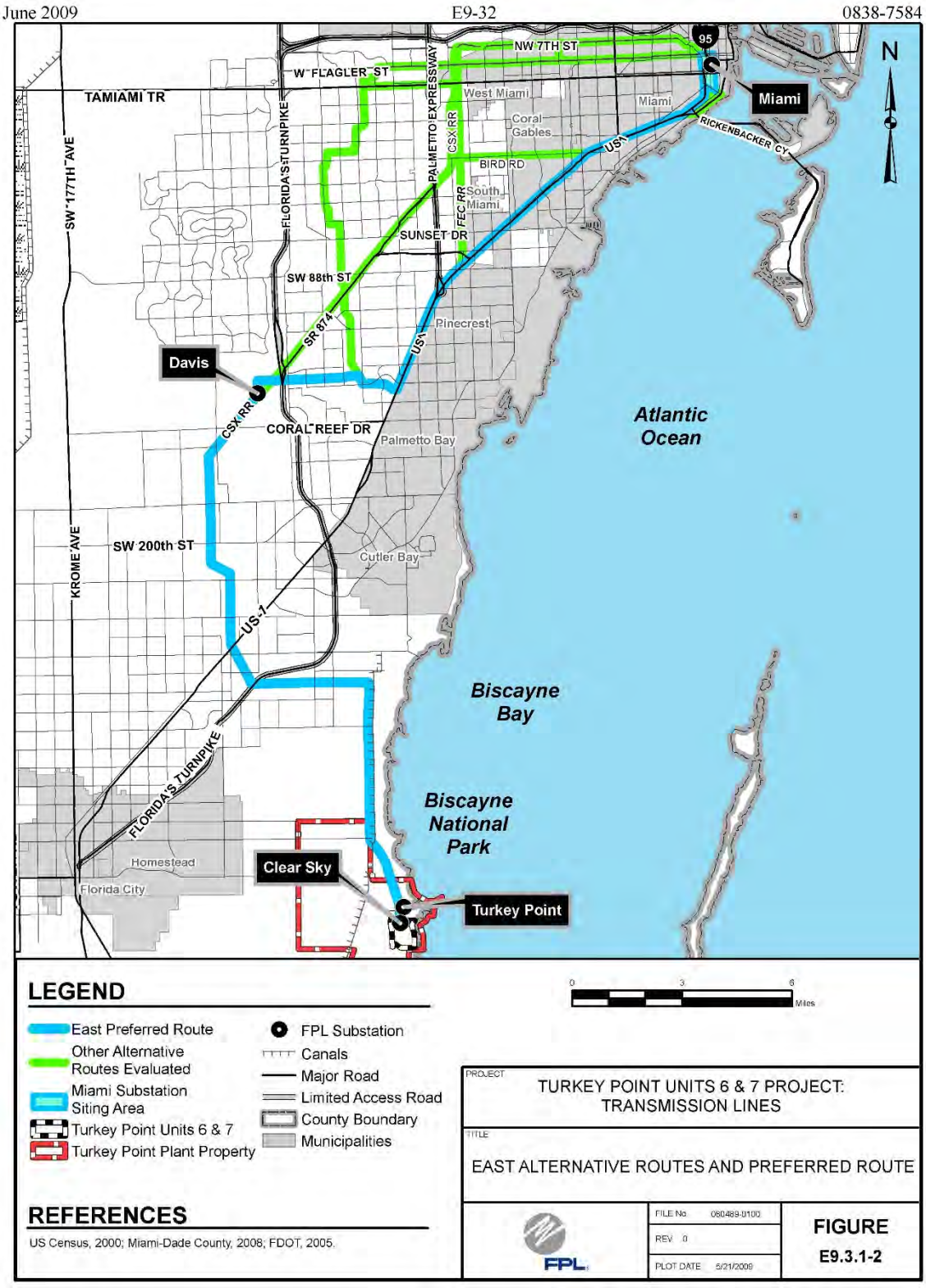
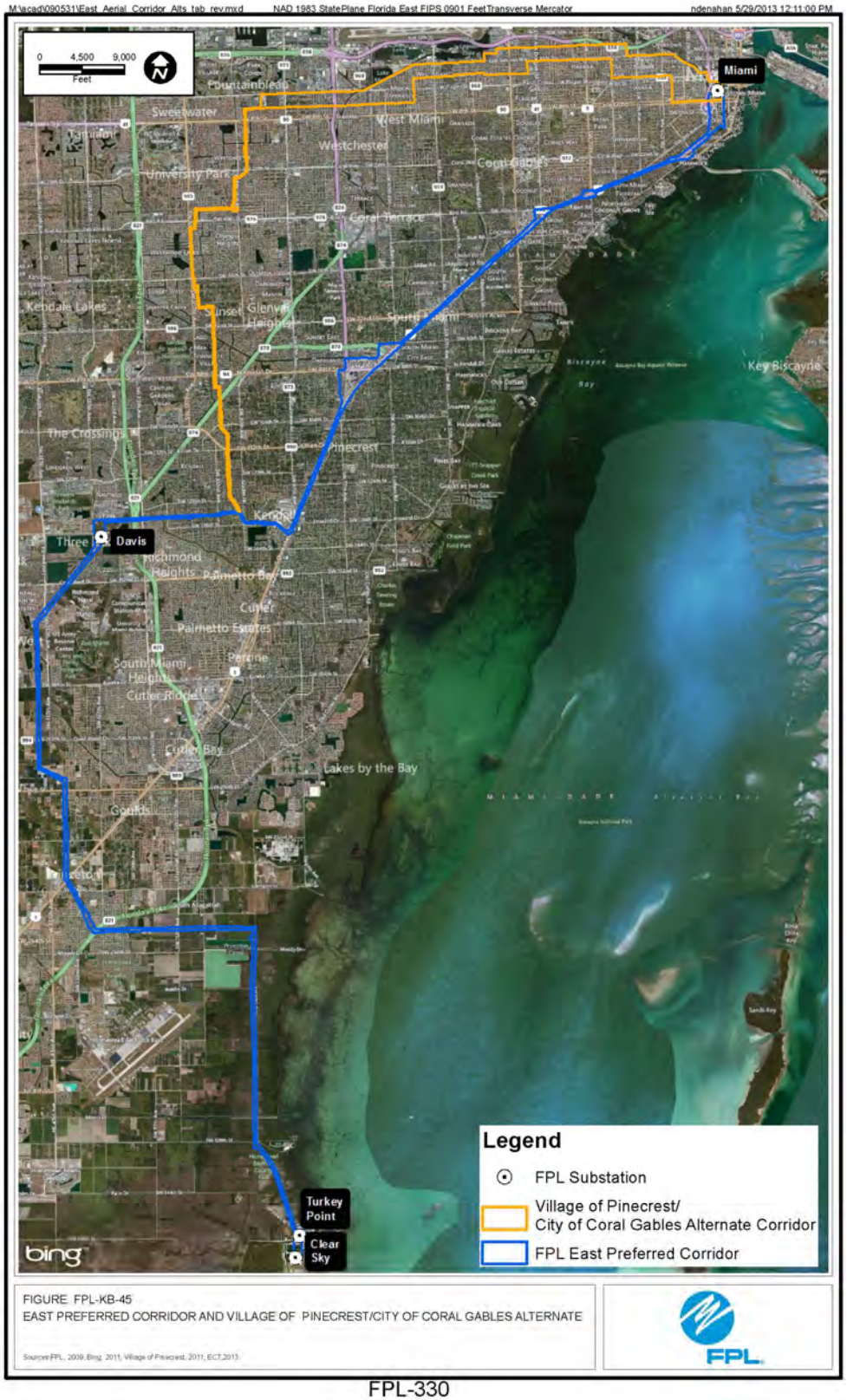


Figure K-4. East Alternatives Routes and Preferred Route (FPL 2010-TN272)



FPL-330

Figure K-5. East Preferred Corridor and Village of Pinecrest/City of Coral Gables Alternative (FPL 2013-TN4777)

K.2 Alternatives Carried Forward for Detailed Review

The East corridor and the West corridor, including the West Secondary corridor, West Preferred corridor, and the West Consensus corridor, were carried forward for further review. The other previously discussed alignments were eliminated from further consideration because of a combination of issues, including right-of-way acquisition; length alignment; buildings in proximity to the alignment; non-FPL parcels crossed; FPL substations crossed; collocation opportunities along the FPL right-of-way and other linear facilities; existing parks, recreation areas, and conservation lands; forested and nonforested wetlands; eagle nest and wading bird colonies; space restrictions; impacts on the Miami-Dade Urban Development Boundary; impacts on Native American lands; conflicts with existing mining operations; and proximity to residential development. This information was submitted by FPL via letter correspondence dated December 21, 2011 and September 11, 2013, in response to several USACE requests for additional information (FPL 2011-TN4753; FPL 2013-TN4754). Additionally, the USACE used information submitted to the State of Florida regarding the East corridor. The USACE independently reviewed FPL's assessment of alternative alignments and considered that the Agency Staff Alternative Routes 1, 2, 3; West Krome Avenue; East Krome Avenue; MDLPA 1, MDPLA 2, MDPLA 3, and NPCA; several unnamed segments in the northern portion of the East corridor and the Village of Pinecrest/City of Coral Gables Alternate corridor should be eliminated from detailed study. Even though in most cases the proposed transmission line corridors were mapped to be collocated with existing infrastructure, there was not enough room to safely install another pole to accommodate the new lines. Because the eastern corridor is predominantly urban landscape, residential and commercial infrastructure dominates. Significant acquisition and demolition of buildings would be needed to achieve the necessary safe distance to construct the new power poles needed to construct the new transmission line which the USACE determined would not be practicable. The USACE retained the West Secondary corridor for a more detailed review because the land swap associated with the West Preferred corridor had not been finalized even though FPL withdrew it from the application prior to the public notice being published. The land swap involves a Congressionally mandated exchange of lands on the eastern boundary of ENP for the lands located inside the West Secondary corridor.

K.3 Purpose and Need

The Corps has determined the basic project purpose is to meet the public's need for electric energy. The overall project purpose is to meet the public's need for reliable increased electrical baseload generating capacity in FPL's service territory. The transmission lines are necessary to distribute power to the continuously expanding population of Miami-Dade County. Specifically, the transmission lines will deliver approximately 2,200 MW of new generation from Turkey Point Units 6 and 7 to the State's electric grid through connections to other existing FPL substations in Miami-Dade County. Both eastern and western transmission lines are required because power from the new units must be delivered to different substations for distribution in order to maintain electrical system reliability. The East and West Preferred corridors both commence at the Turkey Point substation and connect to the Clear Sky substation, which is approximately 0.4 mi away. Improvements would be made to the Turkey Point substation to accommodate the new 230 kV line from Clear Sky substation.

The East transmission corridor includes a 230 kV transmission line between the proposed Clear Sky Substation at Turkey Point to the Miami substation at the northeast intersection of SW 2nd Avenue and the Miami River. The West transmission corridor includes two 500 kV transmission lines between the proposed Clear Sky Substation and the Levee substation located east of State Road 997/Krome Avenue and north of U.S. Highway 41/Tamiami Trail, and one 230-kV transmission line between the proposed Clear Sky Substation and the Pennsuco Substation located along NW 106th Street, south of U.S. Highway 27 near Medley.

K.4 No Action

If the transmission lines are not constructed, power that would be generated from proposed Units 6 and 7 would not be able to reach consumers (i.e., the Miami baseload). The existing distribution system is unable to handle such an additional power load. FPL selected transmission line corridors that could be collocated with disturbed linear facilities such as existing roadways, canals, and rights-of-way. Collocation with existing linear features minimizes the amount of additional clearing of rights-of-way required for construction and reduces wetland impacts associated with access roads and structure pads. The no-action alternative would not allow the applicant to achieve the project purpose.

K.5 Summary of Reasonable Alternatives

The proposed project includes two transmission line corridors: an eastern corridor and a western corridor. The originally proposed West corridor includes a main corridor that diverges into two options—a West Preferred corridor and a West Secondary corridor—and re-forms into one corridor from the Levee substation to the Pennsuco substation. The proposed West corridor, with either option, would include two 500 V single-circuit transmission lines connecting the new Clear Sky substation to the existing Levee substation and one 230 kV single-circuit transmission line connecting the Clear Sky substation to the existing Pennsuco substation. A third option, the West Consensus corridor, was proposed and accepted into the SCA as a Condition of Certification on December 5, 2013. It would also contain infrastructure similar to that described above for the two other West corridor options. The proposed East Preferred corridor consists of a new 230 kV, approximately 19 mi long, transmission line constructed to connect the proposed new Clear Sky substation to the existing Davis substation, and a new 230 kV line approximately 18 mi long, would be constructed to connect the Davis substation to a new 230 kV bay position at the Miami substation (Figure K-3).

K.5.1 General Description of Impacts on the West Corridor

The West corridor consists of the construction of two 500 kV lines from the new Clear Sky substation to the Levee substation and a 230 kV line to the Pennsuco substation. FPL proposes to construct the West corridor in five segments. These segments were based on the type of hydroperiod (deep, moderate, short) present, which correlates to the amount of fill FPL would need to construct the project. Segment 1 starts at the proposed Clear Sky substation and Segment 5 culminates at the Pennsuco substation. Segments 1, 2, and 5 are the same for the West corridor. Segments 3 and 4 show the variations between the three options, which are named the West Preferred, West Secondary, and West Consensus corridors. One of these three options would be constructed within a single right-of-way of approximately 330 ft in width

up to the Levee substation. From the Levee substation to the Pennsuco substation, the single 230 kV line would be constructed largely within an existing multi-circuit right-of-way that is approximately 170 ft in width.

Overall, potential impacts associated with the West corridor generally include impacts on agricultural land, residential communities, environmentally protected lands, and lands within the Miami-Dade County wellfield protection areas. Wetlands would also be affected, in addition to hydrology and freshwater flows that benefit the ENP and associated estuaries, and habitat supporting threatened and endangered plant and animal species. The segment connecting the Clear Sky and Levee substations would be built in three segments (legs). The first leg would pass just south of Homestead and Florida City, then travel north to SW 120th St. Major land use includes fields, pastures, row crops, tree nurseries, and citrus groves.

During multiple public meetings and the public notice comment period, over 20,000 comments were received. Those that pertain to the transmission line corridors included concerns about viewscape and enjoying the National Park experience. Underground transmission lines were considered but the technology may not be available to support the high temperatures over long distances. This issue is currently being evaluated as part of the remand from the State of Florida to review the approved State Certification and will be considered as part of the Corps' LEDPA analysis.

Any of the three portions of the West corridor could also potentially affect four wood stork colonies. The distance between the four wood stork colonies varies from less than 500 ft to 12 mi. The proposed work is also being coordinated to ensure that any proposed work that could modify a Congressionally authorized Comprehensive Everglades Restoration Plan (CERP) project would require review and approval pursuant to Section 14 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 408) (TN4746). The three options within the West corridor may also be inconsistent with the County Code and Comprehensive Development Master Plan. Detailed impact analysis and citations explaining this conclusion are provided in the State of Florida, Division of Administrative Hearings, DEP OGC Case No. 09-3107 document in sections entitled, *"Impacts Associated with Proposed Transmission Line Corridors within and adjacent to the Everglades National Park"* and *"Impacts to Conflict with County Code Section 338, East Everglades Area of Critical Environmental Concern" (*State of Florida 2012-TN1248*).*

The proposed transmission facilities between the Clear Sky and Pennsuco substations traverse the King's Highway Pineland within an existing right-of-way. A number of Federally threatened and endangered plants are known to occur within pine rockland habitats of Miami-Dade County, including the Bartrams' scrub-hairstreak (*Strymon acis bartrami*) and the Florida leafwing (*Anaea troglodyte floridalis*), which rely upon the non-listed pineland croton (*Croton linearis*). The proposed design limits impacts within the King's Highway Pineland to 0.84 ac by using areas that have been previously disturbed. All areas of construction would be isolated from adjacent areas through installation of silt fencing to limit disturbance. FPL would also be required to conduct pre-construction/pre-clearing surveys to provide an updated assessment for listed species, which shall note all habitat, occurrence, or evidence of listed species. FPL would be required to follow Florida Fish and Wildlife Conservation Commission and U.S. Fish and Wildlife Service (FWS) current survey protocols for all listed species that may occur within the site and associated facilities prior to conducting detailed surveys.

Only one transmission line corridor will be built in the West corridor; however, at a point near SW 120 St. and theoretical SW 204 Avenue, the West corridor diverges into three different options or sub-routes that converge at the Levee substation. The options are described in greater detail below.

K.5.1.1 West Secondary Corridor

FPL acquired the Clear Sky-Levee right-of-way in the 1960s and early 1970s in anticipation of the future need for electrical facilities to serve electrical load growth in Miami-Dade County and southeast Florida. Approximately 7.4 mi of this right-of-way was encompassed by the addition of the Everglades National Park Expansion Area to the ENP in 1989. As a result, a total of approximately 12 mi of FPL's existing right-of-way is proposed for relocation, including a short portion that was encompassed by the 8.5 Square Mile Area (SMA) project (immediately south of the ENP). The remaining portion of the right-of-way to be relocated extends across the southeast corner of Water Conservation Area 3B (WCA-3B) immediately north of ENP. This portion of the existing FPL right-of-way is the West Secondary corridor (Figure K-3).

The West Secondary corridor starts at SW 120th Street and theoretical SW 204 Avenue in the 8.5 SMA and continues to follow FPL's existing right-of-way directly northward through the ENP Expansion Area for approximately 7.4 mi to U.S. 41/Tamiami Trail. There the West Secondary corridor crosses U.S. 41/Tamiami Trail and then turns northeastward along FPL's existing right-of-way to its intersection with Krome Avenue. The West Secondary corridor is approximately 330 to 370 ft wide, is wholly located within the existing FPL right-of-way, and is located approximately 2 mi inside the current ENP boundary. This right-of-way is privately owned by FPL even though it is located inside ENP. The total length of FPL's West Secondary corridor is approximately 51 mi.

This corridor was eliminated from detailed analysis prior to the issuance of the Corps' public notice and publication of the draft EIS due to the proposed land exchange between the U.S. Department of the Interior and FPL, which included the exchange of the existing FPL right-of-way through the ENP (known as the West Secondary corridor) for a replacement right-of-way located adjacent to the existing L-31N Canal (known as the West Preferred corridor-discussed below). The land exchange provides the opportunity to minimize impacts on high-quality wetlands within the ENP by collocating the new transmission facilities with existing disturbed linear features. The West Secondary corridor contains impacts on 190.63 ac of higher quality wetlands, 0.94 ac of surface-water impacts, and 23.67 ac of exotic dominated wetlands.

If this corridor were built, the environmental consequences would likely include disruption of natural sheet flow to the eastern boundary of ENP due to the construction of the access road for the transmission lines. Culverts were proposed as needed to maintain flow in an attempt to reduce impacts to sheet flow because the access roads are continuous.

In addition, programmatic general permits (PGPs) were developed by the USACE Regulatory Division for the East Bird Drive, Bird Drive, and North Trail wetland basins under SAJ-59 (DOA 1994-TN4749) and SAJ-74 (DOA 2005-TN4751). SAJ-59 was issued on April 12, 1989, as a PGP administered by Miami-Dade County to allow filling of wetlands in the East Bird Drive Basin (DOA 1989-TN4748; DOA 1994-TN4749). Mitigation funds were collected by Miami-

Dade County until September 30, 1999, and exotic plant species treatment was conducted in the East Everglades Expansion Area in ENP next to the transmission line corridors until 2013 (DOI and Miami-Dade County 2011-TN4750). The final version of the SAJ-74, which covered the Bird Drive and North Trail Wetlands, expired on May 31, 2010 (DOA 2005-TN4751). SAJ-74 was a PGP administered by Miami-Dade County. Even though the majority of mitigation funds were used primarily for acquiring conservation lands in Miami-Dade County outside of ENP, some mitigation funding was authorized for exotic species treatment in 34 various locations in and around ENP, some near the Tamiami Trail and Krome Avenue and some near SW 136 and Krome Avenue. Biological control agents psyllids (*Boreioglycaspis melaleucae)* and weevils (*Oxyops vitiosa*) were released in areas where Melaleuca, an invasive exotic plant, was located (USDA 2010-TN4747). The construction of this portion of the corridor would likely negatively affect the 34 locations where biological control agents were introduced as mitigation associated with these general permits (or PGPs). The construction of the transmission lines and access roads would result in the filling of wetlands that were likely recipient sites of mitigation funds, which were designated for wetland enhancement.

As part of the mitigation associated with Lake Belt limestone mines, the Lake Belt Mitigation Committee designed and constructed a 2 mi long subterranean seepage wall (Phase I) on the eastern side of the L-31N Levee to help prevent the loss of groundwater into the canal. For Phase II of the mitigation, an additional 3 mi long subterranean wall is currently being proposed. The Lake Belt Mitigation Committee seepage wall would likely not be affected by the construction of this corridor because the proposed transmission line corridor is located 2 mi west of this structure and impacts associated with this corridor would likely not impede flow toward the seepage wall.

There would also be an increased likelihood of impacts on the wood stork and other avian species by the construction and operation of the transmission towers and lines. Factors that contribute to avian electrocutions include bird size, bird behavior (does the species find the structures an attractive nuisance, are the structures conducive to perching and roosting), bird abundance and habitat use, and structural design (less than 60 in. vertically between wires). The closer the lines, the more likely a large bird's wingspan can touch both lines, resulting in electrocution. By moving the transmission line corridor 2 mi inside of ENP, there would likely be an increase in the possibility of impacts on the wood stork since there are 4 active wood stork colonies in close proximity. The closest colony is less than 500 ft away.

Because ENP has minimal invasive species in this area, the construction and maintenance of the new transmission line routes would introduce exotic plant species by creating upland/ disturbed areas that would allow exotics greater ability to colonize on the side slopes of the access road. Exotic seeds could also be introduced through the use of construction equipment brought in from other sites.

Viewshed impacts for ENP visitors would increase because the structures would be 2 mi inside the eastern boundary of the ENP. The pads would be 330 ft wide to accommodate a 230 kV line and two, 500 kV lines. Standard height for these structures would be a minimum of 135 ft.

K.5.1.2 West Preferred Corridor

The West Preferred corridor deviates from the West Secondary corridor at SW 120th Street and theoretical SW 204 Avenue in the 8.5 SMA and continues east along a portion of the southern boundary of ENP, and then continues north along the L-31N Levee. The West Preferred corridor crosses U.S. 41/Tamiami Trail and then turns northeastward continuing along Krome Avenue to its intersection with the West Secondary corridor. The West Preferred corridor is approximately 330 to 370 ft wide and is wholly located within the land swap area, whereby FPL will swap the West Secondary corridor land for the land directly west of the L-31N Levee, thereby moving the ENP boundary westward. This right-of-way is privately owned by FPL. The total length of FPL's West Preferred corridor is approximately 52 mi; the length where it differs from the West Secondary corridor is 1 mi.

Part of the West Preferred corridor abuts the eastern perimeter of the ENP, which is characterized by high-quality wetlands, is located closer to four existing wood stork colonies, and is located predominantly inside the current eastern boundary of ENP. This corridor has the potential to be the most damaging on ENP viewscape and wood stork colonies. Portions of the West Preferred corridor outside of ENP contain disturbed wetlands with some agricultural land, limerock quarries, and scattered urban development. Based on conceptual designs, construction of transmission facilities within the West Preferred corridor would cause impacts on approximately 198.92 ac of higher quality wetlands, 0.31 ac of surface waters, and 28.11 ac of exotic dominated wetlands resulting in 227.34 ac of permanent impacts on jurisdictional wetlands.

If this corridor were built, the environmental consequences would likely include impacts on Federal projects, including the L-31N Levee, Modified Water Deliveries to Everglades National Park (Mod Waters), and other CERP components. Building an access road with the associated pads at the toe of slope on the western side of the L-31N Levee would likely affect the structural integrity of the levee and would require authorization pursuant to 33 U.S.C. § 408 (TN4746). The Mod Waters project and several CERP projects, including the refurbishment of several water control structures, were designed to bring water to the eastern part of ENP.

In addition, PGPs were developed by the USACE Regulatory Division for the East Bird Drive, Bird Drive, and North Trail wetland basins under SAJ-59 (DOA 1994-TN4749) and SAJ-74 (DOA 2005-TN4751). SAJ-59 was issued on April 12, 1989, as a PGP administered by Miami-Dade County to allow filling of wetlands in the East Bird Drive Basin (DOA 1989-TN4748; DOA 1994-TN4749). Mitigation funds were collected by Miami-Dade County until September 30, 1999, and exotic plant species treatment was conducted in the East Everglades Expansion Area, near the transmission line corridors in ENP until 2013 (DOI and Miami-Dade County 2011-TN4750). The final version of the SAJ-74, which covered Bird Drive and North Trail Wetlands, expired on May 31, 2010 (DOA 2005-TN4751). SAJ-74 was a PGP administered by Miami-Dade County. Even though the majority of mitigation funds were used primarily for acquiring conservation lands in Miami-Dade County outside of ENP, some mitigation funding was authorized for exotic species treatment in 34 various locations in and around ENP, some near the Tamiami Trail and Krome Avenue and some near SW 136 Street and Krome Avenue. Biological control agents psyllids (*Boreioglycaspis melaleucae)* and weevils (*Oxyops vitiosa*) were released in areas where Melaleuca, an invasive exotic plant, was located (USDA 2010-

TN4747). The construction of this portion of the corridor would likely negatively affect the 34 locations where biological control agents were introduced as mitigation associated with these general permits (or PGPs). The construction of the transmission lines and access roads would result in the filling of wetlands that were likely recipient sites of mitigation funds designated for wetland enhancement.

As part of the mitigation associated with Lake Belt limestone mines, the Lake Belt Mitigation Committee designed and constructed a 2 mi long subterranean seepage wall (Phase I) on the eastern side of the L-31N Levee to help prevent the loss of groundwater into the canal. For Phase II of the mitigation, an additional 3 mi long subterranean wall is currently being proposed. If the access road and fill pads were constructed, the modeling associated with this seepage wall would need to be recalculated to determine if the construction of the access road and fill pads would be beneficial or detrimental to the seepage wall project.

There would also be an increased likelihood of impacts on the wood stork and other avian species by the construction and operation of the transmission towers and lines. Factors that contribute to avian electrocutions include bird size, bird behavior (does the species find the structures an attractive nuisance, are the structures conducive to perching and roosting), bird abundance and habitat use, and structural design (less than 60 in. vertically between wires). By moving the transmission line corridor 2 mi east, there would likely be a reduction in the possibility of impacts on the wood stork because there are four active wood stork colonies in close proximity. The closest colony is less than 500 ft away.

Because ENP has minimal invasive species in this area, the construction and maintenance of the new transmission line routes would create upland/disturbed areas that would allow exotics greater ability to colonize. Exotic seeds could also be introduced through the use of construction equipment brought in from other sites.

Viewshed impacts for ENP visitors would be reduced because the structures would be moved to the eastern boundary of the ENP.

K.5.1.3 West Consensus Corridor

The West Consensus corridor deviates from the West Preferred corridor at SW 120th Street and theoretical SW 187 Avenue in the 8.5 SMA and continues to follow the L-31N Levee northward. The West Consensus corridor turns east, just south of the Krome Detention Center and then turns north within a large swath of the Bird Drive Basin. The West Consensus corridor crosses U.S. 41/Tamiami Trail and heads north through the Pennsuco Wetland Basin until it intersects with the infrastructure associated with the Levee substation where it then turns east. The West Consensus corridor is approximately 330 to 370 ft wide, is located within the existing FPL right-of-way, and is proposed to be located to the east of the current ENP boundary. The total length of FPL's West Consensus corridor is approximately 52.5 mi; it differs in length from the West Preferred corridor by 0.5 mi.

The West Consensus corridor is the latest alternative that was added to the Corps' permit application evaluation in December 2013, prior to publication of the Corps' public notice. It differs from the West Preferred corridor only in that portions of the segment have been shifted to the east to avoid affecting the majority of the eastern perimeter of the current boundary of ENP.

This corridor still crosses a landscape consisting mostly of wetlands and has a small impact on the current ENP boundary; the wetlands range in quality from high quality to disturbed, but FPL states that its use would reduce the potential for adverse impacts on multiple Federally endangered species (FPL 2013-TN2941).

Based on conceptual designs, construction of transmission facilities within the West Consensus corridor would contain impacts on 169.53 ac of higher quality wetlands, 0.29 ac of surface waters, and 42.24 ac of exotic dominated wetlands resulting in 212.06 ac of permanent impacts; which is a reduction of approximately 15 ac of wetland impacts, compared to the West Preferred corridor.

FPL is in the process of acquiring lands to obtain the right-of-way to construct this corridor. The selection of the West Consensus corridor as FPL's preferred alternative for the West corridor was confirmed in FPL's letter to the USACE dated July 8, 2016 (FPL 2016-TN4745). Prior to that date, FPL requested that both the West Preferred and West Consensus corridors be authorized as options in the USACE final decision document; however, the Corps determined that a LEDPA determination could not be reached pursuant to Section 404 of the Clean Water Act with two potential options.

Impacts on sheet flow inside ENP would be nonexistent because the corridor would be located outside ENP boundaries. Access roads would need to be culverted so as not to interfere with sheet flow of adjacent wetlands located within the Bird Drive, Pennsuco, or North Trail wetland basins.

If this corridor were built, the environmental consequences would likely include de minimis impacts on Federal projects, including the L-31N Levee, Mod Waters, and other CERP components because it completely avoids the Federal projects.

In addition, PGPs were developed by the USACE Regulatory Division for the East Bird Drive, Bird Drive and North Trail wetland basins under SAJ-59 (DOA 1994-TN4749) and SAJ-74 (DOA 2005-TN4751). SAJ-59 was issued on April 12, 1989, as a PGP administered by Miami-Dade County to allow filling of wetlands in the East Bird Drive Basin (DOA 1989-TN4748; DOA 1994-TN4749). Mitigation funds were collected by Miami-Dade County until September 30, 1999, and exotic plant species treatment was conducted in the East Everglades Expansion Area, next to the transmission line corridors in ENP until 2013 (DOI and Miami-Dade County 2011-TN4750). The final version of the SAJ-74, which covered the Bird Drive and North Trail Wetlands, expired on May 31, 2010 (DOA 2005-TN4751). SAJ-74 was a PGP administered by Miami-Dade County. Even though the majority of mitigation funds were used primarily for acquiring conservation lands in Miami-Dade County outside of ENP, some mitigation funding was authorized for exotic species treatment in 34 various locations in and around ENP, some near the Tamiami Trail and Krome Avenue and some near SW 136 Street and Krome Avenue. Biological control agents psyllids (*Boreioglycaspis melaleucae)* and weevils (*Oxyops vitiosa*) were released in areas where Melaleuca, an invasive exotic plant, was located (USDA 2010-TN4747). The construction of this portion of the corridor would likely negatively impact the 34 locations where biological control agents were introduced as mitigation associated with these general permits (or PGPs). The construction of the transmission lines

and access roads would result in the filling of wetlands that were likely recipient sites of mitigation funds designated for wetland enhancement.

As part of the mitigation associated with Lake Belt limestone mines, the Lake Belt Mitigation Committee designed and constructed a 2 mi long subterranean seepage wall (Phase I) on the eastern side of the L-31N Levee to help prevent the loss of groundwater into the canal. For Phase II of the mitigation, an additional 3 mi long subterranean wall is currently being proposed. If the access road and fill pads were constructed, the modeling associated with this seepage wall would need to be recalculated to determine if the construction of the access road and fill pads would be beneficial or detrimental to the seepage wall project.

The Lake Belt Mitigation Committee seepage wall would likely not be affected by the construction of this corridor because this corridor is located 1 mi or more away from the mitigation site.

This corridor would have the least adverse impacts on the wood stork and other avian species by constructing the transmission towers and lines closer to a disturbed/urban area, moving the impacts farthest away from four existing wood stork colonies.

Factors that contribute to avian electrocutions include bird size, bird behavior (does the species find the structures an attractive nuisance, are the structures conducive to perching and roosting), bird abundance and habitat use, and structural design (less than 60 in. vertically). By moving the transmission line corridor farther east, outside of ENP, there would likely be a reduction in the possibility of impacts on the wood stork and other avian species.

The majority of construction would occur outside of ENP; therefore, there is a decreased likelihood of introducing exotic plant species into ENP through the construction and maintenance of the new transmission line route. Impacts on the park would be limited to the southern boundary along SW 120th Street, where the corridor would still be partially located in the park.

Impacts on the viewshed for ENP visitors would be greatly reduced because the majority of the construction would occur outside of ENP. The impacts that would likely still be inside ENP would be situated around the east-west route along SW 120 Street.

K.5.1.4 East Preferred Corridor

The proposed East Preferred corridor transmission lines would be largely collocated in an existing right-of-way or other linear/transportation corridors. The segment connecting the Clear Sky and Davis substations traverses a mostly rural landscape consisting predominantly of agricultural land interspersed with wetlands and rangeland and with widely scattered urban areas and forests. The segment between the Davis and Miami substations would traverse a mostly urban landscape but would be built mostly along existing roadways.

The proposed East Preferred corridor would include an overhead, single-circuit 230 kV transmission line. This line would provide connection from the Clear Sky substation to the existing Davis and Miami substations located in Miami-Dade County. The Davis substation is

located at the intersection of SW 136th Street and SW 127th Avenue. The Miami substation, located within the city limits of Miami, is at the intersection of SW 2nd Avenue and SW 3rd Street along the Miami River. There would be improvements made to both substations to accommodate the new 230 kV line. The Clear Sky-Davis portion of the East Preferred corridor would be constructed within an existing, 19 mi long, multi-circuit FPL transmission line right-of-way.

This right-of-way has the ability to accommodate the proposed single-circuit 230 kV line without the need for additional right-of-way. However, for a portion of the Davis-to-Miami corridor, new rights-of-way would be required, but much of the proposed corridor includes existing transportation rights-of-way (e.g., U.S. Route 1, Metrorail). The Davis-Miami portion of the East Preferred corridor is approximately 18 mi long and is predominantly within an existing transmission line corridor with the exception of the portion that runs along the US-1 corridor. There are several areas where there is more uncertainty and where the proposed expanded corridor exceeds the 330 ft width. The most extensive expansions occur from SW 140 Street to SW 128 Street and between SW 127 Avenue and theoretical SW 124 Avenue (which affects the Nixon-Smiley Pineland, a Miami-Dade County, Environmentally Endangered Land); along US-1 from SW 100 Street to SW 80 Street (which affects the Snapper Creek Canal crossing, a Federal project); along US-1 from Orange Street to just north of Bird Avenue (which does not affect wetlands or canal crossings); along US-1 from SW 28 Terrace. to SW 27 Terrace. (which does not affect wetlands or canal crossings); and along US-1 near SW 22 Terrace. until the terminus at the Miami substation (which affects the crossing underneath the Miami River, a Federal project). Please note that the impacts/crossings of Federal projects would require authorization pursuant to 33 U.S.C. § 408 (TN4746).

Various environmental consequences are associated with the proposed East Preferred corridor. Impacts on residential and commercial areas traversed by East Preferred corridor segments would include aesthetics, vegetation removal and the scale of the poles. The proposed transmission lines and utility poles would permanently alter the eastern skyline for Miami-Dade residents and property owners, especially those who live in units above the tree line. The proposed East Preferred corridor would impact the dense urban environment of US1 from the Miami substation in downtown Miami to the southern end of the Busway near SW 136th Street (C-100A Canal at US-1). US-1 has special Miami-Dade County designations and is classified as a Gateway corridor. Anticipated aesthetic impacts and impacts to trees and vegetation would adversely affect the quality of this corridor. Existing street trees provide shelter for pedestrians and bicyclists from the elements such as sun, heat, rain, wind, and vehicles. Impacts to this urban vegetation will additionally affect the aesthetics of US-1 by removing natural buffers to incompatible land uses (as determined by Miami-Dade County) and street fixtures. The proposed East Preferred corridor would also potentially impact pedestrian gateways (bridges) at US-1 and NW 12th Avenue and US-1 and SW 88th Street. Overhead lines in segments along US-1 may restrict efforts to build high-quality development projects designed for pedestrians. Removal of trees in the urban areas throughout the East Preferred corridor is likely to cause an increase in greenhouse gas emissions and the urban heat island effect.

If this corridor were built, the environmental consequences would likely include de minis impacts to Federal projects, including the L-31N Levee, Mod Waters and other CERP components

because this corridor is located 18 m or greater away from the L-31N Levee and Mod Waters, projects. The distance factor would also be the rationale as why the CERP components adjacent to ENP or the Bird Drive Basin would not be affected by the East Preferred corridor. CERP components near the eastern portion of Miami-Dade County in the Biscayne Bay Coastal Wetlands would also likely experience de minimis impacts because the East Preferred corridor proposes only 0.06 ac of impacts on coastal wetlands. Please note that the impacts/crossings of Federal projects would require authorization pursuant to 33 U.S.C. § 408 (TN4746).

Mitigation associated with PGPs SAJ-59 (DOA 1994-TN4749) and SAJ-74 (DOA 2005-TN4751) would likely not be affected by construction of this corridor because it is located 18 mi or more away from the mitigation site.

The Lake Belt Mitigation Committee seepage wall would likely not be affected by the construction of this corridor because this corridor is located 18 mi or more away from the mitigation site.

Factors that contribute to avian electrocutions include bird size, bird behavior (does the species find the structures an attractive nuisance, are the structures conducive to perching and roosting), bird abundance and habitat use, and structural design (at a minimum 60 in. between wires).

By moving the transmission line corridor further east, there would likely be a reduction in the possibility of impacts on the wood stork and but an increase in impacts on other avian species. In the southern portion of this corridor from the point where the transmission lines leave the Turkey Point site, continuing north to theoretical SW 261 Street then heading west to approximately SW 122 Avenue, construction of East Preferred corridor infrastructure may also affect 0.06 ac of coastal wetlands and wetland hydrology and sheetflows or freshwater flows to Biscayne National Park (BNP), habitat supporting threatened and endangered plant and animal species, and protected lands adjacent to the transmission lines. The impacts on wood stork colonies would be minimal because the proposed fill locations are more than 18.6 mi away from the colonies throughout most of the East Preferred corridor.

Because the majority of construction would occur outside of BNP, there is a decreased likelihood of introducing exotic plant species into BNP through the construction and maintenance of the new transmission line route.

Impacts on the viewshed BNP visitors would be minimal because the East Preferred corridor would be constructed within an existing transmission line corridor, which already contains transmission lines and poles that are visible from BNP.

K.6 Mitigation Measures

Avoidance and minimization are being partially addressed by FPL's final selection of the West Consensus corridor, which has the least amount of impacts on wetlands in the West corridor. In addition, impacts on exotic dominated wetlands (exotic wetland hardwoods) and other non-wetland waters (canals, ditches) are helping to minimize impacts on high-quality wetlands. Further avoidance and minimization will be considered and addressed once a final, refined layout is received, according to FPL's letter to the USACE, dated July 8, 2016 (FPL 2016-TN4745).

FPL has identified the West Consensus corridor as its preferred corridor alignment alternative for the West corridor. The West Consensus corridor has the least amount of impacts on wetlands of the West corridor alignment alternatives. This alternative also affects exotic dominated wetlands (exotic wetland hardwoods) and other non-wetland waters (canals, ditches,) in order to avoid and minimize impacts on high-quality wetlands. Further avoidance and minimization will be considered and addressed once a final, refined layout is received, according to FPL's letter to the USACE dated July 8, 2016 (FPL 2016-TN4745).

Unavoidable impacts on herbaceous wetland impacts are proposed to be mitigated through the purchase of credits from the ENP Hole-in-the-Donut (HID) In-Lieu-Fee Mitigation Project. These credits were calculated through the use of the HID's functional assessment methodology Uniform Mitigation Assessment Methodology. Unavoidable impacts on coastal wetlands are proposed to be mitigated through the purchase of credits from the FPL Everglades Mitigation Bank (EMB). These credits were calculated through the use of the EMB's functional assessment methodology, Wetland Assessment Technique for Environmental Reviews (WATER). Final mitigation calculations will be documented in the USACE's record of decision after the Corps determines the LEDPA pursuant to Section 404 of the Clean Water Act (40 CFR 230-TN427).

The NRC is currently in consultation with the FWS pursuant to Section 7 of the Endangered Species Act (73 FR 76272-TN973). The NRC determined that the proposed transmission lines may affect, and are likely to adversely affect the Florida panther. FWS typically considers impacts on the Florida panther by determining the projects impacts on panther habitat units (PHUs). FWS has a pre-determined amount of PHUs associated with each EMB WATER credit. The FWS determines whether the amount of WATER credits will compensate for the PHUs lost as a result of the construction of this project. When consultation is complete, FWS will likely prescribe the number of WATER credits the applicant must acquire in order to offset impacts on the panther by using the WATER functional assessment methodology. Final mitigation calculations will be documented in the USACE's record of decision after consultation with FWS is complete.

Other mitigative measures proposed will attempt to reduce impacts on avian species. Impacts can include collisions with powerlines and electrocution. Collisions are proposed to be reduced through the use of flight diverters and perch discouragers. Flight diverters are typically attached to the ground wire and are intended to increase visibility of the powerlines. Marker balls are an example of a flight diverter. They are brightly colored, lightweight, and round, and are secured on distribution lines to increase visibility. Wood storks are especially vulnerable to collisions with overhead wires due to their size, body mass, and flight behavior. Abundance of bird species, habitat use and structural design (lines vertically spaced less than 60 in. apart) also contribute to avian collisions with overhead lines.

Perch discouragers can include perch guards, bird platforms, and insulator shield designs, and are intended to keep birds from using powerlines and poles for perching. Bird guano is especially problematic in these perching scenarios. When feces build up on the insulator structures or skirts, the insulating qualities become compromised and this can cause an electrical fault. Another major issue is that arcing can occur when birds produce a large stream

of excrement. Arcing can happen when a strong current jumps a gap in a circuit. A bird may be electrocuted without even touching both powerlines.

Additionally, raptors can use these structures to locate prey because the landscape in South Florida is flat, thus giving them a hunting advantage.

FPL has proposed to conduct a monitoring study during the first wood stork nesting season after construction has commenced along the marked stretch of the transmission lines near the currently known wood stork colonies. Their proposed monitoring study is based on a previous study conducted by Frederick and Deng (1997-TN4752) on the FPL Levee-Midway Transmission Line to confirm whether or not these structures are effective in reducing impacts to avian species.

K.7 404 (b)(1) Guidelines and the Least Environmentally Damaging Practicable Alternative

As part of the National Environmental Policy Act process, the USACE evaluated the corridors in this appendix. The Corps considered all reasonable alternatives, including those eliminated from detailed study, alternatives outside of the Corps' jurisdiction, and the no-action alternative. The Corps evaluated the environmental consequences of the East corridor, and several alignments in the West corridor, and proposed mitigative measures. As part of its ongoing review of the project, the Corps will further refine its review of practicable alternatives of the proposed project as required by the 404(b)(1) Guidelines (40 CFR 230-TN427). This analysis will ultimately yield the LEDPA determination for this proposal, which will be included in the USACE record of decision.

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This environmental impact statement (EIS) has been prepared in response to an application submitted to the U.S. Nuclear Regulatory Commission (NRC) by Florida Power and Light Company (FPL) for two combined construction permits and operating licenses) combined licenses or COLs). The proposed actions related to the FPL application are (1) NRC issuance of COLs for two new power reactor units (Units 6 & 7) at the Turkey Point Nuclear Power Plant site in Miami-Dade County, Florida, and (2) U.S. Army Corps of Engineers (USACE) decision to issue, deny or issue with modifications a Department of the Army (DA) permit to perform certain dredge and fill activities in waters of the United States and to construct structures in navigable waters of the United States related to the project.

This EIS documents the review team's analysis, which considers and weighs the environmental impacts of constructing and operating two new nuclear units at the Turkey Point site and at alternative sites, including measures potentially available for reducing or avoiding adverse impacts.

After considering the environmental aspects of the proposed action before the NRC, the NRC staff's recommendation to the Commission is that the COLs be issued as proposed. This recommendation is based on (1) the application, including the Environmental Report (ER), submitted by FPL, (2) consultation with Federal, State, Tribal, and local agencies; (3) the review team s independent review· (4) the consideration of public comments received on the environmental review· and (5) the assessments summarized in this EIS, including the potential mitigation measures identified in the ER and this EIS.

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Appendix E

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Environmental Impact Statement for Combined Licenses (COLs) for Turkey Point Nuclear Plant Units 6 and 7

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Appendix E

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Division of New Reactor Licensing
Office of New Reactors
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Jacksonville, Florida 32232-0019

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Final Environmental Impact Statement for the Combined License (COL)
FOR THE TURKEY POINT NUCLEAR PLANT

Lead Agency: U.S. Nuclear Regulatory Commission
Cooperating Agency: U.S. Army Corps of Engineers, Jacksonville District
Contact: Alicia Williamson, Environmental Project Manager
Environmental Projects Branch
Division of New Reactor Licensing
Office of New Reactors
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
Telephone: 301-415-1878
e-mail: Alicia.Williamson@nrc.gov

ABSTRACT

This environmental impact statement (EIS) has been prepared in response to an application submitted to the U.S. Nuclear Regulatory Commission (NRC) by Florida Power & Light Company (FPL) for two combined construction permits and operating licenses (combined licenses or COLs). The proposed actions related to the FPL application are (1) NRC issuance of COLs for two new power reactor units (Units 6 and 7) at the Turkey Point Nuclear Power Plant site in Miami-Dade County, Florida, and (2) U.S. Army Corps of Engineers (USACE) decision to issue, deny, or issue with modifications a Department of the Army (DA) permit to perform certain dredge and fill activities in waters of the United States and to construct structures in navigable waters of the United States related to the project. The NRC, its contractors, and USACE make up the review team. The National Park Service (NPS) is also a cooperating agency on this EIS but does not now have a request to take any specific regulatory action before it. Due to this unique set of circumstances, impact determinations made in this EIS should only be attributed to the review team. This EIS documents the review team's analysis, which considers and weighs the environmental impacts of constructing and operating two new nuclear units at the Turkey Point site and at alternative sites, including measures potentially available for reducing or avoiding adverse impacts.

The EIS includes an evaluation of the impacts of construction and operation of Turkey Point Units 6 and 7 on waters of the United States pursuant to Section 404 of the Clean Water Act and on navigable waters of the United States pursuant to Section 10 of the Rivers and Harbors Act of 1899. The USACE will base its evaluation of FPL's DA permit application, on the requirements of USACE regulations, the Clean Water Act Section 404(b)(1) Guidelines, and the USACE public interest review process.

After considering the environmental aspects of the proposed action before the NRC, the NRC staff's recommendation to the Commission is that the COLs be issued as proposed. This recommendation is based on (1) the application, including the Environmental Report (ER), submitted by FPL; (2) consultation with Federal, State, Tribal, and local agencies; (3) the review

team's independent review; (4) the consideration of public comments received on the environmental review; and (5) the assessments summarized in this EIS, including the potential mitigation measures identified in the ER and this EIS.

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EXECUTIVE SUMMARY

This environmental impact statement (EIS) presents the results of a U.S. Nuclear Regulatory Commission (NRC) environmental review of an application for a combined construction permit and operating license (combined license or COL) for two new nuclear reactor units at a proposed Turkey Point site in Miami-Dade County, Florida. The U.S. Army Corps of Engineers (USACE) participated in the preparation of the EIS as a cooperating agency and as a member of the review team, which consisted of the NRC staff, its contractor staff, and the USACE staff. The National Park Service (NPS) participated in the environmental review as a cooperating agency by providing special expertise for the areas in and around the adjacent national parks (Biscayne and Everglades National Parks). The NPS does not have a request to take any specific regulatory actions related to the proposed COLs before it. Due to this unique set of circumstances, all impact determinations made in this EIS should not be attributed to NPS, but only to the NRC and USACE (also referred to as the review team). The NPS's participation in connection with this EIS does not imply NPS concurrence.

Background

On June 30, 2009, the Florida Power & Light Company (FPL) submitted an application to the NRC for a combined construction permit and operating license (combined license or COL) for Turkey Point Units 6 and 7.

Upon acceptance of FPL's application, the NRC review team began the environmental review process by publishing a Notice of Intent to prepare an EIS and conduct scoping in the *Federal Register* on June 15, 2010. As part of this environmental review, the review team did the following:

- conducted public scoping meetings on July 15, 2010 in Homestead, Florida
- conducted a site visit of the proposed Units 6 and 7 plant area on the Turkey Point site in June 2010
- conducted visits to alternative sites in July 2010
- reviewed FPL's Environmental Report (ER)
- consulted with Tribal Nations and other agencies such as the U.S. Fish and Wildlife Service (FWS), Advisory Council on Historic Preservation, Florida Fish and Wildlife Conservation Commission, National Marine Fisheries Service, Miami-Dade Office of Historic and Archaeological Resources, and Florida Division of Historical Resources
- conducted the review following guidance set forth in NUREG-1555:
  - "Standard Review Plans for Environmental Reviews for Nuclear Power Plants
  - Supplement 1: Operating License Renewal"
- considered public comments received during the 60-day scoping process from June 15, 2010 to August 16, 2010

- conducted public meetings on the draft EIS on April 22, 2015, in Miami, Florida, and on April 23, 2015, in Homestead, Florida
- considered public comments received during the comment periods for the draft EIS, which extended from March 5 to May 22 and from May 28 to July 17, 2016.

Proposed Action

FPL initiated the proposed Federal action by submitting an application for Turkey Point Units 6 and 7 to the NRC. The NRC's Federal action is issuance of COLs for two Westinghouse AP1000 reactors at the Turkey Point site near Homestead, Florida.

The USACE is a cooperating agency in preparation of this EIS. The USACE's Federal action is its decision of whether to issue, deny, or issue with modifications a Department of Army (DA) permit pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899 to authorize certain construction activities potentially affecting waters of the United States.(1)

Purpose and Need for Action

The purpose of the proposed NRC action, issuance of the COL, is to provide for additional baseload electric generating capacity for use in the FPL service territory.

The USACE determines both a basic and an overall project purpose pursuant to the Clean Water Act Section 404(b)(1) Guidelines, 33 CFR § 230.10. The basic purpose is to meet the public's need for electric energy. The overall purpose is to meet the public's need for reliable increased electrical baseload generating capacity in FPL's service territory.

Affected Environment

The Turkey Point site is located in southeast Miami-Dade County, Florida, near Homestead (Figure ES-1). Turkey Point Units 6 and 7 would be located on the same site as the existing Turkey Point site, which has five other power plants, including two nuclear power reactors. Turkey Point would be located 25 mi south of Miami and 4.5 and 8 mi east of Homestead and Florida City, respectively. The primary source of cooling water would be reclaimed wastewater and the alternative source would be saltwater supplied from radial collector wells beneath Biscayne Bay. The ultimate heat sink for Turkey Point Units 6 and 7 would be the atmosphere, using three mechanical draft cooling towers per reactor.

(1) Waters of the United States" is used to include both "waters of the United States" as defined by 33 CFR Part 328 (TN1683) defining the extent of USACE geographic jurisdiction pursuant to Section 404 of the Clean Water Act and "navigable waters of the United States" as defined by 33 CFR Part 329 (TN4770) defining the extent of USACE geographic jurisdiction pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403) (TN4768).

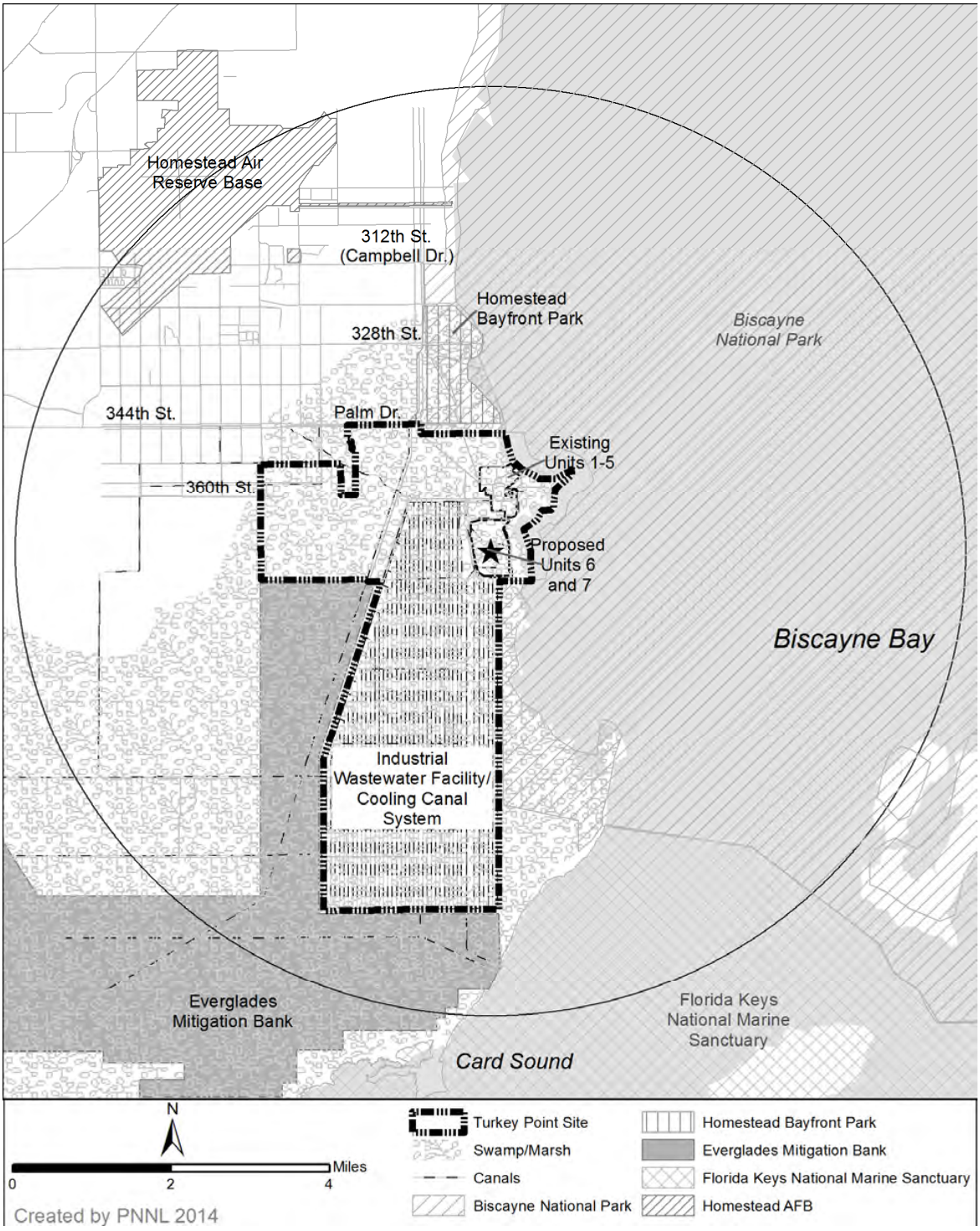

Figure ES-1. The Turkey Point Site and Affected Environment

Evaluation of Environmental Impacts

SMALL: Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.

MODERATE: Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.

LARGE: Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

This EIS evaluates the potential environmental impacts of the construction and operation of the two new nuclear plants proposed for the Turkey Point site related to the following resource areas:

- land use
- air quality
- aquatic ecology
- terrestrial ecology
- surface and groundwater
- waste (radiological and nonradiological)
- human health (radiological and nonradiological)
- socioeconomics
- environmental justice
- cultural resources
- fuel cycle, decommissioning, and transportation

The impacts are designated as SMALL, MODERATE, or LARGE. The incremental impacts related to the construction and operations activities requiring NRC authorization are described and characterized, as are the cumulative impacts resulting from the proposed action when the effects are added to, or interact with, other past, present, and reasonably foreseeable future effects on the same resources. A summary of the construction and operation impacts are outlined in Table ES-1. Table ES-2 summarizes the review team's assessment of cumulative impacts. The review team's detailed analysis which supports the impact assessment of the proposed new units can be found in Chapters 4, 5, and 7, respectively.

Table ES-1. Environmental Impact Levels of the Proposed Turkey Point Units 6 and 7

Resource Category	Preconstruction and Construction	Operation
Land Use	MODERATE (NRC authorized construction impact level is SMALL)	MODERATE
Water-Related		
Water Use – Surface Water	SMALL	SMALL
Water Use – Groundwater Use	SMALL	SMALL
Water Quality – Surface Water	SMALL	SMALL
Water Quality – Groundwater	SMALL	SMALL
Ecology		
Terrestrial Ecosystems	MODERATE (NRC authorized construction impact level is SMALL)	MODERATE
Aquatic Ecosystems	SMALL to MODERATE	SMALL
Socioeconomic		
Physical Impacts	SMALL (adverse) to MODERATE (beneficial)	SMALL (adverse) to MODERATE (beneficial)
Demography	SMALL	SMALL
Economic Impacts on the Community	SMALL	SMALL and beneficial
Infrastructure and Community Services	SMALL to MODERATE	SMALL to MODERATE
Environmental Justice	NONE[(a)]	NONE[(a)]
Historic and Cultural Resources	MODERATE (NRC authorized construction impact level is SMALL)	SMALL
Air Quality	SMALL	SMALL
Nonradiological Health	SMALL	SMALL
Nonradiological Waste	SMALL	SMALL
Radiological Health	SMALL	SMALL
Postulated Accidents	n/a	SMALL
Fuel Cycle, Transportation, and Decommissioning	n/a	SMALL

(a) A determination of "NONE" for Environmental Justice analyses does not mean there are no adverse impacts to minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

Table ES-2. Cumulative Impacts on Environmental Resources, Including the Impacts of Proposed Turkey Point Units 6 and 7

Resource Category	Impact Level
Land Use	MODERATE
Water-Related	
Water Use – Surface Water	SMALL
Water Use – Groundwater Use	SMALL
Water Quality – Surface Water	MODERATE
Water Quality – Groundwater	SMALL
Ecology	
Terrestrial Ecosystems	MODERATE to LARGE
Aquatic Ecosystems	MODERATE
Socioeconomic	
Physical Impacts	SMALL adverse to MODERATE beneficial
Demography	SMALL
Economic Impacts on the Community	SMALL and beneficial
Infrastructure and Community Services	SMALL to MODERATE
Environmental Justice	NONE[(a)]
Historic and Cultural Resources	MODERATE
Air Quality	SMALL to MODERATE for criteria pollutants and MODERATE for GHGs
Nonradiological Health	SMALL
Nonradiological Waste	SMALL
Radiological Health	SMALL
Postulated Accidents	SMALL
Fuel Cycle, Transportation, and Decommissioning	SMALL

(a) A determination of "NONE" for Environmental Justice analyses does not mean there are no adverse impacts to minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

Alternatives

The review team considered the environmental impacts associated with alternatives to issuing a COL for the two new nuclear units proposed by FPL for the Turkey Point site. These alternatives included a no-action alternative (i.e., not issuing the COL) and alternative energy sources, siting locations, and system designs.

The no-action alternative would result in the COL not being granted or the USACE not issuing its permit. Upon such a denial, construction and operation of new units at the Turkey Point site would not occur and the predicted environmental impacts would not take place. If no other facility would be built or strategy implemented to take its place, the benefits of the additional electrical capacity and electricity generation to be provided would also not occur and the need for baseload power would not be met.

Based on the NRC staff's review of energy alternatives, the NRC staff concluded that, from an environmental perspective, none of the viable alternatives is environmentally preferable to building a new baseload nuclear power generation plant at the Turkey Point site. The NRC staff eliminated several energy sources (e.g., wind, solar, geothermal, and biomass) from full

consideration because they are not currently capable of meeting the need of this project. None of the viable baseload alternatives (natural gas, coal, or a combination of alternatives) was environmentally preferable to the proposed Turkey Point units.

After comparing the cumulative effects of a new nuclear power plant at the proposed site against those at the alternative sites, the NRC staff concluded that none of the alternative sites would be environmentally preferable to the proposed site for building and operating a new nuclear power plant (Table ES-3). The four alternatives sites selected were as follows (Figure ES-2):

- Glades
- Martin
- Okeechobee 2
- St. Lucie.

Table ES-3. Comparison of Cumulative Impacts at the Turkey Point and Alternative Sites

Resource Category	Turkey Point Site[a]	Glades[b]	Martin[b]	Okeechobee 2[b]	St. Lucie[b]
Land Use	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
Water-Related					
Surface-water use	SMALL	MODERATE	MODERATE	MODERATE	SMALL
Groundwater use	SMALL	SMALL	SMALL	SMALL	SMALL
Surface-water quality	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
Groundwater quality	SMALL	SMALL	SMALL	SMALL	SMALL
Ecology					
Terrestrial and wetland ecosystems	MODERATE to LARGE	MODERATE	MODERATE	MODERATE	MODERATE
Aquatic ecosystems	MODERATE	MODERATE	MODERATE	MODERATE	SMALL to MODERATE
Socioeconomics					
Physical impacts	SMALL adverse except for MODERATE beneficial impacts on road quality	MODERATE adverse to SMALL beneficial impacts on road quality	MODERATE adverse to MODERATE beneficial impacts on road quality	MODERATE adverse to SMALL beneficial impacts on road quality	LARGE adverse to MODERATE beneficial impacts on road quality
Demography	SMALL	SMALL	SMALL	SMALL	SMALL, except for LARGE residential displacement impacts
Economic impacts on the community	SMALL and beneficial	SMALL and beneficial, except for LARGE and beneficial property tax revenues for Glades County and School District	SMALL and beneficial, except for MODERATE and beneficial property tax revenues for Martin County and School District	SMALL and beneficial, except for LARGE and beneficial property tax revenues for Okeechobee County and School District	SMALL and beneficial

Table ES-3. (contd)

Resource Category	Turkey Point Site[a]	Glades[b]	Martin[b]	Okeechobee 2[b]	St. Lucie[b]
Infrastructure and community services	SMALL except for MODERATE adverse impacts on traffic	SMALL except for MODERATE adverse impacts on traffic	SMALL except for MODERATE adverse impacts on traffic	SMALL except for MODERATE adverse impacts on traffic	SMALL except for MODERATE adverse impacts on traffic
Environmental Justice	None[c]	None[c]	None[c]	None[c]	None[c]
Historic and Cultural Resources	MODERATE	MODERATE	SMALL	MODERATE	SMALL
Air Quality					
Criteria pollutants	SMALL to MODERATE	SMALL	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE
Greenhouse gas emissions	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
Nonradiological Health	SMALL	SMALL	SMALL	SMALL	SMALL
Radiological Health	SMALL	SMALL	SMALL	SMALL	SMALL
Postulated Accidents	SMALL	SMALL	SMALL	SMALL	SMALL

(a) Cumulative impact determinations taken from EIS Table 7-3.
(b) Cumulative impact determinations taken from EIS Table 9-28.
(c) A determination of "NONE" for Environmental Justice analyses does not mean there are no adverse impacts on minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

Table ES-3 provides a summary of the cumulative impacts for the proposed and alternative sites. The NRC staff concluded that all of the sites were generally comparable, and it would be difficult to state that one site is preferable to another from an environmental perspective. In such a case, the proposed site prevails because none of the alternatives is environmentally preferable to the proposed site.

Table ES-4 provides a summary of the EIS-derived impacts for a new nuclear power plant in comparison with the energy alternatives. The NRC staff concluded that none of the viable energy alternatives is preferable to construction of a new baseload nuclear power-generating plant located within FPL's region of interest.

The NRC staff considered various alternative systems designs, including seven alternative heat-dissipation systems and multiple alternative intake, discharge, and water-supply systems. The review team identified no alternatives that were environmentally preferable to the proposed Turkey Point Units 6 and 7 systems design.

Figure ES-2. Location of Sites Considered as Alternatives to the Turkey Point Site

Table ES-4. Summary of Environmental Impacts[a] of Construction and Operation of New Nuclear, Coal-Fired, and Natural-Gas–Fired Generating Units and a Combination of Alternatives

Impact Category	Nuclear	Coal[b]	Natural Gas[b]	Combination of Alternatives[b]
Land Use	MODERATE	MODERATE	MODERATE	MODERATE
Air Quality	SMALL	MODERATE	SMALL to MODERATE	SMALL to MODERATE
Water Use and Quality	SMALL	SMALL	SMALL	SMALL
Ecology	MODERATE	MODERATE	MODERATE	MODERATE
Waste Management	SMALL	MODERATE	SMALL	SMALL
Socioeconomics	MODERATE Beneficial to MODERATE Adverse	MODERATE Beneficial to MODERATE Adverse	MODERATE Beneficial to SMALL Adverse	MODERATE Beneficial to MODERATE Adverse
Human Health	SMALL	SMALL	SMALL	SMALL
Historic and Cultural Resources	MODERATE	MODERATE	MODERATE	MODERATE
Environmental Justice	NONE[b]	NONE[b]	NONE[b]	NONE[b]

(a) Impact levels for all alternatives are for construction and operation but do not reflect cumulative impacts. Thus, the nuclear impacts identified here may differ from those used to compare the proposed site to the alternative sites, which reflect cumulative impacts.
(b) Impacts taken from EIS Table 9-4. These conclusions for energy alternatives should be compared to NRC-authorized activities reflected in Chapters 4, 5, and Sections 6.1, and 6.2.
(c) A determination of "NONE" for Environmental Justice analyses does not mean there are no adverse impacts to minority or low-income populations from the proposed project. Instead, an indication of "NONE" means that while there are adverse impacts, those impacts do not affect minority or low-income populations in any disproportionate manner, relative to the general population.

Benefits and Costs

The NRC staff compiled and compared the pertinent analytical conclusions reached in the EIS. It gathered all of the expected impacts from building and operating proposed Turkey Point Units 6 and 7 and aggregated them into two final categories: (1) expected environmental costs and (2) expected benefits to be derived from approval of the proposed action. Although the analysis in Section 10.6 is conceptually similar to a purely economic benefit-cost analysis, which determines the net present dollar value of a given project, the purpose of the section is to identify potential societal benefits of the proposed activities and compare them to the potential internal (i.e., private) and external (i.e., societal) costs of the proposed activities. In general, the purpose is to inform the COL process by gathering and reviewing information that demonstrates the likelihood that the benefits of the proposed activities outweigh the aggregate costs.

On the basis of the assessments in this EIS, the building and operation of proposed Turkey Point Units 6 and 7, with mitigation measures identified by the review team, would accrue benefits that most likely would outweigh the economic, environmental, and social costs. For the NRC-proposed action (i.e., NRC-authorized construction and operation), the accrued benefits would also outweigh the costs of preconstruction, construction, and operation of proposed Turkey Point Units 6 and 7.

Public Involvement

A 60-day scoping period was held from June 15, 2010, to August 16, 2010. On July 15, 2010, the NRC held two public scoping meetings in Homestead, Florida. The review team received many oral comments during the public meetings and 32 e-mails and 10 letters throughout the rest of the scoping period on numerous topics including energy alternatives, terrestrial ecology, ground and surface water, and socioeconomics. The review team's response to the in-scope public comments can be found in Appendix D. The Scoping Summary Report (Agencywide Documents Access and Management System (ADAMS) Accession No. ML103130609) contains all of the comments, even those considered out-of-scope (e.g., security, safety issues).

During the initial 75-day comment period on the draft EIS, which began on March 6, 2015, the review team held public meetings in Miami, Florida, on April 22, 2015, and in Homestead, Florida, on April 23, 2015. During the course of the comment period, the NRC received requests from members of the public, a Tribal government, and Federal agencies to extend the comment period. In response to these requests, the NRC reopened the comment period on the draft EIS on May 28, 2015, until July 17, 2015, allowing additional time for public comments. In total, approximately 68 people provided oral comments at the public meetings held in April, and the NRC received approximately 11,300 pieces of correspondence during the original and reopened comment period.

Recommendation

The NRC's recommendation to the Commission related to the environmental aspects of the proposed action is that the COL should be issued.

This recommendation is based on the following:

- the application, including the ER, submitted by FPL
- consultation with Federal, State, Tribes, and local agencies
- site audits and alternative sites audits
- consideration of public comments received during the environmental review
- the review team's independent review and assessment summarized in this EIS.

The NRC's determination is independent of the USACE's determination of whether to issue, deny, or issue with modifications the DA permit application for the Turkey Point Units 6 and 7. The USACE will conclude its Clean Water Act Section 404(b)(1) Guidelines and public interest analyses in its Record of Decision.

ABBREVIATIONS/ACRONYMS

AADT	annual average daily traffic
ac	acre(s)
ACC	averted cleanup and decontamination costs
ac-ft	acre (foot) feet
ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
AD	Anno Domini
ADAMS	Agencywide Documents Access and Management System
AERMOD	American Meteorological Society/U.S. Environmental Protection Agency (AMS/EPA) Regulatory Model
AICUZ	Air Installation Compatible Use Zone
ALARA	as low as reasonably achievable
a.m.	ante meridian
AO	Administrative Order
AP-42	EPA's Compilation of Air Pollutant Emission Factors document
APE	Area of Potential Effect
APPZ	Avon Park Permeable (or Producing) Zone
AQCR	Air Quality Control Region
ARNI	Aquatic Resources of National Importance
ARRA	American Recovery and Reinvestment Act of 2009
ASE	advanced safety evaluation
ASR	aquifer storage and recovery (system)
ATC	Atlantic Coastal Ridge
BA	Biological Assessment
BACT	Best Available Control Technologies
BBCW	Biscayne Bay Coastal Wetlands
BC	Before Christ
BEBR	University of Florida's Bureau of Economic and Business Research
BEA	U.S. Bureau of Economic Analysis
BEIR VII	Biological Effects of Ionizing Radiation VII
bgs	below ground surface
BISC	Biscayne Bay
BLS	U.S. Bureau of Labor Statistics
BMP	Best Management Practice
Btu	British thermal unit
°C	degree(s) Celsius
μCi	microcurie(s)

μCi/mL	microcuries per milliliter
CA	Consent Agreement
CAA	Clean Air Act
CAIR	Clean Air Interstate Rule
CCD	Colony Collapse Disorder
CCR	coal combustion residuals
CCS	cooling-canal system (also known as IWF)
CDF	core damage frequency
CDMP	Comprehensive Development Master Plan
CDNFRM	cost for decontamination of non-farmland
CEC	chemical/contaminant of emerging concern
CEQ	Council on Environmental Quality
CERP	Comprehensive Everglades Restoration Program (also Project, Plan)
CFR	*Code of Federal Regulations*
cfs	cubic foot/feet per second
cm	centimeter(s)
cm^2	square centimeter(s)
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COL	combined construction permit and operating license
CPI	Consumer Price Index
CPUE	catch per unit effort
CSAPR	Cross-State Air Pollution Rule
CTEMISS	cooling-tower emissions processor
CWA	Clean Water Act (aka Federal Water Pollution Control Act)
CWS	circulating-water system
CZMP	Coastal Zone Management Plan
d	day(s)
D	Directional Distribution Factor
DA	Department of the Army
dB	decibel(s)
dBA	decibel(s) on the A-weighted scale
DBA	design basis accident
DCD	Design Control Document
DEET	*N*,*N*-Diethyl-*meta*-toluamide
DEIS	draft environmental impact statement
DERM	Miami-Dade County Department of Environmental Resources Management
DHS	Department of Homeland Security

DNL	day-night average sound level
DOE	U.S. Department of Energy
DOI	U.S. Department of Interior
DOT	U.S. Department of Transportation
DPS	distinct population segment
DSM	demand-side management
DZMW	dual-zone monitoring well
EAB	exclusion area boundary
EAI	Ecological Associates, Inc.
EC10	effective concentration required to induce a 10% effect
EC50	effective concentration required to induce a 50% effect
ECOTOX	EPA Ecotoxicology
EDR	Florida Legislature's Office of Economic and Demographic Research
EEEA	East Everglades Expansion Area
EEL	Environmentally Endangered Lands (Program)
EFH	essential fish habitat
EIA	Energy Information Administration
EIS	environmental impact statement
EJ	environmental justice
ELF	extremely low frequency
ELF-EMF	extremely low frequency-electromagnetic field
EMB	Everglades Mitigation Bank
EMF	electromagnetic field
ENP	Everglades National Park
EPA	U.S. Environmental Protection Agency
EPOC	emerging pollutant of concern
EPRI	Electric Power Research Institute
ER	Environmental Report
ESA	Endangered Species Act of 1973, as amended
ESOC	emerging substance of concern
ESRP	Environmental Standard Review Plan (NUREG-1555, Supplement 1, Operating License Renewal)
EW	exploratory well
°F	degree(s) Fahrenheit
FAA	Federal Aviation Administration
FAC	Florida Administrative Code or Fla. Admin. Code
FDEP	Florida Department of Environmental Protection
FDHR	Florida Division of Historic Resources
FDOH	Florida Department of Health

FDOT	Florida Department of Transportation
FEC	Florida East Coast (Railway)
FEFP	Florida Education Finance Program
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FFWCC	Florida Fish and Wildlife Conservation Commission
FIRM	Flood Insurance Rate Map
FKNMS	Florida Keys National Marine Sanctuary
FLUCFCS	Florida Land Use, Cover, and Forms Classification System
FLUM	Future Land Use Map
FMNH	Florida Museum of Natural History
FMP	fishery management plan
FMSF	Florida Master Site File (form)
FNAI	Florida Natural Areas Inventory
FONSI	Findings of No Significant Impact
FPL	Florida Power & Light Company
fps	foot (feet) per second
FPSC	Florida Public Service Commission
FR	*Federal Register*
FRCC	Florida Reliability Coordinating Council
FSAR	Final Safety Analysis Report
FSER	Final Safety Evaluation Report
ft	foot/feet
ft^2	square foot/feet
ft/d	foot (feet) per day
ft^2/d	square foot (feet) per day
ft^3	cubic foot (feet)
ft^3/d	cubic foot (feet) per day
ft^3/yr	cubic foot (feet) per year
FTE	full-time equivalent
FWPCA	Federal Water Pollution Control Act (also known as the Clean Water Act of 1977)
FWS	U.S. Fish and Wildlife Service
FY	fiscal year
µg	microgram(s)
µg/L	microgram(s) per liter
µGy	microgray(s)
g	gram(s) or gravity of Earth (g-force)
gal	gallon(s)
gal/yr	gallon(s) per year

GC	gas centrifuge
g/cm^3	gram(s) per cubic centimeter
GCRP	U.S. Global Change Research Program
GEIS	Generic Environmental Impact Statement (for License Renewal of Nuclear Plants, NUREG-1437)
GHG	greenhouse gas
GIS	geographic information system
gpd	gallon per day
gpm	gallon per minute
gpm/ft	gallon(s) per minute per foot
g/s	gram(s) per second
GU	Interim District (zone)
GW	gigawatt(s)
GWh	gigawatt hour(s)
ha	hectare(s)
HAP	hazardous air pollutant
HAPC	habitat area of particular concern
HBB	health-based benchmark
HDR	HDR Engineering, Inc.
HEC-RAS	Hydrologic Engineering Centers River Analysis System
hr	hour
HUD	U.S. Department of Housing and Urban Development
Hz	hertz
I	Interstate
IAEA	International Atomic Energy Agency
ICRP	International Commission on Radiological Protection
ID	identification
IGCC	integrated gasification combined-cycle
in.	inch(es)
IRWST	in-containment refueling water storage tank
ISFSI	independent spent fuel storage installation
IUCN	World Conservation Union
IWF	industrial wastewater facility (also known as CCS)
K	Standard Peak Hour Factor
kg	kilogram(s)
kg/d	kilogram(s) per day
kg/L	kilogram(s) per liter
kg/yr	kilogram(s) per year

kg/ha/mo	kilogram(s)/hectare/month
kHz	kilohertz
km	kilometer(s)
km^2	square kilometer(s)
km/hr	kilometer(s) per hour
kt	knot(s)
kV	kilovolt(s)
kV/m	kilovolt(s) per meter
kW	kilowatt(s)
kWh	kilowatt-hour(s)
L	liter(s)
lb	pound(s)
lb/yr	pound(s) per year
L_{dn}	day-night average sound level
LEDPA	least environmentally damaging practicable alternative
L_{eq}	noise level equivalent
LFA	Lower Floridan Aquifer
LLC	Limited Liability Company
LLW	low-level waste
LOEC	lowest-observed effect concentration
LOS	level of service
LPZ	low-population zone
LST	local standard time
LWA	Limited Work Authorization
LWR	light water reactor
µmhos/cm	micromhos per centimeter
m	meter(s)
m/s	meter(s) per second
m^2	square meter(s)
m^3	cubic meter(s)
m^3/d	cubic meters per day
m^3/s	cubic meter(s) per second
mA	milliampere(s)
MACCS	MELCOR Accident Consequence Code System
MCU	Middle Confining Unit
MDC	Miami-Dade County
M-DCPS	Miami-Dade County Public School District
MDWASD	Miami-Dade Water and Sewer Department
MEI	maximally exposed individual

mg	milligram(s)
mG	milliGauss
Mgd	million gallon(s) per day
Mgd/yr	million gallon(s) per day per year
Mgm	million gallons per month
Mg/L	milligram(s) per liter
Mg/m^3	milligram(s) per cubic meter
mg N/L	milligrams of nitrate per liter
mg P/L	milligrams of phosphate per liter
mGy	milligray(s)
mGy/d	milligray(s) per day
MFCMA	Magnuson–Stevens Fishery Conservation and Management Act (or Magnuson–Stevens Act)
MHz	megahertz
mi	mile(s)
mi^2	square mile(s)
min	minute(s)
MIT	Massachusetts Institute of Technology
mL	milliliter(s)
MMBtu	one million British thermal units
MMBtu/hr	one million British thermal units per hour
MMBtu/yr	one million British thermal units per year
mo	month(s)
MOU	Memorandum of Understanding
mph	mile(s) per hour
mrad	millirad
mrem	millirem
msl or MSL	mean sea level
mSv	millisievert(s)
MSW	municipal solid waste
MT	metric ton(nes)
MTU	metric ton uranium
MW	megawatt(s)
MWd/MTU	megawatt-days per metric ton of uranium
MW(e)	megawatt(s) electric
MW(t)	megawatt(s) thermal
MWh	megawatt hour(s)
MWh/yr	megawatt hour(s) per year
N	north or nitrogen
NA	not applicable

NAAQS	National Ambient Air Quality Standard
NAD83	North American Datum of 1983
NARUC	National Association of Regulatory Utility Commissioners
NASCAR	National Association for Stock Car Auto Racing
NAVD88	North American Vertical Datum of 1988
NCI	National Cancer Institute
NCRP	National Council on Radiation Protection and Measurements
NEPA	National Environmental Policy Act of 1969, as amended
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NFC	Natural Forest Community
NGCC	natural-gas combined-cycle
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
NIEHS	National Institute of Environmental Health Sciences
NMFS	National Marine Fisheries Service
NNC	Numerical Nutrient Criteria
NO_2	nitrogen dioxide
NO_3+NO_2	nitrate+nitrite
NO_x	nitrogen oxides
NOAA	National Oceanic and Atmospheric Administration
NOEC	no-observed effect concentration
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRC	U.S. Nuclear Regulatory Commission
NRHP	National Register of Historic Places
NSR	new source review
NUREG	U.S. Nuclear Regulatory Commission technical document
NW	northwest
NWS	National Weather Service
O_2	oxygen
O_3	ozone
ODCM	Offsite Dose Calculation Manual
OFW	Outstanding Florida Water
OIG	Office of the Inspector General
ORV	off-road vehicle
OSHA	Occupational Safety and Health Administration
P	phosphorus
PAH	polycyclic aromatic hydrocarbon

PC	personal computer
PCB	polychlorinated biphenyl
pCi/L	picocurie(s) per Liter
pH	measure of acidity or basicity in solution
PHU	panther habitat units
PHU	panther habitat unit
PFA	Panther Focus Area
P/L	phosphorus per liter
PIR	Public Interest Review or Project Implementation Report
PIRF	Public Interest Review Factor
PK-12	preschool through 12th grade
p.m.	post meridian
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter of 10 microns or less
$PM_{2.5}$	particulate matter with an aerodynamic diameter of 2.5 microns or less
PPSA	Power Plant Siting Act
ppm	part(s) per million
ppt	parts per thousand
PRA	probabilistic risk assessment
PSA	probabilistic safety assessment
PSD	Prevention of Significant Deterioration (Permit)
psu	practical salinity unit
PWR	pressurized water reactor
rad	radiation absorbed dose
RAI	Request for Additional Information
RCRA	Resource Conservation and Recovery Act of 1976, as amended
RCW	radial collector well
rem	roentgen equivalent man
REMP	radiological environmental monitoring program
RfC	reference concentration
RFI	Request for Information
RHA	Rivers and Harbors Act of 1899
RIMS II	Regional Input-Output Modeling System
RMS	root mean square
Rn-222	radon-222
ROD	Record of Decision
ROI	region of interest
RPHP	Radiation Public Health Project
RRY	reference reactor year
RSICC	(Oak Ridge) Radiation Safety Information Computational Center

RV	recreational vehicle
RWTF	reclaimed water-treatment facility
Ryr	reactor year
s or sec	second(s)
SAFMC	South Atlantic Fisheries Management Council
SAMA	severe accident mitigation alternative
SAMDA	severe accident mitigation design alternative
SAV	submerged aquatic vegetation
SBO	Station Blackout
SCA	Site Certification Application
scf	standard cubic feet
SCR	selective catalytic reduction
SDWWTP	South District Wastewater Treatment Plant
sec	second(s)
SECA	State Energy Conversion Alliance
SER	Safety Evaluation Report
SFRPC	South Florida Regional Planning Council
SFWMD	South Florida Water Management District
SGWEA	Southern Glades Wildlife Environmental Area
SHA	seismic hazard analysis
SHPO	State Historic Preservation Office (or Officer)
s/m^3	seconds per cubic meter
SO_2	sulfur dioxide
SO_x	oxides of sulfur
SOR	Save Our Rivers (Program)
SPCC	Spill Prevention, Control, and Countermeasure (Plan)
SR	State Route
SRP	Standard Review Plan
SSC	Species of Concern
SU	Standard Unit(s)
Sv	sievert(s)
SW	southwest
SWPPP	stormwater pollution prevention plan
SWS	service-water system
T	ton(s) or tonne(s)
T/B	Tug/Barge
TB_q	terrabequerel
TCP	traditional cultural property
T&E	threatened and endangered

TDS	total dissolved solids
TEDE	total effective dose equivalent
THPO	Tribal Historic Preservation Officer
TIMDEC	decontamination time
TKN	total Kjeldahl nitrogen
TLD	thermoluminescent dosimeter
TLF	Treasured Lands Foundation
TN	total nitrogen
TOC	total organic carbon
TP	total phosphorus
TRC	total reportable cases
TVA	Tennessee Valley Authority
UDB	urban development boundary
UF_6	uranium hexafluoride
UIC	underground injection control
UMAM	Uniform Mitigation Assessment Method
UMTRI	University of Michigan Transportation Research Institute
UNESCO	United National Educational, Scientific and Cultural Organization
UO_2	uranium dioxide
US	U.S. (State Highway)
U.S.	United States
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USCB	U.S. Census Bureau
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USDW	underground source of drinking water
USGS	U.S. Geological Survey
VOC	volatile organic compound
W	west
W.A.T.E.R.	Wetland Assessment Technique for Environmental Review
WCA	water conservation area
Westinghouse	Westinghouse Electric Company, LLC
WHO	World Health Organization
wk	week(s)
WOTUS	waters of the United States
WRDA	Water Resources Development Act
WTP	water treatment plant
WWTP	wastewater treatment plant

χ/Q	atmospheric dispersion factor(s); annual average normalized air concentration value(s)
yd^3	cubic yards
yr	year(s)

APPENDIX E

DRAFT ENVIRONMENTAL IMPACT STATEMENT COMMENTS AND RESPONSES

APPENDIX E

DRAFT ENVIRONMENTAL IMPACT STATEMENT COMMENTS AND RESPONSES

As part of the U.S. Nuclear Regulatory Commission (NRC) review of the Florida Power & Light Company (FPL) application for combined construction permits and operating licenses (COLs) for proposed Units 6 and 7 at the Turkey Point site, located in Miami-Dade County, Florida, the NRC and the U.S. Army Corps of Engineers (USACE) (together referred to as the "review team") solicited comments from the public on the draft environmental impact statement (EIS). The draft EIS was issued on March 5, 2015. A 75-day comment period began on March 6, 2015, when the U.S. Environmental Protection Agency (EPA) issued a *Federal Register* Notice of Availability (80 FR 12172) of the draft EIS to allow members of the public to comment on the results of the environmental review. The public comment period closed on May 22, 2015. On May 28, 2015, the NRC reopened the public comment period to allow more time for members of the public to develop and submit their comments (80 FR 30501-TN4614). The reopened comment period closed on July 17, 2015.

As part of the process to solicit public comments on the draft EIS, the review team

- placed a copy of the draft EIS at the Homestead Branch Library in Homestead, Florida and the South Dade Regional Library in Miami, Florida;
- made the draft EIS available in the NRC's Public Document Room in Rockville, Maryland;
- placed a copy of the draft EIS on the NRC website at http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr2176/.
- provided a copy of the draft EIS to the Turkey Point Nuclear Plant environmental review mailing list and any member of the public who requested one;
- sent copies of the draft EIS to certain Federal, State, Tribal, and local agencies;
- published a request for comment on the draft EIS in the *Federal Register* on March 5, 2015 (80 FR 12043);
- filed the draft EIS with the U.S. Environmental Protection Agency; and
- held three public meetings, one on Wednesday, April 22, 2015 in Miami, Florida, and two on Thursday, April 23, 2015 in Homestead, Florida.

Approximately 182 people attended the public meetings in Miami, approximately 196 people attended the two meetings in Homestead, and numerous participants provided oral comments at each. A certified court reporter recorded these oral comments and prepared written transcripts of the meeting. The transcripts (NRC 2015-TN4553; NRC 2015-TN4554; NRC 2015-TN4555) of the public meetings were published on August 25, 2015, as part of the public meeting summary. In addition to the comments received at the public meeting, the NRC received letters, e-mail messages, and posts to the regulations.gov site with comments concerning the proposed new units at the Turkey Point site.

The comment letters, regulations.gov posts, e-mail messages, and transcripts of the public meetings are available in the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible at http://www.nrc.gov/reading-rm.html. Persons who do not have access to ADAMS or who encounter problems in accessing the documents located in ADAMS should contact the NRC's Public Document Room reference staff at 1-800-397-4209 or 301-415-4737. The ADAMS accession numbers for the letters, regulations.gov posts, e-mail messages, and transcripts are provided in Table E-1.

- Section E.1 – Disposition of Comments provides a list of commenter names and a unique identifier that is used throughout this appendix.
- Section E.2 – Comments and Responses provides individual comments and the corresponding response by subject category.
- Section E.3 – Form Letter Authors provides tables for each form letter received and includes commenter names and the ADAMS identifier.
- Section E.4 – References provides the list of references used in this appendix.

E.1 Disposition of Comments

Each set of comments from a given commenter was given a unique correspondence identifier, allowing each set of comments from a commenter to be traced back to the transcript, letter, or e-mail in which the comments were submitted. After the comment period concluded, the review team considered and dispositioned all comments received. To identify each individual comment, the review team reviewed the transcripts of the public meetings and each piece of correspondence received related to the draft EIS. As part of the review, the review team identified statements that it believed were related to the proposed action and recorded the statements as comments. Each comment was assigned to a specific subject area, and similar comments were grouped together. Finally, responses were prepared for each comment or group of comments.

Some comments addressed topics and issues that are not part of the environmental review for this proposed action. These comments included questions about NRC's safety review, general statements of support or opposition to nuclear power, and comments on the NRC regulatory process in general. These comments are included, but detailed responses to such comments are not provided because they addressed issues that do not directly relate to the environmental effects of this proposed action and are, thus, outside the scope of the National Environmental Policy Act (NEPA) (42 U.S.C. § 4321 et seq.) (TN661) review of this proposed action. Many comments, however, specifically addressed the scope of the environmental review, analyses, and issues contained in the draft EIS.

Table E-1 provides a list of commenters identified by name, affiliation (if given), comment number, and the source of the comment.

Table E-1. Individuals Providing Comments During the Comment Period

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID
Abalos, Jessica		reg.gov (ML15201A051)	0659
Ackerman, Frank		Email (ML15153A511)	0565
Agler, Mindy		Email (ML15141A397)	0152
Aha, Chas		reg.gov (ML15225A087)	0708
Albers, Harold		Email (ML15156A095)	0688
Allen, Keith		Email (ML15156A488)	0162
Allen, Maureen		Email (ML15141A653)	0154
Allison, Noreen		reg.gov (ML15211A039)	0549
Almer, Anessa		reg.gov (ML15225A093)	0712
Almirola, Alejandro		Email (ML15159A881)	0178
Almirola, Alejandro		Email (ML15159A948)	0178
Almirola, Alejandro		Meeting Transcript (ML15219A360)	0721-31
Alvarez, Chad		reg.gov (ML15201A057)	0664
Alvarez, Susana		reg.gov (ML15104A339)	0025
Andersen, Paul		Email (ML15148B181)	0388
Anderson, Glen		Email (ML15156B027)	0321
Anderson, Vaughn		Email (ML15141A262)	0380
Anderson, Vaughn		Email (ML15162A942)	0608
Anderson, Vaughn		Email (ML15195A631)	0560
Anonymous, Anonymous		Email (ML15146A106)	0239
Anonymous, Anonymous		reg.gov (ML15096A471)	0327
Anonymous, Anonymous		reg.gov (ML15110A282)	0331
Anonymous, Anonymous		reg.gov (ML15110A284)	0333
Anonymous, Anonymous		reg.gov (ML15110A288)	0336
Anonymous, Anonymous		reg.gov (ML15128A081)	0346
Anonymous, Anonymous		reg.gov (ML15128A087)	0351
Anonymous, Anonymous		reg.gov (ML15128A091)	0354
Anonymous, Anonymous		reg.gov (ML15198A123)	0644
Anonymous, Anonymous		reg.gov (ML15198A124)	0645
Anonymous, Anonymous		reg.gov (ML15198A130)	0628
Anonymous, Anonymous		reg.gov (ML15211A041)	0551
Anonymous, Anonymous		reg.gov (ML15211A057)	0603
Anonymous, Anonymous		reg.gov (ML15225A084)	0705
Anonymous, Anonymous		reg.gov (ML15225A085)	0706
Anonymous, Anonymous		reg.gov (ML15225A092)	0711
Anonymous, Anonymous		reg.gov (ML15225A204)	0715
Anonymous, Anonymous		reg.gov (ML15225A208)	0719
Anonymous, Charity		reg.gov (ML15198A143)	0638
Anonymous, Elena		reg.gov (ML15201A055)	0662
Anonymous, Judi		reg.gov (ML15211A030)	0537
Anonymous, Lynn		Email (ML15146A153)	0161
Aronson, Murray		Email (ML15153B137)	0391
Atler, Neal		Email (ML15139A871)	0215

Table E-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID
Austin, Stan	National Park Service	Email (ML15222A171)	0622
Austin, Stan	National Park Service	Email (ML15272A460)	0623
Avers, Pamela Dee		Email (ML15139A692)	0090
Bach, Lili		Email (ML15139A722)	0128
Bagwell, Wilson Knox		Email (ML15156A862)	0306
Bailey, Evelyn		Email (ML15148B220)	0525
Ball, Cheri		Email (ML15190A270)	0472
Balog, Nancy		Email (ML15159B075)	0185
Barczak, Sara	Southern Alliance for Clean Energy	Email (ML15146A145)	0112
Barlow, Jeffrey		Email (ML15139A974)	0218
Barnes, Janice		Email (ML15195A188)	0558
Barnidge, Virginia		reg.gov (ML15201A041)	0672
Bastidas, Mauricio		reg.gov (ML15225A115)	0720
Batista, Carlos		Letter (ML15128A183)	0685
Baumwall, Douglas		reg.gov (ML15104A332)	0329
Bazzi, Noell		Email (ML15139A609)	0047
Bazzone, Barbara		Email (ML15146A112)	0159
Beattie, Jane		Email (ML15154B523)	0417
Beckman, Yvonne and Douglas		Email (ML15139A633)	0060
Beiriger, Mary		Email (ML15162A919)	0287
Bejarano, Antonio		reg.gov (ML15104A328)	0019
Bender, Kae		Email (ML15154C263)	0441
Bennett, Robbie		Email (ML15148A890)	0265
Benson, Mary		Email (ML15139A685)	0081
Benton-Janetta, Lori		Email (ML15156B499)	0449
Bereczki, Patricia		Email (ML15153B232)	0393
Berendsohn, Catherine		Meeting Transcript (ML15219A410)	0723-11
Bernabei, Catharina		Meeting Transcript (ML15219A360)	0721-18
Bernatis, Jenn		Email (ML15142A340)	0520
Berndgen, Michelle		reg.gov (ML15128A451)	0361
Bertelson, Bob	Florida Power and Light	Meeting Transcript (ML15219A410)	0723-15
Berzowski, Bill		Meeting Transcript (ML15219A386)	0722-18
Bethune, David		Meeting Transcript (ML15219A360)	0721-23
Bethune, David		reg.gov (ML15128A454)	0615
Betts, Cynthia		Email (ML15155B927)	0280
Birsh, Arthur and Joan		Email (ML15139A684)	0083
Black, Mary Beth		Email (ML15141A499)	0107
Blair, Dan		Email (ML15154A284)	0485
Blanck, Heidi		Email (ML15155C231)	0397
Bloom, Justin	Suncoast Waterkeeper	Email (ML15146A151)	0253

Table E-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID
Bodiford, Loretta		Email (ML15156B342)	0444
Bofill, Beatriz		Email (ML15142A382)	0235
Bofill, Beatriz		Email (ML15211A034)	0235
Boling, Steve	Florida Power and Light	Meeting Transcript (ML15219A410)	0723-7
Bonilla-Jones, Carmen Elisa		Email (ML15142A324)	0231
Boone, James		Email (ML15155A604)	0533
Boone, Jim		Email (ML15154C045)	0436
Borie, Edith		Email (ML15156A016)	0629
Boyce, Sheila		Email (ML15139A693)	0091
Brandariz, Anita		Email (ML15148B306)	0529
Bratcher, Suzanne		Email (ML15155A332)	0498
Bremen, Gary		Email (ML15159B232)	0181
Breslin, Tom		Meeting Transcript (ML15219A360)	0721-17
Brexel, Sr., Charles		Email (ML15197A051)	0592
Brinn, Ira		Email (ML15141A268)	0148
Brito, Rosa	South Dade Chamber of Commerce	Meeting Transcript (ML15219A410)	0723-10
Bromage, Joan		Email (ML15148B122)	0386
Brown, Bradford		reg.gov (ML15201A061)	0667
Brown, Judith O.		Email (ML15139A725)	0131
Brown, Robert		Email (ML15148B082)	0383
Brstow, Mary		Email (ML15156A021)	0497
Brumleve, Charles		Email (ML15155A420)	0502
Bryan, David		Email (ML15195A572)	0507
Bubb, Ken		Email (ML15148B039)	0462
Buechler, Jerry		reg.gov (ML15225A207)	0718
Bump, Deborah		Email (ML15148B317)	0535
Bunker, Diane		Email (ML15154B857)	0426
Burge, Laura		Email (ML15156A161)	0540
Burns, Terry		Email (ML15155B716)	0647
Buyea, Thomas		Email (ML15155A458)	0505
Cafarelli, Cenie		Email (ML15142A309)	0298
Campbell, Cara	Ecology Party of Florida	Email (ML15146A151)	0253
Campbell, Grant		Email (ML15155A310)	0482
Cardona, Alfredo		reg.gov (ML15128A078)	0343
Carlson, John		Email (ML15142A378)	0158
Carpenter, Rory		Email (ML15155B705)	0694
Casey, Sr., Robert J.		Letter (ML15131A379)	0368
Casper, Laurel		Email (ML15159B553)	0202
Castro, Alyssa Tomasi		reg.gov (ML15201A059)	0665
Caswell, Gail		Email (ML15148A721)	0465
Caswell, Susan		Email (ML15154A305)	0487
Cathey, Turner		Email (ML15139A679)	0079

Table E-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID
Causey, Charlie	Florida Keys Environmental Fund	Email (ML15146A151)	0253
Cava, Daniella Levine	Miami-Dade County Commissioner	reg.gov (ML15155A563)	0172
Cava, Daniella Levine	Miami-Dade County Commissioner	reg.gov (ML15198A121)	0172
Cavros, George	Southern Alliance for Clean Energy	Email (ML15146A151)	0253
Cavros, George	Southern Alliance for Clean Energy	Meeting Transcript (ML15219A360)	0721-8
Chatterton, Andrew	North American Young Generation Nuclear	Meeting Transcript (ML15219A386)	0722-3
Chenoweth, Mike	Izaak Walton League of America	Email (ML15146A151)	0253
Chirillo, James		Email (ML15155B963)	0261
Chiszar, Benjamin J.		Letter (ML15191A341)	0677
Chrissos, H. L. Chris		Email (ML15159A039)	0164
Christie, Grazie		reg.gov (ML15104A321)	0013
Clapp, Linda		Email (ML15159B286)	0028
Clay, Cynthia		Email (ML15139A986)	0219
Cleland, Noel		Letter (ML15160A314)	0207
Cleland, Noel	Sierra Club Miami Group	Email (ML15175A152)	0288
Cobb, Tanya		Email (ML15153B269)	0413
Coffey, Rotraud		Email (ML15142A340)	0516
Cohen, Howard		Email (ML15155A936)	0567
Colby, Helen		Email (ML15139A717)	0124
Colby, Helen		Email (ML15146A126)	0242
Colby, Helen		Email (ML15156A120)	0733
Colls, Ana		Email (ML15139A719)	0125
Colson, Clay G.		Email (ML15162A913)	0602
Commenters, Multiple		Email (ML15139A604)	0044
Commenters, Multiple		Email (ML15139A651)	0067
Commenters, Multiple		Email (ML15139A668)	0073
Commenters, Multiple		Email (ML15139A729)	0103
Commenters, Multiple		Email (ML15140A000)	0102
Commenters, Multiple		Email (ML15140A141)	0104
Commenters, Multiple		Email (ML15141A259)	0379
Commenters, Multiple		Email (ML15146A110)	0240
Compel, Jr., Joseph		Email (ML15160A987)	0283
Cook, Cherie		Email (ML15156A492)	0163
Cook, J.		reg.gov (ML15211A051)	0577
Cooper, Fran		Letter (ML15160A311)	0204
Cooper, Joe		Email (ML15159A077)	0165
Corda, Charles		Meeting Transcript (ML15219A360)	0721-25
Corey, Sheffield		Email (ML15154B767)	0424
Cornely, Tina		reg.gov (ML15198A136)	0633

Table E-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID
Corral, Oscar		Email (ML15139A727)	0133
Council, Barbara		Email (ML15155A348)	0731
Courliss, William		Email (ML15153A991)	0604
Critser, Jackie		Email (ML15159A251)	0168
Crystal, Chris		reg.gov (ML15110A285)	0334
Cullen, Sarah		Email (ML15198A538)	0597
Cummings, Frank		reg.gov (ML15225A089)	0709
Cunningham, Sue		Email (ML15146A374)	0114
Cusidor, Teresa		Email (ML15139A721)	0127
Dahlgren, Shelley		Email (ML15154B983)	0434
Daly, Meg	Friends of the Underline	Email (ML15139A674)	0076
Daly, Meg	Friends of the Underline	Email (ML15146A151)	0253
Daniels, Bonnie		reg.gov (ML15128A076)	0341
Darden, Colgate		Email (ML15195A151)	0571
Datz, Amy		reg.gov (ML15211A046)	0621
Dauerty, Barbara		Email (ML15155C003)	0614
Davidson, Penny		Email (ML15154A414)	0493
Davis, S. K.		Email (ML15153B256)	0412
de Armas, Maria Cristina		Email (ML15139A676)	0077
de Azevedo, Ricardo		Email (ML15139A711)	0119
Defoggi, Virginia		Email (ML15148B204)	0266
Degges, Frank		Email (ML15156B481)	0447
Delateur, Marc		Email (ML15142A281)	0230
Demaria, Karen		Email (ML15155C181)	0262
Demello, Christine		Email (ML15155C024)	0180
DeMent, David L.		Email (ML15139A588)	0036
Denninger, Frank		reg.gov (ML15211A045)	0554
Dent, William		Email (ML15162A094)	0319
Detrick, Mary		Email (ML15161A649)	0317
Deutsch, Steven		reg.gov (ML15211A042)	0552
Dickinson, Robert		Email (ML15148B038)	0461
Dietrich, Chris OMeara		Email (ML15142A224)	0295
Dimondstein, Carla		Email (ML15153A491)	0564
Dolben, Hollis		reg.gov (ML15198A128)	0627
Dorn, Kathryn		Email (ML15155B897)	0693
Dougherty, Kate		Email (ML15154B076)	0394
Douglas, Carolyn		Email (ML15154A285)	0486
Draper, Lonnie M.		Email (ML15196A152)	0511
Drevicky, John		Email (ML15156A438)	0691
Drew, Virginia		Email (ML15154B284)	0399
Dronsky, Rick		Email (ML15141A234)	0142
Dudley, Dwight	Florida House of Representatives	Email (ML15146A155)	0254
Dulicai, Linda		Email (ML15156A029)	0697
Dunn, Elmo		Email (ML15154B341)	0402
DuPriest, William Robert		Email (ML15139A695)	0093

Table E-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID
Duquette, Bill	Homestead Hospital	Meeting Transcript (ML15219A386)	0722-13
Duran-Pinzon, Jaime		Email (ML15146A131)	0243
Durieux, P.		Email (ML15158A046)	0451
Dutton, Julene		reg.gov (ML15198A145)	0640
Dwyer, John P.		Email (ML15147A217)	0264
Dwyer, John P.		reg.gov (ML15201A045)	0673
Dwyer, Karen		reg.gov (ML15141A398)	0674
Dwyer, Karen		reg.gov (ML15201A048)	0674
Earnshaw, Shinann		Email (ML15155C194)	0326
Eastman, John		Meeting Transcript (ML15219A360)	0721-24
Eckert, Brenda		Email (ML15154B325)	0400
Edmond, Gabriel	South Miami	Meeting Transcript (ML15219A360)	0721-7
Edwards, Suzi		reg.gov (ML15211A056)	0600
Egan, June		Email (ML15156A312)	0690
Ehrenfried, Jennifer		reg.gov (ML15211A033)	0544
Ehrmann, Nancy		Email (ML15158A154)	0454
Elton, Wallace		Email (ML15160A802)	0229
Enfield, David		Email (ML15142A383)	0236
Engelberg, Jodi		reg.gov (ML15082A283)	0004
England, Margaret	Hendry-Glades Audubon	Email (ML15146A151)	0253
England, Peter		Meeting Transcript (ML15219A386)	0722-10
Ercole, Steven		Email (ML15159A445)	0170
Ericson, Del		Email (ML15142A256)	0320
Erven, Marlene		Email (ML15161A618)	0314
F****SH, Peter		reg.gov (ML15211A037)	0547
Faber, Davenie		reg.gov (ML15082A285)	0006
Fairchild, David		Email (ML15139A696)	0094
Family, Manzi		Email (ML15198A509)	0593
Farnsworth, Stu		Email (ML15148A586)	0464
Fass, Amy		Email (ML15160A803)	0278
Fay, Virginia M.	NOAA-Habitat Conservation Division	Email (ML15272A530)	0724
Fecteau, Lynn		Email (ML15161A617)	0313
Felinski, Julee		reg.gov (ML15198A126)	0625
Fernandez, Maria Cristina		Email (ML15139A647)	0064
Ferro, Colleen		Email (ML15146A231)	0260
Ferry, Lisa		reg.gov (ML15198A129)	0704
Field, Fran		Email (ML15146A228)	0258
Fielding, Ed	Martin County Board of Commissioners	Email (ML15142A379)	0232
Finver, Jody		Email (ML15085A500)	0008
Fischer, Antoinette		reg.gov (ML15128A513)	0365

Table E-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID
Fishman, Zelma		Email (ML15154B087)	0395
Fitzpatrick, Deirdre		Email (ML15139A940)	0217
Fitzpatrick, Deirdre		Email (ML15148B206)	0389
Forbes, J.		Email (ML15159B307)	0189
Foster, Beverly		Email (ML15154B337)	0401
Fox, Kristi		Email (ML15195A187)	0506
Franzmann, Paul		Email (ML15156A298)	0384
Fray, Antje		Email (ML15155B775)	0648
Frederickson, Kelly		Email (ML15155B676)	0188
Freel, Susan		Email (ML15159A079)	0166
Fuentes, Mariana		Email (ML15195A156)	0574
Fulks, Anna Louise		Email (ML15146A141)	0250
Fuller, Manley	Florida Wildlife Federation	Email (ML15146A151)	0253
G., Ambriel		reg.gov (ML15211A050)	0561
Galbreath, Jerry		Email (ML15146A368)	0489
Galles, Camilla		reg.gov (ML15198A125)	0624
Garcia, Alda S.		Email (ML15146A128)	0524
Garcia, Javier	Pipefitters, Local 725	Meeting Transcript (ML15219A360)	0721-20
Garcia, Ruslan		Email (ML15139A705)	0116
Garey, Jenne		Email (ML15142A273)	0668
Garmon, Toni		Email (ML15154A221)	0477
Gavel, Deborah		Email (ML15139A700)	0098
Geary, Craig W.		Email (ML15139A699)	0097
Geiger, Marcia		Email (ML15156A978)	0312
Ghosh, Susan		Email (ML15198A526)	0595
Gibson, David		Email (ML15162A490)	0324
Glass, Rachel		Email (ML15159B572)	0222
Glasshof, Wendy		Email (ML15155B196)	0587
Glynn, Simon		Email (ML15146A143)	0111
Goldberg, Laura		Email (ML15155B050)	0568
Goldman, Emanuel		Email (ML15141A401)	0153
Goldmeier, Barry		reg.gov (ML15104A324)	0015
Goldstein, Louis		Email (ML15154B561)	0418
Gomez, Albert		Meeting Transcript (ML15219A360)	0721-34
Gomez, Christian		Email (ML15154A757)	0269
Gomez, Gustavo		Email (ML15139A703)	0101
Gomez, Lissett		Email (ML15139A549)	0030
Gomez, Toni Thoman		Email (ML15155A442)	0504
Gonzalez, Carlos		reg.gov (ML15225A096)	0714
Gonzalez, Javier		Meeting Transcript (ML15219A386)	0722-8
Govindasamy, Rani		Email (ML15146A137)	0247
Graffagnino, Mary Ann and Frank		Email (ML15154B434)	0403

Table E-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID
Grant, Randy		Email (ML15141A258)	0146
Greenwald, Ken		Email (ML15155C084)	0385
Greer, Tom		Email (ML15153B174)	0392
Gregory, Gregory B.		Email (ML15154A125)	0728
Griffith, Ed and Harriet	New Progressive Alliance	reg.gov (ML15128A514)	0366
Grill, Brock		Email (ML15142A340)	0512
Grill, Helen		Email (ML15139A596)	0043
Griswold, Dave		reg.gov (ML15198A134)	0631
Gross, Cheryl A.		Email (ML15148A486)	0463
Gross, Gary		reg.gov (ML15104A326)	0017
Guy, Sharon		reg.gov (ML15201A043)	0654
H., Pat		reg.gov (ML15211A040)	0550
Haber, Matthew S.	City of Miami	Email (ML15201A460)	0611
Haber, Rochelle		Email (ML15146A132)	0244
Haffmans, Edmund		reg.gov (ML15138A086)	0371
Hall, Linnea M. Fronce Thomas		Email (ML15160A853)	0279
Halligan, Melody		Email (ML15154A377)	0491
Hamilton, Brent		reg.gov (ML15082A281)	0002
Hamilton, McHenry		Letter (ML15160A312)	0205
Hanna, Jane		Email (ML15155B346)	0588
Hansen, Yvonne		Email (ML15154C148)	0439
Harden, Ronald		Email (ML15159B465)	0195
Hardie, Daniel		Email (ML15153A409)	0562
Hardin, Lillian		Email (ML15158A172)	0455
Harper, Diane		Email (ML15153A722)	0583
Harris, Walter	South Miami	Meeting Transcript (ML15219A360)	0721-6
Harrison, J. M. M.		Email (ML15195A715)	0508
Harrison, Norma J. F.		Email (ML15155B823)	0649
Hart, Barbara		Email (ML15162B091)	0196
Hart, Barbara		Email (ML15162B154)	0196
Hartmann, Donald		reg.gov (ML15201A049)	0657
Haselhurst, Richard		reg.gov (ML15198A144)	0639
Hawkes, Holly Forrester		Email (ML15139A552)	0031
Hayes, Linda		Email (ML15156A712)	0275
Hazard, Evan		Email (ML15153B288)	0415
Headley, Linda		reg.gov (ML15138A091)	0376
Hefty, Lee N.	Miami-Dade County Division of Environmental Resources Management	Email (ML15146A118)	0110
Heiney, Jamie		reg.gov (ML15225A095)	0713
Henry, Jim		Meeting Transcript (ML15219A410)	0723-12
Herrera, Luis	Vizcaya Road Association	Meeting Transcript (ML15219A360)	0721-33
Hickey, Alan		reg.gov (ML15201A042)	0653

Table E-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID
Hicklin, Mary		Email (ML15154B949)	0431
Hilderbrandt, Todd		Email (ML15155B158)	0585
Hill, Michael		Email (ML15156B468)	0446
Hodie, Jake		Email (ML15159B366)	0191
Hoegler, Jean		Email (ML15154C117)	0438
Hoffmeyer, Lisa		reg.gov (ML15211A036)	0546
Hogle, Dick		Email (ML15142A185)	0293
Holland, Karen		reg.gov (ML15211A044)	0059
Hollister, David		Email (ML15162A494)	0325
Horiwitz, Laura		Email (ML15155A379)	0732
Houghton, Francis		Email (ML15159B565)	0735
Howell, Carol		Email (ML15142A216)	0294
Hoyle, Lester and Judy		Email (ML15154C229)	0440
Hubbard, Stanley S.		Email (ML15139A707)	0680
Hubler, Gina Marie		Email (ML15139A691)	0089
Hubler, Gina Marie		Email (ML15139A697)	0095
Hudak, Jill		Email (ML15139A591)	0038
Hudak, Jill		Meeting Transcript (ML15219A386)	0722-19
Hudson, Harold J.		Email (ML15139A701)	0099
Hughes, David		reg.gov (ML15138A092)	0377
Hull, Meagan		reg.gov (ML15128A079)	0344
Hunt, Jim		Email (ML15160A978)	0311
Hurley, Paula		reg.gov (ML15128A452)	0362
Hyams, Charles		Email (ML15139A710)	0213
Hyden, Brent A.	Department of the Air Force	Letter (ML15198A132)	0670
Icaza, Alejo		Email (ML15134A013)	0613
Imbesi, Nan		Email (ML15139A631)	0058
Infante, Jose Renee	Redland Market Village	Meeting Transcript (ML15219A386)	0722-12
Inguanzo, Maria		Email (ML15154A756)	0268
Jackalone, Frank	National Sierra Club	Email (ML15175A152)	0288
Jackson, Donald L.		Email (ML15162A859)	0286
Jacobs, Lee		Letter (ML15191A341)	0677
Jacobs, Lee		Letter (ML15191A341)	0679
Jacobs, Leslye		reg.gov (ML15198A137)	0634
Jennings, Cara		Email (ML15162A489)	0323
Jens-Rochow, Steve		reg.gov (ML15201A060)	0666
Jezierski, Elisabeth		Email (ML15156A651)	0302
Jimenz, Lawrence		Email (ML15156A646)	0301
Joannou, Jr., Benjamin		Email (ML15139A949)	0643
Joannou, Jr., Benjamin		reg.gov (ML15104A334)	0023
Johannsen, Christian		Email (ML15139A605)	0045
Johnson, Diane		Email (ML15196A475)	0590
Johnson, Kay		Email (ML15161A638)	0315
Johnson, Nadine		Email (ML15084A178)	0007

Table E-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID
Johnson, Rheta		Email (ML15148B048)	0696
Johnson, Robert		Email (ML15159B352)	0190
Johnston, Judy		Email (ML15156A529)	0734
Jones, Diane		Email (ML15139A724)	0130
Jones, Gary		Email (ML15156B302)	0443
Jones, George L.	Ocean Research and Conservation Association, Inc.	Email (ML15146A151)	0253
Jones, Joan and Robert		Email (ML15141A267)	0147
Jones, Michael E.		Email (ML15139A682)	0082
Juras, Randy		Email (ML15154B691)	0419
Jurczewski, Carol		Email (ML15147A727)	0490
Jurin, Richard		Email (ML15141A538)	0108
K., Jeff		reg.gov (ML15110A286)	0335
Kadis, Patricia		Email (ML15146A138)	0248
Karlow, Edwin		Email (ML15160A657)	0226
Karsten, Annetta		Email (ML15158A072)	0452
Kasenow, Lisa		Email (ML15139A621)	0054
Kasenow, Lisa		Email (ML15159B532)	0200
Kassel, Kerul		reg.gov (ML15128A093)	0676
Kaul, Devika	University of Miami	Meeting Transcript (ML15219A386)	0722-14
Kavanaugh, Daniel		Letter (ML15124A025)	0338
Kaye, Jackie		Email (ML15162A588)	0407
Keating, Tim		reg.gov (ML15211A035)	0545
Keaton, Rebecca		Email (ML15155A438)	0503
Keim, Mary		Email (ML15142A340)	0517
Keller, Alan	Audoban of the Western Everglades	Email (ML15146A151)	0253
Kern, Madeleine Fisher		Email (ML15153B247)	0411
Khajeh-Noori, Jeri		Email (ML15162A951)	0609
Khajeh-Noori, Jeri		Email (ML15196A128)	0381
Kimball, Larry		Email (ML15148B248)	0526
Kipnis, Dan		Email (ML15139A655)	0702
Kipnis, Dan		Email (ML15139A656)	0703
Kipnis, Dan		Email (ML15272A488)	0725
Kipnis, Dan		Email (ML15272A504)	0702
Kipnis, Dan		Meeting Transcript (ML15219A386)	0722-2
Kirschbaum, Saran		Email (ML15148A753)	0466
Klopfer, Carol		Letter (ML15191A341)	0677
Klopfer, Carol		Letter (ML15191A341)	0678
Knowles, Yvonne	Homestead Main Street Program	Meeting Transcript (ML15219A386)	0722-11
Koenigsberg, Linda		Meeting Transcript (ML15219A360)	0721-26
Konczal, Eddie		Email (ML15159A373)	0169
Kowalski, Kathleen S.		Email (ML15139A612)	0049

Table E-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID
Kristy, Joseph		Email (ML15155B886)	0650
Kuraza, Devon	Florida Power and Light	Meeting Transcript (ML15219A360)	0721-15
Lague, Victoria		Email (ML15139A644)	0061
Lamb, Deborah S.		Email (ML15139A661)	0070
Lane, N. Jo		Email (ML15155B103)	0569
Lange, Alexandra		Email (ML15139A689)	0087
Lange, Alexandra		Email (ML15139A690)	0088
Lange, Barbara		Email (ML15197A046)	0591
Langlieb Greer, Evelyn		Email (ML15196A148)	0510
Larrabee, Laura		Email (ML15139A587)	0035
Larsen, Paul		reg.gov (ML15082A284)	0005
Larsen, Shannon		Email (ML15146A148)	0160
Larsen, Shannon		Email (ML15146A156)	0255
Larsen, Shannon		Email (ML15146A156)	0610
Larsen, Shannon		Email (ML15146A159)	0255
Lawrence, Diane		Email (ML15139A688)	0086
Lawrence, Theresa		reg.gov (ML15211A054)	0580
Lawson, Ken		Email (ML15160A577)	0225
Le Cronier, Micki		reg.gov (ML15201A039)	0652
Lebatard, David		Email (ML15159B388)	0192
Ledbetter, Carolyn		Email (ML15156B255)	0406
Lee, Nancy		reg.gov (ML15138A088)	0373
Leibowitz, Arthuir		Email (ML15154B449)	0404
Lenz, Andrew		Email (ML15154A104)	0470
Leo, Carlos		Email (ML15154B902)	0428
Lerner, Cindy	Village of Pinecrest	Email (ML15141A257)	0145
Lerner, Cindy	Village of Pinecrest	Email (ML15160A320)	0145
Lerner, Cindy	Village of Pinecrest Mayor	Email (ML15146A155)	0254
Lerner, Cindy	Village of Pinecrest Mayor	Meeting Transcript (ML15219A360)	0721-3
Lettieri, Tammy		Email (ML15146A230)	0259
Lettieri, Tammy		Email (ML15195A570)	0559
Levy, Morgan I.		Email (ML15139A738)	0136
Liesche, Ken		Email (ML15154A338)	0488
Lindsey, Jerrie		Email (ML15146A133)	0245
Lish, Christopher		reg.gov (ML15211A047)	0555
Livingston, C. J.		Email (ML15154C069)	0437
Livingston, Catherine		reg.gov (ML15138A089)	0374
LoBiondo, Roana and Michael		reg.gov (ML15128A203)	0359
Logan, Brian		Email (ML15139A666)	0072
Lopez, Jaclyn	Center for Biological Diversity	Email (ML15146A150)	0113
Lopez, Josie		Email (ML15162A389)	0284
Lucas, Carmen		Email (ML15141A232)	0141
Lucero, Olga		Email (ML15139A728)	0134

Table E-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID
Lucero, Olga		Email (ML15161A393)	0134
Lucero, Olga		Email (ML15162A855)	0134
Lundholm, Mark		Email (ML15156A896)	0309
Macher, Nathan		reg.gov (ML15139A021)	0378
Macraith, Bonnie		Email (ML15142A031)	0186
Macy, Michelle		Email (ML15156B180)	0405
Maher, William	Florida Power and Light	Email (ML15202A054)	0619
Mahoney, Robert S.		reg.gov (ML15128A512)	0364
Mahoney, Stephen	Sierra Club Miami Group	Email (ML15175A152)	0288
Maida, Cecilia		Email (ML15156B400)	0445
Malefatto, Alfred	Lewis, Longman and Walker	Letter (ML15160A318)	0211
Malone, Peggy		Email (ML15156A131)	0539
Malpass, Betsy		Email (ML15154B739)	0421
Malyon, Hilary		Email (ML15155B974)	0669
Manter, Larry		Email (ML15155A026)	0471
Manuel, Becky Randel		Email (ML15139A739)	0137
Martin, Allan	University of Florida	Meeting Transcript (ML15219A386)	0722-6
Martin, Drew		reg.gov (ML15198A119)	0641
Martin, Drew	Loxahatchee Group of the Sierra Club	Meeting Transcript (ML15219A360)	0721-13
Martin, Drew	Sierra Club, Loxahatchee Group	Email (ML15146A151)	0253
Martin, Patrick	Nuclear Matters	Meeting Transcript (ML15219A360)	0721-21
Martinez, Orlando A.		Email (ML15195A148)	0570
Massa, Arturo		reg.gov (ML15104A327)	0018
Massey, Linda		Email (ML15142A340)	0514
Matheny, Kent		Email (ML15158A087)	0453
Matthews, Debbie	Sierra Club Florida	Email (ML15175A152)	0288
Mauri, Tom		Email (ML15139A726)	0132
Mayer, Doug		Email (ML15139A723)	0129
Mayer, Karen		Email (ML15155A110)	0475
Mayotte, Monica		Email (ML15159B458)	0194
Mazzarella, Rebecca		Email (ML15142A007)	0495
Mazzuca, Rich		Email (ML15153A798)	0584
McCall, Eric		Email (ML15139A624)	0056
McCarthy, Dawn		reg.gov (ML15104A338)	0330
McColgan, Robert		Meeting Transcript (ML15219A386)	0722-15
Mccroskey, Carol		Email (ML15154A835)	0530
McDaniel, Diana		Email (ML15159B554)	0203
McDuffie, Stephen		Meeting Transcript (ML15219A410)	0723-8
Mcintyre, Frances		Email (ML15195A152ML)	0572
Mckee, Sarah		Email (ML15154A386)	0492
McLaughlin, Caroline	National Parks Conservation	Email (ML15146A151)	0253

Table E-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID
	Assocation		
McLaughlin, Caroline	National Parks Conservation Assocation	Meeting Transcript (ML15219A360)	0721-9
McLaughlin, Caroline	National Parks Conservation Assocation	Meeting Transcript (ML15219A410)	0723-4
McLaughlin, Caroline	National Parks Conservation Association	Email (ML15146A150)	0113
McVicker, Micah		Email (ML15159A875)	0177
Melby, George M.		Email (ML15154B109)	0396
Mendelsohn, Alex		Email (ML15158A082)	0277
Mendez, Victoria	Miami's Attorney's Office	Meeting Transcript (ML15219A360)	0721-5
Merino, Miriam		Email (ML15139A694)	0092
Merleaux, Derek		reg.gov (ML15128A077)	0342
Metje, Melodie		Email (ML15153B020)	0606
Meyer, Paul		Email (ML15139A715)	0122
Meyer-Steele, Shawn		Email (ML15166A031)	0187
Miami, City	City of Miami	Email (ML15146A122)	0456
Mikan, Edward		Email (ML15148B348)	0536
Mikowski, George		Email (ML15142A377)	0382
Miller, Howard R.		Email (ML15139A740)	0138
Miller, Melissa		Email (ML15162A670)	0285
Miller, Nena		Email (ML15156A282)	0689
Miller, Nyana		reg.gov (ML15198A127)	0626
Mitzkewich, Yuri		reg.gov (ML15211A029)	0523
Moll, Wolfgang		reg.gov (ML15198A135)	0632
Monfort, Brooke		Email (ML15154A183)	0476
Montalvo, Stephanie		reg.gov (ML15198A133)	0630
Moo, Patrick	University of Florida American Nuclear Society Student Section	Meeting Transcript (ML15219A386)	0722-4
Moore, Linda		Email (ML15159B529)	0199
Morgan, Carol		Email (ML15155C150)	0387
Morgan, Karen		Email (ML15141A687)	0155
Morrisse, Christine		Email (ML15148A138)	0483
Morton, Sean	Florida Keys National Marine Sanctuary	Email (ML15245A496)	0618
Mosca-Clark, Vivianne		Email (ML15154C278)	0442
Mosher, Paul		Email (ML15146A139)	0249
Mueller, Bradley M.	Seminole Tribe of Florida Tribal Historic Preservation Office, Ah-Tah-Thi-Ki Museum	Email (ML15289A368)	0727
Mueller, Heinz J.	U.S. Environmental Protection Agency	Email (ML15216A357)	0617
Mulet, Tomas		Email (ML15139A716)	0123
Mundhenk, Norm		Email (ML15153B015)	0605
Murphy, Mike		Meeting Transcript (ML15219A410)	0723-6

Table E-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID
Myers, B. J.		Email (ML15156B026)	0256
Nagel, Karen		Email (ML15148B250)	0527
Nappe, Judith		Email (ML15155B785)	0695
Neal, Kevin		Email (ML15139A536)	0027
Neff, Victoria		Email (ML15155C228)	0682
Nelson, Joyce E.		Email (ML15141A269)	0149
Nelson, Wendy		Email (ML15154A040)	0468
Neway, Roberta		Email (ML15139A628)	0057
Newman, Donna		Email (ML15141A737)	0156
Nickerson, Nancy		Email (ML15155B708)	0692
Nieto, Victor		reg.gov (ML15225A206)	0717
Norman, Ronald		Letter (ML15128A197)	0358
Nye, Janet		Email (ML15160A887)	0281
O'Brien, Lance		Email (ML15139A548)	0029
O'Donahoo, Gayle		Email (ML15156A031)	0698
O'Donahoo, Roger		Email (ML15156A031)	0698
O'Meara, Patrick		Email (ML15195A644)	0700
Odierna, Cynthia		reg.gov (ML15211A031)	0542
Oliva, Vivian		reg.gov (ML15128A085)	0349
Olson, Diane		Email (ML15154B971)	0432
Oria, Jordan		Email (ML15159A531)	0171
Oria, Jordan		Email (ML15159A532)	0171
Ortiz, Natalia		reg.gov (ML15082A282)	0003
Ortiz, Natalia		reg.gov (ML15138A087)	0372
Orzechowicz, Holly		Email (ML15147A207)	0263
Osborne, Martin		Email (ML15139A939)	0216
Otis, Martha		Email (ML15141A274)	0150
Otto, Peter		Email (ML15196A089)	0509
Padilla, Dora		Email (ML15146A104)	0238
Padron-Delgado, Blanca		Email (ML15146A225)	0257
Palmer, Majorie		reg.gov (ML15128A450)	0360
Pareto, Rolando and Marlene		Email (ML15139A593)	0040
Parker, Richard		Email (ML15161A645)	0316
Parsons, Timothy A.	Florida Department of State	Email (ML15139A741)	0139
Passmore, Judith		Email (ML15153B129)	0390
Pattison, Janet		Email (ML15155B629)	0646
Pearce, J. B.		Email (ML15155A219)	0479
Perez, Danica		Email (ML15159B073)	0184
Peterman, Andy		Email (ML15156A013)	0274
Peters, Emily		reg.gov (ML15128A453)	0363
Petersen, John		reg.gov (ML15128A083)	0347
Peterson, Ted		Email (ML15154B759)	0423
Pew, Don		Email (ML15154A680)	0500
Pheil, Edward		reg.gov (ML15225A086)	0707
Philips, Sally B.		reg.gov (ML15110A296)	0337

Table E-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID
Phillips, Monica D.		Email (ML15139A686)	0084
Pikus, Barbara		Email (ML15156A935)	0303
Pinto, Theresa		Email (ML15195A041)	0499
Piper, Cynthia		Email (ML15159B028)	0183
Platt, David		Email (ML15141A604)	0109
Platt, George Seth		reg.gov (ML15225A091)	0710
Poese, David		Email (ML15156A861)	0305
Polifroni, Josephine		Email (ML15159A957)	0182
Polk, J. D.		reg.gov (ML15133A099)	0369
Polk, James		Email (ML15148B008)	0458
Pontier, Christine Hughes		Email (ML15139A720)	0126
Poole, Diane		Email (ML15148A951)	0457
Poolos, Hazel		Email (ML15153A938)	0726
Portela, Ana C.		Email (ML15188A202)	0409
Porter, Jeff	City of Homestead	Meeting Transcript (ML15219A386)	0722-1
Portuondo, Pilar		Email (ML15146A114)	0241
Post, Patrick		reg.gov (ML15198A146)	0671
Provost, Allan		reg.gov (ML15128A074)	0339
Provost, Allan		reg.gov (ML15198A118)	0339
Prugue, Jorge and Paloma		Email (ML15139A657)	0068
Puchades, Mary		Email (ML15181A349)	0616
Punnett, Daniela		reg.gov (ML15211A043)	0553
Purcell, Douglas		Email (ML15154B901)	0427
Purdy, Shyam and Mohini		Email (ML15142A380)	0233
Quarles, Greyson		Email (ML15139A687)	0085
Quillen, Carter		Email (ML15201A466)	0601
Quinn, George		Email (ML15148A881)	0410
Raab, Frances		Email (ML15154A991)	0532
Rader, D.L.		Email (ML15154B205)	0729
Raits, Eric		Email (ML15139A645)	0062
Ramankutty, Vishnu		reg.gov (ML15211A052)	0578
Ramsey, Betty		Email (ML15153A419)	0563
Rapuano, Shannon		Email (ML15198A522)	0594
Rawlins, Steve		reg.gov (ML15198A120)	0642
Read, Alice Gray		reg.gov (ML15104A333)	0022
Reed, Jennifer		Email (ML15154A658)	0496
Regalado, Tomas	City of Miami Mayor	Email (ML15146A155)	0254
Regalado, Tomas	City of Miami Mayor	Meeting Transcript (ML15219A360)	0721-4
Regalado, Tomas	Mayor of the City of Miami	Email (ML15146A122)	0515
Regalado, Tomas	Mayor of the City of Miami	Email (ML15201A460)	0515
Reid, Sarah		Email (ML15159B539)	0201
Reiter, Ben		Email (ML15139A680)	0080

Table E-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID
Rennie, Edwyna		Email (ML15160A054)	0224
Revord, Michael		Email (ML15154B712)	0420
Reyneri, Juan		Email (ML15139A713)	0121
Reynolds, Laura	Tropical Audubon Society	Email (ML15146A150)	0113
Reynolds, Laura	Tropical Audubon Society	Email (ML15146A151)	0253
Reynolds, Laura	Tropical Audubon Society	Meeting Transcript (ML15219A360)	0721-10
Rhodes, Karen		Email (ML15140A049)	0140
Riccio, Jim	Greenpeace	reg.gov (ML15225A205)	0716
Richards, Margie		Email (ML15156A134)	0450
Richardson, Don		Email (ML15142A227)	0296
Rifkind, David		Meeting Transcript (ML15219A360)	0721-16
Riley, Bill	International Brotherhood of Electrical Workers, Local Union 349	Meeting Transcript (ML15219A360)	0721-19
Riley, Bill	International Brotherhood of Electrical Workers, Local Union 349	Meeting Transcript (ML15219A386)	0722-9
Riley, Bill	International Brotherhood of Electrical Workers, Local Union 349	Meeting Transcript (ML15219A410)	0723-14
Ritz, David	Ocean Reef Community Association	Email (ML15160A315)	0208
Robbin, Valerie		Email (ML15160A050)	0223
Roberts, Kenneth		Email (ML15195A161)	0575
Roberts, Linda		Email (ML15139A698)	0096
Robertson, Alyce		Email (ML15139A706)	0117
Robinson, Angel		Email (ML15155A118)	0474
Rock, Andrew		Email (ML15198A542)	0599
Rodriguez, Barbara		Email (ML15139A560)	0034
Rodriguez, Jose Javier	State of Florida	Meeting Transcript (ML15219A360)	0721-1
Rodriguez, Jose Javier	State of Florida	reg.gov (ML15201A063)	0675
Rodriguez, Manuel J.	RoadTech Engineering	Meeting Transcript (ML15219A360)	0721-27
Roedel, Kitty		Email (ML15139A622)	0055
Roehl, Richard Ralph		Email (ML15142A340)	0513
Roff, Rhonda	Sierra Club Calusa Group	Email (ML15175A152)	0288
Roff, Rhonda	Sierra Club Calusa Group	Meeting Transcript (ML15219A360)	0721-11
Roos, Monica		Email (ML15139A617)	0052
Roque, Julio		reg.gov (ML15096A472)	0328
Roque, Julio		reg.gov (ML15104A336)	0024
Rose, Aaron		Email (ML15156A887)	0307
Rose, Simon		Email (ML15085A501)	0009
Roseberry, Bill		Email (ML15159A882)	0179

Table E-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID
Rosenberry, Casara		reg.gov (ML15128A515)	0367
Rosenfeld, Alice		Email (ML15155A909)	0566
Ross, Robert and Teresa		Email (ML15139A709)	0212
Ross, Sherwood		reg.gov (ML15110A283)	0332
Rossin, A. David		reg.gov (ML15128A080)	0345
Rothstein, Debbie		Email (ML15142A158)	0292
Routh, Jeffrey		Email (ML15142A340)	0522
Rowe, James		reg.gov (ML15104A318)	0011
Royce, M.		reg.gov (ML15128A090)	0353
Rush, Charlene		Email (ML15156B496)	0448
Ryan, Jim		reg.gov (ML15211A032)	0543
Sachs, Jean		Email (ML15155B254)	0686
Salatino, Freda		Email (ML15148B144)	0299
Samole, Sharon		Email (ML15142A381)	0234
San Pedro, Patricia		Email (ML15139A531)	0026
Sanchez, Sergio and Irma		reg.gov (ML15201A052)	0660
Sanfilippo, Val		reg.gov (ML15198A140)	0636
Saporito, Thomas	Saprodani Associates	reg.gov (ML15096A473)	0010
Sasiadek, Alfred		Email (ML15139A620)	0053
Scherr, Matthew		Email (ML15128A183)	0684
Schilling, Judy		Email (ML15154B916)	0429
Schlackman, Mara		Meeting Transcript (ML15219A360)	0721-32
Schoene, William		Email (ML15159B279)	0037
Schwab, Roy		reg.gov (ML15211A053)	0579
Schwaller, Greg		Email (ML15159A156)	0167
Schwartz, Matthew	South Florida Wetlands Association	Email (ML15146A150)	0113
Schwartz, Matthew	South Florida Wetlands Association	Meeting Transcript (ML15219A360)	0721-22
Schwartz, Matthew	South Florida Wetlands Association	Meeting Transcript (ML15219A410)	0723-9
Scott, John	Sierra Club Calusa Group	Email (ML15175A152)	0288
Scott, Ruth		reg.gov (ML15211A038)	0548
Segal-Wright, Nicholas		reg.gov (ML15201A054)	0661
Segor, Joseph C.		Meeting Transcript (ML15219A386)	0722-16
Seiman, Rhonda		reg.gov (ML15198A138)	0635
September, P. J.		Email (ML15155B871)	0267
Shahsavar, Mehran		reg.gov (ML15104A319)	0012
Shapiro, Eugene		reg.gov (ML15128A095)	0357
Shark, Jason		Email (ML15139A712)	0120
Sharp, Andrea Heuson		Letter (ML15160A317)	0210
Shasky, Mike		reg.gov (ML15128A086)	0350
Shelley, Cynthia		reg.gov (ML15211A049)	0556
Shepard, J.		Email (ML15141A253)	0143

Table E-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID
Shepherd, James		Email (ML15155A092)	0473
Sheridan, Michelle		Email (ML15159A863)	0176
Shifflett, Jr., James E.		Email (ML15156A090)	0687
Shipe, Kathleen		Email (ML15159B428)	0193
Shlackman, Jed		reg.gov (ML15128A094)	0356
Shlackman, Mara		Email (ML15146A134)	0246
Sifko, Basilio		Email (ML15188A199)	0408
Silva, Nicolas	University of Florida	Meeting Transcript (ML15219A386)	0722-5
Silver, William		reg.gov (ML15104A330)	0021
Silverstein, Rachel	Miami Water Keeper	Email (ML15146A150)	0113
Silverstein, Rachel	Miami Water Keeper	Meeting Transcript (ML15219A386)	0722-7
Silverstein, Rachel	Miami Waterkeeper	Email (ML15146A151)	0253
Simmerman, Scott		Email (ML15158A216)	0480
Simon, Gary P.		Email (ML15139A613)	0050
Simpson, Chris	International Brotherhood of Electrical Workers	Meeting Transcript (ML15219A410)	0723-13
Skove, Ellen H.		Email (ML15139A681)	0081
Slaton, Marina		Email (ML15154A967)	0531
Slonim, Roberta		reg.gov (ML15104A325)	0016
Smay, Betty		Email (ML15139A646)	0063
Smith, David W.		Email (ML15139A616)	0051
Smith, Leigh Emerson		Email (ML15162A432)	0322
Smith, Leigh Emerson		reg.gov (ML15104A329)	0020
Smith, Pamela		Email (ML15155A184)	0730
Smoller, Merry Sue		reg.gov (ML15141A254)	0637
Smoller, Merry Sue		reg.gov (ML15198A142)	0637
Smyke, Pete		Email (ML15148B026)	0459
Smythe, Ana		Email (ML15155A878)	0557
Socie, Robert		Email (ML15142A340)	0521
Sockloff, Judith		Email (ML15162A906)	0175
Sommers, Andrea		Email (ML15154A758)	0270
Sophia, Tristan		Email (ML15142A063)	0221
Sorenson, Katy		Email (ML15198A528)	0596
Southern, Tom		reg.gov (ML15110A287)	0620
Speno, Charlie		Email (ML15148A180)	0484
Spigel, Sue		Email (ML15139B000)	0220
Stamps, Gail		Email (ML15155B183)	0586
Standley, Ron		Email (ML15153B272)	0414
Stanko, Janet L.	Sierra Club, Northeast Florida	Email (ML15141A319)	0151
Stanley, Gael		Email (ML15139A664)	0071
Stanley, Joyce	U.S. Department of the Interior	Email (ML15294A379)	0227
Star, Priscilla		Meeting Transcript (ML15219A410)	0723-3
Stevens, Lisa		Email (ML15156A898)	0310

Table E-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID
Stewart, Berkeley		Email (ML15155A990)	0273
Stocker, Nancy		Email (ML15162B105)	0699
Stoddard, Philip K.	City of South Miami	Email (ML15141A255)	0106
Stoddard, Philip K.	City of South Miami Mayor	Email (ML15146A155)	0254
Stoddard, Philip K.	City of South Miami Mayor	Meeting Transcript (ML15219A360)	0721-2
Streit, Christopher V.		Email (ML15139A672)	0075
Streit, Didi		Email (ML15139A669)	0074
Strouble, Jackie		Email (ML15156B019)	0297
Suda, Maryska		Email (ML15155A659)	0534
Svensson, Bo		Email (ML15154A242)	0478
Swensen, Harry		Email (ML15159A731)	0174
Swenson, Cyndee		Meeting Transcript (ML15219A386)	0722-17
Szabo, Liz		Email (ML15155A298)	0481
Szabo, Liz		Email (ML15155B617)	0481
Tacher, Ian		Email (ML15082A132)	0001
Tamargo, Jorge J.		Email (ML15154A542)	0494
Tamburr, C.		reg.gov (ML15201A046)	0655
Tambussi-Brechon, Linda		Email (ML15139A595)	0042
Taylor, Kirk		Email (ML15155B906)	0276
Teas, James		reg.gov (ML15138A085)	0612
Teas, Jim	Sierra Club Miami Group	Email (ML15175A152)	0288
Teas, Jim	Sierra Club Miami Group	Meeting Transcript (ML15219A410)	0723-5
Teasley, Regi		Email (ML15162A061)	0318
Thiel, Markus		Email (ML15139A737)	0135
Thomas, Bill		reg.gov (ML15128A092)	0355
Thomas, Gina		Email (ML15154A993)	0271
Thompson, Muhammad		Email (ML15156A270)	0683
Timberlake, Ralph		Email (ML15160A889)	0282
Tingle, Peggy		reg.gov (ML15128A089)	0352
Togati, Joanne		Email (ML15142A340)	0519
Tokunaga, Barb		Email (ML15156A445)	0198
Tompkins, Constance		Email (ML15139A683)	0081
Tosney, Kathryn		Email (ML15153A911)	0173
Trauner, Keith		Email (ML15195A153)	0573
Trencher, Ruth		Email (ML15139A704)	0115
Trowbridge, Mark	Coral Gables Chamber of Commerce	Meeting Transcript (ML15219A410)	0723-2
Tucker, Lauren		Email (ML15141A224)	0105
Tulenko, James		reg.gov (ML15138A090)	0375
Turner, William P.		reg.gov (ML15201A056)	0663
Tweedy, Mary		Email (ML15211A055)	0581
Tweeton, Tanya		reg.gov (ML15128A075)	0340
Ullman, John	Miami Group of the Sierra Club	Meeting Transcript	0721-30

Table E-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID
		(ML15219A360)	
Ullman, Jonathan	National Sierra Club	Email (ML15175A152)	0288
Umpierre, Diana		Email (ML15160A316)	0209
Umpierre, Diana		Email (ML15162A271)	0209
Underwood, John		Email (ML15154B521)	0416
Van Leer, Sam	Urban Paradise Guild	Email (ML15146A147)	0252
Van Pelt, Jason		Email (ML15153A518)	0300
Van Thienen, Mateo		Email (ML15139A557)	0033
Vance, Richard		Email (ML15142A131)	0289
Vayu, Satya		reg.gov (ML15138A084)	0370
Veijalainen, Pertti		Email (ML15148A825)	0467
Veit, Eberhard		Email (ML15153B029)	0607
Vermeulen, Mary		Email (ML15154B979)	0433
Vinciguerra, Anthony		Email (ML15139A556)	0032
Violich, Francesca		Email (ML15139A592)	0039
Vorachek, Mary		Email (ML15142A152)	0291
Wade, Pat		Email (ML15153A704)	0582
Wade, Thomas M.		Email (ML15139A607)	0046
Wallace, Otis	Florida City	Meeting Transcript (ML15219A410)	0723-1
Wallington, Victoria		Email (ML15156A892)	0308
Ward, Richard		reg.gov (ML15128A084)	0348
Warzalla, Jim		Email (ML15155B847)	0144
Wasilewski, Joe	Natural Selections	Meeting Transcript (ML15219A360)	0721-14
Watson, Fran		Email (ML15148B273)	0528
Weber, Gae		Email (ML15142A006)	0157
Weber, Zorina		Email (ML15154A103)	0469
Wegner, Geri		Email (ML15139A611)	0048
Weiss, Arwen		Email (ML15142A340)	0518
Welber, Michael		Email (ML15142A385)	0237
West, Eric		Email (ML15154C041)	0435
Westaway, Katharine		reg.gov (ML15104A323)	0014
White, Barry	Citizens Allied for Safe Energy, Inc.	Email (ML15139A702)	0100
White, Barry J.	CASE	Email (ML15198A539)	0598
White, Barry J.	CASE	Meeting Transcript (ML15219A360)	0721-12
White, Holly		Letter (ML15160A313)	0206
White, Paton	Audubon Society of the Everglades	Email (ML15146A151)	0253
Whitehorn, C.		Email (ML15154A318)	0681
Whitfield, Isabelle		Email (ML15146A146)	0251
Whitlock, Catherine		Email (ML15218A210)	0701
Wicht, Dan		Email (ML15156A578)	0197
Wilansky, Laura Sue		Email (ML15139A678)	0078

Table E-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Correspondence ID
Wilansky, Laura Sue		Meeting Transcript (ML15219A360)	0721-28
Willett, Bett		reg.gov (ML15201A050)	0658
Willett, Greg		Email (ML15148B363)	0538
Williams, Elinor	Loxahatchee National Wildlife Refuge	Email (ML15146A151)	0253
Williams, Paul		Email (ML15139A594)	0041
Williams, Paul		Email (ML15139A659)	0069
Williams, Penelope		Email (ML15196A067)	0576
Wilson, J. D. Bruce		Email (ML15139A648)	0065
Wingerd, Mala		Email (ML15154B820)	0425
Winters, Gracie		Email (ML15154B133)	0398
Wong, Christina		Email (ML15139A649)	0066
Wry, Ellen		Email (ML15142A132)	0290
Yarter, E. C.		Email (ML15148B034)	0460
Yeager, Jerry		Email (ML15160A733)	0228
Yost, Gaylord		Email (ML15154B918)	0430
Young, Kim		Email (ML15155B916)	0651
Yount, Madeline		Email (ML15154B744)	0422
Yovel, Ephrat		Meeting Transcript (ML15219A360)	0721-29
Zakon, Allan		Email (ML15139A708)	0118
Zarsky, Terry		Email (ML15153B098)	0541
Zerulla, Tanja		Email (ML15139A714)	0214
Zhivelev, Leon		reg.gov (ML15201A047)	0656
Zimmermann, John		Email (ML15154A715)	0501
Zimmermann, John		Email (ML15156A789)	0304
Zook, Caryl		Email (ML15196A256)	0589
Zuniga, Family		Email (ML15154B094)	0272

Table E-2 provides an alphabetical index to the comment categories and lists the commentersand the specific comment identification number(s) that were included in each category

Table E-2. Comment Categories

Comment Category	Commenter (Comment ID)
Accidents-Severe	• Allison, Noreen (0549-2) • Almer, Anessa (0712-1) • Almirola, Alejandro (0178-2) • Anonymous, Anonymous (0331-2) (0333-4) (0551-3) (0603-7) (0644-2) • Anonymous, Charity (0638-1) • Bach, Lili (0128-2) • Baumwall, Douglas (0329-3) • Bazzone, Barbara (0159-4) • Bender, Kae (0441-1) • Benson, Mary (0081-2) • Benton-Janetta, Lori (0449-1) • Bethune, David (0615-2-17) (0615-2-26) (0615-3-8) (0721-23-5) (0721-23-7) (0721-23-8) • Betts, Cynthia (0280-1) • Burge, Laura (0540-1) • Burns, Terry (0647-1) • Carpenter, Rory (0694-5) • Caswell, Susan (0487-1) • Chrissos, H. L. Chris (0164-1) • Commenters, Multiple (0044-2) (0067-2) (0067-3) (0240-8) • Corda, Charles (0721-25-1) • Corral, Oscar (0133-4) • Council, Barbara (0731-1) • Denninger, Frank (0554-1) • Draper, Lonnie M. (0511-4) • DuPriest, William Robert (0093-2) • Dwyer, John P. (0673-3) • Enfield, David (0236-2) • Felinski, Julee (0625-3) • Finver, Jody (0008-6) (0008-10) • Fulks, Anna Louise (0250-1) (0250-4) • Geary, Craig W. (0097-3) • Glass, Rachel (0222-1) • Guy, Sharon (0654-4) • Haber, Matthew S. (0611-14) • Haffmans, Edmund (0371-2) • Hall, Linnea M. Fronce Thomas (0279-1) • Hardin, Lillian (0455-1) • Haselhurst, Richard (0639-2) • Hoyle, Lester and Judy (0440-2) • Hull, Meagan (0344-2) • Hyams, Charles (0213-2) • Joannou, Jr., Benjamin (0643-1) • Jones, Diane (0130-3) • Jurin, Richard (0108-1) • Kavanaugh, Daniel (0338-1) • Koenigsberg, Linda (0721-26-2) • Lague, Victoria (0061-2)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
Accidents-Severe (contd)	• Lange, Alexandra (0087-3) • Lee, Nancy (0373-6) (0373-9) • Lettieri, Tammy (0259-1) • LoBiondo, Roana and Michael (0359-2) • Lucero, Olga (0134-1) • Maher, William (0619-1-4) • Mauri, Tom (0132-1) • Mayer, Doug (0129-1) • Mazzarella, Rebecca (0495-3) • McColgan, Robert (0722-15-2) • Mckee, Sarah (0492-3) • Mendez, Victoria (0721-5-1) • Merleaux, Derek (0342-2) • Meyer, Paul (0122-3) • Miami, City (0456-18) (0456-19) • Mikowski, George (0382-2) • Nappe, Judith (0695-3) • Nelson, Joyce E. (0149-8) • Neway, Roberta (0057-3) (0057-4) • Nickerson, Nancy (0692-1) • Norman, Ronald (0358-3) • Orzechowicz, Holly (0263-1) • Palmer, Majorie (0360-4) • Platt, David (0109-2) • Polk, James (0458-1) • Provost, Allan (0339-1) • Rader, D.L. (0729-1) • Read, Alice Gray (0022-2) • Reid, Sarah (0201-1) • Riccio, Jim (0716-9) (0716-10) • Rifkind, David (0721-16-1) • Roehl, Richard Ralph (0513-1) • Roff, Rhonda (0721-11-9) • Roque, Julio (0024-1) • Ross, Sherwood (0332-1) • Schwartz, Matthew (0721-22-10) • Scott, Ruth (0548-2) • Shlackman, Mara (0246-2) • Skove, Ellen H. (0081-2) • Smyke, Pete (0459-2) • Stanko, Janet L. (0151-1) • Stocker, Nancy (0699-1) • Swensen, Harry (0174-1) • Taylor, Kirk (0276-1) • Tompkins, Constance (0081-2) • Trauner, Keith (0573-2) • Trencher, Ruth (0115-7) • Tweeton, Tanya (0340-8) (0340-9) • Van Leer, Sam (0252-2) (0252-10) (0252-11)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Violich, Francesca (0039-2) • White, Holly (0206-2) • Wilansky, Laura Sue (0078-1) (0078-10) (0721-28-2) (0721-28-10) • Yarter, E. C. (0460-1) • Young, Kim (0651-4) • Zarsky, Terry (0541-2)
Alternatives-Energy	• Agler, Mindy (0152-1) • Almer, Anessa (0712-2) • Almirola, Alejandro (0178-5) (0721-31-5) (0721-31-10) (0721-31-12) (0721-31-14) • Anderson, Vaughn (0608-1) • Anonymous, Anonymous (0706-1) (0715-3) • Anonymous, Charity (0638-2) • Anonymous, Elena (0662-2) • Anonymous, Judi (0537-6) • Atler, Neal (0215-1) • Bach, Lili (0128-3) • Bailey, Evelyn (0525-1) • Ball, Cheri (0472-2) • Balog, Nancy (0185-2) • Barlow, Jeffrey (0218-1) • Barnes, Janice (0558-2) • Bastidas, Mauricio (0720-2) • Batista, Carlos (0685-1) • Baumwall, Douglas (0329-4) • Bazzone, Barbara (0159-6) • Bender, Kae (0441-2) • Bennett, Robbie (0265-2) • Bernabei, Catharina (0721-18-3) (0721-18-4) • Bethune, David (0615-1-3) (0615-1-14) • Bonilla-Jones, Carmen Elisa (0231-2) (0231-4) • Brexel, Sr., Charles (0592-2) (0592-3) (0592-5) (0592-6) (0592-7) • Brown, Judith O. (0131-2) • Buechler, Jerry (0718-2) • Cavros, George (0721-8-3) (0721-8-5) (0721-8-7) (0721-8-9) • Chiszar, Benjamin J. (0677-5) • Clay, Cynthia (0219-1) • Cleland, Noel (0207-3) (0288-10) (0288-13) (0288-16) • Colby, Helen (0124-2) (0242-1) • Colls, Ana (0125-2) • Colson, Clay G. (0602-2) • Commenters, Multiple (0044-8) (0073-2) (0104-3) (0240-13) (0379-5) • Compel, Jr., Joseph (0283-3) (0283-5) (0283-6) • Cornely, Tina (0633-3) • Crystal, Chris (0334-5) • Cunningham, Sue (0114-3) • Daly, Meg (0076-6) • Datz, Amy (0621-3) • de Armas, Maria Cristina (0077-2)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• de Azevedo, Ricardo (0119-2) • DeMent, David L. (0036-1) • Detrick, Mary (0317-1) • Deutsch, Steven (0552-2) • Dimondstein, Carla (0564-3) • Dolben, Hollis (0627-1) • Duran-Pinzon, Jaime (0243-3) (0243-5) • Dwyer, John P. (0264-6) (0673-6) • Dwyer, Karen (0674-7) • Eckert, Brenda (0400-2) • Edmond, Gabriel (0721-7-7) • Edwards, Suzi (0600-2) • Ehrenfried, Jennifer (0544-2) • Engelberg, Jodi (0004-2) • Ercole, Steven (0170-2) • Fairchild, David (0094-2) (0094-6) • Family, Manzi (0593-1) • Fecteau, Lynn (0313-1) • Felinski, Julee (0625-4) • Ferro, Colleen (0260-1) • Ferry, Lisa (0704-2) • Finver, Jody (0008-13) • Fischer, Antoinette (0365-9) • Fulks, Anna Louise (0250-5) (0250-7) • Galles, Camilla (0624-4) • Garcia, Ruslan (0116-2) • Geary, Craig W. (0097-2) • Goldman, Emanuel (0153-4) • Goldmeier, Barry (0015-15) • Gomez, Albert (0721-34-2) (0721-34-5) • Gomez, Christian (0269-2) • Gomez, Gustavo (0101-2) • Grant, Randy (0146-5) (0146-6) • Grill, Helen (0043-2) • Gross, Cheryl A. (0463-8) • Haber, Matthew S. (0611-16) • Haffmans, Edmund (0371-5) • Hardin, Lillian (0455-3) • Hartmann, Donald (0657-1) • Haselhurst, Richard (0639-4) • Heiney, Jamie (0713-3) • Henry, Jim (0723-12-5) (0723-12-6) (0723-12-7) • Herrera, Luis (0721-33-4) • Hickey, Alan (0653-2) • Hill, Michael (0446-1) • Hollister, David (0325-1) • Howell, Carol (0294-1) • Hubler, Gina Marie (0089-2) • Hull, Meagan (0344-1)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Hunt, Jim (0311-1) • Hurley, Paula (0362-5) • Hyams, Charles (0213-4) • Icaza, Alejo (0613-2) • Imbesi, Nan (0058-2) • Inguanzo, Maria (0268-1) • Jackalone, Frank (0288-10) (0288-13) (0288-16) • Jacobs, Lee (0677-5) • Jennings, Cara (0323-4) • Jens-Rochow, Steve (0666-3) • Jezierski, Elisabeth (0302-1) • Joannou, Jr., Benjamin (0023-2) • Johnson, Diane (0590-1) • Johnson, Kay (0315-1) • Johnson, Robert (0190-1) • Kadis, Patricia (0248-1) • Keim, Mary (0517-1) • Khajeh-Noori, Jeri (0381-1) (0609-2) • Klopfer, Carol (0677-5) • Kristy, Joseph (0650-1) • Kuraza, Devon (0721-15-2) (0721-15-4) (0721-15-7) • Lamb, Deborah S. (0070-2) (0070-4) • Lange, Alexandra (0087-5) (0088-1) (0088-3) (0088-6) • Lange, Barbara (0591-1) • Lebatard, David (0192-3) • Lee, Nancy (0373-7) • Lettieri, Tammy (0259-5) • Levy, Morgan I. (0136-3) (0136-4) • LoBiondo, Roana and Michael (0359-4) • Lucas, Carmen (0141-2) • Macher, Nathan (0378-2) (0378-7) • Maher, William (0619-1-7) • Mahoney, Stephen (0288-10) (0288-13) (0288-16) • Maida, Cecilia (0445-1) • Martin, Drew (0641-9) • Massey, Linda (0514-1) • Matthews, Debbie (0288-10) (0288-13) (0288-16) • Mayer, Doug (0129-4) • Mayotte, Monica (0194-2) • Mazzarella, Rebecca (0495-2) • Merino, Miriam (0092-3) • Merleaux, Derek (0342-3) • Miami, City (0456-23) • Mitzkewich, Yuri (0523-2) • Moll, Wolfgang (0632-1) • Montalvo, Stephanie (0630-1) • Mosca-Clark, Vivianne (0442-2) • Mosher, Paul (0249-3) • Mueller, Heinz J. (0617-4-12)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Myers, B. J. (0256-2) • Neal, Kevin (0027-1) • Nelson, Joyce E. (0149-6) • Neway, Roberta (0057-6) • O'Meara, Patrick (0700-1) • Ortiz, Natalia (0003-2) (0372-3) • Orzechowicz, Holly (0263-5) • Otis, Martha (0150-2) (0150-3) • Padilla, Dora (0238-2) • Passmore, Judith (0390-1) • Peters, Emily (0363-2) • Philips, Sally B. (0337-6) • Phillips, Monica D. (0084-2) • Piper, Cynthia (0183-2) • Platt, George Seth (0710-4) • Polk, J. D. (0369-2) • Portuondo, Pilar (0241-2) • Post, Patrick (0671-1-3) (0671-2-1) (0671-2-3) • Puchades, Mary (0616-2) • Quillen, Carter (0601-1) • Raab, Frances (0532-1) • Ramsey, Betty (0563-1) • Rapuano, Shannon (0594-5) • Rawlins, Steve (0642-3) • Read, Alice Gray (0022-1) (0022-6) • Regalado, Tomas (0515-4) • Reiter, Ben (0080-3) • Reyneri, Juan (0121-2) • Reynolds, Laura (0721-10-3) • Richards, Margie (0450-1) • Rifkind, David (0721-16-2) (0721-16-3) (0721-16-4) (0721-16-6) • Roberts, Linda (0096-3) • Rodriguez, Barbara (0034-2) (0034-4) • Rodriguez, Jose Javier (0675-3) (0721-1-10) • Roedel, Kitty (0055-4) • Roff, Rhonda (0288-10) (0288-13) (0288-16) (0721-11-4) (0721-11-8) • Roos, Monica (0052-2) • Rose, Simon (0009-4) • Ross, Robert and Teresa (0212-4) • Ross, Sherwood (0332-2) • Ryan, Jim (0543-2) • San Pedro, Patricia (0026-1) • Sanchez, Sergio and Irma (0660-2) • Saporito, Thomas (0010-5) (0010-6) • Sasiadek, Alfred (0053-3) (0053-5) • Schlackman, Mara (0721-32-1) • Schoene, William (0037-2) • Schwab, Roy (0579-2) (0579-5) • Schwartz, Matthew (0721-22-18) (0723-9-2) (0723-9-3) (0723-9-5) (0723-

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	9-20) • Scott, John (0288-10) (0288-13) (0288-16) • Scott, Ruth (0548-3) • Segal-Wright, Nicholas (0661-2) • Seiman, Rhonda (0635-5) • Shahsavar, Mehran (0012-2) • Shapiro, Eugene (0357-2) • Shepherd, James (0473-1) • Shlackman, Jed (0356-4) (0356-16) • Silver, William (0021-2) • Smay, Betty (0063-2) • Smith, David W. (0051-3) • Smith, Leigh Emerson (0020-2) (0322-1) • Sorenson, Katy (0596-2) (0596-4) • Speno, Charlie (0484-2) • Star, Priscilla (0723-3-3) (0723-3-5) • Szabo, Liz (0481-3) • Teas, Jim (0288-10) (0288-13) (0288-16) (0723-5-4) • Thiel, Markus (0135-2) • Thomas, Bill (0355-2) • Trauner, Keith (0573-4) • Trencher, Ruth (0115-5) • Tweeton, Tanya (0340-7) • Ullman, John (0721-30-10) • Ullman, Jonathan (0288-10) (0288-13) (0288-16) • Van Leer, Sam (0252-12) (0252-14) (0252-15) (0252-16) (0252-18) • Van Thienen, Mateo (0033-2) • Vinciguerra, Anthony (0032-2) • Violich, Francesca (0039-4) • Ward, Richard (0348-2) • Wegner, Geri (0048-3) • Welber, Michael (0237-1) • Westaway, Katharine (0014-2) • Wilansky, Laura Sue (0078-11) (0078-13) (0721-28-11) (0721-28-12) • Wingerd, Mala (0425-1) • Zakon, Allan (0118-2) • Zerulla, Tanja (0214-7) • Zhivelev, Leon (0656-2) • Zimmermann, John (0501-1) • Zuniga, Family (0272-3)
Alternatives-No-Action	• Barczak, Sara (0112-3) • Brexel, Sr., Charles (0592-1) (0592-11) • Brinn, Ira (0148-2) • Cavros, George (0721-8-2) • Commenters, Multiple (0104-2) (0379-2) (0379-7) • Harrison, J. M. M. (0508-2) • Khajeh-Noori, Jeri (0609-3) • Lebatard, David (0192-2) • Maher, William (0619-2-17)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
Alternatives-Sites	• Allison, Noreen (0549-1) • Almer, Anessa (0712-4) • Anonymous, Anonymous (0711-1) • Anonymous, Judi (0537-2) (0537-7) • Balog, Nancy (0185-1) • Bazzone, Barbara (0159-2) • Bethune, David (0615-2-24) • Birsh, Arthur and Joan (0083-2) • Blair, Dan (0485-1) • Bloom, Justin (0253-2) • Bofill, Beatriz (0235-2) • Borie, Edith (0629-1) • Bremen, Gary (0181-2) • Brexel, Sr., Charles (0592-12) • Burge, Laura (0540-3) • Campbell, Cara (0253-2) • Causey, Charlie (0253-2) • Cava, Daniella Levine (0172-1) • Cavros, George (0253-2) • Chenoweth, Mike (0253-2) • Chirillo, James (0261-1) • Cobb, Tanya (0413-3) • Commenters, Multiple (0044-3) (0044-5) (0102-4) (0103-4) (0240-2) (0379-3) • Daly, Meg (0253-2) • Datz, Amy (0621-2) • Dietrich, Chris OMeara (0295-2) • Dorn, Kathryn (0693-4) • Douglas, Carolyn (0486-1) • Dudley, Dwight (0254-2) • Edmond, Gabriel (0721-7-1) (0721-7-5) • England, Margaret (0253-2) • Fass, Amy (0278-1) • Ferry, Lisa (0704-1) • Field, Fran (0258-5) • Finver, Jody (0008-9) • Fulks, Anna Louise (0250-2) • Fuller, Manley (0253-2) • Garey, Jenne (0668-1) • Glasshof, Wendy (0587-1) • Goldstein, Louis (0418-1) • Govindasamy, Rani (0247-1) • Greer, Tom (0392-2) • Griffith, Ed and Harriet (0366-2) (0366-6) • Grill, Brock (0512-1) • Guy, Sharon (0654-2) • Hanna, Jane (0588-2) (0588-3) (0588-4) • Headley, Linda (0376-1) • Jones, George L. (0253-2)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Karsten, Annetta (0452-1) • Kassel, Kerul (0676-4) (0676-9) • Keller, Alan (0253-2) • Kimball, Larry (0526-1) • Lague, Victoria (0061-3) • Lebatard, David (0192-5) • Lerner, Cindy (0145-13) (0254-2) (0721-3-4) • Lish, Christopher (0555-2) • Livingston, C. J. (0437-1) • LoBiondo, Roana and Michael (0359-1) • Lopez, Jaclyn (0113-1-3) • Macy, Michelle (0405-1) • Maher, William (0619-3-2) (0619-5-14) (0619-5-15) (0619-5-16) (0619-5-18) • Malpass, Betsy (0421-1) • Manter, Larry (0471-1) • Martin, Drew (0253-2) (0641-11) (0721-13-3) • Mckee, Sarah (0492-2) • McLaughlin, Caroline (0113-1-3) (0253-2) (0721-9-2) (0721-9-3) (0723-4-4) • Melby, George M. (0396-1) • Mendelsohn, Alex (0277-1) • Mendez, Victoria (0721-5-5) • Miami, City (0456-3) (0456-4) (0456-5) (0456-7) (0456-9) • Mueller, Heinz J. (0617-4-14) • Mundhenk, Norm (0605-1) • Neff, Victoria (0682-1) • Oliva, Vivian (0349-2) (0349-3) • Ortiz, Natalia (0372-4) • Orzechowicz, Holly (0263-3) • Palmer, Majorie (0360-1) • Pareto, Rolando and Marlene (0040-2) • Petersen, John (0347-1) • Poese, David (0305-1) • Rapuano, Shannon (0594-1) • Regalado, Tomas (0254-2) • Revord, Michael (0420-1) • Reynolds, Laura (0113-1-3) (0253-2) • Riccio, Jim (0716-8) • Ritz, David (0208-2) (0208-5) • Ross, Robert and Teresa (0212-3) • Routh, Jeffrey (0522-1) • Royce, M. (0353-2) (0353-6) • Sachs, Jean (0686-1) • Schlackman, Mara (0721-32-5) • Schwartz, Matthew (0113-1-3) (0721-22-17) • Sharp, Andrea Heuson (0210-2) • Sheridan, Michelle (0176-1) • Shlackman, Jed (0356-7) (0356-8) (0356-13)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Silverstein, Rachel (0113-1-3) (0253-2) • Smoller, Merry Sue (0637-1) • Speno, Charlie (0484-1) • Spigel, Sue (0220-1) • Stoddard, Philip K. (0254-2) • Tingle, Peggy (0352-1) • Togati, Joanne (0519-1) • Tokunaga, Barb (0198-1) • Ullman, John (0721-30-7) • Van Leer, Sam (0252-7) • Van Pelt, Jason (0300-1) (0300-3) • Vayu, Satya (0370-6) (0370-12) • Violich, Francesca (0039-3) • White, Paton (0253-2) • Whitehorn, C. (0681-1) • Wilansky, Laura Sue (0078-8) (0721-28-8) • Willett, Greg (0538-1) • Williams, Elinor (0253-2) • Yeager, Jerry (0228-4)
Alternatives-System Design	• White, Barry J. (0721-12-12)
Benefit-Cost Balance	• Anonymous, Anonymous (0333-5) (0336-2) (0715-2) • Anonymous, Charity (0638-3) • Bastidas, Mauricio (0720-1) • Batista, Carlos (0685-6) (0685-11) • Bennett, Robbie (0265-1) • Bethune, David (0615-1-15) • Burns, Terry (0647-2) • Cavros, George (0721-8-6) (0721-8-11) • Chrissos, H. L. Chris (0164-4) • Cleland, Noel (0207-7) • Compel, Jr., Joseph (0283-2) • Dickinson, Robert (0461-1) • Dimondstein, Carla (0564-2) • Eastman, John (0721-24-2) • Gross, Cheryl A. (0463-2) • Harrison, Norma J. F. (0649-1) • Heiney, Jamie (0713-2) • Henry, Jim (0723-12-3) • Keating, Tim (0545-7) • Lane, N. Jo (0569-1) • Lange, Alexandra (0088-5) • Mayer, Doug (0129-2) • Miller, Nyana (0626-3) • Mosher, Paul (0249-2) • Nelson, Joyce E. (0149-10) (0149-13) • Platt, George Seth (0710-5) • Post, Patrick (0671-1-2) (0671-2-4) • Read, Alice Gray (0022-3)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Regalado, Tomas (0515-6) • Rock, Andrew (0599-1) • Rodriguez, Jose Javier (0721-1-1) (0721-1-2) (0721-1-4) • Roedel, Kitty (0055-5) • Roff, Rhonda (0721-11-3) • Stanley, Gael (0071-1) • Tamargo, Jorge J. (0494-1) • Vorachek, Mary (0291-2) • Wilansky, Laura Sue (0078-3) (0721-28-4) • Zerulla, Tanja (0214-2)
Climate Change	• Berendsohn, Catherine (0723-11-4) (0723-11-5) (0723-11-7) • Edmond, Gabriel (0721-7-2) (0721-7-4) • Haber, Matthew S. (0611-15) • Harris, Walter (0721-6-3) • Henry, Jim (0723-12-13) • Hubbard, Stanley S. (0680-2) • Lawrence, Diane (0086-3) • Martin, Drew (0721-13-4) • McLaughlin, Caroline (0721-9-7) (0723-4-2) (0723-4-8) (0723-4-9) • Mueller, Heinz J. (0617-4-16) • Roff, Rhonda (0721-11-2) • Rose, Simon (0009-2)
Cumulative Impacts	• Austin, Stan (0622-2-5) • Cava, Daniella Levine (0172-6) (0172-8) • Lerner, Cindy (0145-6) • Lopez, Jaclyn (0113-2-2) • McLaughlin, Caroline (0113-2-2) • Reynolds, Laura (0113-2-2) • Schwartz, Matthew (0113-2-2) • Silverstein, Rachel (0113-2-2)
Decommissioning	• Franzmann, Paul (0384-2) • Hyams, Charles (0213-5) • Jones, Diane (0130-4)
Ecology-Aquatic	• Anonymous, Judi (0537-5) • Austin, Stan (0622-1-7) (0622-1-9) (0622-1-26) (0622-2-3) (0622-2-11) • Benson, Mary (0081-3) • Bertelson, Bob (0723-15-2) • Brexel, Sr., Charles (0592-9) • Carpenter, Rory (0694-6) • Casey, Sr., Robert J. (0368-2) • Cleland, Noel (0288-2) • Cobb, Tanya (0413-2) • Commenters, Multiple (0102-3) (0103-3) • Courliss, William (0604-1) • Dietrich, Chris OMeara (0295-4) • Fay, Virginia M. (0724-1) (0724-2) (0724-3) (0724-5) (0724-8) (0724-9) (0724-10) (0724-11) (0724-12) (0724-13) (0724-14) • Field, Fran (0258-3)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Finver, Jody (0008-5) • Goldmeier, Barry (0015-13) • Gregory, Gregory B. (0728-2) • Griffith, Ed and Harriet (0366-5) (0366-7) • Hazard, Evan (0415-1) • Hefty, Lee N. (0110-1-6) • Hodie, Jake (0191-1) • Hurley, Paula (0362-3) • Icaza, Alejo (0613-1) • Jackalone, Frank (0288-2) • Jones, Diane (0130-2) • Kassel, Kerul (0676-2) (0676-7) • Kaul, Devika (0722-14-4) • Lish, Christopher (0555-1) • Lopez, Jaclyn (0113-1-13) (0113-1-16) (0113-1-18) (0113-1-19) • Lopez, Josie (0284-3) (0284-5) • Maher, William (0619-1-12) (0619-1-16) (0619-2-29) (0619-3-12) (0619-3-13) (0619-4-9) (0619-4-10) (0619-4-11) (0619-4-16) (0619-6-8) (0619-6-12) (0619-6-14) (0619-7-3) (0619-7-4) (0619-7-6) (0619-7-7) (0619-7-8) (0619-7-9) (0619-7-10) (0619-7-11) • Mahoney, Stephen (0288-2) • Martin, Drew (0641-7) (0721-13-7) • Matthews, Debbie (0288-2) • McLaughlin, Caroline (0113-1-13) (0113-1-16) (0113-1-18) (0113-1-19) (0723-4-3) • Mendez, Victoria (0721-5-7) • Morton, Sean (0618-2) (0618-3) • Mueller, Heinz J. (0617-1-11) (0617-1-12) (0617-1-24) (0617-1-27) (0617-1-31) (0617-1-32) (0617-1-33) (0617-4-7) (0617-4-8) • Pheil, Edward (0707-2) (0707-4) • Phillips, Monica D. (0084-1) • Post, Patrick (0671-1-1) • Raab, Frances (0532-2) • Regalado, Tomas (0515-3) • Reynolds, Laura (0113-1-13) (0113-1-16) (0113-1-18) (0113-1-19) • Ritz, David (0208-3) • Rodriguez, Jose Javier (0721-1-8) • Roff, Rhonda (0288-2) • Royce, M. (0353-5) • Salatino, Freda (0299-2) • Schwartz, Matthew (0113-1-13) (0113-1-16) (0113-1-18) (0113-1-19) (0721-22-13) (0721-22-15) (0721-22-16) • Scott, John (0288-2) • Sharp, Andrea Heuson (0210-4) • Shipe, Kathleen (0193-2) • Shlackman, Jed (0356-2) (0356-11) • Silverstein, Rachel (0113-1-13) (0113-1-16) (0113-1-18) (0113-1-19) • Skove, Ellen H. (0081-3) • Stanley, Joyce (0227-4) (0227-5) (0227-11) • Stoddard, Philip K. (0106-5) (0106-12)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Swenson, Cyndee (0722-17-4) • Teas, Jim (0288-2) • Tompkins, Constance (0081-3) • Tweeton, Tanya (0340-2) • Ullman, Jonathan (0288-2) • Van Leer, Sam (0252-4) • Vayu, Satya (0370-3) (0370-7) (0370-10) • Wegner, Geri (0048-1) • White, Barry J. (0721-12-4) (0721-12-10) • Wilansky, Laura Sue (0078-7) • Yeager, Jerry (0228-3) • Zerulla, Tanja (0214-5)
Ecology-Terrestrial	• Austin, Stan (0622-1-6) (0622-1-8) (0622-1-17) (0622-1-18) (0622-1-19) (0622-1-20) (0622-1-21) (0622-1-22) (0622-1-23) (0622-1-24) (0622-1-25) (0622-2-1) (0622-2-2) (0622-2-4) (0622-2-7) (0622-2-10) (0622-2-12) (0622-2-13) (0622-2-15) (0623-9) • Bazzone, Barbara (0159-3) • Benton-Janetta, Lori (0449-2) • Berendsohn, Catherine (0723-11-3) • Bertelson, Bob (0723-15-3) • Casper, Laurel (0202-1) • Cleland, Noel (0288-7) • Commenters, Multiple (0240-9) • Cusidor, Teresa (0127-3) • Dwyer, Karen (0674-6) • Eastman, John (0721-24-4) • Fay, Virginia M. (0724-4) (0724-15) (0724-16) • Finver, Jody (0008-7) • Jackalone, Frank (0288-7) • Lee, Nancy (0373-2) • Lindsey, Jerrie (0245-3) • Lopez, Jaclyn (0113-1-6) (0113-1-9) (0113-1-10) (0113-2-8) (0113-2-9) (0113-2-14) (0113-2-16) (0113-2-17) • Maher, William (0619-1-2) (0619-1-9) (0619-1-19) (0619-1-20) (0619-2-2) (0619-2-5) (0619-2-6) (0619-2-7) (0619-2-31) (0619-2-35) (0619-2-37) (0619-2-38) (0619-2-39) (0619-3-7) (0619-3-8) (0619-3-9) (0619-3-10) (0619-3-11) (0619-4-3) (0619-4-4) (0619-4-5) (0619-4-6) (0619-4-7) (0619-4-8) (0619-4-17) (0619-4-18) (0619-5-9) (0619-6-1) (0619-6-2) (0619-6-3) (0619-6-4) (0619-6-5) (0619-6-6) (0619-6-7) (0619-6-9) (0619-6-10) (0619-6-11) (0619-6-13) (0619-6-15) (0619-6-16) (0619-6-17) (0619-6-18) (0619-6-19) (0619-7-1) (0619-7-2) (0619-7-5) • Mahoney, Stephen (0288-7) • Matthews, Debbie (0288-7) • McDuffie, Stephen (0723-8-4) • McLaughlin, Caroline (0113-1-6) (0113-1-9) (0113-1-10) (0113-2-8) (0113-2-9) (0113-2-14) (0113-2-16) (0113-2-17) • Miller, Melissa (0285-2) • Miller, Nena (0689-1) • Mueller, Heinz J. (0617-1-6) (0617-1-9) (0617-1-10) (0617-1-13) (0617-1-28) (0617-1-29) (0617-1-30)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Peters, Emily (0363-4) • Reynolds, Laura (0113-1-6) (0113-1-9) (0113-1-10) (0113-2-8) (0113-2-9) (0113-2-14) (0113-2-16) (0113-2-17) • Roff, Rhonda (0288-7) • Rose, Aaron (0307-1) • Schlackman, Mara (0721-32-9) • Schwartz, Matthew (0113-1-6) (0113-1-9) (0113-1-10) (0113-2-8) (0113-2-9) (0113-2-14) (0113-2-16) (0113-2-17) (0721-22-4) (0721-22-7) (0723-9-10) (0723-9-12) (0723-9-13) • Scott, John (0288-7) • Shlackman, Mara (0246-5) • Silverstein, Rachel (0113-1-6) (0113-1-9) (0113-1-10) (0113-2-8) (0113-2-9) (0113-2-14) (0113-2-16) (0113-2-17) • Stanley, Joyce (0227-1) (0227-2) (0227-3) (0227-6) (0227-7) (0227-8) (0227-10) (0227-12) (0227-13) (0227-14) • Swenson, Cyndee (0722-17-1) • Teas, Jim (0288-7) • Ullman, Jonathan (0288-7) • Wallington, Victoria (0308-1) • White, Barry J. (0598-2) • Wong, Christina (0066-3) • Zerulla, Tanja (0214-4) (0214-6)
Editorial Comments	• Maher, William (0619-1-5) (0619-1-13) (0619-1-18) (0619-2-15) (0619-2-16) (0619-2-28) (0619-5-7) (0619-5-11)
Environmental Justice	• Edmond, Gabriel (0721-7-6) • Mueller, Heinz J. (0617-3-2) (0617-3-3) • Stoddard, Philip K. (0721-2-15)
Geology	• Mueller, Heinz J. (0617-1-23) • White, Barry J. (0721-12-7)
Health-Nonradiological	• Almirola, Alejandro (0721-31-8) • Batista, Carlos (0685-2) • Bethune, David (0615-2-19) • Commenters, Multiple (0073-5) (0240-4) • de Armas, Maria Cristina (0077-4) • Dwyer, Karen (0674-2) • Goldman, Emanuel (0153-2) • Griffith, Ed and Harriet (0366-4) • Haselhurst, Richard (0639-3) • Hurley, Paula (0362-2) • Kassel, Kerul (0676-6) • Koenigsberg, Linda (0721-26-1) • Lange, Alexandra (0088-7) • Maher, William (0619-2-26) (0619-2-32) (0619-2-33) (0619-4-12) (0619-4-13) (0619-4-14) • Mueller, Heinz J. (0617-1-35) (0617-1-36) • Philips, Sally B. (0337-3) • Poolos, Hazel (0726-1) • Roff, Rhonda (0721-11-6) • Royce, M. (0353-4)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Schwartz, Matthew (0721-22-12) • Shlackman, Jed (0356-10) • Stoddard, Philip K. (0721-2-12) • Vayu, Satya (0370-9) • White, Barry J. (0721-12-3) • Wilansky, Laura Sue (0078-6) (0721-28-6)
Health-Radiological	• Anonymous, Anonymous (0603-2) (0603-3) (0603-4) (0603-5) (0628-2) (0644-3) • Bethune, David (0615-1-8) (0615-1-9) (0615-1-11) (0615-2-22) • Draper, Lonnie M. (0511-3) • DuPriest, William Robert (0093-4) • Dwyer, John P. (0264-4) • Galles, Camilla (0624-2) (0624-3) • Garcia, Alda S. (0524-1) • Maher, William (0619-1-3) (0619-2-27) (0619-2-30) (0619-2-36) (0619-4-15) (0619-4-19) (0619-4-20) (0619-7-12) (0619-7-13) (0619-7-14) (0619-7-15) (0619-7-16) • Schlackman, Mara (0721-32-3) • Wilansky, Laura Sue (0078-9) (0721-28-9) • Wilson, J. D. Bruce (0065-1)
Historic and Cultural Resources	• Maher, William (0619-1-10) (0619-2-10) (0619-2-13) (0619-3-14) (0619-3-15) (0619-3-16) • Mueller, Bradley M. (0727-1) (0727-2) (0727-3) (0727-4) (0727-5) • Mueller, Heinz J. (0617-3-4) (0617-3-5) • Parsons, Timothy A. (0139-1) (0139-2) (0139-3)
Hydrology-Groundwater	• Almirola, Alejandro (0721-31-3) • Austin, Stan (0622-1-2) (0623-2) (0623-6) (0623-8) • Barczak, Sara (0112-7) • Batista, Carlos (0685-14) • Berendsohn, Catherine (0723-11-2) • Bethune, David (0615-1-5) (0615-3-1) (0615-3-4) • Bloom, Justin (0253-3) • Breslin, Tom (0721-17-2) • Campbell, Cara (0253-3) • Causey, Charlie (0253-3) • Cavros, George (0253-3) • Chenoweth, Mike (0253-3) • Cleland, Noel (0288-8) • Cobb, Tanya (0413-5) • Commenters, Multiple (0102-6) (0103-6) (0240-12) • Daly, Meg (0253-3) • Daniels, Bonnie (0341-3) • de Armas, Maria Cristina (0077-1) • Dorn, Kathryn (0693-3) • Eastman, John (0721-24-3) • England, Margaret (0253-3) • Fay, Virginia M. (0724-6) (0724-7) • Finver, Jody (0008-8) • Fischer, Antoinette (0365-2) (0365-4)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Fulks, Anna Louise (0250-8) • Fuller, Manley (0253-3) • Gomez, Christian (0269-1) • Gross, Cheryl A. (0463-1) • Haber, Matthew S. (0611-4) (0611-5) (0611-7) (0611-8) (0611-9) (0611-10) • Hefty, Lee N. (0110-1-8) (0110-1-9) (0110-1-10) (0110-1-12) • Henry, Jim (0723-12-9) (0723-12-12) (0723-12-14) • Horiwitz, Laura (0732-1) • Hoyle, Lester and Judy (0440-6) • Jackalone, Frank (0288-8) • Jennings, Cara (0323-1) • Jones, George L. (0253-3) • Kaul, Devika (0722-14-2) • Keaton, Rebecca (0503-1) • Keller, Alan (0253-3) • Kuraza, Devon (0721-15-10) • Lange, Barbara (0591-2) • Lerner, Cindy (0145-2) (0145-3) (0145-5) (0145-8) (0145-10) (0721-3-2) • Lindsey, Jerrie (0245-5) • Livingston, C. J. (0437-2) • Lopez, Jaclyn (0113-1-4) (0113-1-15) (0113-1-17) (0113-2-1) (0113-2-3) (0113-2-4) (0113-2-5) (0113-2-7) (0113-2-10) • Maher, William (0619-2-20) (0619-4-2) (0619-5-8) (0619-7-17) (0619-7-18) (0619-7-19) (0619-7-20) (0619-7-21) (0619-7-22) • Mahoney, Stephen (0288-8) • Malefatto, Alfred (0211-1) • Martin, Drew (0253-3) • Matthews, Debbie (0288-8) • McDuffie, Stephen (0723-8-8) • McLaughlin, Caroline (0113-1-4) (0113-1-15) (0113-1-17) (0113-2-1) (0113-2-3) (0113-2-4) (0113-2-5) (0113-2-7) (0113-2-10) (0253-3) (0721-9-6) (0723-4-6) (0723-4-7) • Meyer-Steele, Shawn (0187-3) • Miami, City (0456-10) (0456-12) (0456-21) • Mueller, Heinz J. (0617-1-7) (0617-1-15) (0617-1-17) (0617-1-22) (0617-1-25) (0617-1-26) (0617-2-1) • Palmer, Majorie (0360-3) • Reynolds, Laura (0113-1-4) (0113-1-15) (0113-1-17) (0113-2-1) (0113-2-3) (0113-2-4) (0113-2-5) (0113-2-7) (0113-2-10) (0253-3) • Ritz, David (0208-1) (0208-7) • Roff, Rhonda (0288-8) • Schwartz, Matthew (0113-1-4) (0113-1-15) (0113-1-17) (0113-2-1) (0113-2-3) (0113-2-4) (0113-2-5) (0113-2-7) (0113-2-10) (0721-22-8) (0721-22-14) (0723-9-16) (0723-9-18) • Scott, John (0288-8) • Silverstein, Rachel (0113-1-4) (0113-1-15) (0113-1-17) (0113-2-1) (0113-2-3) (0113-2-4) (0113-2-5) (0113-2-7) (0113-2-10) (0253-3) (0722-7-5) • Stoddard, Philip K. (0106-4) (0721-2-2) (0721-2-3) (0721-2-4) • Streit, Didi (0074-2)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Teas, James (0612-1) (0612-2) (0612-3) (0612-4) (0612-5) (0612-6) • Teas, Jim (0288-8) (0723-5-6) • Tweeton, Tanya (0340-1) • Ullman, Jonathan (0288-8) • Van Leer, Sam (0252-5) • Vayu, Satya (0370-11) • White, Barry J. (0721-12-6) • White, Paton (0253-3) • Wilansky, Laura Sue (0078-9) (0721-28-7) • Williams, Elinor (0253-3) • Yeager, Jerry (0228-6)
Hydrology-Surface Water	• Albers, Harold (0688-1) • Almer, Anessa (0712-3) • Anonymous, Anonymous (0327-1) (0551-1) • Anonymous, Judi (0537-3) • Austin, Stan (0622-1-3) (0622-1-4) (0622-1-5) (0622-1-10) (0622-1-14) (0622-1-28) (0622-1-29) (0622-2-14) (0623-3) (0623-4) (0623-5) (0623-7) • Barczak, Sara (0112-2) (0112-5) (0112-6) • Beattie, Jane (0417-2) • Beckman, Yvonne and Douglas (0060-3) (0060-4) • Berndgen, Michelle (0361-2) • Bethune, David (0615-2-27) (0615-3-2) (0615-3-3) (0615-3-5) (0615-3-6) • Bloom, Justin (0253-4) • Boyce, Sheila (0091-2) • Bremen, Gary (0181-1) • Brexel, Sr., Charles (0592-8) • Brstow, Mary (0497-1) • Buechler, Jerry (0718-1) (0718-5) • Cafarelli, Cenie (0298-1) • Campbell, Cara (0253-4) • Carpenter, Rory (0694-3) • Casey, Sr., Robert J. (0368-1) • Cathey, Turner (0079-1) • Causey, Charlie (0253-4) • Cava, Daniella Levine (0172-2) (0172-3) (0172-4) (0172-5) • Cavros, George (0253-4) • Chenoweth, Mike (0253-4) • Chiszar, Benjamin J. (0677-3) • Cleland, Noel (0288-3) (0288-4) (0288-5) (0288-9) (0288-12) (0288-14) • Cobb, Tanya (0413-4) • Coffey, Rotraud (0516-1) • Commenters, Multiple (0073-1) (0102-2) (0102-5) (0103-2) (0103-5) (0103-7) (0104-4) (0240-3) (0240-6) (0379-6) • Compel, Jr., Joseph (0283-4) • Cook, Cherie (0163-2) • Cornely, Tina (0633-2) • Corral, Oscar (0133-2) • Crystal, Chris (0334-3) (0334-4) • Cunningham, Sue (0114-2) (0114-4)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Cusidor, Teresa (0127-2) (0127-4) • Daly, Meg (0253-4) • Darden, Colgate (0571-2) • Davidson, Penny (0493-1) • Demello, Christine (0180-1) • Dietrich, Chris OMeara (0295-3) • Dorn, Kathryn (0693-1) • Drevicky, John (0691-1) • Dudley, Dwight (0254-3) (0254-4) • Duquette, Bill (0722-13-7) • Dwyer, John P. (0264-3) (0673-4) (0673-8) • Dwyer, Karen (0674-4) • Eckert, Brenda (0400-1) • Enfield, David (0236-1) • England, Margaret (0253-4) • Ericson, Del (0320-1) • Fairchild, David (0094-1) (0094-3) (0094-5) • Field, Fran (0258-2) (0258-4) • Finver, Jody (0008-14) (0008-15) • Fischer, Antoinette (0365-3) (0365-5) (0365-6) (0365-7) • Foster, Beverly (0401-1) • Fuentes, Mariana (0574-2) • Fulks, Anna Louise (0250-6) • Fuller, Manley (0253-4) • Goldman, Emanuel (0153-1) • Gonzalez, Javier (0722-8-1) (0722-8-2) (0722-8-3) • Grant, Randy (0146-4) • Gregory, Gregory B. (0728-1) • Griffith, Ed and Harriet (0366-9) • Gross, Cheryl A. (0463-3) • Guy, Sharon (0654-3) • H., Pat (0550-1) (0550-4) • Haber, Matthew S. (0611-1) (0611-2) (0611-3) (0611-6) (0611-11) (0611-12) (0611-13) (0611-18) (0611-19) • Haber, Rochelle (0244-2) • Hanna, Jane (0588-6) • Hefty, Lee N. (0110-1-7) • Hoyle, Lester and Judy (0440-3) (0440-4) • Hudak, Jill (0722-19-1) • Jackalone, Frank (0288-3) (0288-4) (0288-5) (0288-9) (0288-12) (0288-14) • Jacobs, Lee (0677-3) • Johnson, Diane (0590-2) • Jones, Gary (0443-1) • Jones, George L. (0253-4) • Jones, Joan and Robert (0147-2) • Kasenow, Lisa (0054-1) (0200-1) • Kassel, Kerul (0676-5) (0676-8) • Kaul, Devika (0722-14-3) • Keating, Tim (0545-2) (0545-3)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Keller, Alan (0253-4) • Kipnis, Dan (0702-1) (0703-1) (0722-2-1) (0722-2-2) (0722-2-3) (0725-1) • Klopfer, Carol (0677-3) • Kowalski, Kathleen S. (0049-2) • Lange, Alexandra (0088-4) • Larsen, Paul (0005-1) • Lawrence, Diane (0086-2) • Lebatard, David (0192-4) • Lee, Nancy (0373-3) (0373-4) (0373-8) (0373-11) (0373-12) • Lenz, Andrew (0470-1) • Lerner, Cindy (0145-4) (0145-7) (0145-9) (0145-11) (0145-12) (0254-3) (0254-4) (0721-3-1) (0721-3-3) • Levy, Morgan I. (0136-1) (0136-2) • Liesche, Ken (0488-1) • Lindsey, Jerrie (0245-2) • Lopez, Jaclyn (0113-1-5) (0113-1-7) (0113-1-8) (0113-1-11) (0113-2-6) (0113-2-11) (0113-2-12) (0113-2-18) • Lopez, Josie (0284-2) • Maher, William (0619-1-8) (0619-1-15) (0619-2-9) (0619-2-12) (0619-2-14) (0619-2-19) (0619-5-17) • Mahoney, Robert S. (0364-2) • Mahoney, Stephen (0288-3) (0288-4) (0288-5) (0288-9) (0288-12) (0288-14) • Malefatto, Alfred (0211-2) • Martin, Drew (0253-4) (0641-2) (0641-3) (0641-4) (0641-12) (0721-13-2) (0721-13-6) (0721-13-8) • Martinez, Orlando A. (0570-3) (0570-4) • Matthews, Debbie (0288-3) (0288-4) (0288-5) (0288-9) (0288-12) (0288-14) • Mayotte, Monica (0194-1) • Mazzarella, Rebecca (0495-4) • Mazzuca, Rich (0584-1) • McLaughlin, Caroline (0113-1-5) (0113-1-7) (0113-1-8) (0113-1-11) (0113-2-6) (0113-2-11) (0113-2-12) (0113-2-18) (0253-4) (0721-9-5) • Mendez, Victoria (0721-5-4) (0721-5-8) • Merleaux, Derek (0342-1) • Meyer, Paul (0122-2) • Meyer-Steele, Shawn (0187-4) • Miami, City (0456-6) (0456-8) (0456-11) (0456-13) (0456-14) (0456-15) (0456-16) (0456-17) (0456-20) (0456-27) (0456-28) • Monfort, Brooke (0476-1) • Montalvo, Stephanie (0630-2) • Morrisse, Christine (0483-1) • Morton, Sean (0618-1) • Mueller, Heinz J. (0617-1-2) (0617-1-3) (0617-1-4) (0617-1-8) (0617-1-14) (0617-1-16) (0617-1-18) (0617-1-19) (0617-1-20) (0617-1-21) (0617-4-1) (0617-4-2) (0617-4-3) (0617-4-4) (0617-4-5) (0617-4-6) (0617-4-10) (0617-4-13) • Murphy, Mike (0723-6-3) • Nappe, Judith (0695-2)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Otto, Peter (0509-2) • Pareto, Rolando and Marlene (0040-4) • Peters, Emily (0363-3) • Philips, Sally B. (0337-4) • Platt, George Seth (0710-2) • Pontier, Christine Hughes (0126-3) • Rapuano, Shannon (0594-2) • Rawlins, Steve (0642-2) (0642-5) • Read, Alice Gray (0022-4) • Regalado, Tomas (0254-3) (0254-4) (0515-2) (0515-5) (0721-4-2) (0721-4-3) • Reynolds, Laura (0113-1-5) (0113-1-7) (0113-1-8) (0113-1-11) (0113-2-6) (0113-2-11) (0113-2-12) (0113-2-18) (0253-4) (0721-10-2) (0721-10-4) • Rhodes, Karen (0140-3) • Riccio, Jim (0716-7) • Riley, Bill (0722-9-9) • Ritz, David (0208-6) (0208-8) (0208-9) • Robinson, Angel (0474-1) • Rock, Andrew (0599-2) • Rodriguez, Jose Javier (0675-2) (0675-6) (0721-1-5) (0721-1-6) • Roedel, Kitty (0055-3) • Roff, Rhonda (0288-3) (0288-4) (0288-5) (0288-9) (0288-12) (0288-14) (0721-11-5) • Rose, Simon (0009-3) • Ross, Robert and Teresa (0212-2) • Royce, M. (0353-3) • Salatino, Freda (0299-1) (0299-3) (0299-4) • Sasiadek, Alfred (0053-2) (0053-4) • Schlackman, Mara (0721-32-4) (0721-32-6) • Schwartz, Matthew (0113-1-5) (0113-1-7) (0113-1-8) (0113-1-11) (0113-2-6) (0113-2-11) (0113-2-12) (0113-2-18) (0723-9-14) (0723-9-15) • Scott, John (0288-3) (0288-4) (0288-5) (0288-9) (0288-12) (0288-14) • Segal-Wright, Nicholas (0661-3) • Segor, Joseph C. (0722-16-1) • Seiman, Rhonda (0635-3) • Sharp, Andrea Heuson (0210-3) (0210-5) • Shipe, Kathleen (0193-1) • Shlackman, Jed (0356-1) (0356-9) (0356-12) • Shlackman, Mara (0246-3) • Silverstein, Rachel (0113-1-5) (0113-1-7) (0113-1-8) (0113-1-11) (0113-2-6) (0113-2-11) (0113-2-12) (0113-2-18) (0253-4) (0722-7-3) (0722-7-4) (0722-7-6) (0722-7-8) • Smyke, Pete (0459-1) • Standley, Ron (0414-1) • Stanley, Joyce (0227-9) • Stoddard, Philip K. (0106-2) (0106-6) (0106-7) (0106-8) (0106-9) (0106-10) (0106-11) (0254-3) (0254-4) (0721-2-5) (0721-2-6) (0721-2-7) (0721-2-8) (0721-2-9) (0721-2-10) • Strouble, Jackie (0297-2) • Swenson, Cyndee (0722-17-3)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Teas, James (0612-7) • Teas, Jim (0288-3) (0288-4) (0288-5) (0288-9) (0288-12) (0288-14) (0723-5-5) • Teasley, Regi (0318-1) • Thiel, Markus (0135-1) • Thomas, Bill (0355-1) • Tingle, Peggy (0352-2) • Trauner, Keith (0573-3) • Trencher, Ruth (0115-6) • Trowbridge, Mark (0723-2-6) • Ullman, John (0721-30-3) (0721-30-6) (0721-30-8) (0721-30-9) • Ullman, Jonathan (0288-3) (0288-4) (0288-5) (0288-9) (0288-12) (0288-14) • Van Leer, Sam (0252-3) (0252-6) (0252-9) • Vayu, Satya (0370-2) (0370-8) • Wallace, Otis (0723-1-6) • West, Eric (0435-1) • White, Barry J. (0598-3) (0721-12-2) (0721-12-9) • White, Paton (0253-4) • Wicht, Dan (0197-1) • Wilansky, Laura Sue (0078-5) • Williams, Elinor (0253-4) • Yeager, Jerry (0228-2) (0228-5) (0228-7) • Yovel, Ephrat (0721-29-2)
Land Use-Site and Vicinity	• Austin, Stan (0622-2-8) • Gross, Cheryl A. (0463-5) • Hefty, Lee N. (0110-1-4) (0110-1-11) • Lindsey, Jerrie (0245-6) • Maher, William (0619-1-17) (0619-2-3) (0619-2-4) (0619-2-8) (0619-2-11) (0619-2-18) (0619-3-3) (0619-3-4) (0619-3-5) (0619-3-6) • Tweeton, Tanya (0340-4)
Land Use-Transmission Lines	• Almirola, Alejandro (0721-31-6) (0721-31-7) • Austin, Stan (0622-1-12) (0622-1-15) (0622-1-16) (0622-1-27) (0622-2-9) (0623-12) • Batista, Carlos (0685-3) • Berendsohn, Catherine (0723-11-6) • Berndgen, Michelle (0361-3) • Brown, Judith O. (0131-1) • Commenters, Multiple (0044-7) (0073-3) (0073-4) (0073-6) (0240-10) (0240-11) • Corral, Oscar (0133-3) • Crystal, Chris (0334-2) • Daly, Meg (0076-1) (0076-3) • de Armas, Maria Cristina (0077-3) • Fairchild, David (0094-4) • Finver, Jody (0008-2) • Fulks, Anna Louise (0250-3) • Griffith, Ed and Harriet (0366-3) (0366-8) • H., Pat (0550-2)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Haber, Matthew S. (0611-17) • Hamilton, McHenry (0205-1) • Hefty, Lee N. (0110-1-1) (0110-1-2) (0110-1-3) (0110-1-5) • Hughes, David (0377-1) (0377-2) • Hyden, Brent A. (0670-1) (0670-2) • Johnson, Nadine (0007-2) • Kassel, Kerul (0676-3) • Koenigsberg, Linda (0721-26-3) • Lange, Alexandra (0088-2) • Langlieb Greer, Evelyn (0510-1) • Maher, William (0619-2-1) (0619-2-34) (0619-4-1) • Martin, Drew (0641-10) • Martinez, Orlando A. (0570-2) • McCall, Eric (0056-2) • McLaughlin, Caroline (0721-9-4) (0723-4-5) • Merino, Miriam (0092-2) • Meyer-Steele, Shawn (0187-5) • Miami, City (0456-24) • Mueller, Heinz J. (0617-4-11) • Nelson, Joyce E. (0149-2) (0149-4) (0149-11) • Ortiz, Natalia (0372-1) • Palmer, Majorie (0360-2) • Perez, Danica (0184-1) • Provost, Allan (0339-2) • Puchades, Mary (0616-1) • Rawlins, Steve (0642-4) • Regalado, Tomas (0515-7) (0721-4-4) • Reiter, Ben (0080-2) • Robertson, Alyce (0117-2) • Rodriguez, Barbara (0034-3) • Rodriguez, Jose Javier (0675-5) (0721-1-7) • Roedel, Kitty (0055-6) • Roque, Julio (0024-2) (0328-1) • Schwab, Roy (0579-4) • Schwartz, Matthew (0721-22-3) (0721-22-5) (0723-9-9) (0723-9-11) • Shlackman, Jed (0356-3) • Sifko, Basilio (0408-1) (0408-2) (0408-3) (0408-4) (0408-6) (0408-8) • Stoddard, Philip K. (0721-2-14) • Trencher, Ruth (0115-8) • Trowbridge, Mark (0723-2-8) • Vayu, Satya (0370-4) • Wegner, Geri (0048-2) • Whitlock, Catherine (0701-2)
Meteorology and Air Quality	• Frederickson, Kelly (0188-1) • Harris, Walter (0721-6-2) • Maher, William (0619-2-22) • Mueller, Heinz J. (0617-2-3) (0617-4-9) • Platt, George Seth (0710-3) • Riley, Bill (0722-9-8) (0722-9-10)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Roff, Rhonda (0721-11-1) (0721-11-7) • Schwartz, Matthew (0721-22-9) (0723-9-17) • Stoddard, Philip K. (0721-2-11) • Trowbridge, Mark (0723-2-5) • Tweeton, Tanya (0340-3)
Need for Power	• Almirola, Alejandro (0721-31-4) • Barczak, Sara (0112-1) (0112-4) • Bethune, David (0615-1-4) (0615-1-13) • Breslin, Tom (0721-17-1) • Cavros, George (0721-8-1) (0721-8-4) (0721-8-8) (0721-8-10) • Commenters, Multiple (0379-4) • de Azevedo, Ricardo (0119-3) • England, Peter (0722-10-2) • Finver, Jody (0008-3) • Goldmeier, Barry (0015-1) (0015-8) (0015-12) • Henry, Jim (0723-12-1) (0723-12-4) • Hickey, Alan (0653-3) • Hubbard, Stanley S. (0680-4) • Keating, Tim (0545-6) • Larrabee, Laura (0035-3) • Maher, William (0619-5-12) (0619-5-13) • Martin, Drew (0641-8) (0721-13-5) • McDuffie, Stephen (0723-8-3) • Mendez, Victoria (0721-5-2) • Miami, City (0456-22) • Nelson, Joyce E. (0149-7) • Philips, Sally B. (0337-2) • Platt, George Seth (0710-6) (0710-7) • Porter, Jeff (0722-1-1) • Rapuano, Shannon (0594-4) • Read, Alice Gray (0022-5) • Riccio, Jim (0716-6) • Rodriguez, Jose Javier (0721-1-9) • Rodriguez, Manuel J. (0721-27-1) • Saporito, Thomas (0010-4) (0010-10) • Sifko, Basilio (0408-5) • Silva, Nicolas (0722-5-2) • Trencher, Ruth (0115-4) • Trowbridge, Mark (0723-2-2) • Wallace, Otis (0723-1-1) • Williams, Paul (0041-1)
Opposition-Licensing Action	• Ackerman, Frank (0565-1) • Allen, Maureen (0154-1) • Almirola, Alejandro (0178-1) (0178-4) (0721-31-1) (0721-31-11) (0721-31-13) • Alvarez, Chad (0664-1) • Anderson, Glen (0321-1) • Anderson, Vaughn (0380-1) • Anonymous, Anonymous (0239-1) (0331-1) (0351-1) (0354-1) (0628-3)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	(0644-1) (0644-5) • Anonymous, Charity (0638-4) • Anonymous, Elena (0662-1) • Anonymous, Judi (0537-1) (0537-4) • Anonymous, Lynn (0161-1) • Aronson, Murray (0391-1) • Avers, Pamela Dee (0090-1) • Bach, Lili (0128-1) • Bagwell, Wilson Knox (0306-1) • Ball, Cheri (0472-1) (0472-3) • Barczak, Sara (0112-10) • Barlow, Jeffrey (0218-2) • Barnidge, Virginia (0672-1) • Bastidas, Mauricio (0720-3) • Baumwall, Douglas (0329-1) • Bazzi, Noell (0047-1) • Bazzone, Barbara (0159-1) (0159-7) • Beattie, Jane (0417-1) • Beckman, Yvonne and Douglas (0060-1) (0060-2) • Beiriger, Mary (0287-1) (0287-2) • Bejarano, Antonio (0019-1) • Benson, Mary (0081-1) (0081-6) (0081-7) • Berendsohn, Catherine (0723-11-9) • Bernabei, Catharina (0721-18-5) • Bernatis, Jenn (0520-1) • Berndgen, Michelle (0361-1) (0361-4) • Bethune, David (0615-1-12) (0615-3-11) (0615-3-12) (0721-23-9) • Birsh, Arthur and Joan (0083-1) • Blanck, Heidi (0397-1) • Bloom, Justin (0253-1) (0253-6) • Bodiford, Loretta (0444-1) • Boone, James (0533-2) • Boone, Jim (0436-1) • Boyce, Sheila (0091-1) (0091-4) • Bremen, Gary (0181-3) • Brinn, Ira (0148-1) (0148-3) • Bromage, Joan (0386-1) • Brown, Bradford (0667-1) • Bryan, David (0507-1) • Buechler, Jerry (0718-3) • Bump, Deborah (0535-1) • Bunker, Diane (0426-1) • Burge, Laura (0540-2) (0540-4) • Burns, Terry (0647-3) • Buyea, Thomas (0505-1) (0505-3) • Campbell, Cara (0253-1) (0253-6) • Cardona, Alfredo (0343-1) (0343-2) • Carlson, John (0158-3) • Casey, Sr., Robert J. (0368-3)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Castro, Alyssa Tomasi (0665-1) • Cathey, Turner (0079-2) • Causey, Charlie (0253-1) (0253-6) • Cavros, George (0253-1) (0253-6) • Chenoweth, Mike (0253-1) (0253-6) • Chiszar, Benjamin J. (0677-1) (0677-7) • Clapp, Linda (0028-1) (0028-2) • Cleland, Noel (0207-1) (0207-8) (0288-1) • Cobb, Tanya (0413-1) • Coffey, Rotraud (0516-2) • Cohen, Howard (0567-1) • Colby, Helen (0124-3) (0242-2) (0733-1) • Colls, Ana (0125-1) • Colson, Clay G. (0602-1) • Commenters, Multiple (0044-1) (0044-9) (0067-1) (0067-4) (0073-7) (0102-1) (0102-7) (0102-8) (0103-1) (0103-8) (0104-1) (0104-6) (0240-1) (0379-1) • Compel, Jr., Joseph (0283-1) • Cook, Cherie (0163-1) (0163-3) • Cooper, Fran (0204-1) • Cooper, Joe (0165-1) • Cornely, Tina (0633-1) • Corral, Oscar (0133-1) (0133-5) • Courliss, William (0604-2) • Crystal, Chris (0334-1) • Cullen, Sarah (0597-1) • Cummings, Frank (0709-1) (0709-3) • Cunningham, Sue (0114-1) • Cusidor, Teresa (0127-1) (0127-6) • Daly, Meg (0076-4) (0253-1) (0253-6) • Daniels, Bonnie (0341-1) (0341-4) • Darden, Colgate (0571-1) • Dauerty, Barbara (0614-1) • de Armas, Maria Cristina (0077-5) • de Azevedo, Ricardo (0119-1) (0119-4) • Defoggi, Virginia (0266-1) • Degges, Frank (0447-1) • Demaria, Karen (0262-1) • Dent, William (0319-1) • Deutsch, Steven (0552-1) • Dietrich, Chris OMeara (0295-1) (0295-5) • Dimondstein, Carla (0564-1) • Dorn, Kathryn (0693-2) (0693-5) • Dougherty, Kate (0394-1) • Douglas, Carolyn (0486-2) • Draper, Lonnie M. (0511-1) • Drew, Virginia (0399-1) • Dronsky, Rick (0142-1) • Dudley, Dwight (0254-1) (0254-7)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Dunn, Elmo (0402-1) • DuPriest, William Robert (0093-1) • Duran-Pinzon, Jaime (0243-1) (0243-4) • Durieux, P. (0451-1) • Dutton, Julene (0640-1) • Dwyer, John P. (0264-8) (0673-9) • Dwyer, Karen (0674-1) (0674-8) (0674-9) • Earnshaw, Shinann (0326-2) • Edmond, Gabriel (0721-7-8) • Edwards, Suzi (0600-1) • Egan, June (0690-1) • Ehrenfried, Jennifer (0544-1) • Elton, Wallace (0229-1) (0229-2) • Engelberg, Jodi (0004-1) • England, Margaret (0253-1) (0253-6) • Erven, Marlene (0314-1) • F****SH, Peter (0547-1) • Faber, Davenie (0006-1) • Felinski, Julee (0625-1) (0625-5) • Fernandez, Maria Cristina (0064-1) • Field, Fran (0258-1) • Fielding, Ed (0232-1) • Finver, Jody (0008-1) (0008-12) • Fischer, Antoinette (0365-1) • Fishman, Zelma (0395-1) • Fitzpatrick, Deirdre (0217-1) • Fox, Kristi (0506-1) • Franzmann, Paul (0384-1) (0384-3) • Frederickson, Kelly (0188-2) • Freel, Susan (0166-1) • Fuentes, Mariana (0574-1) • Fuller, Manley (0253-1) (0253-6) • Galbreath, Jerry (0489-1) • Galles, Camilla (0624-1) • Garcia, Ruslan (0116-1) • Gavel, Deborah (0098-1) (0098-3) • Geary, Craig W. (0097-1) • Ghosh, Susan (0595-1) • Glass, Rachel (0222-2) • Goldberg, Laura (0568-2) • Goldman, Emanuel (0153-3) (0153-5) • Gomez, Albert (0721-34-3) • Gomez, Gustavo (0101-1) • Gomez, Lissett (0030-1) • Gomez, Toni Thoman (0504-1) • Gonzalez, Carlos (0714-1) • Graffagnino, Mary Ann and Frank (0403-1) • Grant, Randy (0146-1) • Greenwald, Ken (0385-1)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Greer, Tom (0392-1) (0392-3) • Griffith, Ed and Harriet (0366-1) (0366-12) • Grill, Helen (0043-1) • Griswold, Dave (0631-1) • Gross, Cheryl A. (0463-6) (0463-7) • Guy, Sharon (0654-1) • H., Pat (0550-5) • Haber, Rochelle (0244-1) (0244-3) • Haffmans, Edmund (0371-1) (0371-6) • Halligan, Melody (0491-1) • Hanna, Jane (0588-1) • Hansen, Yvonne (0439-1) • Harden, Ronald (0195-1) • Hardie, Daniel (0562-1) • Harris, Walter (0721-6-5) • Harrison, J. M. M. (0508-1) • Hart, Barbara (0196-1) • Haselhurst, Richard (0639-1) • Hawkes, Holly Forrester (0031-1) (0031-2) • Hayes, Linda (0275-1) • Heiney, Jamie (0713-1) (0713-4) • Herrera, Luis (0721-33-1) (0721-33-3) • Hickey, Alan (0653-1) • Hilderbrandt, Todd (0585-1) • Hoegler, Jean (0438-1) • Hoffmeyer, Lisa (0546-1) • Holland, Karen (0059-1) • Houghton, Francis (0735-1) • Hoyle, Lester and Judy (0440-1) (0440-5) • Hubler, Gina Marie (0089-1) (0089-3) (0095-1) • Hudson, Harold J. (0099-1) • Hurley, Paula (0362-1) (0362-6) • Hyams, Charles (0213-1) • Imbesi, Nan (0058-1) • Jackalone, Frank (0288-1) • Jacobs, Lee (0677-1) (0677-7) (0679-1) • Jacobs, Leslye (0634-1) • Jennings, Cara (0323-2) • Jens-Rochow, Steve (0666-1) • Jimenz, Lawrence (0301-1) • Joannou, Jr., Benjamin (0643-3) (0643-4) (0643-6) • Johannsen, Christian (0045-1) (0045-3) • Johnson, Nadine (0007-1) (0007-3) • Johnson, Rheta (0696-1) • Johnston, Judy (0734-1) • Jones, Diane (0130-1) • Jones, George L. (0253-1) (0253-6) • Jones, Joan and Robert (0147-1) (0147-3) • Jones, Michael E. (0082-1)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Jurczewski, Carol (0490-1) • K., Jeff (0335-1) • Kadis, Patricia (0248-2) • Karlow, Edwin (0226-1) • Kassel, Kerul (0676-1) • Kaul, Devika (0722-14-1) (0722-14-6) • Kavanaugh, Daniel (0338-2) • Kaye, Jackie (0407-1) • Keating, Tim (0545-1) • Keller, Alan (0253-1) (0253-6) • Kern, Madeleine Fisher (0411-1) • Kirschbaum, Saran (0466-1) • Klopfer, Carol (0677-1) (0677-7) (0678-1) • Koenigsberg, Linda (0721-26-4) (0721-26-7) • Kowalski, Kathleen S. (0049-3) • Lague, Victoria (0061-1) (0061-4) • Lane, N. Jo (0569-2) • Lange, Alexandra (0087-1) (0087-2) (0087-4) (0088-8) • Langlieb Greer, Evelyn (0510-2) • Larsen, Shannon (0160-1) • Lawrence, Diane (0086-1) (0086-4) • Lawrence, Theresa (0580-1) (0580-3) • Lawson, Ken (0225-1) • Le Cronier, Micki (0652-1) • Lebatard, David (0192-1) (0192-7) • Lee, Nancy (0373-1) (0373-15) • Lenz, Andrew (0470-3) • Leo, Carlos (0428-1) • Lerner, Cindy (0254-1) (0254-7) • Lettieri, Tammy (0259-3) (0259-4) (0559-1) • Levy, Morgan I. (0136-5) • Lindsey, Jerrie (0245-1) (0245-7) • Lish, Christopher (0555-3) • Livingston, Catherine (0374-1) • LoBiondo, Roana and Michael (0359-3) • Lopez, Jaclyn (0113-1-14) (0113-2-15) • Lopez, Josie (0284-1) (0284-6) (0284-7) • Lucas, Carmen (0141-1) (0141-3) (0141-5) • Macraith, Bonnie (0186-1) • Mahoney, Robert S. (0364-1) • Mahoney, Stephen (0288-1) • Malone, Peggy (0539-1) (0539-2) • Malyon, Hilary (0669-1) • Manter, Larry (0471-2) • Manuel, Becky Randel (0137-1) • Martin, Drew (0253-1) (0253-6) (0641-1) • Martinez, Orlando A. (0570-1) (0570-5) • Matheny, Kent (0453-1) • Matthews, Debbie (0288-1)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Mauri, Tom (0132-3) • Mayer, Karen (0475-1) • Mazzarella, Rebecca (0495-1) • McCall, Eric (0056-1) (0056-4) (0056-5) • McCarthy, Dawn (0330-1) (0330-2) • Mcintyre, Frances (0572-1) • Mckee, Sarah (0492-1) (0492-4) • McLaughlin, Caroline (0113-1-14) (0113-2-15) (0253-1) (0253-6) (0721-9-1) (0721-9-8) (0723-4-1) (0723-4-10) • McVicker, Micah (0177-1) • Merino, Miriam (0092-1) • Metje, Melodie (0606-1) • Meyer, Paul (0122-1) • Meyer-Steele, Shawn (0187-1) (0187-6) • Miami, City (0456-1) (0456-25) • Mikan, Edward (0536-1) • Miller, Howard R. (0138-1) • Miller, Melissa (0285-1) (0285-3) • Miller, Nyana (0626-1) (0626-4) • Mitzkewich, Yuri (0523-1) • Morgan, Karen (0155-1) • Mosher, Paul (0249-1) • Nagel, Karen (0527-1) • Nappe, Judith (0695-1) • Nelson, Joyce E. (0149-1) (0149-3) (0149-14) • Neway, Roberta (0057-1) (0057-5) • Newman, Donna (0156-1) • Nickerson, Nancy (0692-2) • Nieto, Victor (0717-1) • Norman, Ronald (0358-1) (0358-4) (0358-5) • Nye, Janet (0281-1) • O'Donahoo, Gayle (0698-1) • O'Donahoo, Roger (0698-1) • Odierna, Cynthia (0542-1) • Oliva, Vivian (0349-1) (0349-4) • Oria, Jordan (0171-2) • Ortiz, Natalia (0003-1) (0003-3) (0372-2) (0372-5) • Orzechowicz, Holly (0263-2) (0263-6) (0263-7) • Osborne, Martin (0216-1) • Otis, Martha (0150-1) (0150-4) • Otto, Peter (0509-3) • Padilla, Dora (0238-1) (0238-3) • Padron-Delgado, Blanca (0257-1) (0257-3) • Pareto, Rolando and Marlene (0040-1) (0040-5) • Parker, Richard (0316-1) • Pattison, Janet (0646-1) • Pearce, J. B. (0479-1) • Perez, Danica (0184-2) (0184-3) • Peterman, Andy (0274-1) (0274-2)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Peters, Emily (0363-1) • Petersen, John (0347-2) • Peterson, Ted (0423-1) • Phillips, Monica D. (0084-3) • Pinto, Theresa (0499-1) • Piper, Cynthia (0183-1) • Platt, David (0109-1) (0109-3) • Platt, George Seth (0710-1) • Polifroni, Josephine (0182-1) • Pontier, Christine Hughes (0126-1) • Poole, Diane (0457-1) • Portela, Ana C. (0409-1) • Portuondo, Pilar (0241-1) (0241-3) • Post, Patrick (0671-2-2) • Provost, Allan (0339-5) • Prugue, Jorge and Paloma (0068-1) • Punnett, Daniela (0553-1) (0553-3) • Purcell, Douglas (0427-1) • Purdy, Shyam and Mohini (0233-1) • Quinn, George (0410-1) • Raits, Eric (0062-1) • Ramankutty, Vishnu (0578-1) • Rawlins, Steve (0642-1) (0642-6) • Regalado, Tomas (0254-1) (0254-7) (0515-8) • Reiter, Ben (0080-1) • Rennie, Edwyna (0224-1) • Reyneri, Juan (0121-1) • Reynolds, Laura (0113-1-14) (0113-2-15) (0253-1) (0253-6) (0721-10-5) • Rhodes, Karen (0140-4) • Richards, Margie (0450-2) • Rifkind, David (0721-16-7) • Robbin, Valerie (0223-1) • Roberts, Linda (0096-2) (0096-4) • Robertson, Alyce (0117-1) (0117-4) • Rodriguez, Barbara (0034-1) • Rodriguez, Jose Javier (0675-1) (0721-1-11) • Roedel, Kitty (0055-1) (0055-7) (0055-9) • Roff, Rhonda (0288-1) • Roos, Monica (0052-3) • Roque, Julio (0024-3) • Rose, Simon (0009-1) • Roseberry, Bill (0179-1) • Rosenfeld, Alice (0566-1) • Ross, Robert and Teresa (0212-1) • Rothstein, Debbie (0292-1) • Royce, M. (0353-7) • Ryan, Jim (0543-1) (0543-3) • Salatino, Freda (0299-5) • Sanchez, Sergio and Irma (0660-1)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Sanfilippo, Val (0636-1) • Saporito, Thomas (0010-1) (0010-2) • Sasiadek, Alfred (0053-1) • Scherr, Matthew (0684-1) • Schilling, Judy (0429-1) • Schlackman, Mara (0721-32-10) • Schwab, Roy (0579-1) (0579-6) • Schwartz, Matthew (0113-1-14) (0113-2-15) • Scott, John (0288-1) • Scott, Ruth (0548-1) • Segal-Wright, Nicholas (0661-1) • Seiman, Rhonda (0635-1) (0635-2) (0635-4) • September, P. J. (0267-1) • Shapiro, Eugene (0357-1) • Shark, Jason (0120-1) • Sharp, Andrea Heuson (0210-1) (0210-7) • Shasky, Mike (0350-1) • Shelley, Cynthia (0556-1) • Shepard, J. (0143-1) • Shipe, Kathleen (0193-3) • Shlackman, Jed (0356-15) (0356-17) • Shlackman, Mara (0246-1) (0246-7) • Silverstein, Rachel (0113-1-14) (0113-2-15) (0253-1) (0253-6) (0722-7-1) (0722-7-2) • Simmerman, Scott (0480-1) • Simon, Gary P. (0050-1) (0050-3) • Skove, Ellen H. (0081-1) (0081-6) (0081-7) • Slaton, Marina (0531-1) • Smay, Betty (0063-1) • Smith, David W. (0051-1) (0051-4) • Smith, Pamela (0730-1) • Smythe, Ana (0557-1) • Sockloff, Judith (0175-1) • Sommers, Andrea (0270-1) • Sophia, Tristan (0221-1) • Sorenson, Katy (0596-1) (0596-3) • Southern, Tom (0620-1) • Speno, Charlie (0484-3) • Stanley, Gael (0071-2) • Stevens, Lisa (0310-1) • Stoddard, Philip K. (0254-1) (0254-7) • Streit, Christopher V. (0075-2) • Streit, Didi (0074-1) • Strouble, Jackie (0297-1) (0297-3) • Suda, Maryska (0534-1) • Svensson, Bo (0478-1) • Tambussi-Brechon, Linda (0042-1) • Teas, Jim (0288-1) (0723-5-1) • Thiel, Markus (0135-3)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Thomas, Bill (0355-3) • Thomas, Gina (0271-1) • Timberlake, Ralph (0282-1) • Tingle, Peggy (0352-3) • Tompkins, Constance (0081-1) (0081-6) (0081-7) • Trauner, Keith (0573-1) • Trencher, Ruth (0115-1) (0115-3) • Tucker, Lauren (0105-1) • Turner, William P. (0663-1) • Tweedy, Mary (0581-1) • Tweeton, Tanya (0340-6) • Ullman, John (0721-30-1) (0721-30-5) (0721-30-12) • Ullman, Jonathan (0288-1) • Umpierre, Diana (0209-1) • Underwood, John (0416-1) • Van Leer, Sam (0252-13) (0252-20) • Van Pelt, Jason (0300-4) • Van Thienen, Mateo (0033-1) • Vance, Richard (0289-1) • Vayu, Satya (0370-1) (0370-14) • Vermeulen, Mary (0433-1) • Vinciguerra, Anthony (0032-1) • Violich, Francesca (0039-1) (0039-5) • Wade, Pat (0582-1) • Wade, Thomas M. (0046-1) • Wallington, Victoria (0308-2) • Warzalla, Jim (0144-1) • Watson, Fran (0528-1) • Weber, Gae (0157-1) • Weber, Zorina (0469-2) • Wegner, Geri (0048-4) • Weiss, Arwen (0518-1) • West, Eric (0435-2) • White, Barry J. (0721-12-8) • White, Holly (0206-1) (0206-3) • White, Paton (0253-1) (0253-6) • Whitfield, Isabelle (0251-1) • Wilansky, Laura Sue (0078-4) (0078-14) (0721-28-5) (0721-28-12) • Willett, Bett (0658-1) • Williams, Elinor (0253-1) (0253-6) • Winters, Gracie (0398-1) • Wong, Christina (0066-1) (0066-2) (0066-4) • Wry, Ellen (0290-1) (0290-2) (0290-3) • Yeager, Jerry (0228-1) (0228-8) • Yost, Gaylord (0430-1) • Young, Kim (0651-1) (0651-2) (0651-3) (0651-5) • Yount, Madeline (0422-1) • Yovel, Ephrat (0721-29-1) (0721-29-3) • Zakon, Allan (0118-1)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Zarsky, Terry (0541-1) • Zerulla, Tanja (0214-3) (0214-8) • Zuniga, Family (0272-2)
Opposition-Licensing Process	• Bethune, David (0721-23-2) • Breslin, Tom (0721-17-3) • Edmond, Gabriel (0721-7-3) • Lee, Nancy (0373-14) • Lerner, Cindy (0721-3-5) • Schwartz, Matthew (0721-22-11) • Stoddard, Philip K. (0721-2-1) • White, Barry J. (0721-12-13)
Opposition-Nuclear Power	• Aha, Chas (0708-1) • Almirola, Alejandro (0178-3) • Alvarez, Chad (0664-2) • Alvarez, Susana (0025-1) • Andersen, Paul (0388-1) • Anderson, Vaughn (0380-2) • Anonymous, Anonymous (0327-2) (0336-1) (0336-4) (0346-1) (0603-1) (0628-1) (0645-1) (0705-1) (0715-1) (0719-1) (0719-2) • Bach, Lili (0128-4) • Barnes, Janice (0558-1) • Baumwall, Douglas (0329-2) • Bereczki, Patricia (0393-1) • Bernabei, Catharina (0721-18-1) (0721-18-2) • Bonilla-Jones, Carmen Elisa (0231-1) (0231-3) • Brandariz, Anita (0529-1) (0529-3) • Bratcher, Suzanne (0498-1) • Brexel, Sr., Charles (0592-4) • Bubb, Ken (0462-1) • Campbell, Grant (0482-1) • Chiszar, Benjamin J. (0677-2) (0677-4) (0677-8) (0677-9) • Chrissos, H. L. Chris (0164-2) • Cleland, Noel (0207-2) (0207-4) (0207-5) (0288-15) • Cohen, Howard (0567-2) • Colby, Helen (0124-1) • Compel, Jr., Joseph (0283-7) • Cook, J. (0577-1) • Corey, Sheffield (0424-1) • Cummings, Frank (0709-2) • Cusidor, Teresa (0127-5) • Davis, S. K. (0412-1) • Dolben, Hollis (0627-3) • Draper, Lonnie M. (0511-2) (0511-5) • Dulicai, Linda (0697-1) • DuPriest, William Robert (0093-3) • Duran-Pinzon, Jaime (0243-2) • Earnshaw, Shinann (0326-1) • Engelberg, Jodi (0004-3) • Ercole, Steven (0170-1)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Faber, Davenie (0006-2) • Farnsworth, Stu (0464-1) • Forbes, J. (0189-1) • Fray, Antje (0648-1) • Fulks, Anna Louise (0250-9) • G., Ambriel (0561-1) (0561-4) • Gavel, Deborah (0098-2) • Gibson, David (0324-1) • Glasshof, Wendy (0587-2) • Goldberg, Laura (0568-1) • Gomez, Lissett (0030-2) • Grant, Randy (0146-2) • Griffith, Ed and Harriet (0366-10) • Gross, Gary (0017-1) • Haffmans, Edmund (0371-4) • Hardin, Lillian (0455-2) • Hartmann, Donald (0657-2) • Hicklin, Mary (0431-2) • Hogle, Dick (0293-1) • Jackalone, Frank (0288-15) • Jacobs, Lee (0677-2) (0677-4) (0677-8) (0677-9) • Jacobs, Leslye (0634-2) • Jens-Rochow, Steve (0666-2) • Jezierski, Elisabeth (0302-2) • Joannou, Jr., Benjamin (0023-1) (0643-2) • Juras, Randy (0419-1) • Khajeh-Noori, Jeri (0609-1) • Klopfer, Carol (0677-2) (0677-4) (0677-8) (0677-9) • Koenigsberg, Linda (0721-26-5) • Larsen, Shannon (0255-1) • Lettieri, Tammy (0259-2) • Lundholm, Mark (0309-1) • Mahoney, Stephen (0288-15) • Matthews, Debbie (0288-15) • Mccroskey, Carol (0530-1) • McDaniel, Diana (0203-1) • Miller, Nyana (0626-2) • Moll, Wolfgang (0632-3) • Moore, Linda (0199-1) • Morgan, Carol (0387-1) • Mosca-Clark, Vivianne (0442-1) • Mosher, Paul (0249-4) • Myers, B. J. (0256-1) • Neal, Kevin (0027-2) • Nelson, Wendy (0468-1) • O'Brien, Lance (0029-1) • Oliva, Vivian (0349-5) • Olson, Diane (0432-1) • Padron-Delgado, Blanca (0257-2)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Philips, Sally B. (0337-1) • Pikus, Barbara (0303-1) • Polk, J. D. (0369-1) • Provost, Allan (0339-3) • Punnett, Daniela (0553-2) • Rapuano, Shannon (0594-3) • Reed, Jennifer (0496-1) • Reid, Sarah (0201-2) (0201-4) • Rhodes, Karen (0140-1) • Richardson, Don (0296-1) • Rodriguez, Jose Javier (0721-1-3) • Roehl, Richard Ralph (0513-2) • Roff, Rhonda (0288-15) • Roos, Monica (0052-1) • Rosenberry, Casara (0367-1) • Royce, M. (0353-1) • Schwartz, Matthew (0723-9-6) • Scott, John (0288-15) • Shahsavar, Mehran (0012-1) • Shlackman, Jed (0356-6) • Silver, William (0021-1) • Simmerman, Scott (0480-2) • Smith, Leigh Emerson (0020-1) (0020-3) • Socie, Robert (0521-1) • Stamps, Gail (0586-1) • Star, Priscilla (0723-3-4) (0723-3-6) • Szabo, Liz (0481-1) (0481-2) • Teas, Jim (0288-15) (0723-5-2) (0723-5-3) • Thompson, Muhammad (0683-1) • Ullman, John (0721-30-2) (0721-30-4) • Ullman, Jonathan (0288-15) • Van Leer, Sam (0252-1) (0252-19) • Vayu, Satya (0370-5) • Veit, Eberhard (0607-1) • Vorachek, Mary (0291-1) • Ward, Richard (0348-1) • Westaway, Katharine (0014-1) • White, Barry (0100-1) • White, Barry J. (0598-4) • Whitlock, Catherine (0701-1) • Wilansky, Laura Sue (0078-2) (0721-28-3) • Williams, Penelope (0576-1) • Zerulla, Tanja (0214-1) • Zhivelev, Leon (0656-1) • Zimmermann, John (0304-1) • Zook, Caryl (0589-1) • Zuniga, Family (0272-1)
Opposition-Plant	• Brown, Bradford (0667-2) • Buechler, Jerry (0718-4)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Buyea, Thomas (0505-2) • Cava, Daniella Levine (0172-7) • Daniels, Bonnie (0341-2) • Gomez, Albert (0721-34-1) • Logan, Brian (0072-1) • Lopez, Josie (0284-4) • Nelson, Joyce E. (0149-5) • Neway, Roberta (0057-2) • Reynolds, Laura (0721-10-1) • Roberts, Linda (0096-1) • Roedel, Kitty (0055-2) • Sanchez, Sergio and Irma (0660-3) • Tamargo, Jorge J. (0494-2) • Trencher, Ruth (0115-2) (0115-9) • Van Leer, Sam (0252-17) • White, Barry J. (0721-12-1)
Outside Scope-Emergency Preparedness	• Anonymous, Anonymous (0336-3) • Berendsohn, Catherine (0723-11-8) • Bethune, David (0615-2-14) (0615-3-7) (0615-3-9) • Commenters, Multiple (0044-6) • Dwyer, John P. (0264-1) (0673-1) • Johannsen, Christian (0045-2) • Lee, Nancy (0373-5) (0373-13) • Lettieri, Tammy (0259-6) • Martin, Drew (0641-6) • McColgan, Robert (0722-15-3) (0722-15-4) • Meyer-Steele, Shawn (0187-2) • Mueller, Heinz J. (0617-4-15) • Orzechowicz, Holly (0263-4) • Pareto, Rolando and Marlene (0040-3) • Philips, Sally B. (0337-5) • Robbin, Valerie (0223-2) • Roedel, Kitty (0055-8) • Samole, Sharon (0234-1) • Van Leer, Sam (0252-8)
Outside Scope-Miscellaneous	• Abalos, Jessica (0659-1) • Almer, Anessa (0712-5) • Anderson, Vaughn (0560-1) • Anonymous, Anonymous (0645-3) • Batista, Carlos (0685-12) (0685-13) • Beckman, Yvonne and Douglas (0060-6) • Berendsohn, Catherine (0723-11-10) • Black, Mary Beth (0107-1) • Bofill, Beatriz (0235-1) • Boling, Steve (0723-7-2) • Brown, Robert (0383-1) • Brumleve, Charles (0502-1) • Caswell, Gail (0465-1) • Cusidor, Teresa (0127-7)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Daniels, Bonnie (0341-5) • Dwyer, John P. (0264-5) (0673-5) • Eastman, John (0721-24-5) • Ehrmann, Nancy (0454-1) • Family, Manzi (0593-2) • Finver, Jody (0008-11) • Fitzpatrick, Deirdre (0389-1) • G., Ambriel (0561-3) • Geiger, Marcia (0312-1) • Gomez, Albert (0721-34-4) (0721-34-6) • Harper, Diane (0583-1) • Harris, Walter (0721-6-4) • Harrison, J. M. M. (0508-3) • Henry, Jim (0723-12-10) (0723-12-11) • Jennings, Cara (0323-3) • Larsen, Shannon (0610-1) • Lenz, Andrew (0470-2) • Oria, Jordan (0171-1) • Pew, Don (0500-1) • Quarles, Greyson (0085-1) • Schlackman, Mara (0721-32-2) • Schwartz, Matthew (0723-9-4) • Shark, Jason (0120-2) • Shifflett, Jr., James E. (0687-1) • Timberlake, Ralph (0282-2) • Van Pelt, Jason (0300-2) • Wilansky, Laura Sue (0721-28-1) • Zhivelev, Leon (0656-3)
Outside Scope-NRC Oversight	• Batista, Carlos (0685-8) • Bethune, David (0615-3-10) • Boling, Steve (0723-7-3) • Garmon, Toni (0477-1) • Gomez, Albert (0721-34-7) (0721-34-8) (0721-34-9) • Schwartz, Matthew (0723-9-21) • Smith, David W. (0051-2) • Wallace, Otis (0723-1-4)
Outside Scope-Safety	• Anonymous, Anonymous (0333-1) (0333-2) • Bethune, David (0615-1-1) (0615-1-16) (0615-1-17) (0615-1-18) (0615-2-1) (0615-2-2) (0615-2-3) (0615-2-4) (0615-2-5) (0615-2-6) (0615-2-8) (0615-2-9) (0615-2-10) (0615-2-11) (0615-2-12) (0615-2-13) (0615-2-15) (0615-2-16) (0615-2-18) (0615-2-20) (0615-2-21) (0615-2-23) (0615-2-28) (0721-23-1) (0721-23-3) (0721-23-4) (0721-23-6) (0721-23-10) • Cleland, Noel (0288-6) • Commenters, Multiple (0044-4) (0240-5) • Delateur, Marc (0230-1) • Dwyer, Karen (0674-3) • Finver, Jody (0008-4) • Hyams, Charles (0213-3) • Jackalone, Frank (0288-6)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Keating, Tim (0545-4) • Lamb, Deborah S. (0070-3) • Lee, Nancy (0373-10) • Mahoney, Stephen (0288-6) • Martin, Drew (0641-5) (0721-13-1) • Matthews, Debbie (0288-6) • Mendez, Victoria (0721-5-3) (0721-5-6) • Mueller, Heinz J. (0617-2-2) • Nelson, Joyce E. (0149-12) • Orzechowicz, Holly (0263-8) • Pontier, Christine Hughes (0126-2) • Rhodes, Karen (0140-2) • Roff, Rhonda (0288-6) • Scott, John (0288-6) • Star, Priscilla (0723-3-2) • Swenson, Cyndee (0722-17-2) • Tacher, Ian (0001-1) • Tamburr, C. (0655-1) • Teas, Jim (0288-6) • Ullman, Jonathan (0288-6)
Outside Scope-Security and Terrorism	• Anonymous, Anonymous (0333-3) • Bethune, David (0615-2-7) (0615-2-25) • Keating, Tim (0545-5) • Koenigsberg, Linda (0721-26-6) • Mauri, Tom (0132-2) • Provost, Allan (0339-4) • Riccio, Jim (0716-11) • Shlackman, Jed (0356-5)
Process-ESP-COL	• Barczak, Sara (0112-9) • Bethune, David (0615-1-6) • Boone, James (0533-1) • Daly, Meg (0076-5) • Harris, Walter (0721-6-1) • Herrera, Luis (0721-33-2) • Keating, Tim (0545-8) • Kipnis, Dan (0722-2-4) • Lerner, Cindy (0145-1) • Lopez, Jaclyn (0113-1-1) • Maher, William (0619-1-1) • Malefatto, Alfred (0211-3) • McLaughlin, Caroline (0113-1-1) • Miami, City (0456-26) • Mueller, Heinz J. (0617-1-1) • Reynolds, Laura (0113-1-1) • Riccio, Jim (0716-4) (0716-5) (0716-13) • Ritz, David (0208-4) • Schwartz, Matthew (0113-1-1) (0721-22-2) (0721-22-19) (0723-9-22) • Silverstein, Rachel (0113-1-1) • Star, Priscilla (0723-3-1)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Stoddard, Philip K. (0106-1) (0721-2-16) • White, Barry J. (0598-1)
Process-NEPA	• Austin, Stan (0622-1-1) (0622-2-6) (0622-2-16) (0623-1) (0623-10) (0623-11) (0623-13) • Ball, Cheri (0472-4) • Bethune, David (0615-1-2) (0615-1-7) • Hanna, Jane (0588-5) • Hull, Meagan (0344-3) • Lopez, Jaclyn (0113-1-2) (0113-2-13) • Maher, William (0619-3-1) • McLaughlin, Caroline (0113-1-2) (0113-2-13) • Mueller, Heinz J. (0617-1-5) (0617-1-34) • Regalado, Tomas (0515-1) (0721-4-1) • Reynolds, Laura (0113-1-2) (0113-2-13) • Riccio, Jim (0716-1) (0716-2) (0716-3) (0716-12) • Ritz, David (0208-10) • Saporito, Thomas (0010-3) (0010-7) (0010-8) • Schwartz, Matthew (0113-1-2) (0113-2-13) (0721-22-1) (0723-9-8) • Silverstein, Rachel (0113-1-2) (0113-2-13)
Site Layout and Design	• Kuraza, Devon (0721-15-12) • Maher, William (0619-1-14) (0619-2-23) (0619-3-17) (0619-3-18) (0619-3-19) (0619-3-20) (0619-3-21)
Socioeconomics	• Almirola, Alejandro (0721-31-2) (0721-31-9) • Austin, Stan (0622-1-11) (0622-1-13) (0622-1-30) • Bazzone, Barbara (0159-5) • Beckman, Yvonne and Douglas (0060-5) • Benson, Mary (0081-4) (0081-5) • Boyce, Sheila (0091-3) • Brito, Rosa (0723-10-1) (0723-10-4) • Chiszar, Benjamin J. (0677-6) • Cleland, Noel (0207-6) (0288-11) • Daly, Meg (0076-2) • Dudley, Dwight (0254-6) • Duquette, Bill (0722-13-3) (0722-13-4) • Garcia, Javier (0721-20-2) • Goldmeier, Barry (0015-4) (0015-7) (0015-11) • Henry, Jim (0723-12-2) (0723-12-8) • Hubbard, Stanley S. (0680-3) • Hudak, Jill (0722-19-2) • Infante, Jose Renee (0722-12-1) • Jackalone, Frank (0288-11) • Jacobs, Lee (0677-6) • Kaul, Devika (0722-14-5) • Klopfer, Carol (0677-6) • Knowles, Yvonne (0722-11-1) • Kuraza, Devon (0721-15-9) • Lawrence, Theresa (0580-2) • Lerner, Cindy (0254-6) • Lopez, Jaclyn (0113-1-12)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Macher, Nathan (0378-4) • Maher, William (0619-1-6) (0619-2-21) (0619-2-24) (0619-2-25) (0619-5-19) • Mahoney, Stephen (0288-11) • Martin, Patrick (0721-21-2) • Matthews, Debbie (0288-11) • McCall, Eric (0056-3) • McDuffie, Stephen (0723-8-2) • McLaughlin, Caroline (0113-1-12) • Miami, City (0456-2) • Mueller, Heinz J. (0617-3-1) • Murphy, Mike (0723-6-2) • Nelson, Joyce E. (0149-9) • Norman, Ronald (0358-2) • Regalado, Tomas (0254-6) • Reynolds, Laura (0113-1-12) • Rifkind, David (0721-16-5) • Riley, Bill (0721-19-3) (0722-9-3) (0722-9-4) (0723-14-4) • Robertson, Alyce (0117-3) • Rodriguez, Jose Javier (0675-4) • Rodriguez, Manuel J. (0721-27-2) • Roedel, Kitty (0055-10) • Roff, Rhonda (0288-11) • Schwartz, Matthew (0113-1-12) (0721-22-6) (0723-9-7) (0723-9-19) • Scott, John (0288-11) • Shlackman, Mara (0246-6) • Sifko, Basilio (0408-7) • Silva, Nicolas (0722-5-1) • Silverstein, Rachel (0113-1-12) (0722-7-7) • Simon, Gary P. (0050-2) • Simpson, Chris (0723-13-2) • Skove, Ellen H. (0081-4) (0081-5) • Stanley, Joyce (0227-15) • Stoddard, Philip K. (0106-3) (0106-13) (0254-6) (0721-2-13) • Teas, Jim (0288-11) • Tompkins, Constance (0081-4) (0081-5) • Trowbridge, Mark (0723-2-7) (0723-2-9) • Ullman, John (0721-30-11) • Ullman, Jonathan (0288-11) • Wallace, Otis (0723-1-5) (0723-1-7) • White, Barry J. (0721-12-5) (0721-12-11) • Wilansky, Laura Sue (0078-12) (0721-28-13)
Support-Licensing Action	• Batista, Carlos (0685-4) (0685-7) (0685-9) (0685-10) • Boling, Steve (0723-7-5) • Brito, Rosa (0723-10-3) (0723-10-6) • Carpenter, Rory (0694-1) (0694-2) (0694-4) • Christie, Grazie (0013-2) • Duquette, Bill (0722-13-2) (0722-13-9) • England, Peter (0722-10-4)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Garcia, Javier (0721-20-1) • Goldmeier, Barry (0015-9) (0015-10) (0015-14) (0015-16) (0015-17) • Hamilton, Brent (0002-1) • Hubbard, Stanley S. (0680-1) • Hudak, Jill (0038-1) • Infante, Jose Renee (0722-12-2) • Jackson, Donald L. (0286-1) (0286-3) • Knowles, Yvonne (0722-11-2) • Kuraza, Devon (0721-15-14) • Lamb, Deborah S. (0070-1) • Larrabee, Laura (0035-1) • Macher, Nathan (0378-1) • Martin, Allan (0722-6-1) • Massa, Arturo (0018-1) • McDuffie, Stephen (0723-8-7) • Moo, Patrick (0722-4-1) • Pheil, Edward (0707-1) • Porter, Jeff (0722-1-3) • Riley, Bill (0721-19-1) (0721-19-4) (0722-9-1) (0722-9-5) (0722-9-7) (0722-9-12) (0723-14-1) (0723-14-5) • Roberts, Kenneth (0575-1) • Rodriguez, Manuel J. (0721-27-4) • Rossin, A. David (0345-1) • Rowe, James (0011-1) • Simpson, Chris (0723-13-1) (0723-13-3) • Slonim, Roberta (0016-1) • Tulenko, James (0375-1) (0375-2) • Wallace, Otis (0723-1-8) • Williams, Paul (0041-2) (0069-1)
Support-Licensing Process	• Berendsohn, Catherine (0723-11-1) • Chatterton, Andrew (0722-3-2) • Duquette, Bill (0722-13-1) • England, Peter (0722-10-1) • McDuffie, Stephen (0723-8-5) • Schwartz, Matthew (0723-9-1)
Support-Nuclear Power	• Brito, Rosa (0723-10-5) • Chatterton, Andrew (0722-3-1) • Christie, Grazie (0013-1) • Duquette, Bill (0722-13-6) • Glynn, Simon (0111-1) (0111-2) (0111-3) • Goldmeier, Barry (0015-3) (0015-6) • Jackson, Donald L. (0286-2) • Kuraza, Devon (0721-15-3) (0721-15-5) (0721-15-6) (0721-15-8) (0721-15-11) • Macher, Nathan (0378-3) (0378-5) (0378-6) • Martin, Patrick (0721-21-1) (0721-21-3) • McDuffie, Stephen (0723-8-1) • Moo, Patrick (0722-4-2) (0722-4-3) • Mulet, Tomas (0123-1)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Murphy, Mike (0723-6-1) • Pheil, Edward (0707-3) (0707-5) • Riley, Bill (0723-14-3) • Roberts, Kenneth (0575-2) • Rodriguez, Manuel J. (0721-27-3) • Silva, Nicolas (0722-5-3) • Streit, Christopher V. (0075-1) • Trowbridge, Mark (0723-2-3) • Wallace, Otis (0723-1-2)
Support-Plant	• Batista, Carlos (0685-5) • Bertelson, Bob (0723-15-1) (0723-15-4) • Berzowski, Bill (0722-18-1) • Boling, Steve (0723-7-1) (0723-7-4) • Brito, Rosa (0723-10-2) • Duquette, Bill (0722-13-5) (0722-13-8) • England, Peter (0722-10-3) • Goldmeier, Barry (0015-2) • Hamilton, Brent (0002-2) • Kuraza, Devon (0721-15-1) (0721-15-13) • Larrabee, Laura (0035-2) • McDuffie, Stephen (0723-8-6) • Murphy, Mike (0723-6-4) • Porter, Jeff (0722-1-2) • Riley, Bill (0721-19-2) (0722-9-2) (0722-9-6) (0722-9-11) (0723-14-2) • Trowbridge, Mark (0723-2-1) (0723-2-4) (0723-2-10) • Wallace, Otis (0723-1-3) • Wasilewski, Joe (0721-14-1)
Transportation	• Goldmeier, Barry (0015-5) • Maher, William (0619-1-11) (0619-5-2) (0619-5-3) (0619-5-4) (0619-5-5) (0619-5-6) (0619-5-10)
Uranium Fuel Cycle	• Anonymous, Anonymous (0551-2) (0603-6) (0644-4) (0645-2) • Barczak, Sara (0112-8) • Bethune, David (0615-1-10) • Bloom, Justin (0253-5) • Brandariz, Anita (0529-2) • Brexel, Sr., Charles (0592-10) • Brumleve, Charles (0502-2) • Campbell, Cara (0253-5) • Carlson, John (0158-1) (0158-2) • Causey, Charlie (0253-5) • Cavros, George (0253-5) • Chenoweth, Mike (0253-5) • Chrissos, H. L. Chris (0164-3) • Commenters, Multiple (0104-5) (0240-7) • Dahlgren, Shelley (0434-1) • Daly, Meg (0253-5) • Datz, Amy (0621-1) • Dolben, Hollis (0627-2) • Dudley, Dwight (0254-4)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Dwyer, John P. (0264-2) (0264-7) (0673-2) (0673-7) • Dwyer, Karen (0674-5) • Eastman, John (0721-24-1) • England, Margaret (0253-5) • Felinski, Julee (0625-2) • Fischer, Antoinette (0365-8) • Fuller, Manley (0253-5) • G., Ambriel (0561-2) • Grant, Randy (0146-3) • Griffith, Ed and Harriet (0366-11) • Gross, Cheryl A. (0463-4) • H., Pat (0550-3) • Haffmans, Edmund (0371-3) • Hartmann, Donald (0657-3) • Hicklin, Mary (0431-1) • Hurley, Paula (0362-4) • Joannou, Jr., Benjamin (0643-5) • Jones, George L. (0253-5) • Kassel, Kerul (0676-10) • Keller, Alan (0253-5) • Lebatard, David (0192-6) • Ledbetter, Carolyn (0406-1) • Leibowitz, Arthuir (0404-1) • Lerner, Cindy (0254-4) • Lindsey, Jerrie (0245-4) • Lucas, Carmen (0141-4) • Maher, William (0619-5-1) • Martin, Drew (0253-5) • Mayer, Doug (0129-3) • McColgan, Robert (0722-15-1) • McLaughlin, Caroline (0253-5) • Mikowski, George (0382-1) • Moll, Wolfgang (0632-2) • Otto, Peter (0509-1) • Regalado, Tomas (0254-4) • Reid, Sarah (0201-3) • Reynolds, Laura (0253-5) • Rush, Charlene (0448-1) • Saporito, Thomas (0010-9) • Schlackman, Mara (0721-32-7) (0721-32-8) • Schoene, William (0037-1) • Schwab, Roy (0579-3) • Shark, Jason (0120-3) • Sharp, Andrea Heuson (0210-6) • Shlackman, Jed (0356-14) • Shlackman, Mara (0246-4) • Silverstein, Rachel (0253-5) • Stewart, Berkeley (0273-1) • Stoddard, Philip K. (0254-4)

Table E-2. (contd)

Comment Category	Commenter (Comment ID)
	• Tweeton, Tanya (0340-5) • Vayu, Satya (0370-13) • Veijalainen, Pertti (0467-1) • Weber, Zorina (0469-1) • White, Paton (0253-5) • Williams, Elinor (0253-5)

E.2 Comments and Responses

Table E-3 is a list of the comment categories included in this appendix in the order in which they appear. This section presents the comments and responses organized by topic category. When the comments resulted in a change in the text of the draft EIS, the corresponding response refers the reader to the appropriate section of the EIS where the change was made. Throughout the final EIS, with the exception of this new Appendix E, revisions to the text (other than editoral) from the draft EIS are indicated by vertical lines (change bars) in the margin beside the text. Additionally, for purposes of this review, DEIS and FEIS are abbreviations for draft EIS and final EIS.

Table E-3. Comment Categories in Order of Presentation

E.2.1 Comments Concerning Process - COL E-70
E.2.2 Comments Concerning Process - NEPA E-76
E.2.3 Comments Concerning Site Layout and Design E-85
E.2.4 Comments Concerning Land Use - Site and Vicinity E-87
E.2.5 Comments Concerning Land Use - Transmission Lines E-92
E.2.6 Comments Concerning Geology E-111
E.2.7 Comments Concerning Hydrology - Surface Water E-117
E.2.8 Comments Concerning Hydrology - Groundwater E-182
E.2.9 Comments Concerning Ecology - Terrestrial E-239
E.2.10 Comments Concerning Ecology - Aquatic E-280
E.2.11 Comments Concerning Socioeconomics E-306
E.2.12 Comments Concerning Environmental Justice E-323
E.2.13 Comments Concerning Historic and Cultural Resources E-325
E.2.14 Comments Concerning Meteorology and Air Quality E-331
E.2.15 Comments Concerning Health - Nonradiological E-335
E.2.16 Comments Concerning Health - Radiological E-340
E.2.17 Comments Concerning Accidents - Severe E-351
E.2.18 Comments Concerning the Uranium Fuel Cycle E-370
E.2.19 Comments Concerning Transportation E-379

E.2.20 Comments Concerning Decommissioning E-381
E.2.21 Comments Concerning Cumulative Impacts E-382
E.2.22 Comments Concerning the Need for Power E-383
E.2.23 Comments Concerning Alternatives - No-Action E-392
E.2.24 Comments Concerning Alternatives - Energy E-393
E.2.25 Comments Concerning Alternatives - System Design E-429
E.2.26 Comments Concerning Alternatives - Sites E-429
E.2.27 Comments Concerning Benefit-Cost Balance E-446
E.2.28 Comments Concerning Climate Change E-452
E.2.29 General Comments in Support of the Licensing Action E-454
E.2.30 General Comments in Support of the Licensing Process E-460
E.2.31 General Comments in Support of Nuclear Power E-461
E.2.32 General Comments in Support of the Existing Plant or the Applicant E-465
E.2.33 General Comments in Opposition to the Licensing Action E-468
E.2.34 General Comments in Opposition to the Licensing Process E-515
E.2.35 General Comments in Opposition to Nuclear Power E-516
E.2.36 General Comments in Opposition to the Existing Plant or the Applicant E-530
E.2.37 Comments Concerning Issues Outside Scope - Emergency Preparedness E-532
E.2.38 Comments Concerning Issues Outside Scope - Miscellaneous E-535
E.2.39 Comments Concerning Issues Outside Scope - NRC Oversight E-542
E.2.40 Comments Concerning Issues Outside Scope - Safety E-543
E.2.41 Comments Concerning Issues Outside Scope - Security and Terrorism E-554
E.2.42 General Editorial Comments E-555

E.2.1 Comments Concerning Process - COL

Comment: At the very least the United States Nuclear Regulatory Commission, the agency that will be licensing this project, should complete a supplementary environmental impact statement to more thoroughly review these matters and the portions of the project that are related to the reactor site, its backup cooling systems, and their adverse impacts on water quality. (**0076-5** [Daly, Meg])

Comment: The Turkey Point 6 & 7 Draft EIS [DEIS] has serious omissions in analysis that make it impossible to determine the likely effects of plant operation on the environment. (**0106-1** [Stoddard, Philip K.])

Comment: We ask that you address these concerns and take the following into consideration for a sorely needed supplemental EIS[.] (**0208-4** [Ritz, David])

Comment: It is clear from the actions of the NRC's poorly-informed staff that due diligence was not performed in researching and writing the draft EIS for Turkey Point 6 and 7. The NRC has

failed to meet its obligation to protecting people and the environment by ignoring or failing to discover crucial information about the environmental and health impacts of siting two new nuclear plants alongside two existing plants and near to such a large, water-starved population. In addition to the comments I presented orally last night, I add my voice to the many others at the meeting who demand a revised and complete Environmental Impact Statement which address the issues outlined in this letter. (**0615-1-6** [Bethune, David])

Comment: So that's ten different points in which I believe the Environmental Impact Statement Draft is incomplete and it may require a supplemental draft in order to address these points. (**0721-2-16** [Stoddard, Philip K.])

Comment: At any rate, we demand a supplemental EIS from this agency to cover all the unanswered questions that everybody is bringing up and we basically say this is the wrong project in the wrong location. Let's move on to something that's going to work. (**0721-22-19** [Schwartz, Matthew])

Comment: They haven't done that. It's not in the Draft. And just at the outset I'm saying, I'm requesting the agency undertake a supplemental EIS to deal with many of the unanswered questions that have been brought up today and which will be brought up in further comments. (**0721-22-2** [Schwartz, Matthew])

Comment: I'm not against nuclear power, I'm against the EIS the way it's written here without taking this into consideration seriously. And I really hope that if we're going to spend $30 billion that we have to look at getting our money's worth for it. (**0722-2-4** [Kipnis, Dan])

Comment: This application should be rejected. At the very least a supplemental EIS needs to be written to address all of these concerns that people are raising and do not rush into a project of this caliber. (**0723-9-22** [Schwartz, Matthew])

Response: *The comments state that the draft EIS is incomplete and request the NRC to supplement it. To the extent the commenters identify specific environmental topics as incompletely discussed in the DEIS in support of the request for supplementation, the NRC staff addresses such comments under the associated subject matter headings in this response document (Appendix E to the final EIS). To the extent the NRC staff agrees with the commenters' specific comments, the staff has so indicated in its responses in the specific subject matter sections below; the staff has also indicated which of those comments warranted inclusion of additional or modified discussion in the final EIS. Comments not identifying specific information related to environmental topics did not provide any significant new information not considered by the review team in the draft EIS, and therefore did not identify any reason to supplement the DEIS.*

One of the purposes of circulating a draft EIS for public comment is to obtain additional insight into the environmental issues evaluated in the draft EIS and augment the EIS discussion as warranted. However, the mere fact that a final EIS includes additional or modified information as a result of public comments does not necessarily indicate that a draft EIS requires supplementation.

Specifically, the NRC regulations outlined in 10 CFR 51.72 describe when the staff should produce a supplement to a draft EIS. According to 10 CFR 51.72, the NRC staff will issue a supplement to an EIS if: (1) there are substantial changes in the proposed action that are relevant to environmental concerns, or (2) there are significant new circumstances or

information relevant to the environmental concerns and bearing on the proposed action or its impacts. For the Turkey Point COL draft EIS, the staff has determined there have been no substantial changes to the proposed action in the Florida Power & Light (FPL) COL relevant to environmental concerns or significant new information associated with environmental issues that would trigger a supplement. Accordingly, supplementation is not required, and the staff has determined not to issue a supplement to the draft EIS.

Comment: Please do not reward, poorly thought out proposals because that is your job (at the NRC). (**0545-8** [Keating, Tim])

Response: *The staff has independently verified information in the applicant's Environmental Report (ER; Part 3 of the Application dated October 29, 2014 (ML14311A715)), and has performed literature searches and field studies in doing so. The draft EIS reflects the staff independent evaluation of the environmental effects of the proposed action. The comment did not warrant any change to the final FEIS.*

Comment: On behalf of the National Parks Conservation Association, Center for Biological Diversity, Miami Waterkeeper, South Florida Wildlands Association, and Tropical Audubon Society, we thank you for the opportunity to comment on the Draft Environmental Impact Statement (DEIS) for Combined Licenses (COLs) for Turkey Point Units 6 & 7, released by the Nuclear Regulatory Commission (NRC) under Docket ID NRC-2009-0337 and as publicly noticed by the U.S. Army Corps of Engineers (Corps), 2009-02417 (SP-MLC). We are deeply concerned about the potential wide-ranging environmental impacts to regional water resources, national parks, wildlife, and sensitive wetlands resulting from the construction and operation of Units 6 & 7 and ancillary facilities. (**0113-1-1** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: ACI appreciates your consideration of the foregoing comments, and we look forward to the final EIS adequately addressing the issues raised. (**0211-3** [Malefatto, Alfred])

Comment: I'm writing this letter because this issue is important to me. I hope it is to you as well. (**0533-1** [Boone, James])

Comment: The DEIS provides useful information and covers a variety of complex environmental issues related to the COL process for the proposed new units. We appreciate your coordination and outreach to us to discuss the numerous technical issues and our environmental concerns regarding this project, and your response to our request for additional review time for this DEIS. We look forward to working with the NRC to reduce this project's impacts, and to provide environmental protection for future generations. We request that the FEIS address our concerns, which are detailed in the enclosed comments. (**0617-1-1** [Mueller, Heinz J.])

Comment: FPL appreciates the opportunity to review and provide comments on the DEIS to assist the Commission and U. S. Army Corps of Engineers in disclosing an accurate and complete evaluation of potential impacts in the final EIS (FEIS). FPL recommends that the inconsistencies identified in the attached comments be reconciled in the FEIS. Many comments can be categorized as (1) significant overestimation of environmental impacts (such as the statement that FPL seeks approval to discharge fill into 1,000 acres of federal jurisdictional wetlands or describing impacts to the entirety of a pipeline or transmission corridor, when only a relatively narrow right-of-way would ultimately be affected), (2) minor discrepancies between values in the DEIS and the values in the cited references, and (3) overlooking updates to FPL's

application documents, many of which result from binding Conditions of Certification recently imposed under the Florida Power Plant Siting Act process. Given the NRC's delayed comment closing deadline of July 17, FPL hopes sufficient, timely resources are engaged to address all comments and maintain the NRC's Phase 3 milestone of February 2016 for publication of the FEIS, since publication of the FEIS is a prerequisite for permitting activities required before FPL can proceed with the project. (**0619-1-1** [Maher, William])

Response: *These comments express support for the NEPA review process for eliciting and receiving comments on the draft EIS as implemented by the NRC. To the extent the comments identified specific information regarding the environmental impacts of the proposed action, that information is discussed in the comment responses on specific impacts below. No changes were made in response to these comments.*

Comment: We believe it is important to mention problems experienced with public accessibility and public notifications associated with the release of the DEIS and related public hearings. Initially there were discrepancies in the meeting times for the afternoon public meeting in Homestead, Florida on April 23, 2015 -- both on the NRC's website and in NRC public meeting notices. There were also different email and mailing addresses to submit public comments to the NRC as listed in separate NRC public notices that were also different than what was listed in the Federal Register Notice. There was also a problem with the DEIS itself in that hyperlinks included in the DEIS were not active, yet appeared to be resulting in the reader receiving an "Authentication Required" error message. In terms of the inactive hyperlinks, we were told that it was a publication problem that occurred during the printing process, that the links were supposed to be removed before printing and that this would be resolved when the FEIS is issued. All of this caused confusion among the public and SACE staff spent significant time researching and bringing this to the attention of NRC staff. Though NRC staff were cordial and prompt in responding to our concerns, these discrepancies should not have happened. We hope that in the future, a more thorough review process can occur before issuing such important public notices. (**0112-9** [Barczak, Sara])

Comment: EVERY SINGLE FOOTNOTE IN THE DEIS IS HIDDEN BEHIND A FIREWALL! [FIGURE: Authentication Required; The server https://earrth.pnnl.gov:443 requires a username and password. User Name: Password: Log In Cancel] (**0716-4** [Riccio, Jim])

Comment: NEPA requires agencies to ensure professional and scientific integrity by setting forth the methodologies used and making "explicit reference by footnote [to] the scientific and other sources relied upon for conclusions in the statement." (Earth Island Inst. v. U.S. Forest Serv., 442 F.3d 1147, 1160 (9th Cir. 2006), abrogated on other grounds by Winter v. Natural Res. Def Council, Inc., 555 U.S. 7 (2008).

When the NRC staff was informed that every single citation in the DEIS was broken their reply was that it would be repaired in the final draft. OUTRAGEOUS! NRC has sought public comment on a two volume EIS totaling 1458 pages where every single citation is hidden behind a fire wall and the agency somehow thinks this is adequate? This pathetic inadequacy in citation wouldn't pass muster in a high school science class but somehow the NRC thinks it's appropriate for a DEIS to construct two nuclear reactors. (**0716-5** [Riccio, Jim])

Response: *The comment refers to administrative discrepancies associated with the Federal Register Notice, Public Meeting Notice, and draft EIS published in support of proposed Turkey Point Units 6 and 7. Each of these errors was quickly corrected as soon as the staff was notified. For instance, the NRC website and public meeting notice were updated to reflect the*

correct public meeting times. As for the different mailing addresses, each was within the NRC Administration Division therefore, all comments submitted were accounted for within the Turkey Point COL review process. Finally, hyperlinks or tracking numbers (e.g. TN3792) were inadvertently left active in the publicly distributed electronic copies of the draft EIS. This error occurred during the printing process but was corrected immediately in electronic copies in NRC's ADAMS; and will be remedied in any future EIS publication. If active, these hyperlinks would not have provided access to information beyond that in draft EIS Chapter 11. Draft EIS Chapter 11, "References," properly cited and included all the references that are not copyrighted. References in Chapter 11 include ADAMS accession numbers where available, allowing the reader to access these documents at http://www.nrc.gov/reading-rm/adams.html. Web links are also included where available. The staff regrets any inconvenience or confusion these errors may have caused.

Comment: Why at the next meeting they going to do? There's two meetings only. Why the next meeting this in Homestead? They no inviting in the news. All the people going there. And they going to find out some more against it. (**0721-33-2** [Herrera, Luis])

Comment: I don't know what you've been listening to for the last several years. I've been to a lot of the NRC meetings. And when people ask questions, nobody answered any of them. When they asked what you thought of sea level rise, you actually just said -- you quoted the company, you didn't actually say what you thought. When they asked, what is the need for this, you said the -- a Public Service Commission had recommended it. (**0721-6-1** [Harris, Walter])

Comment: I came here a little bit afraid that if I opposed this plan there would be people looking at me right now that might be angry with things that I'd say so I want to make sure that whatever I say I'm going to feel safe when I leave. So I'd like that assurity. (**0723-3-1** [Star, Priscilla])

Response: *It is NRC policy to involve the public in the Commission's decision-making process; therefore, it elects to conduct open public meetings to collect comments on the environmental aspects of a proposed project. The NRC generally holds meetings in locations accessible to the largest population that will experience the most direct environmental impact as a result of the proposed action. In the case of the draft EIS on the proposed Turkey Point Units 6 and 7, the NRC held three public meetings, one in Miami on April 22, 2014 and two in Homestead, Florida on April 23, 2014. The NRC held a meeting in Miami to make it more convenient for people from the nearby population center to participate in the meeting; the NRC held meetings in Homestead to make it more convenient for people from the communities closest to the site proposed for power plant construction to attend and comment. The NRC staff attends these meetings to listen to the comments to improve their understanding of the public concerns as part of its independent review. In some cases there is insufficient time available to respond to comments during a meeting. Nonetheless, the NRC responds to all comments on the draft EIS in Appendix E of the final EIS.*

Regarding the comment about the security of these public meetings, the NRC had security personnel present at all of the public meetings to ensure the safety of all participants. The NRC takes the safety of the meeting participants very seriously.

No changes were made to the EIS as a result of these comments.

Comment: To the extent that certain of these comments are determined to be outside the scope of the environmental review, the City requests that those comments be addressed

through the safety review process or the review undertaken by the U.S. Army Corps of Engineers. (**0456-26** [Miami, City])

Response: *The NRC conducts a concurrent safety review of each COL application along with the environmental review; the results of the NRC's safety review of Turkey Point Units 6 and 7 will be published in a Final Safety Evaluation Report, scheduled for publication in November 2016. Further information on the safety review and how to members of the public can participate should be directed to the NRC Safety Project Manager, Manny Comer. Mr. Comar can be reached at Manny.Comar@nrc.gov. In addition, comments received by the public comment process are being reviewed by the U.S. Army Corps of Engineers under a Department of Army permit application, who is a cooperating agency on this EIS. No changes were made to the EIS as a result of this comment.*

Comment: As the Nuclear Regulatory Commission awaits the final NEPA required studies, including the Environmental Impact Statement (EIS) and the Final Safety Analysis Report, there are significant environmental impacts that have not been adequately addressed in the Draft EIS and on behalf of our residents, we register our concerns through these written comments to the draft statement issued. (**0145-1** [Lerner, Cindy])

Response: *The licensing process for combined construction permit and operating license (COL) applications is specified in Title 10 of the Code of Federal Regulations (CFR), Part 52. The process includes a detailed review by the NRC of an applicant's COL application to determine the safety and environmental effects of construction and operation of a nuclear power facility. Public involvement and comments are invited and encouraged throughout the environmental review of major Federal actions; the NRC formally solicits both written and oral comments from members of the public at the beginning of the process during environmental scoping for the environmental impact statement (EIS) and when the draft EIS is issued. Specific information regarding the environmental impacts of the proposed action is discussed in the comment responses for specific impacts below. No changes were made in response to this comment.*

Comment: Even if the draft EIS weren't fatally flawed by the lack of functioning footnotes, the NRC has failed to meets its responsibilities under NEPA to address the impacts of the proposed federal action. (**0716-13** [Riccio, Jim])

Response: *The NRC implements NEPA according to its regulations in 10 CFR Part 51. The NRC uses these regulations as the basis for preparing EIS's in support of NEPA. This comment is general in nature and provides no specific information related to the environmental review. No changes were made to the EIS as a result of this comment. The comment also refers to hyperlinks or tracking numbers (e.g. TN3792) that were inadvertently left active in the publicly distributed electronic copies of the draft EIS. This error occurred during the printing process but was corrected immediately in electronic copies in NRC's Agencywide Documents Access and Management System (ADAMS); and will be remedied in any future EIS publication. If active, these hyperlinks would not have provided access to information beyond that in draft EIS Chapter 11. Draft EIS Chapter 11, "References," properly cited and included all of the references that are not copyrighted. References in Chapter 11 include ADAMS accession numbers where available, allowing the reader to access these documents at http://www.nrc.gov/reading-rm/adams.html. Web links are also included where available. The staff regrets any inconvenience or confusion these errors may have caused. The NRC implements National Environmental Policy Act (NEPA) according to its regulations in 10 CFR Part 51. The NRC uses these regulations as the basis for preparing EIS's in support of*

NEPA. This comment is general in nature and provides no specific information related to the environmental review. No changes were made to the EIS as a result of this comment.

Comment: Please consider the relevant issues in the attached documents regarding the environmental impact of the operation of proposed reactors 6 & 7 at Turkey Point, FL by FPL. (**0598-1** [White, Barry J.])

Response: *This comment is referring to a motion submitted by the Citizens Allied for Safe Energy, Inc. (CASE) in the ongoing Atomic Safety and Licensing Board (ASLB) proceeding on the Turkey Point Units 6 and 7 combined licenses, docket numbers 52-040 and 52-041 COL. Information regarding the legal proceedings can be found on the electronic hearing docket at https://adams.nrc.gov/ehd/. This comment is legal in nature, has been addressed in the ASLB proceeding, and outside of the environmental review. No changes were made to the EIS in response to this comment.*

E.2.2 Comments Concerning Process - NEPA

Comment: Potential Mitigation Measures Are Speculative, Inadequate, and Based on Incomplete Information. The U.S. Army Corps of Engineers has an independent responsibility under Section 404 of the Clean Water Act to determine if the project is consistent with the "public" interest and if impacts to the Waters of the United States have been adequately avoided, minimized, or mitigated. As a cooperating agency, the Corps will depend on information included in the EIS to comply with the requirements of NEPA in issuing a permit under the Clean Water Act. The Corps makes this determination through its own Record of Decision (ROD) and Department of Army (DA) permit. The potential mitigation measures proposed in the DEIS are speculative and inadequate and their effectiveness is not properly examined as required under NEPA. NEPA is "our basic national charter for protection of the environment," [Footnote 48: 40 C.F.R.§ 1500.1(a).] ensuring that federal agencies identify and analyze detailed information regarding significant environmental impacts of proposed projects and that such information is disseminated to a wide audience. Within an EIS, the EIS must describe the environmental impacts of the proposed action; "adverse environmental effects which cannot be avoided should the proposal be implemented;" alternatives to the action proposed; "the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity;" and any "irreversible or irretrievable commitment of resources which would be involved in the proposed action should it be implemented." [Footnote 49: 42 U.S.C. §4332(2)(c).] The proposed project will impact approximately 1000 acres of tidal and freshwater wetlands in order to construct Units 6 & 7. [Footnote 50: Gattiana, J. L., United States Environmental Protection Agency Letter to Colonel Alan M. Dodd, U.S. Army Corps of Engineers, April 9, 2015, 1.] Portions of the project, as outlined in permit application number 2009-02417 (SP-MLC), include (1) new transmission lines, (2) Units 6 & 7 site, (3) pipelines for potable and reclaimed water, (4) equipment barge unloading area, (5) transmission line crossing under the Miami River, (6) access roads, (7) radial collector wells located under Biscayne Bay, and (8) pre-treatment building. Impacted wetlands include mangrove swamp, sawgrass marsh, seagrass, mixed wetland hardwoods, freshwater and saltwater marsh, and wetland shrub. [Footnote 51: Ibid. 1.] The project will directly impact approximately 300 acres of high quality mangrove wetlands, 40 acres of sawgrass marshes, and one acre of submerged aquatic vegetation, all of which are considered by the U.S. Environmental Protection Agency to be aquatic resources of national importance (ARNI). [Footnote 52: Ibid., 1-2.] (**0113-2-13** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Response: *The USACE will complete an independent evaluation of the proposed project after publication of the final EIS. The USACE's independent Record Of Decision (ROD) regarding the proposed permit will reference the analyses in the EIS and will also present any additional information required by the USACE to support its permit decision. This will include the USACE's determination on the Least Environmentally Damaging Practical Alternative (LEDPA), the consideration of impacts to the aquatic environment, Public Interest Review (PIR) factors, a consideration of all comments received, and compliance with applicable laws and regulations. Mitigation for the resource areas described in the comments are discussed in Sections 4.3.1 and 5.3.1 and support the NRC's NEPA review, and includes information for the USACE's permit decision. While the USACE will reference and tier off of the information in the EIS, the USACE final decision document is separate from the EIS and will not be completed until after the final EIS is published. The comments, however, provided no specific information not already discussed in the draft EIS, and did not warrant any change to the final EIS. No changes were made to the EIS as a result of these comments.*

Comment: According to the requirements of the National Environmental Policy Act (NEPA) and NRC regulations, the DEIS must present an analysis that examines and considers the environmental impacts, including direct, indirect, and cumulative impacts, of the proposed action; the environmental effects of alternatives to the proposed action; and mitigation alternatives that would reduce or avoid adverse environmental impacts. [Footnote 1: United States Regulatory Commission, Draft Environmental Impact Statement - Contents, 2014, 10 C.F.R. 51.71(d). The DEIS fails to adequately discuss and analyze potential adverse environmental impacts and provides insufficient proposals for mitigation. Due to the deficiencies of the DEIS, as outlined in this letter, it would be premature and inappropriate to issue COLs for Turkey Point Units 6 and 7. (**0113-1-2** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: According to the requirements of the National Environmental Policy Act (NEPA) and NRC regulations, the DEIS must present an analysis that examines and considers the environmental impacts, including direct, indirect, and cumulative impacts, of the proposed action; the environmental effects of alternatives to the proposed action; and mitigation alternatives that would reduce or avoid adverse environmental impacts.1 [Footnote 1: United States Regulatory Commission, Draft Environmental Impact Statement-Contents, 2014, 10 C.F.R. § 51.71(d)]. The DEIS fails to adequately discuss and analyze potential adverse environmental impacts and contains insufficient proposals for mitigation. Due to the deficiencies of the DEIS, as outlined in this letter, it would be premature and inappropriate to issue COLs for Turkey Point Units 6 & 7. (**0208-10** [Ritz, David])

Comment: It is telling that no fewer than four local mayors and a state representative were in attendance to speak out against the draft EIS on behalf of their constituents. The meeting facilitator made a grievous error in trying to hurry the mayor of Miami off the podium as he continued to point out the appalling environmental impacts of the proposed plants, particularly on our drinking water supply. The fact that our elected representatives have no power over the NRC's licensing process other than to stand at the podium like their fellow citizens shows that the licensing process for nuclear power plants in this country is anything but democratic. (**0615-1-7** [Bethune, David])

Comment: The NRC has failed to produce an EIS for the proposed nuclear reactors at Turkey Point that is easily amenable to public review. Even if the draft EIS werent fatally flawed by the lack of functioning footnotes, the NRC has failed to meets its responsibilities under NEPA to address the impacts of the proposed federal action. (**0716-1** [Riccio, Jim])

Comment: Since this a discussion on a Draft EIS that's been prepared under the auspices of NEPA, I'd like to talk -- just make one statement about NEPA that really wasn't made when we started this meeting, and it's important for people to understand what NEPA requires. And I took this from the Citizens Guide to NEPA, prepared by the Council on Environmental Quality. To implement these policies NEPA requires agencies -- in this case the NRC as the lead agency - - to undertake an assessment of the environmental effects of their proposed actions prior to making decisions. In common language we call that the hard look. The agency is required to take a hard look at all of the environmental impacts and human impacts from this major Federal action before it takes place. (**0721-22-1** [Schwartz, Matthew])

Comment: The purpose of NEPA is to evaluate the environmental impacts of a project before it is built, thoroughly. Take what's called a hard look. This EIS did not do that in any way, shape or form. (**0723-9-8** [Schwartz, Matthew])

Response: *The review team agrees that NEPA calls for a hard look at the environmental impacts of a major Federal action having a significant effect on the environment. The NRC licensing process for nuclear power plants includes a thorough review of the proposed plant's impacts on the environment in accordance with NRC regulations. The EIS analyses of the potential adverse environmental impacts from building the proposed units are described in Chapter 4 and the potential adverse environmental impacts from the operation of the proposed units are described in Chapter 5. Alternatives to the proposed action are analyzed in Chapter 9. Mitigation proposed by the applicant and imposed on the applicant by local, state and Federal regulatory agencies other than the NRC during construction and operation are documented in Chapters 4 and 5, respectively. The draft DEIS summarizes the staff analyses of the impacts of the proposed action, which are based on extensive staff work that includes literature search, field work, modeling, and independent staff consideration of all pertinent information. To the extent the comments identified specific information regarding the environmental impacts of the proposed action, that information is discussed in the comment responses on specific impacts below. Otherwise, the comments provided no specific information not already discussed in the draft EIS, and did not warrant any change to the final EIS.*

In regard to public participation, Congress included in NEPA a requirement to circulate each draft EIS for public comment. The NRC implements that requirement in 10 CFR 51.73. In accordance with 10 CFR 51.74, the NRC staff distributed the draft EIS to appropriate State and local agencies authorized to develop and enforce relevant environmental standards. This ensures that local governments with authority to regulate the impacts of the proposed action have the opportunity to participate in the NEPA process and provide information to the NRC to inform the NRC staff analysis of the impacts. The NRC staff typically holds public meetings on draft EISs to elicit comments from the public. In that regard, the NRC staff process is designed to allow all of those who wish to speak that opportunity by allotting approximately equal speaking time to each speaker. Normally, elected officials are afforded the courtesy of speaking before members of the public at large. Every public meeting, however, is finite in length, and to ensure every member of the public who seeks to speak has the opportunity to do so, the NRC allots an approximately equal time to each speaker, given the available time and the number of speakers. One who speaks far beyond the time allotted—even an elected public official—will be informed that his or her time is up. Nonetheless, the public can submit comments (i.e. via electronic or U.S. postal mail), which compensates for the practical limits for receiving comments in the public meeting setting.

No changes were made to the EIS as a result of these comments.

Comment: Thank you for listening to logic and reason. (**0344-3** [Hull, Meagan])

Comment: Thank you for listening to the wishes, promises, and concerns of this one voice in the large pool of Floridian voices. (**0472-4** [Ball, Cheri])

Comment: Thank you for the opportunity to comment on the draft Environmental Impact Statement ("'DEIS") for Turkey Point Nuclear Plant Units 6 & 7. Attached to this letter, please find the City of Miami's comments prepared by the Office of the City Attorney. (**0515-1** [Regalado, Tomas])

Comment: Thank you for considering my deeply felt and knowledgeable concerns. (**0588-5** [Hanna, Jane])

Response: *These comments express support for the NEPA review process for eliciting and receiving comments on the draft EIS as implemented by the NRC. To the extent the comments identified specific information regarding the environmental impacts of the proposed action, that information is discussed in the comment responses on specific impacts below. Otherwise, the comments provided no specific information not already discussed in the EIS, and did not warrant any changes to the EIS.*

Comment: Last night, I attended the NRC's public meeting on the draft Environmental Impact Statement for Turkey Point units 6 and 7. I must say the lack of preparedness and poor access to information demonstrated by the NRC staff at this meeting were most distressing. NRC staff were essentially unable to answer any public questions of significance. (**0615-1-2** [Bethune, David])

Response: *The purpose of the NRC's public meetings on the draft EIS was to provide an opportunity for members of the public to submit comments on the draft EIS for FPL's Turkey Point Units 6 and 7 COL application. The NRC staff were present primarily to assure that they heard and understood the comments. Because of the large number of people who signed up to provide comments there was little time for the NRC staff to respond. Responses to all comments on the draft EIS are provided in Appendix E of the final EIS. No changes were made to the EIS as a result of this comment.*

Comment: The NPS strongly encourages the NRC to consider the important anthropocentric value (i.e. enjoyment) of wildlife that is reflected in the NPS Organic Act and the enabling legislation that established both Biscayne and Everglades NPs. The Organic Act states that "wild life" must be conserved for the "enjoyment" of future generations. Biscayne NP's enabling legislation states the NPS must "preserve and protect ... for the enjoyment of present and future generations a rare combination of terrestrial, marine, and amphibious life. Lastly, Everglades NP was established as a "public park for the benefit of the people" that preserves the "ecological integrity of the unique flora and fauna." This statutory context, and the fact the NPS is a cooperating agency, makes the EIS for Units 6 and 7 unique among environmental reviews the NRC may have prepared in the past. It also elevates the value that should be given by the NRC to the human environment, which includes the relationship of people with the environment. (**0622-2-16** [Austin, Stan])

Comment: The construction and operation of Units 6 and 7 and related infrastructure has the potential to adversely affect NPS resources and potentially make more difficult ongoing federal, state, and county efforts to restore the broader everglades ecosystem via CERP and the BBCW Project. This section provides the NRC and USACE concepts for mitigation that would be necessary if Units 6 and 7 and supporting infrastructure were approved. Upon review, the NPS

maintains that FPL's Turkey Point Units 6 & 7 Mitigation Plan Rev. 2, which was prepared in July 2011, is far from being sufficient to offset the potential for the impacts to NPS resources for which we have expressed concern.

While the NPS understands that the NRC and USACE will be considering mitigation that complies with their own internal guidance, we encourage you to consider Secretarial Order Number 3330 Improving Mitigation Policies and Practices of the Department of the Interior (DOI). A central component of DOI's strategy is taking "a landscape-scale approach to identify and facilitate investment in key conservation priorities in a region." Another component encourages agencies to focus "on mitigation efforts that improve the resilience of our Nation's resources in the face of climate change." Because NPS lands and resources would be significantly impacted by this project, we assert that an innovative mitigation package that contains measures that take a landscape-scale approach and account for climate change would be essential if the project and associated infrastructure were to be approved.

The NPS understands that it is difficult to compare this project to other projects elsewhere in the country that would similarly impact a national park, let alone two parks. Nonetheless, we encourage both agencies to consider the following two case studies as they may provide helpful context.

Skagit River Project, Washington[.] In 1995, the Federal Energy Regulatory Commission (FERC) accepted several settlement agreements (SA) to mitigate various environmental, operational, and recreational issues relating to the relicensing of the Skagit River Hydroelectric Project (FERC Project No. 553), which is located within Ross Lake National Recreation Area and along the Skagit River in northwest Washington State. Under the SA, Seattle City Light (SCL), the licensee that operates the dams, helped fund the construction of the North Cascades Environmental Learning Center, which has become an internationally renowned center for environmental education and a source of pride for SCL. They also set aside $17 million for land acquisition to conserve wildlife habitat in the Skagit River watershed. Since relicensing, over eight thousand acres of high-value conservation lands have been acquired. The SA also included an additional $17 million to support recreation access along the river. According to Dean Shumway, the former Director of FERC's Office of Hydropower Licensing, the SA have been recognized by many as a national model and have been called "the most comprehensive set of Settlement Agreements for the public good ever submitted to FERC."

Susquehanna to Roseland Transmission Line Upgrade, Pennsylvania. New York, and New Jersey[.] In 2012, the NPS approved construction of the 4.5 mile section of the proposed 146 mile Susquehanna-Roseland Transmission Line across Delaware Water Gap National Recreation Area. Importantly, the new transmission line is located entirely along existing rights-of-way held by the companies for decades and that predate the parks' establishment. In an effort to minimize impacts to the park, the companies partnered with The Conservation Fund and contributed $56 million for the acquisition of critical lands within and near the park. An additional $10 million was provided to mitigate for visual impacts of the project to the Appalachian National Scenic Trail. Lastly, the applicants funded a number of NPS staff for five years for construction monitoring. (**0622-2-6** [Austin, Stan])

Comment: After a thorough review of the DEIS, the NPS has identified a number of concerns regarding assumptions contained in the DEIS, the analysis of impacts, and the conclusions related to severity of impacts on resources managed by the NPS. The NPS remains concerned that federal actions associated with permitting and operating the proposed facility could result in adverse impacts to NPS resources and values including water quality and quantity, wetlands,

wildlife and fisheries resources (including species listed under the Endangered Species Act), scenery, and the experience of park visitors that may affect our ability to manage these resources for their preservation for current and future generations. Although we recognize nuclear power as one of the means to achieve energy independence from fossil fuel, we also recognize the unique situation posed by the proposed expansion of the Turkey Point power plant immediately adjacent to two national parks. Both Biscayne and Everglades NPs are located within the greater Everglades ecosystem, which is not only one of the nation's most iconic landscapes, but also the focus of the largest intergovernmental watershed restoration program in the world. (**0623-1** [Austin, Stan])

Comment: The NPS asserts that the DEIS impact analysis associated with construction and operation of proposed Units 6 and 7 does not sufficiently address issues related to the environmental impacts of the proposed action on resources managed by the NPS. Based on our review of the DEIS, we have strong concerns that impact analysis described in the DEIS does not:...provide for opportunities to eliminate or mitigate risks to NPS resources. (**0623-10** [Austin, Stan])

Comment: It is for these reasons, we respectfully request that NRC and USACE revise the DEIS to address these issues. An update to the DEIS analysis should: 1) more fully evaluate potential impacts on NPS resources[.] (**0623-11** [Austin, Stan])

Comment: It is for these reasons, we respectfully request that NRC and USACE revise the DEIS to address these issues. An update to the DEIS analysis should:...development of this additional information would better inform NRC licensing and USACE's permitting decisions. Specifically, additional analysis of the outstanding issues we have identified may assist USACE in determining the Least Environmentally Damaging Practicable Alternative and consideration of the public interest. Moreover, this information would better inform the public regarding the extent of potential impacts and the decision-making process. The NPS is ready to collaborate with the NRC and USACE on this effort. (**0623-13** [Austin, Stan])

Response: *The National Park Service (NPS) presents recommended mitigation measures for impacts to NPS resources resulting from project construction and operation. The ecological impacts of building and operating the proposed units are described in Sections 4.3 and 5.3, respectively. Visual and aesthetic impacts are addressed in Sections 4.4 and 5.4. The applicant, FPL, has proposed a series of specific wetland mitigation measures that are described in Section 4.3.1 of the EIS. Because the applicant develops mitigation measures in conjunction with State, local, and Federal agencies other than the NRC that have jurisdiction over such matters, the NRC only rarely imposes mitigation requirements on the applicant. The NRC staff nonetheless accounts for such mitigation matters, in its environmental evaluation. The USACE determines the adequacy of proposed compensatory mitigation for unavoidable impacts to aquatic resources pursuant to 33 CFR Part 332. Furthermore, the USACE determines whether mitigation is required in order for a proposed project not to be contrary to the public interest pursuant to 33 CFR § 320.4(r).*

The NRC staff responses to the specific NPS comments regarding the environmental impacts of the proposed action are set forth in the comment responses on specific subjects below. In regard to the specific subjects identified in the comment, other NPS comments provided more detailed information that is addressed in the responses below. The general or otherwise prefatory statements in the NPS comment do not provide the type of specific information set forth in the NPS-specific comments discussed in the subject matter sections below, and do not

warrant any change to the EIS. No change was made to the EIS as a result of the general comments.

Comment: The National Park Service provides the following detailed technical comments regarding the determinations reached in the DEIS. Based on our review of the DEIS, the NPS has identified updated information relevant to environmental concerns that were not included in the DEIS and need to be addressed to more fully incorporate environmental impacts of the proposed action into the decision-making process. (**0622-1-1** [Austin, Stan])

Response: *The NRC appreciates the NPS's continued participation in the development of the EIS as a cooperating agency. Information provided by the NPS throughout the entire environmental review was considered by the review team as the EIS was developed and included in the draft and final EIS, as appropriate.*

Comment: Today we must discuss a matter of vital importance to the future of our citizens and their children. Specifically, we must have an honest and critical discussion about FPL's plan to expand the nuclear plant at Turkey Point. When I say that we must have a 'discussion,' I mean it in the truest sense. We need our citizens and residents to be informed on the expansion and then speak up and make their voices heard to the Federal Regulators entrusted with our safety. (**0721-4-1** [Regalado, Tomas])

Response: *The NRC prepared a draft EIS to assess the environmental impacts if the NRC grants FPL's application to construct and operate two new nuclear power plants at the Turkey Point site. A 75-day comment period began on March 6, 2015 when the EPA published its Notice of Availability of the draft EIS to allow members of the public to comment on the results of the environmental review. During the public comment period, three public meetings were held, one in Miami on April 22, 2015 and two in Homestead, Florida on April 23, 2015. Members of the review team described the results of the environmental review, provided members of the public with information to assist them in formulating comments on the EIS, and accepted comments on the EIS. Of those attending the public meetings, 68 provided oral comments. In addition to comments received at the public meetings, the NRC staff received approximately 11,300 additional pieces of correspondence. The review team considered the comments received at the public meetings and through correspondence as it developed the final EIS. Appendix E of the EIS outlines the comments received and responses to the comments on the draft EIS. No changes to the EIS were made as a result of this comment.*

Comment: The NRC's apparent failure to properly consider the harm to the environment that FPL's Turkey Point Nuclear Units 6 & 7 will cause is **alarming** and should be investigated by the NRC's Office of the Inspector General (OIG). To this extent -the NRC Staff is hereby requested to provide a copy of this document and all related NRC documents to the NRC's OIG -to enable that agency to make an informed decision as to whether the NRC Staff acted improperly in these circumstances to protect public health and safety and to **protect the environment**. (**0010-3** [Saporito, Thomas])

Comment: To the extend that the NRC wholly relied on the FPSC's "NEED" determination - the agency failed to consider the benefits of these grid-tied solar power home energy systems in completing the agency's EIS determination in this matter. Accordingly - the NRC should reject and/or deny and/or revoke FPL's COL and the agency's EIS in their entirety as a matter of law. **Moreover, to the extent that the NRC failed in its mission to protect public health and safety - and the environment as a whole in issuance of a "flawed" EIS in this matter - the NRC is requested to self-identify - to the NRC OIG accordingly**. (**0010-7** [Saporito, Thomas])

Comment: The NRC's EIS is **flawed** insofar as the EIS wholly relied upon the FPSC's "NEED" determination in authorizing FPL's COL and other licenses for the construction and operation of the proposed Turkey Point Nuclear Units 6 & 7 near Homestead, Florida. In so doing - the NRC jeopardized public health and safety and failed to protect the environment as a matter of law - and therein - violated the agency's mission statement. Thus, the NRC OIG must investigate the NRC in this instance as a matter of law accordingly. (**0010-8** [Saporito, Thomas])

Comment: In conclusion, it is Greenpeace's view that the NRC's Environmental Impact Statement for Combined Licenses (COLs) for Turkey Point Nuclear Plant Units 6 and 7, Draft Report for Comment (NUREG-2176) should be pulled from public consideration unless and until the footnotes in the document actually work. I am amazed that the NRC even allowed the Draft EIS to see the light of day with every footnote hidden behind a fire wall. It is both a measure of the extent to which the NRC is captured and a measure of the disdain it has for the law and the public it supposedly serves. If NRC fails to withdraw and repair the document, I fail to see how the agency can conclude that the public has been given an adequate opportunity to comment. As the OIG Report reported, "NRC ought to break down the information 'in a common sense approach so the average person can do a quick read and learn how they may be impacted by the action." (http://pbadupws.nrc.gov/docs/ML1323/ML13232A192.pdf) The NRC has failed to produce an EIS for the proposed nuclear reactors at Turkey Point that is easily amenable to public review. (**0716-12** [Riccio, Jim])

Comment: The U.S. Nuclear Regulatory Commission (NRC) has once again displayed its disdain for both the National Environmental Policy Act (NEPA) and the public it supposedly serves. The NRC's failure to comply with the terms of NEPA as well as own regulations in the preparation of environmental impact statements was the subject of a 2013 NRC Office of the Inspector General (OIG) Report. (http://pbadupws.nrc.gov/docs/ML1323/ML13232A192.pdf) (**0716-2** [Riccio, Jim])

Comment: The OIG report found that NRC's NEPA documentation "does not clearly present, in an accessible way, the proposed action, alternatives, and conclusions to stakeholders" and "undermines its extensive efforts to be clear, open, and transparent." OIG Report at 12. The OIG criticized NRC's EIS documents for being "lengthy and complex" and "overwhelming to the average person." OIG Report at 7, 10-15. (http://pbadupws.nrc.gov/docs/ML1323/ML13232A192.pdf) The OIG's criticisms were not meant as a road map for continued NRC malfeasance. (**0716-3** [Riccio, Jim])

Response: *The comments refer to a 2013 report of the NRC Office of the Inspector General (OIG), "Audit of NRC's Compliance With 10 CFR Part 51 Relative to Environmental Impact Statements," OIG-13-A-20, dated August 20, 2013 (NRC 2013-TN4804). The portions of the OIG report to which the comment refers focus on (1) the record of decision (ROD) (OIG Report at 7, 10-11) and (2) the model format for an EIS in 10 CFR Part 51, Appendix A (OIG Report at 12-15). Neither the NRC nor the U.S. Army Corps of Engineers (USACE) has issued a ROD on the proposed action, and the NRC fully intends to comply with the NRC regulations that govern the issuance of RODs in 10 CFR 51.102 and 51.103. The NRC staff took the appropriate steps to address recommendations expressed in the report. Members of the public can review how the staff responded to the recommendations on the OIG website at http://www.nrc.gov/reading-rm/doc-collections/insp-gen/2013/. Any additional inquires and/or follow up regarding this case should be directed to the NRC's OIG at 1-800-233-3497. No changes to the EIS were made as a result of this comment.*

Comment: *CWA 404 Permit NEPA Documentation*: EPA understands that the NRC is addressing impacts of the onsite facility, and that offsite facilities, such as the transmission lines and other related facilities, will not be considered in detail for the purposes of this EIS. The EPA also understands that the USACE intends to adopt the NRC's EIS for the purposes of their CWA Section 404 permit action. However, many of the associated and connected actions, such as construction of the transmission lines, are not considered in the NRC's EIS. For the purposes of permit issuance, the USACE should state how they plan to address associated NEPA documentation for these offsite facilities, as those impacts are directly related to this project. NEPA coverage for these permit actions should be included within NRC's FEIS.

Recommendations: EPA recommends that the NRC document the USACE intentions for addressing their NEPA documentation and timing with NRC's FEIS and permit issuance. The FEIS should include a mitigation plan which details how the proposed mitigation is in compliance with the Federal Compensatory Mitigation Rule, dated April 2008. (**0617-1-34** [Mueller, Heinz J.])

Response: *The final EIS does provide a NEPA alternatives analysis for the transmission corridor alignment alternatives, see Appendix K. The USACE will conduct its Least Environmentally Damaging Practicable Alternative (LEDPA) analysis and public interest review (PIR) in its ROD and will potentially provide the draft LEDPA/PIR for public review and comment. The final EIS addresses mitigation measures, including avoiding, minimizing, rectifying, reducing, eliminating, and compensating for impacts to the extent required by the NEPA statute (42 U.S.C. Section 4321 et seq.), the Council on Environmental Quality (CEQ) regulations at 40 CFR Parts 1500-1508, and CEQ guidance (e.g., CEQ January 14, 2011 Memorandum on the Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact). These NEPA authorities and guidance do not require an action agency to detail how proposed mitigation is in compliance with 33 CFR Part 332 in the final EIS. The USACE will review the sufficiency of the proposed compensatory mitigation for unavoidable losses of aquatic resources at the appropriate point in the Clean Water Act Section 404(b)(1) Guidelines process, which is after avoidance and minimization. 33 CFR Section 332.1(c). The Corps will determine the LEDPA and determine the sufficiency of the proposed mitigation plan pursuant to 33 CFR Part 332 in its ROD.*

Comment: DEIS Section 1.3, Page 1-9, Lines 25-28: The DEIS states: "The purpose and need of the NRC proposed action—NRC authorization of the construction and operation of two AP1000 units at the Turkey Point site—is to provide additional baseload electrical generation capacity for use in the FPL service territory." ER Subsection 1.1.1, Purpose and Need, states: "FPL's purpose is to provide additional baseload generation to maintain system reliability, increase fuel diversity, and allow progress toward meaningful CO_2 emissions reductions." (**0619-3-1** [Maher, William])

Response: *The comment offers a more detailed purpose and need statement written in the applicant's ER for the proposed Turkey Point Units 6 and 7 (COL Application Part 3). While the comment does provide more detail regarding the overall purpose and need for the application, the staff thinks the purpose and need as stated in the EIS is sufficient. Furthermore, the NRC does not promote any particular form of energy generation, including nuclear. No changes were made to the EIS.*

Comment: The EPA has numerous concerns regarding the analyses, data and mitigation required for the CWA Section 404 permitting application. We noted a number of details and data that need to be clarified, with additional information provided to the EPA prior to the publication

of the FEIS, in order for the FEIS to meet the needs of all the project's permitting requirements. The EPA reviewed the permit application number 2009-02417(SP-MLC) submitted to the U.S. Anny Corps of Engineers (USACE} by Florida Power & Light (FPL), and responded in writing on April 9, 2015 and May 4, 2015. EPA's letters state our CWA Section 404 concerns regarding the proposed project. These comments should be considered and responded to by the project team, with further information provided in the FEIS. (**0617-1-5** [Mueller, Heinz J.])

Response: *The Corps is in receipt of the EPA comments dated April 9, 2015 and May 4, 2015. The Corps will review the sufficiency of the proposed compensatory mitigation for unavoidable losses of aquatic resources at the appropriate point in the Clean Water Act Section 404(b)(1) Guidelines process, which is after avoidance and minimization. 33 C.F.R. Section 332.1(c). The Corps will determine the Least Environmentally Damaging Practicable Alternative and determine the sufficiency of the proposed mitigation plan pursuant to 33 C.F.R. Part 332 in its Record of Decision.*

E.2.3 Comments Concerning Site Layout and Design

Comment: There are instances in the DEIS where the reclaimed water pipeline is not correctly illustrated. Instances in the DEIS include: a. DEIS Subsection 2.2.2.1, Page 2-16, Figure 2-5: DEIS Figure 2-5 contains the following inconsistencies: i. A reclaimed water pipeline route is illustrated that does not take into account the width of the corridor for the northern section of the pipeline as it approaches the Miami-Dade County WASD. ER Figure 2.2-5 shows the pipeline corridor in this section to be 1 mile wide. ii. The reclaimed water pipeline route is illustrated following the transmission line corridor as it approaches the Turkey Point site. ER Figure 2.2-3 shows the pipeline route following the L-31 E canal south until it enters the RWTF. b. DEIS Subsection 3.2.2, Page 3-7, Figure 3-4: DEIS Figure 3-4 has the reclaimed water pipeline exiting the Reclaimed Water Treatment Facility but also has a reclaimed water-pipeline along 344th St. ER Figure 2.2-3 illustrates the current configuration of the reclaimed water pipeline route which does not include the routing along 344th Street. c. DEIS Appendix F-3, Section 3.1.1, Page 3-4, Figure 3-3: Appendix F-3 Figure 3-3, illustrates the reclaimed water pipeline as it approaches the RWTF from the north and is not shown correctly. ER Figure 2.2-3 shows the pipeline following the L-31 E canal south until it enters the RWTF. (**0619-1-14** [Maher, William])

Comment: DEIS Subsection 3.2.2.2, Page 3-10, Lines 13-14; Appendix F-3, Subsection 3.1.1.1, Page 3-5, Lines 34-35; and Appendix F-4, Subsection 2.3.4, Pages 2-9/2-10, Lines 40/1: DEIS (Subsection 3.2.2.2) states: "A typical injection well steel casing would be lined with...**with grout in the annulus**..." Similar descriptions occur in Appendix F-3 (Subsection 3.1.1.1) and Appendix F-4 (Subsection 2.3.4). In contrast, in a letter dated April 22, 2014, FPL submitted a supplemental response to NRC Request for Additional Information Letter No. 72 (eRAI 6985), ML14113A411, which states: "The **annular space**...will be filled with a non-hazardous corrosion inhibitor (e.g., **one percent Baracor 100 solution**)..." This supplemental response indicates that the annular space will be lined with a non-hazardous corrosion inhibitor. Additionally, ER Figure 3.4-3 illustrates that the annular space is filled with "**1% Baracor 100 solution**". (emphasis added) (**0619-3-18** [Maher, William])

Comment: DEIS Subsection 3.2.2.3, Page 3-16, Lines 23-25: The DEIS states: "FPL plans to build...It would be sized to serve the operational workforce of both units (approximately **500** workers)...workforce expected to be onsite during an **outage (approximately 1,000 workers**)." The operational workforce and outage workforce numbers should reflect the values indicated in the supporting documentation. ER Subsection 3.10.3 states: "... it is estimated that the onsite operations workforce would be 403 personnel for each unit, or **806** personnel..." Additionally,

ER Subsection 5.8.2 states: "Refueling outages for each unit would occur every 18 months, last approximately 30 days, and require **the addition of approximately 600-1000** temporary workers." (emphasis added) (**0619-3-19** [Maher, William])

Comment: DEIS Subsection 3.4.4.2, Page 3-38/3-39, Table 3-5: DEIS Table 3-5 reflect constituents' concentrations (or stated value in the case of conductivity) that are not consistent with those reported in ER Table 3.6-3 for saltwater. These include: Nitrate as N; Total Organic Compounds, Total Dissolved Solids; Barium; Copper; Silica as SiO2; and conductivity. The listed sources for DEIS Table 3-5 are: FPL 2014-TN4058 (ER Revision 6) and FPL 2012-TN263 (FPL response to RAI No. 4.2-2). The listed constituents' concentrations (or stated value in the case of conductivity) are consistent with DEIS reference FPL 2012-TN263. However, subsequent to the submission of RAI response 4.2-2, the values were revised as reflected in ER Revision 6. (**0619-3-20** [Maher, William])

Comment: DEIS Subsection 3.4.4.3, Page 3-39, Lines 4-7: The DEIS states: "Based on four operating hours per month for each engine, the estimated annual emissions...and **24,004 lb of hydrocarbons and nitrogen oxides** (FPL 2014-TN4058)." ER Table 3.6-4 lists 11.83 tons/year which is equivalent **to 23,660** lbs. (11.83 tons x 2000 lbs/tons = 23,660 lbs.). (emphasis added) (**0619-3-21** [Maher, William])

Response: *EIS Figures 2-5 and 3-4, Table 3-5, and text in Sections 3.2 and 3.4 were revised to incorporate the identified changes. Appendices F-3 and F-4 contain species and habitat consultation documents submitted to the National Marine Fisheries Service (NMFS) as part of Endangered Species Act (ESA) Section 7 consultation and Magnuson-Stevens Act Essential Fish Habitat (EFH) consultation. Once consultation documents are submitted to the regulatory agency they cannot be modified. No changes were made to the submitted consultation documents as a result of these comments.*

Comment: And we have extra barriers and defenses in place to make sure that that can't happen here. But that doesn't mean that we can't learn from it. And we did. And we've made further upgrades and further modifications, not just to our procedures but to our actual plant equipment. We've turned Turkey Point and the future designs into basically a plug-and-play type of design. So now we don't just look at, hey, what's the worst hypothetical thing that can happen. We try to not even look at the what-ifs. We just say, if it happens, how do we mitigate it. We've implemented new designs and new strategies, new approaches, to make sure that we have extra margin of safety. (**0721-15-12** [Kuraza, Devon])

Response: *This comment relates to how the site layout and design developed by FPL for the Turkey Point site would prevent the kind of accident that happened at Fukushima from happening at the Turkey Point site. Site layout and design are discussed in Chapter 3 of the EIS, but this comment relates to safe operation of the proposed units and, as such, is outside the scope of the environmental review. A safety assessment for the proposed licensing action was provided as part of the application. The NRC is developing a Safety Evaluation Report that will analyze all aspects of reactor and operational safety for the proposed units; this document is slated to be issued in November 2016 and can found on the NRC's Turkey Point homepage (http://www.nrc.gov/reactors/new-reactors/col/turkey-point/documents.html#nrcDocuments). No changes were made in the EIS as a result of this comment.*

Comment: DEIS Subsection 3.2.2.1, Page 3-8, Lines 21-22 and DEIS Subsection 3.3.1.1, Page 3-23, Lines 19-20: The DEIS (Subsection 3.2.2.1) states: "The proposed stormwater-discharge locations for the main plant area, laydown area, and administration/training/parking

area are shown on Figure 3-4." Additionally, the DEIS (Subsection 3.3.1.1) states: "EIS Section 3.2.2.1 provides a description of the drainage system and Figure 3-4 shows the stormwater outfall locations." The text indicates that stormwater discharge locations and stormwater outfall locations are shown on Figure 3-4. However, neither the stormwater discharge locations nor the stormwater outfall locations are shown on this figure. (**0619-3-17** [Maher, William])

Response: *The text in Sections 3.2 and 3.3 of the EIS were revised to delete the reference to Figure 3-4.*

Comment: Inconsistencies identified in draft EIS and ER, Rev 6: Subsection 3.2.2.3, Page 3-18, Table 3-2: The total length of the "Clear Sky-Turkey Point" route for the East Corridor is listed as **0.4 miles**. ER Subsection 3.7.2: In the first paragraph of ER Subsection 3.7.2, the length of the "Clear Sky-Turkey Point (230 kV)" transmission line is characterized as **0.5 miles**. (**0619-2-23** [Maher, William])

Response: *Table 3-2 has been revised to be consistent with Revision 6 of the ER.*

E.2.4 Comments Concerning Land Use - Site and Vicinity

Comment: There are two national parks, an aquatic preserve, a wetland preserve and a national wildlife refuge within six miles of the proposed expansion site. Obviously an expansion of Turkey Point could jeopardize the area's habitat, endangering wildlife including a wide range of federally protected endangered species. The Nuclear Regulatory Commission's rules state that "sites adjacent to lands devoted to public use may be considered unsuitable," and unacceptable impacts are "most apt to arise in areas adjacent to natural-resource-oriented areas." The area certainly fits the accepted criteria for "unsuitable" and the plan for "unacceptable impacts". (**0463-5** [Gross, Cheryl A.])

Response: *The comment suggests that the ecological costs of the proposed action, in combination with the site's proximity to nearby public lands, are so high as to make the site unsuitable for nuclear power. The principal costs and benefits of the proposed action are summarized in Chapter 10 of the EIS. The summary is derived from careful assessment of ecological impacts across the terrestrial and aquatic environmental interfaces affected by the action during construction (Section 4.3) and during operations (Section 5.3). In addition, the cumulative terrestrial and aquatic ecologic impacts of the action are presented in Chapter 7. These impact discussions frame the assessment of overall project benefits and costs that are within the staff's scope to assess. The NRC staff determined that the overall benefits of the proposed action outweigh the expected environmental costs. No changes to the EIS were made as a result of this comment.*

Comment: The impacts of additional roads and pads [is] unacceptable. (**0245-6** [Lindsey, Jerrie])

Comment: It will be necessary to fill in our precious wetlands, build new roads, bridges, new electrical transmission line corridors etc. all which threaten to degrade the restoration efforts of recently carried out CERP projects and perhaps also threaten to damage the very fragile marine ecosystems of Biscayne National Park! (**0340-4** [Tweeton, Tanya])

Response: *These comments express opposition to the roads and transmission tower pads that are part of the proposed project. The impacts of building roads and transmission lines are described in Section 4.1 and 4.3.1. No changes were made to the EIS as a result of these comments.*

Comment: Miami-Dade County's Environmentally Endangered Lands (EEL)[.] The NPS supports the Miami-Dade County's request that certain FPL owned land be transferred and/or otherwise made available through easements to the County's Environmentally Endangered Lands (EEL) Program's South Dade Wetlands Project Area. This request was outlined in letter from George M. Burgess, County Manager, to FPL dated April 22, 2010. EEL was approved by Miami-Dade County voters in 1990 and was created to "acquire, preserve, enhance, restore, conserve, and maintain environmentally-endangered lands for the benefit of present and future generations." According to the County, over 19,500 acres of land has been conserved since the establishment of the EEL program in 1990. The letter also identified that FPL owns 3,388 acres of non-mitigation lands that are on the EEL list. FPL's proposed mitigation plan indicates that they would dedicate 812 acres of land outside of mitigation banks for conservation. Importantly, the County's EEL map identifies conservation priority lands west of the Biscayne NP contained within the Biscayne Bay Greenprint (shown in Figure 2 [Biscayne Bay Greenprint map showing BNP adjacent lands protection and overall conservation priorities]). We encourage close consideration of the County's request that FPL's entire 3,388 acres be given to EEL as a part of their mitigation package. Additionally, we encourage FPL to create a restoration fund to combat invasive species, reverse salt water intrusion, and restore the full ecological function of these lands. (**0622-2-8** [Austin, Stan])

Response: *The commenter presents specific recommended mitigation measures for wetland impacts resulting from building the proposed project. The applicant, FPL, has proposed a series of specific wetland mitigation measures which are described in Section 4.3.1.6 of the EIS. The review team does not itself impose natural resources mitigation requirements on the applicant, but in its assessment does account for the mitigation measures that the applicant develops in conjunction with other regulatory agencies. No change was made to the EIS as a result of this comment.*

Comment: There are instances in the DEIS where there are inconsistencies and/or discrepancies relating to authorizations, permitting and certifications. Instances in the DEIS include (emphasis added):...DEIS Subsection 5.1.1.1, Page 5-3, Lines 28-29: The DEIS states: "The applicant would be required to obtain a Coastal Zone Consistency Determination from the State of Florida prior to initiating work." As noted in the Conditions of Certification issued by the State of Florida Department of Environmental Protection, Section A, Subsection XXIII: "Pursuant to Sections 373.428 and 403.511, F.S., certification of the Certified Facilities constitutes the State's concurrence that the licensed activity or use is consistent with the federally approved program under the Florida Coastal Management Act." (**0619-2-11** [Maher, William])

Comment: Inconsistencies identified in draft EIS and ER, Rev 6: Section 2.1, Page 2-1, Lines 35-36 "The location for the proposed Units 6 and 7 is within portions of Sections 33 and 34 of Township **58S** Range 40E (FPL 2014-TN4058)" ER Section 2.1 "The Units 6 & 7 plant area would be located in portions of Sections 33 and 34 of Township **57S**, Range 40E." (**0619-2-18** [Maher, William])

Comment: There are instances in the DEIS with respect to the presented land use values in their respective tables, which are inconsistent with the cited source or not current with the most recent documentation/reference. Instances in the DEIS include (emphasis added):...DEIS Subsection 4.1.1.1, Pages 4-5 and 4-6, Table 4-1: DEIS Table 4-1 reports the disturbed area acreage for the Turkey Point Site. The following acreage values do not reflect the values in ER Table 4.3-1 Revision 6, but rather reflects those of ER Table 4.3-1 Revision 4 prior to the relocation of the FPL Reclaimed Wastewater-Treatment Facility: i. The following "FPL Reclaimed Wastewater-Treatment Facility" FLUCFCS codes and associated acreages are

reported (612B: 42.82 acres; 617: 0.78 acres; and 814: 0.31 acres). ER Table 4.3-1, Revision 6, reports the same facility with FLUCFCS codes and associated acreages as (437: 7.79 acres; 510: 3.07 acres; 511: 0.30 acres: 612-B: 19.80 acres; 619: 0.61 acres; 619-AP: 0.16 acres; 6411: 11.93 acres; and 814: 0.26 acres). ii. Additionally, FLUCFCS land-use codes and acreages are reported in DEIS Table 4-1 for disturbed areas for the "Treated Reclaimed Delivery Pipelines" category. Per note in ER Table 4.3-1, Revision 6: "The treated reclaimed water supply pipeline is now fully within the heavy haul road disturbed area and is not separately considered". g. DEIS Subsection 4.1.1.1, Page 4-7, Table 4-2: DEIS Table 4-2 contains acreages for the project elements by major FLUCFCS codes. The following inconsistencies with the cited source, DEIS Table 4-1, and/or the corresponding source for DEIS Table 4-1, ER Table 4.3-1, are noted: i. The "Heavy Haul Roads" project element, under code 500, 0.30 acres is listed; and under code 700, 0.21 acres is listed. DEIS Table 4-1 and ER Table 4.3-1 both report 0.15 acres under code 500. The summed values for code 700 listed in both DEIS Table 4-1 and ER Table 4.3-1 is 0.22 acres for the same project element. ii. The "Equipment Barge-Unloading Area" project element, under code 600, 0.73 acres is listed. Both DEIS Table 4-1 and ER Table 4.3-1 reports this acreage under code 800 not 600. iii. The "Radial Collector Well Delivery Pipeline" project element does not have acreage listed under code 700, while both DEIS Table 4-1 and ER Table 4.3-1, report 9.21 acres under code 700 for the same project element. iv. The acreages for the "FPL Reclaimed Wastewater Treatment Facility" and "Treated Wastewater Delivery Pipelines" project elements do not reflect the revised location of the FPL Reclaimed Water Treatment Facility detailed in ER Table 4.3-1, Revision 6. (**0619-2-3** [Maher, William])

Comment: There are instances in the DEIS with respect to the presented land use values in their respective tables, which are inconsistent with the cited source or not current with the most recent documentation/reference. Instances in the DEIS include (emphasis added):...h. DEIS Subsection 4.1.1.3, Pages 4-10 and 4-11, Table 4-3: DEIS Table 4-3 contains acreage values by FLUCFCS codes for the reclaimed water and potable water pipelines. The following inconsistencies are noted with the source cited for DEIS Table 4-3, (FPL 2014-TN4058): i. The acreages for the "Reclaimed Wastewater Pipeline" do not reflect the revised location of the FPL Reclaimed Water Treatment Facility detailed in ER Table 4.3-1, Revision 6, but rather reflect those of the initial location with the acreages and percentages matching ER Table 4.3-1, Revision 4. ii. The acreages for the "Potable Water Pipeline" do not reflect the values in ER Table 4.3-1 Revision 6, but rather reflects those of ER Table 4.3-1 Revision 4. i. DEIS Subsection 4.1.1.3, Pages 4-12 and 4-13, Table 4-4: DEIS Table 4-4 reports acreage values by FLUCFCS codes for the access roads. The following inconsistency is noted with the source cited for DEIS Table 4-4, (FPL 2014-TN4058): i. For "SW 359th Ave. East", DEIS Table 4-4 does not list FLUCFCS code 534 "Reservoirs Less Than 10 Acres (4 Hectares) Which Are Dominant Features" and its corresponding acreage and percent total. However, ER Revision 6 Table 2.2-7, lists FLUCFCS code 534, under the "SW 359th Ave. East" area with a corresponding acreage and percent total of 0.06 and 0.13, respectively. j. DEIS Subsection 4.1.2.1, Page 4-16 through 4-19, Table 4-5: DEIS Table 4-5 contains acreages for the transmission line routes by FLUCFCS codes. The following inconsistencies with the source cited in the text for DEIS Table 4-5, (FPL 2014-TN4058) are noted: i. DEIS Table 4-5 contains information listed as "Clear Sky to Levee 2nd Leg (Consensus Corridor)." From ER Table 2.2-3, these acreages are actually acreages from "Clear Sky to Levee 2nd Leg (Secondary Corridor)." The West Secondary Corridor was removed from consideration in 2013. [DEIS Reference (FPL 2013-TN2941)]. Acreages should be provided for the West Consensus Corridor, which are found in DEIS reference (FPL2013-TN2941). ii. DEIS Table 4-5 lists the total acres for the proposed Clear Sky to Levee 1st Leg as **1378.9**. ER Table 2.2-3 and DEIS Table 2-5 list the correct total acreage, **1365.43**, for the same route. Seven of the values for the Clear Sky to

Levee 1st Leg are inconsistent with the ER, which is cited as the reference. DEIS Table 4-5 for codes 437, 510, 511, 612-B, 619, 6411, and 814 lists 0.84, 219.01, 0.92, 73.16, 57.07, 11.47 and 12.27 respectively, while the values listed on ER Table 2.2-3 for codes 437, 510, 511, 612-B, 619, 6411, and 814 are 0.08, 218.11, 0.67, 63.96, 56.46, 9.97, and 12.03, respectively. (emphasis added) iii. DEIS Table 4-5 contains information listed as "Clear Sky to Levee 2nd Leg (Preferred Option). There is one category missing-category 619, Exotic Wetlands Hardwood, which should be listed with an acreage value of 74.62 acres.[ER Table 2.2-3, DEIS reference (FPL2014-TN4058)]. iv. DEIS Table 4-5 does not contain acreages for the Clear Sky to Levee 3rd Leg (Consensus Corridor) per DEIS Reference (FPL 2013-TN2941). (**0619-2-4** [Maher, William])

Comment: There are instances in the DEIS where there are inconsistencies and/or discrepancies relating to authorizations, permitting and certifications. Instances in the DEIS include (emphasis added): a. DEIS Subsection 4.1.2.1, Page 4-20, Lines 5-7: The DEIS states: "The State certification review process also includes a determination of land-use consistency with local land-use plans and zoning ordinances (Fla. Stat. 29-403.50665-TN1470)." However, under the Power Plant Siting Act, land use consistency determination does not apply to transmission lines. The land use consistency determination made was for the site and associated facilities that constitute development under state law. Transmission lines are not "development" under Florida law and, therefore, local government land use and zoning ordinances are not applicable. See 403.50665 and 380.04 Fla. Stat. (**0619-2-8** [Maher, William])

Comment: DEIS Subsection 2.2.1.6, Page 2-14, Lines 12-13: The DEIS states: "Agricultural land composes approximately **9 percent (3,500 ac)** of land use within the 6 mi vicinity of the Turkey Point site (Figure 2-4; **Table 2-2**)." DEIS Subsection 2.2.1.6, page 2-8,Table 2-2 details the acreage related to the Turkey Point site, where no agricultural land use is designated, rather than the 6 mi vicinity. DEIS Subsection 2.2.1.6, page 2-8/2-10, **Table 2-3**, contains the agricultural land acreage within the 6 mi vicinity. However, the total land use acreage depicted in DEIS Table 2-3 and ER Table 2.2-1 is 62,941.15 acres; 9 percent of 62,941.15 acres is approximately 5,665 acres not 3,500 acres (3,500 acres is approximately 5.6 percent). From DEIS Table 2-3 and ER Table 2.2-1, agricultural land composes approximately **4.5 percent (2,850 ac)**. (emphasis added) (**0619-3-3** [Maher, William])

Comment: DEIS Subsection 2.2.2.3, Page 2-20, Lines 25-27: The DEIS states: "Existing land uses in the area to be disturbed by the potable water pipelines would be approximately **20** percent agricultural land, **19** percent urban or built-up land, and approximately **30** percent marsh and wetland (FPL 2014-TN4058)." The cited reference in the DEIS text, (FPL 2014-TN4058), is FPL's ER Revision 6. Taking into consideration the acreages in DEIS Subsection 2.2.3, page 2-20, Table 2-6 and ER Table 2.2-6, the percentages are approximately 21 percent for agricultural land; **6** percent for urban or build-up; and **49** percent for marsh and wetland. (emphasis added) (**0619-3-5** [Maher, William])

Comment: DEIS Subsection 2.2.3.2, Page 2-25, Lines 9-11: The DEIS states: "Most of this land is wetland...urban or built-up lands account for approximately **15** percent (FPL 2014-TN4058)." Taking into consideration the acreages in DEIS Subsection 2.2.3, page 2-23, Table 2-7 and ER Table 2.2-8, the percentage for urban or build-up is approximately **13** percent. (emphasis added) (**0619-3-6** [Maher, William])

Response: *The review team verified the suggested changes in these comments and revised the EIS accordingly. The conclusions of the EIS were not altered by this information.*

Comment: It does not appear that potential adverse impacts to CERP were adequately evaluated during the DEIS process. CERP was approved by the U.S. Congress and has required and will require significant funding in the future for the implementation of the BBCW project. Therefore, the EIS should re-evaluate the impacts of the construction and operation of the proposed RCW to evaluate the project consistency with CERP or a supplemental EIS should be performed. (**0110-1-11** [Hefty, Lee N.])

Response: *The EIS presents the impacts of the construction and operation of the project on sensitive wetlands and wildlife in Section 4.3 as part of the discussion of ecological impacts of preconstruction/construction and in Section 5.3 as part of the discussion of ecological impacts of operation. Interactions between actions planned under the Comprehensive Everglades Restoration Plan (CERP) and the actions proposed by FPL for Turkey Point Units 6 and 7 are discussed in Sections 7.2 (Water) and 7.3 (Ecology).*

The review team has expanded the discussion in the EIS regarding how the proposed action could potentially conflict with the CERP. The expanded discussion has not altered the conclusions regarding potential impacts on land use or terrestrial ecology in the EIS.

Comment: Miami-Dade County notes that the discussion on MDC's CDMP in Section 2.2.1.4 appears to be limited to selected policies within the Land Use Element; no references or summaries are provided for other CDMP elements. Miami-Dade County asks whether the NRC specifically considered the consistency of the proposed project with Land Use Element Policy LU-3A, which requires consistency with all elements of the CDMP, including Objectives CON-4, CON-7, and CON-9 of the Conservation, Aquifer Recharge and Drainage and Coastal Management Elements, as well as with all applicable environmental regulations; the referenced objectives and policies address protection of the aquatic environment and endangered and threatened species and consistency with the Comprehensive Everglades Restoration Program. If so, the NRC should provide citations from the DEIS where this information was presented. If the NRC did not consider the consistency of the proposed project with Land Use Element Policy LU-3A, including consistency with the referenced policies of the Conservation, Aquifer Recharge and Drainage Element, please provide an explanation for why this analysis was not performed. (**0110-1-4** [Hefty, Lee N.])

Response: *The land use reviewers on the review team considered the entirety of the MDC CDMP when arriving at the conclusions regarding land use conflicts in Sections 4.1 and 5.1. The review team recognizes that the CDMP also includes issues that fall outside of traditional land use considerations. The EIS evaluates the impact of building and operating the proposed units on water resources in Sections 4.3 and 5.3 and on ecological resources including wetlands in Sections 4.4 and 5.4. No changes were made to the EIS in response to this comment.*

Comment: DEIS Subsection 2.2.2.3, Page 2-20, Lines 12-15: The DEIS states: "The reclaimed wastewater pipelines from the FPL RWTF would be routed south along the eastern side of the cooling canals to the makeup-water reservoir, **traversing a mangrove forest**..." The Turkey Point Units 6 & 7 Mitigation Plan, Revision 2, DEIS Reference (FPL 2011-TN1012), Section 2.3.2 states: "The treated reclaimed water pipeline between the FPL reclaimed water treatment facility potential alternative location and the Site would be **installed within construction access roadways**, avoiding additional wetland impact." (emphasis added) (**0619-3-4** [Maher, William])

Response: *Data on acreages of terrestrial habitat affected by pipeline installation have been updated in Sections 4.1 and 4.3.1 of the EIS. Additionally, the review team has added information about in situ restoration activities planned for the reclaimed water pipeline to Section 4.1 of the EIS to describe why some impacts from this pipeline can be considered temporary. However, the review team expects forested wetlands (i.e., mangroves) to be converted to herbaceous wetlands and to remain so for the operational life of the pipelines because standard practice dictates exclusion of woody vegetation from pipeline corridors due to root intrusion and subsequent maintenance issues. Although no net loss of wetlands would occur within the reclaimed water pipeline corridors, the conversion of forested wetlands to herbaceous wetlands within the corridors must be regarded as a permanent impact (at least for the operational life of the pipelines). The updated data do not alter any conclusions presented in the EIS.*

Comment: The DEIS text refers to the "**9,640 ac** Turkey Point site". The reference listed in the DEIS is FPL 2014-TN4058, FPL's ER. The ER text denotes this same area as the "approximately **9400-ac** Turkey Point plant property". (emphasis added) Instances in the DEIS include: a. DEIS Section 1.0, Page 1-1, Line 12. b. DEIS Section 2.1, Page 2-1, Line 23. c. DEIS Section 3.1, Page 3-1, Line 30. d. DEIS Section 10.0, Page 10-1, Line 12. e. DEIS Appendix F-3, Section 1.0, Page 1-2, Line 10. References to the approximate **9400-ac** Turkey Point plant property in the ER include (emphasis added): a. ER Subsection 1.1.2.2. b. ER Section 2.1. c. ER Subsection 2.2.1.1.1. d. ER Table 2.2-1 which lists **9459.94** acres as total land for Turkey Point Property. (**0619-1-17** [Maher, William])

Response: *The review team has reviewed all acreage figure information and updated acreage figures as appropriate in Chapters 1 and 3 and Sections 2.4, 4.3, and 5.3 of the EIS. The updated acreage figures did not alter the conclusions presented in the EIS.*

E.2.5 Comments Concerning Land Use - Transmission Lines

Comment: I am opposed to above ground transmission line towers being installed along roads where citizens live. (**0007-2** [Johnson, Nadine])

Comment: I was quite surprised this plan was going through given the public hearings and continued comments about...the overwhelming opposition to high voltage transmission lines running the US1 corridor right near residential neighborhoods. (**0008-2** [Finver, Jody])

Comment: Second, the infrastructure necessary to support this project, including power cables traversing some of the best communities in South Florida, will lower property values and increase health concerns for our families. (**0024-2** [Roque, Julio])

Comment: and the cities along US 1 where fp&l wants to put the huge transmission lines is being fought in court. (**0055-6** [Roedel, Kitty])

Comment: There are other sites where high voltage poles can be placed that would cause less impact than placement so close to such a historically significant neighborhood as the Miami Roads neighborhood. The placement of these poles and lines are not even in sync with the presently existing criteria governing their building or placement. (**0073-3** [Commenters, Multiple])

Comment: I am also concerned about the loss of value of our homes due the close proximity of these lines through our neighborhood. Should the lines be placed in the neighborhood, they

should be buried underground to a level that will not pose a hazard to the neighborhood or those traversing the area. (**0073-6** [Commenters, Multiple])

Comment: 3. Placing high voltage poles in a historically significant neighborhood such as the Miami Roads or South Miami Avenue Association is not the best of ideas. The placement of these poles in areas where they would cause less impact and where they would synchronize better with presently existing criteria governing their placement. 4. The hazards of 100 foot high electric poles within 50 feet of our homes where hurricanes or tornados could cause massive damage to both life and property by toppling onto roofs and causing fires. (**0077-3** [de Armas, Maria Cristina])

Comment: Brickell Neighbors, I oppose the 10 Story Transmission Lines across Brickell Avenue. (**0088-2** [Lange, Alexandra])

Comment: In addition to the underestimating the environmental impacts, FPL will degrade the quality of life of people in the pathway of the transmission lines. (**0117-2** [Robertson, Alyce])

Comment: My townhouse is less than 250 feet from the 110 foot high transmission lines that will be built to carry the power from these new reactors. The effect upon my property value will not be positive, and FP&L will not reimburse us. (**0205-1** [Hamilton, McHenry])

Comment: As a resident of Coconut Grove, I want to express my deep concerns over the power line plans routing over our neighborhood. Health concerns and property value issues should be a consideration when making routing plans. (**0328-1** [Roque, Julio])

Comment: I am shocked to hear that FPL is planning to construct two (count them, two) new nuclear reactor units at Turkey Point. This ill-advised and high-risk project will engender miles of 100-foot oversized poles with high-voltage lines throughout Miami-Dade county, including the historic and-at the moment-desirable neighborhood of The Roads. (**0339-2** [Provost, Allan])

Comment: I live in Miami in an area called The Roads. We will be directly impacted by the FPL high voltage lines. (**0372-1** [Ortiz, Natalia])

Comment: I oppose the expansion of the Turkey Point Nuclear Plant if it causes the placement of above ground power lines through any residential neighborhoods. (**0377-1** [Hughes, David])

Comment: I oppose FPL's proposal to string a high-voltage, aboveground power line along US Hwy One. (**0408-1** [Sifko, Basilio])

Comment: I worked amicably with FPL on many projects but must express deep and substantial opposition to the installation of high intensity power poles along US 1, a project which will impact the many diverse communities along this corridor and near Turkey Point in Miami-Dade County. (**0510-1** [Langlieb Greer, Evelyn])

Comment: Should the lines be placed in the neighborhood, they should be buried underground to a level that will not pose a hazard to the neighborhood or those traversing the area. (**0685-3** [Batista, Carlos])

Comment: Also costs to quality of life. I think some of the questions were about these 105 feet --5 foot transmission towers, which, as it happens, would cut my District in half, along commercial and residential corridors. (**0721-1-7** [Rodriguez, Jose Javier])

Comment: I'm shocked to hear that FP&L is planning to construct two, count them, two, new nuclear reactor units at Turkey Point. This ill-advised and high-risk project will endanger miles with 100 foot oversized poles with high-voltage lines throughout Miami-Dade County, including the historic and at the moment desirable neighborhood of the Roads. Who know what will happen then. Are they going to buy our properties? Are they going to buy all of us out? I doubt it. (**0721-26-3** [Koenigsberg, Linda])

Comment: Number three is that there are other sites where high voltage poles can be placed that would cause less impact then placement so close to such a historically significant neighborhood as the Miami Roads neighborhood. Now, the placement of these poles and lines aren't even in sync with the present of the existing criteria governing their building or placement. (**0721-31-6** [Almirola, Alejandro])

Response: *These comments express concerns regarding the proposed assemblage and locations of transmission lines to distribute power into Miami-Dade County from proposed Turkey Point Units 6 and 7. The review team considered the environmental impacts of electrical transmission in EIS Section 4.1.2 and 5.1.2 for land use; 4.6 and 5.6 for historic and cultural impacts; 4.4 and 5.4 for socioeconomics impacts; and 5.8 for nonradiological health impacts. Electrical transmission, its siting and safety are outside the regulatory authority of the NRC and, in Florida, are regulated by the Florida Public Service Commission and appropriate state agencies. No changes were made to the EIS as a result of these comments.*

Comment: My biggest concern with this project is the proposed Power Lines that FPL is not willing to place underground, rather they're willing to place the lives of this community at risk by choosing the cheapest route. Erecting poles 150ft above ground is not only a eye sore but it's also poses a huge risk to the residents of this community during Hurricane Season. We've been fortunate thus far but in the event another Hurricane Andrew were to hit our community there is no guarantee that those poles could survive the devastating impact of high force winds. This poles should automatically be laid underground with FPL paying for the cost which is ultimately paid by the consumers of this community. Expecting municipalities to cover the cost of 8 million dollars per mile is absolutely ludicrous and doing so will most likely result in higher property taxes for the residents of the municipalities affected. (**0034-3** [Rodriguez, Barbara])

Comment: Constructing the associated new 110' tall High Voltage Electrical Power Line Transmission towers, exempted from the high velocity hurricane zone requirements of the Florida Building Code, in a location that historically experiences Very High Velocity Hurricane force winds, at 200 foot intervals along the length of US One, the major north -south evacuation route for Dade County, poses unacceptable risks to the population of Dade County. Doing so is simply inviting catastrophe in the event of a natural or man-made disaster requiring evacuation. (**0044-7** [Commenters, Multiple])

Comment: In addition to the plants, FPL wants to erect more power lines along US 1. During a hurricane, exposed power lines are the first things to fall. Why are these not being place underground as other new power lines around the state? It is doable, a little more expensive at first to put in but we would have power during bad storms and there would be minimal repair costs, saving money in the long run. (**0048-2** [Wegner, Geri])

Comment: Hurricane Andrew show me unrivaled destruction I couldn't have imagined nor can I forget if I live for a thousand years, I do seriously believe that if you construct 110 foot high carrier lines along US-1 on purpose, any decent hurricane will down those towers, and endanger millions of citizens[.] (**0056-2** [McCall, Eric])

Comment: I am concerned about the hazards of 100 foot high electric poles that are within 50 feet of our homes and, in a hurricane or tornado could cause massive damage, including toppling onto rooftops and causing fires. (**0073-4** [Commenters, Multiple])

Comment: The Underline is an initiative to transform the land below Miami's Metrorail from the Brickell area to Dadeland South into a 10-mile linear park and urban trail. Miami is one of the country's most dangerous places to bike and walk in the country. The Underline will be Miami's first off-road mobility corridor providing a safe haven for bicyclists and pedestrians, greatly improving our city's bike and pedestrian infrastructure, safety and while also taking cars off our roads improving our traffic problems. What does this have to do with FPL? At the same time the vision for The Underline was ramping up, FPL was finalizing its preferred corridor for transmission line placement - right in the same place as the future Underline. (**0076-1** [Daly, Meg])

Comment: The towers for the power line will be ten-stories tall (up to 105-feet), 4-feet wide, and placed every 200-400 feet. Moreover, they will not be built to Florida hurricane safety standards. This aspect of FPL's expansion project alone will make it more difficult to create beautiful, urban spaces, like the Underline, that improve public safety. (**0076-3** [Daly, Meg])

Comment: Furthermore, 100 foot towers for transmission lines represents old technology and is dangerous. When we went through hurricane Wilma in 2006, only the city of Weston, with underground transmission lines, had power. (**0080-2** [Reiter, Ben])

Comment: I sincerely hope you will withdraw your proposal to build additional nuclear plants and to install more giant size transmission poles in South Florida. I live in the City of West Miami and objected to the installation of the poles on SW 62nd avenue to no avail. Many countries in Europe have installed necessary transmission lines underground. What are we waiting for? (**0131-1** [Brown, Judith O.])

Comment: And the idea to route massive, unsightly power lines through a beautiful part of the city is just tone deaf to the residents of the area. Those power lines can snap when a hurricane hits because they aren't hurricane resistant strength. (**0133-3** [Corral, Oscar])

Comment: If we have a hurricane and any of these poles fall, who is liable? If it falls on my house, will they fix my house? How long will it take to fix homes, roadways, buildings, etc? We need proof of liability. If placed underground, it should include a maintenance plan and who will pay for that? (**0149-11** [Nelson, Joyce E.])

Comment: Why can't the lines be underground. They exist all over the world!!!! There are already plans to do a Green Link for biking and walking under the Metrorail from Dadeland to downtown Miami. The path would be directly next to these huge power poles. Check out the plan on greenlink.org. Has there been a coordinated plan with all projects for US1? Land use and zoning does not recommend this. Coral Gables, Pinecrest, and the City of Miami has filed a lawsuit and others will follow.! (**0149-4** [Nelson, Joyce E.])

Comment: My street is favored as the "preferred alternative route" for the giant power transmission lines referenced below, which has been approved by Gov. Rick Scott and his entire cabinet. To construct such power lines on a residential street, which combines low-rise condominiums, a church and small businesses, is a complete travesty of justice that endangers our health, welfare and property values. (**0184-1** [Perez, Danica])

Comment: The proposed towers will create a danger to all those living and working in close proximity to them, they will be an unnecessary eyesore running through some of Miami's nicest neighborhoods, and exponentially increase the traffic situation on US1 during the construction phase. (**0187-5** [Meyer-Steele, Shawn])

Comment: Wires need to be underground. (**0334-2** [Crystal, Chris])

Comment: Power lines must be underground near or through or neighborhoods! (**0377-2** [Hughes, David])

Comment: It is wholly unjustifiable to place a high-voltage, aboveground power line along US Hwy 1. FPL has ample resources to place it belowground. The only justification for aboveground placement is to save a few dollars on one-time placement costs at the expense of our communities, which demonstrates FPL's utter contempt for residents who are also its customers. (**0408-2** [Sifko, Basilio])

Comment: It is dangerous. Traffic accidents are not scripted...they happen. This is why they are called precisely those...accidents. Even reinforced concrete poles crack, break and fall when impacted by tractor-trailers and fuel-laden delivery vehicles traveling at 55 miles per hour, weighing several tons plus the weight of cargo or flammable liquid, namely, gasoline, to the Florida Keys. The assurances of FPL Counsel of absolute safety notwithstanding. (**0408-3** [Sifko, Basilio])

Comment: It will negatively affect tourism. Along this same corridor, millions of tourists travel on their way to the world-known and widely visited ...Florida Keys. Imagine a tourist from any city flying into MIA, renting their car and traveling southbound on US Hwy 1. The welcome they would receive to the Florida Keys is a very visible, very unsightly and very dangerous high-voltage, aboveground power line strung for mile after mile. (**0408-4** [Sifko, Basilio])

Comment: Homeowners and affected businesses along the proposed route will not watch passively and accept a situation in which a tiny handful of power company executives, who, by virtue of: vast power (by "power" I do not mean electricity); considerable influence at all government levels; and immense economic resources arbitrarily impose their will. We are actively organizing opposition. (**0408-6** [Sifko, Basilio])

Comment: It would behoove counsel for FPL/NextERA to revisit a court case as old as me: Microwave Communications Inc. vs. (AKA MCI) American Telephone & Telegraph Company (AKA AT&T). The quarrel began in 1963 and the resolution was implemented January 1, 1984. Careful examination strongly suggests similarities. MCI only asked for a license to provide two-way radio communications for truckers traveling Route 66 from Chicago to Joilet, Illinois. AT&T flexed its power, influence and economic resources in opposition. In the final analysis, Judge Harold Greene's decision ended the monopoly privilege enjoyed by AT&T. A monopoly privilege almost exactly as that enjoyed by FPL. I use the term "monopoly" because it is correct. There are substitutes but who among us uses candles to light our home? So we depend on FPL to generate and distribute power...safely. Some of us strongly believe some markets are what economists call "natural monopolies". Best served where the company can operate serving an "economy of scale". We do not seek to remove the privilege FPL enjoys under a monopoly pricing structure. We only ask FPL place its high-voltage power line belowground. FPL's latest Balance Sheet lists the account, "Goodwill & Intangibles", as an asset account with a zero balance. A protracted battle with the entities listed below and the inevitable media exposure will result in, "Goodwill & Intangibles", shifting to the Liabilities section and an

account balance. How much of a balance is contingent upon FPL's intransigence and insistence at aboveground placement. There is a direct relationship between the two; the more FPL insists on aboveground placement, the more FPL's "brand" will suffer. The homeowners who would be adversely affected by this "quick-and-dirty" proposal are actively organizing to assure this proposal never becomes reality. We will do our best to make the proposal so public, and therefore so costly, the "fallout" will render it untenable. US Supreme Court Associate Justice Louis Brandeis was quoted as saying. "the best disinfectant is the sun". We agree and hoping (some of us praying) for bright sunny days until this issue is resolved to the satisfaction of the citizens of Miami-Dade and Monroe Counties. Nature supports our position ...for we are the Sunshine State. The NRC (Nuclear Regulatory Commission), the Florida Department of Tourism, The Florida Public Service Commission, environmentalist organizations, NGO's, affected municipalities and businesses will be contacted. Homeowners of record six city-blocks east and west and north and south will be culled from public records. Direct mail will be used to inform them how and why their property values will drop. Just as important are the residents and "mom-and-pop" businesses of Monroe County, specifically those in the Florida Keys whose primary source of income is tourism. It is they who will suffer the most economically. In the event moral suasion does not convince FPL to recognize right...as well as reality, available legal channels will be used; moratoriums and class-actions are possible eventualities. Preliminary research indicates legal fees alone could rival the marginal difference in underground placement We expect and are prepared for a protracted legal battle given the resources of FPL. Make no mistake there is a countervailing force to FP&L / NextERA's vast resources. It is called Democracy and we will exercise it. Lastly, we will see this ill-conceived, counterproductive and unsafe proposal never becomes reality. (**0408-8** [Sifko, Basilio])

Comment: Expand Consideration of Transmission Line Impacts. ... the impacts of FPL's proposed transmission lines are not limited to construction-related disruptions. **Comment 17: The final Environmental Impact Statement should disclose risks related to transmission lines not built to Florida hurricane safety standards.** The transmission lines associated with this project will not be constructed to conform to Florida's Building Code, which specifically accounts for the high velocity hurricane zones common throughout South Florida. Instead, the transmission lines will be erected according to an industry-created minimum safety standard known as the National Electrical Safety Code (NESC). In short, structures built using NESC standards are significantly less hurricane resistant than structures built to Florida Building Code standards. The NESC is too large to attach to these comments. However, it is contained in the Site Certification Application that FPL submitted to the State of Florida. NESC Table 253-1 shows the load factors for the highest velocity winds contemplated under that code. The table lists the relevant load factor as 1.00. Essentially, a load factor is a safety factor that accounts for construction error and establishes the amount of additional stress from wind, and related swaying, that the structure is able to withstand; **designs using this standard will have 60% less loading, and less reliability**, than required by building codes which account for high velocity hurricanes. This is a significant concern when many of the transmission poles proposed in the Turkey Point Nuclear Plant Units 6 & 7 application are over ten-stories tall. (**0456-24** [Miami, City])

Comment: Moreover, the transmission line FPL plans to run through Miami will not be built to Florida hurricane safety standards. In a storm, the ten-story poles could collapse onto homes or the Metrorail. (**0515-7** [Regalado, Tomas])

Comment: While transmission lines may be an eyesore, that is not the biggest issue with what is being proposed. The biggest issue IMO is that these transmission lines will not even be up to hurricane code (ie able to withstand hurricane force winds). As someone who has lived through

several hurricanes in south florida, this is absolutely a NON-STARTER. I cannot build or remodel a home without it being to code, so FPL should NOT be allowed to construct these without ensuring that they can withstand hurricanes. (**0570-2** [Martinez, Orlando A.])

Comment: Comment 18: The final Environmental Impact Statement should disclose risks related to transmission lines not built to Florida hurricane safety standards. The transmission lines associated with this project will not be constructed to conform to Florida's Building Code, which specifically accounts for the high velocity hurricane zones common throughout South Florida. Instead, the transmission lines will be erected according to an industry-created minimum safety standard known as the National Electrical Safety Code ("NESC"). Structures built using NESC standards are significantly less hurricane resistant than structures built to Florida Building Code standards. The NESC is too large to attach to these comments. However, it is contained in the Site Certification Application that FPL submitted to the State of Florida. NESC Table 253-1 shows the load factors for the highest velocity winds contemplated under that code. The table lists the relevant load factor as 1.00. Essentially, a load factor is a safety factor that accounts for construction error and establishes the amount of additional stress from wind, and related swaying, that the structure is able to withstand; **designs using this standard will have 60% less loading, and less reliability**, than required by building codes which account for high velocity hurricanes. This is a significant concern when many of the transmission poles proposed in the Turkey Point Nuclear Plant Units 6 & 7 application are over ten-stories tall. (**0611-17** [Haber, Matthew S.])

Comment: The thought of FPL poles dotting US1 is unbearable. Haunting images in my head, I cannot understand how the poles would even be a consideration. We are the United States, one of the most advanced countries in the world. In other developed countries this issue is dealt by placing the cables underground. How is it possible that we, in the United States, would be taking a step forward with The Underline project and two steps back with how we deal with unsightly, antiquated, industrial-age ideas? (**0616-1** [Puchades, Mary])

Comment: In addition the FPL plan requires the building of transmission lines through populous residential areas to downtown Miami. According to an editorial in the Miami Herald, these lines will not be built to Florida hurricane safety standards. Having lived through Hurricane Andrew in 1992, I am appalled by any such plan which would endanger the lives and property of thousands of our citizens. (**0642-4** [Rawlins, Steve])

Comment: The proposed transmission lines will not be built to Florida hurricane safety standards. If a tower buckles during a storm, it could destroy the Metrorail and surrounding homes. (**0675-5** [Rodriguez, Jose Javier])

Comment: Therefore, the solution proposed in #8 [burial of the transmission lines] is not an acceptable alternative to the plan. (**0701-2** [Whitlock, Catherine])

Comment: And also, five, I'm concerned about the hazards of 100 foot high electric poles that are within 50 feet of our homes, and a hurricane or a tornado could cause massive damage, you know, toppling these things onto, you know, close by to my house. I live on 20th Road, you know, next to the Shell Gas Station on 20th and Coral Way, and I just think it's just a really bad idea that they're going to put those ugly things that nobody wants, and they're going to crash and ruin our neighborhood. Just terrible. (**0721-31-7** [Almirola, Alejandro])

Comment: And the transmission line towers will be ten stories tall and will not be built to Florida Hurricane Safety Standards. If the NRC does not grant the licensing then the transmission lines also will not be built. (**0721-4-4** [Regalado, Tomas])

Comment: And finally whereas transmission interconnection between the Turkey Point facility and the transmission system will be needed in order to support the electrical supply and reliability means of Miami Dade County customers. (**0723-2-8** [Trowbridge, Mark])

Response: *These comments express concerns regarding the proposed assemblage, capability, and placement of transmission lines to distribute power into Miami-Dade County from proposed Turkey Point Units 6 and 7. The review team considered the environmental impacts of electrical transmission in EIS Sections 4.1.2 and 5.1.2 for land use; 4.6 and 5.6 for historic and cultural impacts; 4.4 and 5.4 for socioeconomics impacts; and 5.8 for nonradiological health impacts. Electrical transmission, its siting and safety are outside the regulatory authority of the NRC and, in Florida, are regulated by the Florida Public Service Commission and appropriate state agencies. No changes were made to the EIS as a result of these comments.*

Comment: [I strongly oppose] the installation of the transmission lines through our neighborhoods or the everglades. (**0092-2** [Merino, Miriam])

Comment: I recommend that you disapprove any further processing of their Turkey Point Nuclear Power plant expansion proposal for the reasons summarized below 4) The proposed project includes massive new transmission lines through Everglades National Park and the heart of Miami-Dade's densely populated commercial and residential areas on 105-foot tall steel towers. The towers would deface Dixie Highway and traverse residential neighborhoods in Pinecrest, South Miami, Coral Gables, Coconut Grove, and then go along Brickell Avenue on their way to downtown Miami. Apart from their appalling visual impacts, these lines would remove tens of millions annually from the county's tax base. Worse, FPL -- evidently to save costs -- proposes erecting those transmission towers without meeting Florida State hurricane safety standards. FPL did not adequately evaluate the risk of those towers buckling during the region's relatively frequent hurricane force storms. Their location would almost certainly risk those transmission lines and towers falling onto the adjacent MetroRail and surrounding homes. The costs in life and property, not to mention of disruption of transportation and electrical service during the aftermath of a storm would be catastrophic. This cost was not adequately assessed by FPL in their proposal. (**0094-4** [Fairchild, David])

Comment: Does the DEIS consider that the area of proposed impact within ENP is a designated UNESCO World Heritage Site in Danger, a Ramsar Wetland of International Importance, a Specially Protected area under the Cartagena Convention and an Outstanding Florida Water and a Miami-Dade County designated Area of Critical Environmental Concern where the proposed roads are specifically prohibited in portions of the proposed corridor? (**0110-1-2** [Hefty, Lee N.])

Comment: Florida Power & Light plans to erect a series of huge concrete light poles each more than 100 feet tall, with a 35 square foot footprint. These concrete structures are intended to carry the energy created by the new reactors north so the energy can, for the near future at least, be sold. FPL would like to run its gigantic poles through our national park, the Everglades! This would have a huge impact on this national treasure and severely impact the plants and animals in the park., Local cities, as well as citizen groups, have protested the erection of these towers, asking instead that the lines be buried. FPL says it will consider burial only of the local communities provide the money. Although the power is not intended for the citizens in these

cities and the towers provide no benefits to the community, they want us to pay to have the lines buried! Their plan is to run the power towers parallel to US 1, a major thoroughfare for our residents. First, it would run north on the west side of US 1, totally destroying the value of homes nearby.It would continue north, running by the Metrorail, our local mass transit system, a narrow strip of land currently a bicycle path and planned as an urban linear park. (**0115-8** [Trencher, Ruth])

Comment: Florida, Power, and Light is planning to place 2 nuclear reactors and transmission lines of high voltage, approximately 80-105 feet tall and the size of a 10 story building, along US1 from the Homestead to Downtown Miami. If built, such transmission lines will impact my community. FPL will be contacting you and the cabinet for approval and we want you all to know our community along this route is outraged. Please defer this until all questions are answered, reviewed and the constituents are informed. (**0149-2** [Nelson, Joyce E.])

Comment: [I] oppose the transport of energy across or through the fragile Everglades. Our river of grass which feeds into Florida Bay and supports and entire eco system has been devastated in the past by the effects of phosphorus and fertilizer from the sugar industry and has killed off the grasses in the bay where shrimp spawn. (**0360-2** [Palmer, Majorie])

Comment: I also don't like that the power lines would run through the Shark River Slough. There are power lines running north along 27. Let there be areas that are just wild. (**0361-3** [Berndgen, Michelle])

Comment: 7) <u>Description of the Affected Environment, Especially Relating to the State of Florida Site Certification Process</u>

The DEIS does not provide accurate geographical descriptions, hydrology, and Western Corridor language pertaining to the Florida Site Certification Process and up-to-date information relating to the Western Corridor which represents the location for the transmission power lines that was approved in the Siting Order. Although the Final Siting Order has been appealed, the DEIS should be updated to include not only the Final Siting Order as it relates to the proposed expansion and the location of the powerlines, but also the Conditions of Certification for these features that are the subject of this DEIS as it provides the anticipated framework for the implementation of these features. (**0622-1-15** [Austin, Stan])
Comment:

<u>Status of State of Florida Site Certification Process Pertaining to Western Corridors</u>

Introductory text on pages 1-1 to 1-2 regarding the State of Florida's May 2014 certification of the Turkey Point project is incomplete. As written, it suggests the certification process has concluded and FPL has all the State, regional and local permits needed for the project. We encourage a revision of this section to note that Miami-Dade County has appealed the certification of the West Preferred Corridor for transmission lines and three municipalities have appealed the location of transmission lines in the Eastern Corridor. Certification of the West Consensus Corridor was not appealed. The appeal process is anticipated to continue through the fall of 2015 or longer. Until there is a non-appealable Final Order, FPL does not have the State, regional, and local approvals needed to use the West Preferred Corridor as the backup location for its western transmission lines.

Text on page 2-18 regarding the Site Certification Process is incomplete. We recommend adding the following text to describe the Final Order and the Siting Board's direction to

maximize use of the West Consensus Corridor to avoid siting transmission lines in Everglades NP:

> ["]On May 19th, 2014, Florida's Governor and Cabinet, sitting as the Siting Board, issued a Final Order (FO) of Certification that approved FPL 's application to construct and operate two new nuclear generating units at Turkey Point, approved the transmission lines to be located in the East Preferred Corridor, and approved the western transmission lines to be located in the West Consensus Corridor with the West Preferred Corridor as the backup location if a right-of-way in the West Consensus Corridor cannot be obtained in a timely manner and at a reasonable cost. The FO directs FPL, the affected rock mining companies, and the South Florida Water Management District to pursue the option of fully accommodating the western transmission right-of-way to the east of the L-31N canal to avoid siting any transmission lines in Everglades NP. In areas where FPL is unable to build and maintain its structures east of the L-3JN canal (outside of ENP), the FO directs that FPL shall only use the minimum amount of land west of the L-31N canal (inside the current boundaries of ENP) that is necessary to build and maintain the structures, and FPL shall return to installing structures to the east side of the L-31N canal at the first available and practicable location. The Siting Board's certification of the West Preferred Corridor and the East Corridor is currently under appeal. The timeline for a decision by the Appeals Court is anticipated to continue through the fall of 2015.["]

Section 2.2.2.1 Western Corridors[.] We are concerned with the accuracy and completeness of information regarding the West transmission corridor on page 2-17. Text on lines 5-7 states FPL has "two options for the West corridor that differ primarily with respect to where the corridor would pass near Everglades NP (even though no part of the corridor would actually pass through the park)." The last half of this sentence is inaccurate. The West Preferred and West Consensus corridors overlap and traverse five to six miles of lands currently within the park boundary.

Similarly, the West Preferred Corridor text (page 2-17, lines 13-24) states that the West Preferred Corridor runs just east of the park boundary. This is inaccurate at the present time. The West Preferred Corridor north of SW 120 St. and west of the L-31N canal includes 260 acres of NPS land along 6.5 miles of the eastern park boundary. NPS is currently preparing an EIS that considers exchanging park lands in the West Preferred and West Consensus corridors for FPL lands farther west in the park. The Final NPS EIS and Record of Decision on the potential land exchange are anticipated to be complete in December 2015. Until the ROD is signed, the existing status of NPS lands in the West corridor should be described in the NRC's EIS.

The West Consensus Corridor text (page 2-17, lines 25-31) states that portions of the Consensus Corridor "have been shifted to the east to avoid abutting the eastern perimeter of Everglades National Park." This is partially accurate but omits noting that the Consensus corridor overlaps the West Preferred corridor for 5 miles and includes approximately 200 acres within the current park boundary. It may be several years after a non-appealable Final Order of Certification is issued before FPL knows if it will be able to use any of the Consensus Corridor for the west transmission lines. The following text is recommended to be included in a revised DEIS to provide a more complete description of the corridor:

["]The Consensus Corridor follows the West Preferred Corridor until it reaches a point approximately six miles south of Tamiami Trail. There, the Consensus Corridor expands the

width of the corridor by 600 feet to the east of the West Preferred Corridor for a distance of about 5 miles until it reaches a point one mile south of Tamiami Trail. This segment includes approximately 200 acres of land within the current boundary of Everglades National Park and rock-mining lands on the east side of the L-31N canal. Then, the Consensus Corridor turns to the east for a distance of about 2.5 miles, turns northeast through the Bird Drive Basin and passes through the Pennsuco wetlands north of Tamiami Trail to intersect with the West Preferred Corridor. The Consensus Corridor differs from the West Preferred Corridor in that it is wide enough to potentially allow FPL to locate the full right-of-way on the east side of the L-31N Canal to avoid siting transmission lines within the current boundary of Everglades National Park. The alignment through the Bird Drive Basin and Pennsuco wetlands would locate transmission lines farther to the east of endangered Wood stork colonies in Everglades National Park and Water Conservation Area 3-B. This corridor still crosses a landscape consisting mostly of wetlands and disturbed wetlands, but FPL states that its use would reduce the potential for adverse impacts on multiple federally endangered species (FPL 2013-TN2941).["] (**0622-1-16** [Austin, Stan])

Comment: It is for these reasons, we respectfully request that NRC and USACE revise the DEIS to address these issues. An update to the DEIS analysis should:...more fully address the current information related to the Florida Siting Board's Conditions of Site Certification that address features of the plant components that may affect the environment, including the RCWs and other associated infrastructure, including the construction of power lines. (**0623-12** [Austin, Stan])

Comment: The heart of Everglades restoration, the reason we're doing Everglades restoration, now we're going to align it with three massive power lines and that's what hundreds of thousands of visitors are going to see when they come to Everglades National Park. The first thing they're going to see is these three 150-foot power lines going up over there...[and] the pads... (**0723-9-11** [Schwartz, Matthew])

Response: *These comments express concerns regarding the potential effects of the proposed transmission lines to support Turkey Point Units 6 and 7 on ecological resources including the Everglades National Park. Although electrical transmission and its safety and siting are outside the regulatory authority of the NRC, the review team considered the environmental impacts of electrical transmission, which are described in Sections 4.1.2 and 5.1.2 for land use; 4.3.1, 4.3.2, 5.3.1, and 5.3.2 for terrestrial and aquatic resources including the Everglades National Park; and 4.4 and 5.4 for socioeconomics impacts.*

Regarding Everglades National Park, the NPS signed a ROD transferring 260 ac of land to FPL in exchange for 360 ac of FPL property within the East Everglades Expansion Area (EEEA)(NPS 2016-TN4532). The ROD incorporates the Conditions of Certification from the Final Order on Certification from the State of Florida Siting Board dated May 19, 2015 (State of Florida 2014-TN3637). As a result of this land exchange, no portion of any proposed power line corridor would fall within Everglades National Park. A description of the land exchange was added to Section 2.2. In addition, the designation of Everglades National Park as a Miami-Dade County designated area of critical environmental concern was added to Section 2.2. The status of the State of Florida site certification process was updated in Sections 1.0 and 2.2.

Comment: The East Preferred Corridor for the transmission lines runs through the Homestead Air Reserve Base (HARB) Accident Potential Zone II (APZ II). APZ II is an area beyond the end of runway which possesses a measurably higher potential for aircraft accidents. This area is identified in the base Air Installation Compatible Use Zone (AICUZ) Study. Recommendations

from the base's AICUZ should be a major consideration in any planning process. (**0670-1** [Hyden, Brent A.])

Comment: The goal of the Department of Defense's (DoD) long standing AICUZ program is to promote public health, safety and general welfare while also protecting military airfields from encroachment that would in turn jeopardize the military mission. The land use guidelines for the Air Force AICUZ programs are outlined in DoD Instruction 4165.57, Change 1, 12 March 2015. The suggested land use compatibility guidelines for APZ II are located in the referenced DoD instruction, Appendix 2, Enclosure 3, Recommended Land Use Compatibility in APZs, which begins on page 16. Here you will find Table 1 which includes the Standard Land Use Coding Manual (SLUCM). Utilities are listed on page 17 of this Table. SLUCM 48 (Utilities) shows that while some utilities are allowed in APZ II, note 6 states: *"No above ground passenger terminals and no above ground power transmission or distribution lines. Prohibited power lines include high-voltage transmission lines and distribution lines that provide power to cities, towns, or regional power for unincorporated areas".* HARB recognizes the fact that FPL owns a right-of-way in this area. HARB also recognizes that transmission lines already exist. However, we feel that adding more transmission lines coupled with the fact that these new lines will also be positioned higher than the existing lines, will put our pilots and the public at increased risk. Should an aircraft impact these transmission lines, the consequences could be a loss of life, and a loss of electrical power to a large part of the county. As such, we recommend that the transmission lines be routed through either the West Preferred Corridor or the West Secondary Corridor. Both of these corridors would run the transmission lines through areas outside of the APZs and therefore not put at risk U.S. Air Force pilots or the community. (**0670-2** [Hyden, Brent A.])

Response: *The Air Installation Compatible Use Zone (AICUZ) was reviewed as a part of the analysis performed for the EIS, and is cited in Section 4.1 of the EIS. The new transmission line proposed in the East Corridor would be collocated with the existing transmission line as described in that section of the EIS, and as noted by the commenter. The portion of the transmission line that would traverse the Accident Potential Zone II (APZ II) alongside the existing transmission line between the Clear Sky and Davis substations would be a little less than a mile long at the end of the zone delineated in the AICUZ (Figure 3-1). The EIS has been revised to include this information.*

Comment: And we have modeled the same costs from the transmission lines infrastructure which turn out to be significantly greater than the temporary benefits. The permanent costs per year are greater than the temporary benefits that are going to end. (**0721-2-14** [Stoddard, Philip K.])

Response: *Section 10.6 of the EIS presents a benefit-cost balance performed by the review team for the Units 6 and 7 project, including associated new transmission line infrastructure. While Table 10-4 of the EIS acknowledges potentially MODERATE costs associated with the land use and terrestrial ecology impacts, the analysis in Section 10.6 concludes that the benefits of the project likely outweigh the costs. Therefore, no changes to the EIS were made as a result of these comments.*

Comment: There are instances in the DEIS with respect to the presented land use values in their respective tables, which are inconsistent with the cited source or not current with the most recent documentation/reference. Instances in the DEIS include (emphasis added): a. DEIS Subsection 2.2.2.1, Page 2-15, Table 2-4: In DEIS Table 2-4 contains acreages for the existing and proposed transmission corridors. The following inconsistencies are noted with the cited

source for DEIS Table 2-4, (FPL 2014-TN4058) (areas where the data is inconsistent with the most current reference are also indicated): i. Information for the West Secondary Corridor is included, while information for the West Consensus Corridor is not included. The West Secondary Corridor was removed from consideration in 2013 at the time the West Consensus Corridor was adopted. [DEIS Reference (FPL 2013-TN2941)]. ii. The acreage for the proposed "Clear Sky-Levee Leg 1"/ "Clear Sky-Pennsuco Leg 1" is listed as **1378.9**. ER Table 2.2-3 and DEIS Table 2-5 lists the total acreage, **1365.43**, for the same route. (Note the total acreages for mentioned corridors are accordingly inconsistent.) iii. The total length of the "Clear Sky-Levee" is listed as **44** miles. ER Subsection 2.2.2.2 lists the total length as **43** miles. iv. The intermediary lengths for the co-located legs of "Clear Sky-Levee" and "Clear Sky "Pennsuco" is listed as 27.5, 13, and 4.5 for Leg 1, Leg 2, and Leg 3, respectively, and gives the total of these three legs as 44. ER Subsection 2.2.2.2 lists the total length as 43 miles and no intermediary lengths are provided in the ER. b. DEIS Subsection 2.2.2.1, Page 2-18, Table 2-5: In DEIS Table 2-5 contains total acres of transmission line corridors and access roads by major FLUCFCS code. The following inconsistencies are noted with the cited sources for DEIS Table 2-5, [(FPL 2014-TN4058) and (FPL 2013-TN2941)]: i. Listed under "West Consensus Access Roads" are 11 different segments. As stated in DEIS Section 2.2.2.1, Transmission-Line Corridors, and DEIS reference (FPL 2013-TN2941), only four proposed access road corridors for the West Consensus corridor have been designated: NW 12th Street, Tamiami Trail, L-31 Canal and Levee, and SW 88th Street. ii. The acreage listed for FLUCFCS code 600 under "West Consensus Access Corridor", segment for the L-31 Canal is **4.2 ac**. DEIS reference (FPL 2013-TN2941) Table 1 lists this entry as **4.7 ac**. ii. The presented summation of the acreage for FLUCFCS code 800 listed for both the "West Preferred Corridor" and "West Consensus Corridor", segments for the Levee to Pennsuco is **24.8 ac**. ER Table 2.2-3 provides the individual acreage by FLUCS code subcategory. For code 800, under the Levee to Pennsuco route, the sum is **34.8 ac**. c. DEIS Subsection 2.2.2.3, Page 2-20, Table 2-6: DEIS Table 2-6 contains total acres of reclaimed water pipeline and the potable water pipeline by major FLUCFCS land-use categories. The following inconsistencies are noted with the source cited for DEIS Table 2-6, (FPL 2014-TN4058): i. Four of the values for the reclaimed water pipeline are inconsistent with the ER. DEIS Table 2-6 for codes 200, 500, 600, and 800 lists 496.64, 74.89, 447.80, and 672.05, respectively, while the summation of the values listed on ER Table 2.2-6 for codes 200, 500, 600, and 800 are 496.65, 78.06, 457.75, and 669.29, respectively. ii. Four of the values for the potable water pipeline are inconsistent with the ER. DEIS Table 2-6 for codes 400, 500, 600, and 800 lists 7.69, 24.75, 159.95, and 39.21, respectively, while the summation of the values listed on ER Table 2.2-6 for codes 400, 500, 600, and 800 are 7.65, 24.72,158.95, and 39.19, respectively. d. DEIS Subsection 2.2.3, Page 2-23, Table 2-7: DEIS Table 2-7 reports the acres within the 50 mile region using FLUCFCS. The following inconsistency is noted with the source cited for DEIS Table 2-7 (FPL 2014-TN4058): i. Two of the values, for codes 600 and 800, listed as **1,409,912** and **42,570**, respectively, are inconsistent with ER Table 2.2-8. The summation provided in ER Table 2.2-8 for codes 600 and 800, are **1,416,931** and **42,588**, respectively. (**0619-2-1** [Maher, William])

Comment: Numerical value inconsistencies within the draft EIS: Subsection 4.1.2.2, Page 4-23, Lines 7-10 "The affected land comprises... **1.81 ac of existing electric power facility land** (FLUCFCS Code 831)...plus...**0.52 ac of adjoining land designated as exotic wetland hardwoods** (FLUCFCS Code 619)." DEIS Subsection 4.3.1.2 Page 4-50, Lines 29-31 ER Table 2.2-5 DEIS Section 4.3.1.2: "Approximately **1.81 ac...is classified as exotic wetland hardwoods**, and the remaining **0.52 ac is existing electric power facilities** (FPL 2014-TN4058)." ER Table 2.2-5 lists the Levee Substation acreage for FLUCCS code 619, **Exotic Wetland Hardwoods, as 1.81 ac**, and for FLUCCS code 831, **Electric Power Facilities as 0.52 ac**. (**0619-2-34** [Maher, William])

Response: *The review team updated acreage information in the EIS to be consistent with data provided in Revision 6 of the ER or more recent responses to Requests for Additional information (RAI). The conclusions in the EIS were not altered by these changes.*

Comment: If the Army Corps of Engineers will have to decide to issue, deny, or issue with modifications a Department of the Army (DA) permit for the portions of the West corridor that would be constructed within wetlands, shouldn't the DEIS provide all available information on what alternatives are potentially available? Miami-Dade County requests that the NRC explain why only the West Preferred and West Consensus transmission corridors were considered as West corridor alternatives in the DEIS, when several alternatives for the West corridor were presented to the State of Florida and "all of the western alternate corridors met the criteria for certification" (State of Florida, Division of Administrative Hearings, Application No. PA 03-45A3, Florida Power & Light Company Turkey Point Units 6 & 7 Power Plant Siting Case No. 09-3575EPP, Recommended Order, Section III.C.2.d., paragraph 511). Miami-Dade County requests that the NRC explain why the DEIS does not provide information or analysis of all of the alternative corridors presented to the State of Florida, including the West Consensus and West Preferred corridors, that includes an assessment of which of these are practicable, which of the alternatives have less adverse impact on the aquatic environment, and which of the alternatives have other significant adverse environmental consequences. Miami-Dade County requests that the DEIS be revised or a supplemental EIS performed in order to evaluate and compare all of the possible western alternate corridors that met the criteria for certification under provisions of the State of Florida Transmission Line Siting Act, and at a minimum, evaluate which of these are practicable (including which of the alternatives meet local regulatory and land use requirements), which of the alternatives have less adverse impact on the aquatic environment, and which of the alternatives have other significant adverse environmental consequences that the Army Corps of Engineers should consider. It is Miami-Dade County's position that that the corridor submitted by the National Parks Conservation Association (NPCA) for certification by the State of Florida is the only proposed corridor other than the West Consensus corridor that could meet Miami-Dade County's strict environmental regulations for the East Everglades Area of Critical Environmental Concern. Miami-Dade County asserts that the NPCA corridor is a practicable alternative to the West Preferred corridor and has significantly less adverse impact on the aquatic environment because it does not require the construction of transmission lines and associate infrastructure within the current boundaries of Everglades National Park and because it avoids impacts to high quality wetlands in this area. This alternative therefore meets the requirements for the Section 404(b)(1) Guidelines that "no discharge of dredged or fill material into waters of the United States (including jurisdictional wetlands) shall be permitted if there is a practicable alternative that would have a less adverse impact on the aquatic environment, as long as the alternative does not have other significant adverse environmental consequences". (**0110-1-3** [Hefty, Lee N.])

Response: *The USACE will complete an independent evaluation of the proposed project after publication of the final EIS. The USACE's independent ROD regarding the proposed permit will reference the analyses in the EIS and will also present any additional information required by the USACE to support its permit decision. This will likely include the USACE's determination on the LEDPA, the consideration of impacts to the aquatic environment, PIR factors, consideration of all comments received, and compliance with applicable laws and regulations. The USACE's final decision document was not addressed in this EIS because the document is separate and independent and will not be completed until after the final EIS is issued. The siting of the electrical transmission lines is outside the regulatory authority of the NRC so the NRC does not propose alternatives to the routes included in the application submitted by FPL. However, the review team (which includes the USACE) considered the environmental impacts of electrical*

transmission, which are described in Sections 4.1.2 and 5.1.2 (land use); 4.3.1, 4.3.2, 5.3.1, and 5.3.2 (ecological impacts); 4.6 and 5.6 (historic and cultural impacts); 5.7.3 (meteorological and air quality impacts); and 5.8 (nonradiological health impacts). No changes were made to the EIS as a result of this comment.

Comment: The NPS suggests that revisions to the DEIS consider the specific purposes the Everglades NP Protection and Expansion Act of 1989, which expanded the boundaries of the park to include approximately 109,600 acres. This analysis is especially important for USACE as they consider their public interest review. The NPS's DEIS found that the construction and operation of powerlines in the West Preferred Corridor would have adverse impacts on park resources and values that would be inconsistent with the Expansion Act purposes. (See DEIS pp 54-55 Table 2, How Alternatives Meet Project Objectives.) (**0622-1-27** [Austin, Stan])

Response: *This comment references the NPS findings in its final EIS for acquisition of a parcel of land owned by FPL in the EEEA of Everglades National Park. Concerns regarding the location of transmission lines near Everglades National Park are noted in Section 4.1.2 of this EIS. Although the siting of the electrical transmission lines is outside the regulatory authority of the NRC, the review team (which includes the USACE) considered the land use impacts of electrical transmission, which are described in Sections 4.1.2 and 5.1.2.*

Comment: [Three new sets of power lines will cause] changes to the hydrology of the Shark River Slough (the "crown jewel" of Everglades restoration) due to tower pads and road construction[.] (**0240-10** [Commenters, Multiple])

Comment: [A] new, unsightly, industrial landscape - visible for miles - for visitors to one of our country's most unique and popular wilderness areas. (**0240-11** [Commenters, Multiple])

Comment: NRC is planning three new sets of power lines to run across and through the eastern section of Everglades National Park. (**0250-3** [Fulks, Anna Louise])

Comment: In addition, power lines from the expanded plant could be run across the eastern side of Everglades National Park. (**0356-3** [Shlackman, Jed])

Comment: There are also three sets of massive power lines going inside Everglades National Park at the heart of Everglades restoration. (**0366-3** [Griffith, Ed and Harriet])

Comment: Power lines from the expanded plant could also be run across the eastern side of Everglades National Park. (**0366-8** [Griffith, Ed and Harriet])

Comment: Power lines from the expanded plant would likely run across the eastern side of Everglades National Park, further impacting the natural treasures of this area. (**0370-4** [Vayu, Satya])

Comment: In addition, the power lines through the Everglades, a World Heritage site and the location near the Biscayne NP, is reprehensible. (**0550-2** [H., Pat])

Comment: Much of the energy that this expansion of Turkey Point produces will be directed to other areas of the state requiring massive power line towers that are dangerous to migrating birds and an eyesore for the hundreds of thousands of visitors to Everglades National Park. (**0579-4** [Schwab, Roy])

Comment: *Transmission line impacts*. We have concerns regarding the proposed transmission line corridor route potentially impacting the Everglades National Park. The second and third legs of the West Preferred Corridor would traverse a landscape just east of the Everglades National Park characterized by wetlands and disturbed wetlands; a portion of the second leg would be adjacent to the eastern perimeter of the park (page 2-17). EPA is concerned with the lack of information in the DEIS regarding the National Park Services' (NPS) DEIS (*Acquisition of Florida Power & Light Company Land in the East Everglades Expansion Area Draft Environmental Impact Statement*, January 2014). The NPS decision regarding the land exchange action will greatly influence which transmission corridor is viable. ***Recommendations:*** The FEIS should clarify the impacts to the Everglades (particularly to the Everglades National Park) associated with the Western Preferred Corridor, and better describe the NPS land exchange DEIS. Efforts should be made to avoid impacts to the extent feasible, and to effectively mitigate impacts where they are unavoidable. (**0617-4-11** [Mueller, Heinz J.])

Comment: FPL's Eastern Corridor would include the addition of a 230 kV (up to 90 ft. tall) powerline. The Eastern Corridor crosses a portion of Biscayne NP along a FPL easement and crosses the road leading to the entrance to the park's visitor center. The conclusion that locating the Eastern Corridor along U.S. Highway One and the metro rail line would result in minimal visual impacts is unsubstantiated. FPL's West Preferred and West Consensus corridors cross lands located within and near the Everglades NP boundary. Either route would contain two 500 kV transmission lines (up to 160 ft. tall) and one 230 kV (up to 90 ft. tall) powerline. Importantly, the NPS's Acquisition of FPL land in the East Everglades Expansion Area DEIS found that the construction and operation of three powerlines and associated fill pads and access roads in West Preferred Corridor would result in minor to major impacts on park visual resources.

If powerlines are built in FPL's West Preferred Corridor, they would be located west of the L3lN levee road on roadless wetlands currently inside Everglades NP (not east of the canal on SW 187th Ave). The NPS DEIS found that the introduction of three powerlines, fill pads, and access roads inside the current NPS boundary would result in minor to major adverse impacts on visual resources. The most severe impacts would be where the powerlines cross Tamiami Trail and from the L-31N canal levee road. See NPS DEIS pages 364-370, and photo simulations of powerlines looking west from the L-3lN Canal (Figure 59 on page 361) and looking northwest from the L-31N Canal (Figure 63 on page 369), and looking west on Tamiami Trail (Figure 61 on page 365).

If powerlines are built in the West Consensus Corridor, east of L-31N canal along SW 187th alignment, the impacts to park visual resources could be less depending on how much of the Consensus Corridor is used. The NPS questions how a horizontal road would "attenuate" the visual contrast of a powerline, which has vertical structures and elevated horizontal conductors. Because the access road along the levee isn't substantially elevated and is generally unnoticeable from the park, we maintain this statement should be revised to indicate the expected level of contrast and visibility of the powerline. (**0622-1-12** [Austin, Stan])

Comment: One of the requirements of this evaluation is to look at the impacts of this plant on the two national parks. These parks are situated next to the Turkey Point Power Plant. The building of two additional reactors will increase the need for power lines near or in Everglades National Park. These power lines will impact birds and affect the visual expansiveness of the park. They are an extreme negative to visitors in the area. The power lines are a direct effect of permitting the two new reactors. (**0641-10** [Martin, Drew])

Comment: In addition, power lines from the expanded plant could be run across the eastern side of Everglades National Park. (**0676-3** [Kassel, Kerul])

Comment: The power lines through Everglades National Park on the eastern side are part of this project. My organization has been fighting that for years. Many, many questions remain about those. What are the impacts from building a major power line corridor along the east side of Everglades National Park with access roads, pads for many, many towers that are standing there. (**0721-22-3** [Schwartz, Matthew])

Comment: [You've got] changes to the hydrology of Shark River Slough. That place was added to Everglades National Park in 1989 for the restoration of the Shark River Slough, the crown jewel of Everglades's restoration. And now it's going to be lined with three major FP&L power lines from the Turkey Point plant that points north? (**0721-22-5** [Schwartz, Matthew])

Comment: Furthermore, FP&L has proposed constructing power lines in Everglades National Park. These power lines would severely endanger the incredible viewsheds that really define the experience in Everglades National Park, and could threaten endangered Wood Stork habitat. (**0721-9-4** [McLaughlin, Caroline])

Comment: But then I didn't even realize three power lines in the Everglades? (**0723-11-6** [Berendsohn, Catherine])

Comment: Furthermore, FPL has proposed constructing power lines in Everglades National Park. This could severely affect and endanger wood stork habitat and some of the incredible views that really just define the visitor experience in the Everglades. (**0723-4-5** [McLaughlin, Caroline])

Comment: First of all, this application includes three master power lines across Everglades National Park. (**0723-9-9** [Schwartz, Matthew])

Response: *Although electrical transmission is outside the regulatory authority of the NRC, the review team considered the potential impacts of transmission lines in Sections 4.1.2, 4.3.1.2, 4.4.1.6, 5.1.2, 5.3.1.2, and 5.4.1.6. The text of the EIS has been revised to reference the findings of the NPS in its EIS on the NPS's acquisition of FPL land in the EEEA regarding visual impacts of construction and operation of a transmission line in or near the Everglades National Park.*

Comment: **Considerations for Mitigating Impacts from Project Infrastructure**[.] Below are suggestions for mitigating impacts to NPS resources from proposed project infrastructure. We have aligned each topic area according to USACE's public notice from March 13, 2015.

New Transmission Lines[.] As discussed previously, FPL's two western corridors are adjacent to and within Everglades NP. It would contain two 500 kV powerlines (up to 150 ft. tall) and one 230 kV (up to 105 ft. tall) powerline. FPL's eastern corridor would contain a single 230 kV (up to 90 ft. tall) powerline that would be built alongside an existing FPL powerline corridor. The corridor crosses a section of Biscayne NP. For wetland impacts in the western corridor, we support FPL's proposal to conduct mitigation within the "Hole in the Donut," which is within Everglades NP. We also recommend preparation of a planning study to consider the effectiveness of transferring soil to Miami-Dade County to use in raising the elevation of certain levees and for agricultural use to potentially reduce impacts of flooding. To offset added visual and ecological impacts to Biscayne NP from the eastern corridor, we suggest consideration be

given to the purchase of the Ragged Keys, which are located on the end of Elliot Key. Ragged Key 5 and 2 are priority lands for the park and are the only fee-simple lands within the park boundary not yet owned by the NPS.

The NPS recommends that FPL work with NPS to identify and remove unnecessary transmission infrastructure within Everglades NP, such as that which remains in the Chekika area of the park. In addition, we recommend FPL work with Everglades NP and other Everglades restoration partners to relocate the powerline located along the Old Tamiami Trail within the park, south of the current U.S. Hwy 41 west of the L-67 canal. Converting this powerline to an underground transmission line along the current U.S. 41 alignment could improve reliability of electrical service to the Miccosukee Reservation, allow for removal of the Old Tamiami Trail to achieve restoration benefits, and reduce impacts to wildlife from the current aerial transmission line.

Units 6 & 7 Site[.] The Nuclear Island, which includes Units 6 and 7 and other reactor buildings, would encompass approximately 300 acres, most of which are mud flat wetlands that provide important bird habitat. As discussed, nitrogen and phosphorus organics from the muck could further degrade the IWF. To offset ecological impacts related to the construction on Nuclear Island, the NPS encourages USACE to consider the NPS's ongoing efforts to eradicate invasive plants and restore three spoil islands and adjacent peninsulas within the Biscayne NP. These restoration projects involve stabilizing eroding shorelines, removing exotic vegetation, and planting native species. The resulting sites benefit submerged vegetation such as seagrass, improve water quality of coastal waters, and provide high quality native habitat for coastal birds and wildlife. Further, spoil island restoration offers the community opportunities to learn about the benefits of environmental restoration, to "get dirty" in an actual restoration project, and to observe birds and wildlife in their native habitat. (**0622-2-9** [Austin, Stan])

Response: *The commenter presents specific recommended mitigation measures intended to offset the loss of wetlands and other natural habitats, especially those within Biscayne National Park and Everglades National Park. The applicant, FPL, has proposed a series of specific natural resource mitigation measures that are described in Section 4.3.1.6 of the EIS. The NRC staff does not impose natural resources mitigation requirements on the applicant, but in its assessment does account for the mitigation measures that the applicant develops in conjunction with other regulatory agencies. No change was made to the EIS as a result of this comment.*

Comment: DEIS Subsection 4.1.2.1, Page 4-21, Table 4-6: DEIS Table 4-6 contains the header "**L-31 Canal (West Consensus)**". DEIS reference, (FPL2013-TN2941), refers to this transmission line access corridor as "**L-31N Canal and Levee**". (emphasis added) (**0619-4-1** [Maher, William])

Response: *In response to this comment and to various other comments received from the applicant (FPL), the review team has provided more precise details regarding the anticipated extent of impacts on terrestrial and wetland habitats from each proposed offsite transmission line. Tables 4-5 and 4-6 have been updated accordingly.*

Comment: Miami-Dade County requests that the NRC undertake a thorough review of the proposed project, and especially the West transmission corridor alternatives, for consistency with local land use objectives and policies and local environmental regulations prior to issuing the FEIS, and update the document conclusions accordingly. For example, how did the NRC evaluate the transmission lines for the proposed project with regards to the provisions of Land Use Element Policy LU-3A and Section 24-48.4 of the Miami-Dade County Code? This section

of the Code provides for mitigation for projects that are otherwise acceptable under the evaluation factors provided in Section 24-48.3 of the Code, but that nevertheless result in adverse environmental impacts. Miami-Dade County notes that the mitigation methods elaborated in Section 24-48.4(1)-(4) of the Code must be considered in the priority order listed, and avoiding the impact altogether as provided in Section 24-48.4(1) is the first (and highest) priority, followed by minimizing impacts by limiting the degree or magnitude of the action or its implementation (Section 24-48.4(2)). Please explain how the NRC justified consistency of the West Preferred corridor with the adopted local comprehensive plan and applicable environmental regulations, given the existence of a transmission line alternative (NPCA corridor) that has been accepted by both FPL and the State of Florida as certifiable (State of Florida, Division of Administrative Hearings, Application No. PA 03-45A3, Florida Power & Light Company Turkey Point Units 6 & 7 Power Plant Siting Case No. 09-3575EPP, Recommended Order, Section III.C.2.d., paragraph 511), does not have any fatal flaws, according to testimony presented by FPL's witness during the administrative hearings (Proposed Recommended Order filed by the National Parks Conservation Association and Miami-Dade County, State of Florida, Division of Administrative Hearings, Application No. PA 03-45A3, Florida Power & Light Company Turkey Point Units 6 & 7 Power Plant Siting Case No. 09-3575EPP, Section 11(a), Paragraph 165, attached), and which is fully consistent with Land Use Element Policy LU-3A because it meets the requirements of the Conservation, Aquifer Recharge and Drainage Element and other applicable CDMP policies, as well as Section 24-48.4(1) of the Miami-Dade County Code. The NPCA corridor avoids and minimizes adverse environmental impacts to the highest quality wetlands in the region because it: does not require that transmission lines or associated infrastructure be built within the current boundary of Everglades National Park; does not require a land swap that will reduce the overall size of Everglades National Park; avoids impacts to feeding and nesting habitat for the federally endangered snail kite by avoiding the high quality wetlands west of L-31N where feeding and nesting habitat for snail kites have been documented; and avoids impacts to the federally endangered wood stork by avoiding the 1-mile buffer zone between wood stork rookeries and high tension power lines that is recommended by the USFWS wood stork management plan. In addition, the NPCA corridor does not require the construction of transmission lines and associated road infrastructure in areas within the East Everglades Area of Critical Environmental Concern where roads are not allowed, and otherwise meets the environmental standards of Chapter 33B, Miami-Dade County Code. (**0110-1-5** [Hefty, Lee N.])

Response: *Section 4.1.1 describes how FPL has worked to minimize land-use impacts from the transmission lines as part of its corridor selection process using Florida State criteria. The siting criteria include potential disruption to such areas as national, state, and county parks; wildlife refuges; estuarine sanctuaries; landmarks; and historical sites. Section 4.1.1 also describes how FPL would implement other mitigation measures for the transmission lines such as installing erosion-control devices, using matting and wide-track vehicles when working in wetlands, and restoring wetlands following temporary disturbances. Additionally, Section 4.3.1.6 of the EIS summarizes the review team's independent analysis of FPL's proposed mitigation for terrestrial ecology impacts, including installing avian protective measures on transmission lines and conducting wetland enhancement measures that would benefit the wood stork. Finally, the USACE, a cooperating agency on the EIS, will identify the LEDPA for the Units 6 and 7 project prior to issuing a Department of the Army permit under Section 404 of the Clean Water Act. The LEDPA determination will include a consideration of various project alternatives possible, including alternative transmission line routes such as those noted in the comment. Appendix K of the EIS includes the USACE analysis of alternative transmission lines.*

Comment: Miami-Dade County asserts that the DEIS is inadequate with respect to the West transmission line corridor. It is our understanding that as a cooperating agency, the Army Corps of Engineers will use the EIS in their review and processing of the requisite regulatory permits for this proposed activity. However, the DEIS does not provide the Army Corps of Engineers with the information needed to support a "*decision to issue, deny, or issue with modifications a Department of the Army (DA) permit to perform certain dredge and fill activities in waters of the United States and to construct structures in navigable waters of the United States related to the project*" (DEIS Abstract, Lines 7-10). Specifically, the DEIS does not include an adequate alternatives analysis for the West transmission corridor. (**0110-1-1** [Hefty, Lee N.])

Response: *The USACE review of the project will continue after the publication of the final EIS. If additional information is needed during that review, the applicant will be required to submit the necessary information. Please note that as a result of this comment regarding an alternatives analysis for the West Transmission Corridor, Appendix K was added to the final EIS.*

E.2.6 Comments Concerning Geology

Comment: Well, not exactly, according to Dr. Donald McNeill, a University of Miami Geologist. The DEIS contends that the confining layer is over 1,000 feet thick and will not let the newly-introduced water percolate upward into the upper Floridan aquifer from which Hialeah, coral reef, the Keys, and other draw their water. However, Dr. McNeill found that at the Southern Miami-Dade Water Treatment Plant, about nine miles from Turkey Point, the presumed very thick, low permeability confining layer was only about 14 feet thick, just above the Boulder Zone at a depth of 2,456 to 1,443 feet. Ten of the 17 deep injection wells for the effluent came out above the low permeability zone. And this area of low permeability rises from the area of Turkey Point and continues to the northwest, the location of the treatment plant relative to Turkey Point. So the Boulder Zone at Turkey Point is not like Las Vegas. What is injected at Turkey Point will not stay at Turkey Point. It will migrate to the northwest where the natural fissures in the thin, confining layer will allow it to percolate upward. Like the DEIS reports, the Boulder Zone confining layer has may fissures and the DEIS reports the general westward movement of water in the Boulder Zone from Turkey Point. (**0721-12-7** [White, Barry J.])

Response: *As described in Section 2.3.1.2 of the draft EIS, upward migration of injected effluent out of the Boulder Zone has been observed at a minority of injections sites in Florida. The extent, causes and impacts of upwelling at these sites has been widely studied and these studies were evaluated as part of the EIS development to understand potential impacts of proposed injection at the Turkey Point site.*

As part of development of the final EIS, the staff reviewed two studies from Dr. McNeill, who is cited in the comment above, which evaluated the upwelling that has occurred at the Miami-Dade SDWWTP north of the Turkey Point site (McNeill 2000-TN4572; McNeill 2002-TN4571). Together these studies identified an "important low-permeability interval" dolomite layer which "appears to act as a competent confining unit" between the Boulder Zone and MCU. The two studies indicated that 10 of 17 injection wells were drilled through this unit but were completed above it, leaving an open hole and upward pathway for injected effluent. In the 2002 study, McNeill concluded that the dolomite confining unit appeared continuous throughout southeast Florida and provided "additional effective confinement of upwardly buoyant injected fluids." McNeill (2002-TN4571) indicated that while there is local variability in the bottom depth of the "dolomite confining unit" which may cause buoyant injectate to flow westward at the SDWWTP site, the overall dip of the structure to the southwest would cause any migration

within the Boulder Zone beyond the site to move northeast, away from areas of use in the upper aquifers. The review team concluded that this could also apply to injectate at the Turkey Point site.

Maliva et al. (2007-TN1483) coupled an analysis of core plug vertical hydraulic conductivity data from the MCU at 29 South Florida injection well systems (including the SDWWTP) with variable density solute-transport modeling. Based on this, they observed that "matrix hydraulic conductivies of the limestone and dolostones that constitute the confining strata between the injection zone and the base of the USDW in South Florida are sufficiently low to retard significant vertical fluid movement" and that vertical migration would be limited by thin sections where vertical hydraulic conductivity was low (10^{-6} cm/sec or less), as is seen at the Turkey Point site.

Based on a review of well logs and water chemistry data at the SDWWTP, Walsh and Price (2010-TN3656) determined that enhanced vertical flow pathways that allowed upwelling likely resulted from well installation issues identified by Dr. McNeill, because "no fracturing of the confining strata had been reported" and effluent appeared to bypass deeper monitored intervals before being detected higher. Walsh and Price found that upwelling did not extend into the upper portion of the MCU and the Upper Floridan aquifer and concluded that this may be because "rapid vertical pathways did not appear to extend up to the Upper Floridan aquiferA" and because once upwelling reached the APPZ of the MCU, "the transport mechanism appeared to be a horizontal flow with mixing of ambient waters" (Walsh and Price 2010-TN3656).

Cunningham (2012-TN4576; Cunningham 2013-TN4573; Cunningham 2014-TN4051; Cunningham 2015-TN4574) evaluated injection sites for natural vertical high conductivity features (such as karst collapse structures) using seismic-reflection data. In the absence of seismic data, Cunningham (2015-TN4574) suggests that, "other evidence for karst collapse includes borehole log signatures that indicate highly fractured rock" and that fractures would be indicated by "high travel times measured on borehole sonic log data." Using sonic logs from injection sites in South Florida, Maliva et al (2007-TN1483) depicted log signatures and travel times for both fractured and unfractured rock. The NRC staff evaluated return velocities in sonic logs obtained at well EW-1 at the Turkey Point site and found large sections of the MCU to have log signatures and transit times consistent with unfractured rock.

One study evaluating the human and ecological impacts of various methods of wastewater disposal in South Florida, concluded that the overall health risk for deep well injection was "low where there have been impacts to USDWs" and that "the risk would be further reduced when the injected wastewater is treated to reclaimed water standards" (EPA 2003-TN4759). The water proposed for injection at the Turkey Point site would be treated beyond the secondary treatment referred to here before it is sent to the Turkey Point site, where it would be further treated and diluted before injection.

As a result of this information, staff determined it was reasonable to conclude that properly installed injection wells that are cased and cemented through the confining zone will provide adequate confinement of the injected wastewater. If upward leakage of wastewater through the confining layers did occur, it is not likely it would impact the Upper Floridan aquifer and could be detected onsite in the overlying monitoring wells and mitigated as required by the FDEP UIC program. Additional information has been added to Sections 2.3 and 5.2 of the EIS to reflect the discussion above.

Comment: A petition was submitted to EPA on April 28, 2015, to designate the entire Floridan aquifer system as a Sole Source Aquifer (SSA) under 40 CFR Part 149. The area in the petition includes the Lower Floridan, which contains the Boulder Zone. Although the Boulder Zone is saline, it is hydraulically connected to fresh water zones lying above. If confinement of the overlying layer is not sufficient, the injection of effluent into the Boulder Zone could result in waste, including radionuclides, being emplaced into the lowermost USDW. EPA's review of the petition is in progress. The MDWSD installed Class I injection wells for discharging effluent from the South District wastewater treatment plant (WWTP) into the Boulder Zone; injection began in 1983. This facility is located approximately 8 miles north of the Turkey Point facility. In 1994, MDWSD notified the Florida Department of Environmental Protection (FDEP) that ammonia and total kjeldahl nitrogen (TKN) had been found outside the injection zone in the freshwater aquifer protected by the Safe Drinking Water Act (SDWA) as a USDW. (EPA's well classification information: http://water.epa.gov/type/groundwater/uidwells.cfm) EPA issued consent order 4-UICC-006-95 in 1995, which became effective in 1997. This order included testing to determine whether confinement existed, as required by federal and state regulations, for Class I wells. In February 2001, the report *"Evaluation of Confining Layer Integrity Beneath the South District Wastewater Treatment Plant, Miami-Dade Water and Sewer Department, Dade County, Florida,"* by R.C. Starr, T.S. Green, and L.C. Hull was completed. The conclusions included the finding that the geologic data provided for review were not sufficient to demonstrate that the Middle Confining Unit is a competent, low hydraulic conductivity layer capable of preventing upward migrations of fluids from the Boulder Zone into the overlying underground source of drinking water. Also, the geochemical data showed that groundwater in the Upper Floridan aquifer is contaminated with treated wastewater. Based upon EPA's review of the available scientific information and data, there is no information to show that sufficient confinement exists to meet the Underground Injection Control (UIC) regulatory requirements for Class I wells. Class I wells must meet the "No-Migration Clause" of the UIC regulations at 40 CFR § 144.12(b). Recent USGS studies indicate that karst collapse features and possibly transmissive faults exist in the subsurface in the south Florida area, and modeling for the proposed Class I wells should determine whether the proposed wells would meet the criteria in order to comply with UIC Class I permit requirements. It is not clear whether the installation of a desalinization unit has been considered, in order to reduce or control the salinity of the water in the cooling canal system, and decrease the rate of migration of the hypersaline plume towards the water supply wells completed in the Biscayne sole source aquifer. ***Recommendations:*** The FEIS should include more information regarding the proposed deep injection wells to be used for wastewater disposal, including the status of the permitting process of the 12 deep injection wells that are proposed, the planned timeline for permitting of these wells, and planning for surface discharge of effluents in the event that delays occur in the permitting process. In addition, the FEIS should include information regarding subsurface karst delineation, aquifer testing and modeling that will be required to demonstrate that this project will be protective of the USDWs in the Upper Floridan. Also, the FEIS should evaluate the other alternatives that are being considered for effluent discharge. In addition, the FEIS should include details of a robust monitoring plan to ensure the protection of the Biscayne aquifer, the public drinking water supply, and prevention of migration of injectate into freshwater. The proposed injection wells are contingent upon future issuance of applicable UIC permits, for which substantial issues will need to be addressed. More data and modeling is needed to determine whether all requirements will be met in order to issue the required permits. Since the proposed planning for disposition of blowdown/effluent is contingent upon issuance of the required permits by FDEP, alternatives will need to be developed. (**0617-1-23** [Mueller, Heinz J.])

Response: *In keeping with its responsibility under NEPA, the NRC has developed the EIS to inform the decision of whether or not to grant FPL's application for combined licenses for*

proposed Turkey Point Units 6 and 7. Information requested in the comment demonstrating protection of the underground sources of drinking water (USDWs) through monitoring and confinement by the Middle Confining Unit (MCU) is required by and would be described in the underground injection control (UIC) permit for the proposed injection wells, which is granted by the Florida Department of Environmental Protection (FDEP). The NRC regulates the release of radiological constituents and a conservative evaluation of the expected impacts of the radiological component of the injected effluent at Turkey Point is documented in Final Safety Evaluation Report (FSER) Section 11.2 and EIS Section 5.9. The NRC recognizes that responsibility for regulation of non-radiological pollutant discharges "rests by statute with the Environmental Protection Agency" (10 CFR 51.10(c)).

NRC staff evaluated the expected impacts of deep well injection and documented this evaluation in updated Sections 2.3, 5.2, 7.2, and Appendix G of the final EIS. This evaluation includes an extensive literature review of many studies concerning the adequacy of the Boulder Zone to receive and the MCU to confine injected effluent. Specifically, the staff reviewed studies of; the local and regional hydrogeology of the Floridan aquifer system, the nature and competency of the MCU using geologic and geophysical investigation techniques, behavior of injected wastewater at current injection facilities and causes of documented upwelling, relative risk assessments of wastewater disposal methods including deep well injection, and ranges of hydrogeological parameters that inhibit upwelling. NRC staff also performed an independent conservative evaluation of injected effluent migration assuming a non-fractured MCU matrix as well as an evaluation of instantaneous migration to a hypothetical drinking water well at the site boundary, which assumes total, instantaneous failure of the MCU. Based on this evaluation the impacts were determined to be SMALL.

The NRC would like to clarify several issues raised in the comment. The comment states that the Boulder Zone is "hydraulically connected to fresh water zones lying above." The staff notes that the Upper Floridan aquifer is brackish in southeast Florida. Despite this, the Upper Floridan aquifer is mixed with fresher water and used municipally in the vicinity of the site (draft EIS Section 2.3.2.2). The overlying Biscayne Aquifer, which is a Sole Source Aquifer, has been impacted by saltwater intrusion up to 4 mi inland along the coast and also by infiltration of hypersaline waters from the cooling-canal system (CCS) in the vicinity of the Turkey Point site. However, the NRC staff understands that the UIC program requires protection of these resources from upward migration of effluent.

The degree of hydraulic connection between the Upper Floridan aquifer and the Boulder Zone has been the subject of many studies. These studies have determined that, in general, the MCU provides confinement and that incidences of upwelling have been coincident with features that provide vertical pathways for upward migration. As for potential contamination of the Biscayne aquifer, the Biscayne aquifer is a near-surface aquifer that is separated from the Boulder Zone at the Turkey Point site by about 2,800 ft, a large portion of which is confining strata. As mentioned earlier, recent studies of the impacts of deep well injection in South Florida indicate that the Upper Floridan aquifer (UFA) has not been impacted by deep well injection. Therefore, impact to the Biscayne Aquifer is very unlikely.

The comment also states that the Upper Floridan aquifer has been "contaminated with treated wastewater", repeating a conclusion made by Starr et al. (2001-TN1251) and other reports published around the same time. More recent studies, such as those by Maliva et al. (2007-TN1483) and Walsh and Price (2010-TN3656), have clarified that while migration has reached the USDW at some Class I injection facilities, no impact has been reported for the Upper Floridan aquifer in southeast Florida. This may be explained as follows: in some places, the

USDW (total dissolved solids (TDS) concentrations exceed 10,000 mg/L) is below the Upper Floridan aquifer within the MCU. In this regard, more recent reviews of hydrostratigraphy, such as Reese and Richardson (2008-TN3436) have recognized that a permeable unit known as the Avon Park Permeable Zone (APPZ) occurs within the MCU and "…has been identified in previous studies as the…lower part of the Upper Floridan aquifer in…the southern part of southeastern Florida." A comparison of the depth where impact has been detected relative to the revised stratigraphy indicates that upwelling has only impacted the APPZ and not the Upper Floridan aquifer. These clarifications are discussed in greater detail in the EIS and below.

NRC staff previously reviewed the study identified in the comment, which the draft EIS refers to as Starr et al. (2001-TN1251). This study was an independent review of "existing information that describes geology, hydrogeology, and geochemistry at the SDWWTP [South District Wastewater Treatment Plant]…" which was conducted by the Idaho National Engineering Laboratory at the request of the EPA Region 4 to determine the ability of the MCU to prevent fluid upward migration. The NRC staff disagrees that this and other available studies should be interpreted to indicate that there is "no information to show that sufficient confinement exists" as stated in the comment above. Rather, the study expressed concern about the amount and type of data then available for evaluation. According to the Starr et al. (2001-TN1251) report, a few of the shortcomings of the data set include; "The review of the available geologic data set resulted in the conclusion that it is insufficient for performing this analysis..", "it is not possible to perform an evaluation of the stratigraphy or physical attributes of the confining units without sonic and density logs", "…the validity of the hydrographs is suspect…", "the hydraulic head data available for review are inadequate to provide a useful understanding of head relationships…", and "the hydraulic conductivity values reviewed may not reflect the effective vertical hydraulic conductivity of the confining units above the Boulder Zone." Rather than indicating a lack of confinement by the MCU, the study concludes that "the MCU and/or upper portion of the Lower Floridan Aquifer is a better confining unit than indicated" by the data set that was reviewed. The study concluded that overall, the spatial distribution of contaminants "suggests that isolated conduits, such as inadequately sealed wells or natural features, provide pathways for contaminated water to migrate upward from the Boulder Zone, but contaminants are not migrating upward through the MCU across a broad area." The study also recommended additional collection of specific types of data. This additional data collection as well as modeling, which has also been requested in this comment, has been performed in subsequent studies and further data are required and will be collected as part of the UIC permitting process.

The conclusion reached by the Starr et al. study that upward migration at the SDWWTP resulted from flow along enhanced vertical flow pathways has been strengthened by findings from later studies, including those by McNeill (2002-TN4571), Maliva et al. (2007-TN1483), and Walsh and Price (2010-TN3656).

In a 2002 study of upwelling at the SDWWTP (2002-TN4571), Dr. McNeill indicated that 10 of 17 injection wells were drilled through an "important low-permeability interval" that "appears to act as a competent confining unit" between the Boulder Zone and MCU, but completed above it, leaving an open hole and upward pathway for injected effluent.

Maliva et al. explored this subject by studying core plug vertical hydraulic conductivity data from the MCU at 29 South Florida injection well systems (including the SDWWTP) and variable density solute-transport modeling Maliva et al. (2007-TN1483). Maliva et al. observed that "matrix hydraulic conductivies of the limestone and dolostones that constitute the confining strata between the injection zone and the base of the USDW in South Florida are sufficiently low

to retard significant vertical fluid movement." Accordingly, the Maliva et al. study concluded that observed vertical fluid migration from injection zones likely occurred due to enhanced vertical flow pathways created by natural features (such as fractures) or improper well installation.

Walsh and Price (2010-TN3656) evaluated well logs and water chemistry data at the SDWWTP and determined that enhanced vertical flow pathways that allowed upwelling likely resulted from well installation issues identified by Dr. McNeill, because "no fracturing of the confining strata had been reported". Walsh and Price found that upwelling did not extend into the upper portion of the MCU and the Upper Floridan aquifer and concluded that this may be because "rapid vertical pathways did not appear to extend up to the upper Floridan aquifer" and because once upwelling reached the APPZ of the MCU, "the transport mechanism appeared to be a horizontal flow with mixing of ambient waters" (Walsh and Price 2010-TN3656). This conceptual model was also illustrated in a numerical modeling scenario by Maliva et al. (2007-TN1483). This indicates that, even where migration through the bottom portion of the MCU has occurred, impact to the upper MCU and the overlying Upper Floridan aquifer may not be possible. This could partially explain why recent studies have indicated that impact to the Upper Floridan aquifer has not occurred at injection sites.

Cunningham (2012-TN4576; Cunningham 2013-TN4573; Cunningham 2014-TN4051; Cunningham 2015-TN4574) evaluated injection sites for natural vertical high conductivity features (such as karst collapse structures) using seismic-reflection data. Cunningham stated that "if present at or near wastewater injection utilities, these features represent a plausible physical system for the upward migration of effluent injected into the Boulder Zone to overlying EPA-designated USDW in the upper part of the Floridan aquifer system." At a municipal wellfield for the City of Sunrise, where upwelling was coincident with a karst collapse feature, migration had not occurred above the Lower Floridan aquifer.

While seismic data has been collected near the Turkey Point site, there is no deep seismic data at the site. In the absence of seismic data Cunningham (2015-TN4574) suggests that "other evidence for karst collapse includes borehole log signatures that indicate highly fractured rock" and that fractures would be indicated by "high travel times measured on borehole sonic log data." Using sonic logs from injection sites in south Florida, Maliva et al. (2007-TN1483) depicted log signatures and travel times for both fractured and unfractured rock. The NRC staff evaluated return velocities in sonic logs obtained at well EW-1 at the Turkey Point site and found sections of the MCU to have log signatures and transit times consistent with unfractured rock.

The draft EIS states that at the Turkey Point site "The bottom of the deepest underground source of drinking water (USDW) was determined to be between 1,430 and 1,505 ft below ground surface based on water samples collected during packer testing, and was estimated at 1,450 ft based on specific conductance logging (FPL 2012-TN1577). The deepest USDW is within the Avon Park Formation, and is considered part of the Upper Floridan aquifer because of its relatively low salinity." The NRC staff revised the EIS to more clearly describe the status of the Avon Park Formation in general, and the APPZ in particular. The State of Florida granted a permit for FPL to use the exploratory well drilled at the Turkey Point site (EW-1) as an injection well under the Florida State UIC program. The permit rests, in part, on the status of the Upper Floridan aquifer, which is designated as a USDW.

Based on the information presented above and discussed in updated text within the final EIS, the staff finds it reasonable to conclude that adequate confinement of injected wastewater would occur if injection wells are properly installed through the MCU. If upward leakage of wastewater

through the confining layers did occur at the site, it would likely be detected in the overlying monitoring wells and mitigated as required by the FDEP UIC program. Modeling performed as part of the EIS analysis also indicates that the extent of migration of the injected effluent within the Boulder Zone would be limited over the life of the proposed plant.

Even in the event that upward migration occurs, studies evaluating the human and ecological impacts of various methods of wastewater disposal in South Florida have concluded that the overall health risk for deep well injection was "low where there have been impacts to USDWs" and that "the risk would be further reduced when the injected wastewater is treated to reclaimed water standards" (EPA 2003-TN4759). The reclaimed wastewater would be treated beyond the secondary treatment referred to here before it is sent to the Turkey Point site. At the Turkey Point site, it would be further treated and diluted before injection at rates lower than those currently used at the SDWWTP. This study also reinforces the staff conclusion regarding the requirements of the UIC permit by stating that "the [FDEP UIC] permit process offers better opportunities to evaluate the suitability of specific well sites and injection zones. The permit process is also designed to anticipate and prevent potential problems related to well operation (and adverse impacts resulting from injection)." The construction and operation of proposed Turkey Points Units 6 and 7 would have only a negligible effect (through salt drift) on the salinity of the existing cooling canals associated with the operation of Turkey Point Units 3 and 4, and need not be discussed further in the EIS. Possible measures to address the salinity of the existing cooling canals are outside the scope of this EIS. The potential impact of upward leakage of wastewater injected in the Boulder Zone is assessed in Appendix G of the EIS and discussed in EIS Section 5.2.1.3.

E.2.7 Comments Concerning Hydrology - Surface Water

Comment: The concern related to expected sea level rise throughout the world which is anticipated to occur over the coming decades and measured in feet and it's possible impacts on any coastal development activity needs to be fully addressed. (**0005-1** [Larsen, Paul])

Comment: I certainly don't want two reactors being built using outdated scientific sea rise models. (**0008-14** [Finver, Jody])

Comment: The facts speak for themselves: the cooling ponds at Turkey Point were at dangerously high temperatures late last summer with no end in sight for increasing water temperatures in Biscayne Bay; even the more conservative estimates of sea level rise would cause cascading and catastrophic results to a nuclear reactor in the event of major storm coupled with storm surge at the plant site. (**0009-3** [Rose, Simon])

Comment: FPL should be denied a license for Turkey Point expansion for many reasons:...4. Sea level rise will make Turkey Point an island (**0022-4** [Read, Alice Gray])

Comment: Has anyone considered the raising of the ocean waters? How will that affect the nuclear reactors? This should be another concern. (**0040-4** [Pareto, Rolando and Marlene])

Comment: Sea level rise makes Turkey Point a bad place for nuclear plants. The new transmission lines are tied to development of two new nuclear reactors at Turkey Point, situated between two national parks on a hurricane-swept coastline subject to storm surge and inundation from sea level rise. Just this past week reports came out naming our area as one of the worst regarding rising sea levels. (**0049-2** [Kowalski, Kathleen S.])

Comment: Building any such plants on the shores of Florida, which will see the sea rise up to 10 feet in 50 years, is lunacy. (**0053-4** [Sasiadek, Alfred])

Comment: with global warming, Miami and Florida will be the first affected areas in the nation with sea level rise. so how can anyone, NRC, fp&l, propose adding two more nuclear reactors at turkey point in that scenario. (**0055-3** [Roedel, Kitty])

Comment: As a related matter, we also do NOT need any more irresponsible, out of control, development in our tenuous environmental situation with the global warming and sea level rising. The latter is especially dire in our peninsula because we have water on three sides and, to date no ways the ameliorate the rapid continuation of this pending threat. (**0060-4** [Beckman, Yvonne and Douglas])

Comment: These reactors would pose a danger not only in a hurricane, but the location doesn't take into account the reality of rising seas caused by climate change. (**0086-2** [Lawrence, Diane])

Comment: I recommend that you disapprove any further processing of their Turkey Point Nuclear Power plant expansion proposal for the reasons summarized below. 1) The National Oceanic and Atmospheric Administration (NOAA) recommends that new power plants account for three feet to 6.6 feet of sea-level rise. FPL's application proposes to accommodate only one foot of sea-level rise over the proposed 60-year project life. (**0094-1** [Fairchild, David])

Comment: I recommend that you disapprove any further processing of their Turkey Point Nuclear Power plant expansion proposal for the reasons summarized below 5)FPL's proposes operating the new reactors for 60 years, or at least until 2080. One foot of sea-level rise will certainly occur during that time frame, inundating the area surrounding Turkey Point and turning the power plant into an island, possibly flooding radioactive waste storage facilities and releasing radioactivity into the surrounding water during storm surges. The proposal fails to adequately assess that risk. The proposal fails to use the latest and most authoritative forecasts of sea-level rise at the site, nor the probability of storm surges releasing radioactive waste storage there. FPL's assertion that the new reactors will be safe from storm surges does not properly account for these and other impacts to the plant from expected sea level rise plus storm surges heights at the site. (**0094-5** [Fairchild, David])

Comment: The site proposed for expansion is located directly on the shores of Biscayne National Park in an area that is extremely susceptible to sea level rise and the impacts of climate change. (**0102-2** [Commenters, Multiple])

Comment: The proposed construction site is located directly on the shores of Biscayne National Park in an area that's extremely susceptible to sea-level rise and the storm surges that will come with climate change. (**0103-2** [Commenters, Multiple])

Comment: [E]xpanding a nuclear power plant in an area that's ground zero for sea level rise puts South Florida at unacceptable risk. (**0103-7** [Commenters, Multiple])

Comment: Clearly, South Florida is highly vulnerable to sea level rise and the impacts of climate change. This site was never an acceptable location for the Turkey Point facility there today and many decades later it has only become an even more unacceptable location. (**0104-4** [Commenters, Multiple])

Comment: Comment 3. The DEIS fails to take NOAA's guidance of planning for the highest estimates of SLR, and likely underestimates SLR by using consensus global projections for future SLR that are below the ongoing local rates of SLR measured by regional experts at the University of Miami's Rosenstiel School of Marine and Atmospheric Science - Appendix I of the DEIS addresses climate change and sea level rise: *"Sea level is projected to rise 1 to 4 ft globally by 2100." [DEIS, p. I-3]* While several reports list project such global figures, scientists at the University of Miami's Rosenstiel School of Marine and Atmospheric Science (RSMAS) have actually measured SLR in the Miami region that indicates higher SLR rates are already happening locally: *"...over the past 15 years, the average annual increase [in sea level] is roughly 0.27./year, but over just the past 5 years, it's about 0.97./year." [McNoldy 2014]* Existing SLR rates measured locally yield a range of 2 to 6.5 feet of rise over the life of the plant stated in DEIS Appendix I, but scientists agree the rate of rise is going to accelerate exponentially. The NOAA states: *"The Highest Scenario [for SLR] should be considered in situations where there is little tolerance for risk (e.g. new infrastructure with a long anticipated life cycle such as a power plant)." [NOAA 2012]* ***The final EIS must better estimate effects of sea level rise (SLR) by considering how measured local rates of SLR differ from projected global rates, and the effect of uncertainty in SLR on viability of the project.*** (**0106-6** [Stoddard, Philip K.])

Comment: Comment 4. The DEIS is incomplete in failing to consider loss of the main cooling water supply through reduction of the wastewater stream resulting from reduced residential demand caused by forced water conservation - Sea level rise (SLR) will limit cooling water availability in ways that were not considered in the DEIS. One foot of sea level rise will overwhelm the saltwater exclusion dams in Miami-Dade County, and produce significant saltwater intrusion upon the wellfields. The freshwater supply will be supplemented, at considerable expense, with desalinated water from the Upper Floridan Aquifer, a process that has already begun in parts of Miami-Dade County. Since saltwater intrusion from SLR will impose staunch water conservation measures, either by regulation or by economics, the amount of water available from the Southern Waste Water Treatment Facility will undoubtedly decline over time. Thus the amount of water available today from the Southern Waste Water Treatment Facility will not be available for use as cooling water over the projected operational life of TPN 6&7. ***The final EIS must consider loss of wastewater as cooling water source because of reduced residential demand from water conservation measures addressing SLR induced saltwater intrusion on freshwater supply.*** (**0106-7** [Stoddard, Philip K.])

Comment: Comment 6. The DEIS is incomplete in failing to consider access restriction and ocean vulnerability caused by SLR that could eliminate treated wastewater as a source of cooling water for TPN 6&7 - SLR will complicate road access to the Southern Waste Water Treatment Facility, making plant operation difficult. Although a causeway could be built to keep the plant operational, the price could make operation uneconomical. Further, Elliot Key, which currently shields the region from open ocean effects, will be underwater. Ocean swell, east winds, storms, and tides will have greater effects on plant accessibility and operations. If Miami-Dade County finds operation of the plant has become uneconomical because of SRL, then TPN 6&7 could lose its primary source of cooling water. ***The final EIS must consider possible loss of treated wastewater as a cooling water source because SLR will impair site access and operability of the Southern Waste Water Treatment Facility.*** (**0106-9** [Stoddard, Philip K.])

Comment: The direct, indirect, and cumulative impacts of sea level rise on the construction and operation of Units 6 & 7 and ancillary facilities are not adequately analyzed. (**0113-1-8** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: Failure to Adequately Analyze the Direct, Indirect, and Cumulative Impacts of Sea Level Rise on the Construction and Operation of Units 6 & 7 and Ancillary Facilities. Preparing for the impacts of impending sea level rise and ensuring that development, both existing and planned, takes into account these potential impacts is one of the most critical challenges facing South Florida. In considering such impacts, the DEIS fails to adequately address the direct, indirect, and cumulative impacts of sea level rise on the construction and operation of Units 6 & 7 and ancillary facilities. Turkey Point is located close to sea level, with an elevation of -2.4 feet to 0.8 feet. Over the last 100 years, sea level in the area of Turkey Point has risen approximately 9-12 inches. [Footnote 40: South Florida Water Management District, FPL Turkey Point Units 6 & 7, Site Certification Application, First Completeness Review, July 30, 2009, 34-35.] According to the Miami-Dade Climate Change Task Force, by 2050, sea level rise could be between 1.5 and 5 feet. [Footnote 41: Ibid., 34-35.] With FPL seeking a COL valid for 40 years, Units 6 & 7 could still be operating when these predictions come to fruition. However, the DEIS fails to adequately analyze the potential impacts associated with this level of sea level rise. The DEIS acknowledges that global sea level is projected to rise by 1 to 4 feet by 2100 and that the vulnerability of Turkey Point to sea level rise is "high" to "very high." [Footnote 42: NRC, DEIS, I-3.] According to the U.S. Global Change Research Program, as cited in the DEIS, there is "an imminent threat of increased inland flooding during heavy rain events in low-lying coastal areas such as southeastern Florida" and sea level rise will "accelerate saltwater intrusion into freshwater supplies" [Footnote 43: Ibid. I-3.] Predictions for sea level rise globally and in specific regions can vary widely and the DEIS accounts for a very conservative estimate of sea level rise in its analysis. NOAA discourages decision makers from using only the most likely sea level rise scenarios when considering future impacts of sea level rise on development. Rather, in terms of the construction of power plants, NOAA recommends that a projection of over six feet of sea level rise by 2100 be used for planning purposes. [Footnote 44: Parris, A., P. Bromirski, V. Burkett, D. Cayan, M. Culver, J. Hall, R., Horton, K. Knuuti, R. Moss, J. Obejsekera, A. Sallenger, and J. Weiss. Global Sea Level Rise Scenarios for the US National Climate Assessment, NOAA Tech Memo OAR CPO-1, 2012, 2.] Under such recommendations, three feet of sea level rise by 2060 should be accounted for, which is within the lifetime of Units 6 & 7. Despite the fact that new units would be constructed on elevated pads, transmission line facilities, reclaimed water pipelines, industrial wastewater facilities, access roads, and other facilities would be located at the current elevation of the plant. The DEIS omits an adequate discussion on how sea level rise could potentially impact these facilities and the operations of Units 6 & 7. Sea level rise could cut off road access to the Southern Waste Water Treatment Facility, impacting the plant's operations. Moreover, considering the porosity of the Biscayne Aquifer, increasing sea level rise could also increase groundwater levels in the region. [Footnote 45: South Florida Water Management District, FPL Turkey Point Units 6 & 7, Site Certification Application, First Completeness Review, July 30, 2009, 34-35.] Impacts of sea level rise could affect the operations of the radial collector wells, particularly in regards to the percentage of water drawn from Biscayne Bay versus freshwater from the Biscayne Aquifer. The NRC should also look at the impacts of sea level rise beyond the 40 year lifetime of the plant, especially as nuclear waste will be stored onsite. In addition, the DEIS does not adequately discuss the increased vulnerability of Units 6 & 7 to storm surge as a result of sea level rise. While sea level rise occurs slowly, impacts from storm surge can be sudden and immediate. Turkey Point is located between Biscayne Bay to the east and low-lying wetlands to the west. As sea level rises, Florida Bay could also border the Turkey Point site. Therefore, when anticipating future scenarios, storm surge could potentially come at the plant from three directions. Elliott Key, which currently acts as a barrier to the impacts of storms, may be underwater, leaving the facility more vulnerable to storm surge, high tides, winds, and ocean swell. Given projections, it is extremely likely that water from Biscayne Bay will rise to or above levels of water within the cooling canal system at some point in the project's lifetime. During storm events, it is possible

that water levels may breach the height of the berms surrounding the CCS, causing Bay water to mix with CCS water before the water returns to Biscayne Bay. [Footnote 46: West, B. United States Department of the Interior, National Park Service Letter to A. Williamson, U.S. Nuclear Regulatory Commission, November 25, 2014, SER PC, 9.] The end result would be the increased presence of cooling canal system water in the bay, which could lead to nutrient loading and potentially devastating algal blooms within the bay. [Footnote 47: Ibid., 9.] The DEIS must account for such future scenarios and direct, indirect, and cumulative impacts of sea level rise and storm surge in its analysis of project impacts. (**0113-2-12** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: The current reactors and the proposed two new reactors are located along the south east Florida coast on low lying land. We are already actively seeing the effects of sea rise; the city of Miami Beach, some 10-15 miles from the plant, has been suffering from flooding during high tides, and is spending millions of dollars installing huge pumps to move the water back into the sea. Nuclear reactors should not be built on the coast, an location threatened by sea rise, an area mere feet above current sea level (Miami Dade County has a maximum height of 13.5 feet above sea level). (**0115-6** [Trencher, Ruth])

Comment: Even one foot of sea-level rise will inundate the area surrounding Turkey Point and turn the power plant into a remote island. A difference of two feet of sea-level rise will dramatically affect the height of future storm surges. (**0122-2** [Meyer, Paul])

Comment: I herewith want you to note my objection to FPL's planned new nuclear power plans - a dangerous and superfluous proposition, given our climate change[.] (**0135-1** [Thiel, Markus])

Comment: I am writing today from my home to oppose the approval of FPL's two new nuclear power plant at Turkey Point for the following reasons: 1. This location is too vulnerable to storm surges in a hurricane prone location. Sea level rise is not a fantasy and will subject Turkey Point to serious damage as well as costly preventative measures. (**0136-1** [Levy, Morgan I.])

Comment: The biggest risk in Florida would be from flooding, and that risk increases every year because of people like our idiot governor who deny climate change. (**0140-3** [Rhodes, Karen])

Comment: Secondly, the draft Environmental Impact statement fails to thoroughly review and address the fact that the FPL proposed plan does not adequately take into account the plan for the sea level rise that is certain to come over the next 40 - 60 years, the lifespan of the two new reactors. The plan must be compliant with the NOAA Dec 6 2012 report, Global Sea Level Rise Scenarios for the United States National Climate Assessment. In that review, the report indicates that over Eight million people live in areas at risk of coastal flooding, and many of the nation's assets related to military readiness, energy, commerce and ecosystems are already located at or near the ocean. The report establishes a high confidence (greater than 9 in 10 chances that global mean sea level will rise at least 8 inches, and no more than 6.6 feet by 2100. The report indicates that the highest scenario should be considered in situations where there is little tolerance for risk, eg new infrastructure with a long anticipated life cycle, such as a power plant. The FPL plan only accounts for one foot of rise. The draft EIS utterly fails to address the commonly accepted levels of impact of projected sea level rise on the site, as well as the surrounding land, according to the US Global Change Research, which will all be several feet under water within the lifetime of the nuclear plants over 50 years. The NRC review study failed to rely on the US Global Change Research, which rates the Vulnerability of the Turkey

point area to sea level rise as "high" to "very high" and notes an "imminent threat of increased inland flooding during heavy rain events in low lying coastal areas such as Southeastern Florida, where just inches of sea level rise will impair the capacity of Stormwater drainage systems to empty into the ocean." (**0145-11** [Lerner, Cindy])

Comment: The access roads, and all accompanying infrastructure would make the Plant site eventually, during the projected life and operation of the plant inaccessible to maintain operation, and most importantly, crisis management would not be feasible. For example, the planned Miami Dade County reclaimed water pipeline will run 9 miles to the plant site, approximately 4-5 feet underground. By not accounting adequately for sea level rise, there would not be access to the pipeline along the 9 mile track, which would then be several feet underwater and therefore inaccessible to necessary repair. The Draft EIS fails to consider the impact of different weather events combined with scenarios of Sea Level Rise, which according to the NOAA report is crucial to developing hazard profiles for emergency planning and vulnerability impact and adaptation assessment, all of which are required to be done by the Global Change Research Act and in addition, the US Army Corp of Engineers Guidance for Coastal Decision Makers. (**0145-12** [Lerner, Cindy])

Comment: The Florida climate is not safe for this reactor. Hurricane's, tropical storms, sea level changes, etc. According to scientific research, the area could be below sea level in less than 30 years. (**0146-4** [Grant, Randy])

Comment: Sea rise is a major threat in and of itself; what it Will do to the present facility is deeply concerning.... But to a hugely expanded plant? Terrifying. (**0163-2** [Cook, Cherie])

Comment: This location is exceedingly vulnerable to sea level rise from climate change. (**0172-2** [Cava, Daniella Levine])

Comment: And finally, expanding a nuclear power plant in an area that's ground zero for sea level rise, as well as hurricane threats, puts South Florida at unacceptable risk. (**0180-1** [Demello, Christine])

Comment: Expanding Turkey Point power plant is a fool's errand in light of undeniable sea level rise. (**0181-1** [Bremen, Gary])

Comment: South Florida has already experienced a sea level rise of almost 5" over the last 10 years. Increasing the size and scope of a plant that will be susceptible to yearly hurricane events, ever powerful storm surge and rising sea levels is irresponsible and I am sure one day will be recognized as criminal. (**0187-4** [Meyer-Steele, Shawn])

Comment: Clearly, South Florida is highly vulnerable to sea level rise and the impacts of climate change. (**0192-4** [Lebatard, David])

Comment: Florida is subject to some rather alarming affects of global warming, including the influx of salt water due to the rising seas. Florida has beautiful natural resources that deserve protection. (**0193-1** [Shipe, Kathleen])

Comment: The location of the Turkey Point power plant will begin (if it hasn't already) to feel the affects of climate change very soon. It will exponentially get worse as time passes. This is not the right location or timeframe to be adding new reactors to Turkey Point. (**0194-1** [Mayotte, Monica])

Comment: The site proposed for expansion is located directly on the shores of Biscayne National Park in an area that is extremely susceptible to sea level rise and the impacts of environmental degradation. (**0197-1** [Wicht, Dan])

Comment: The direct, indirect, and cumulative impacts of sea level rise on the construction and operation of Units 6 & 7 and ancillary facilities are not adequately analyzed. (**0208-9** [Ritz, David])

Comment: Furthermore, South Florida is vulnerable to the impacts of climate change, including storm surge, sea level rise, and increased incidents of other types of flooding. (**0210-5** [Sharp, Andrea Heuson])

Comment: In addition, proper reporting and evaluation of present and forecasted climatological changes and how they might affect the power plant operations is of critical importance. (**0211-2** [Malefatto, Alfred])

Comment: In addition, the assumptions made about sea level rise are inaccurate. If they are, the plant will be an island before the units are taken out of service. (**0212-2** [Ross, Robert and Teresa])

Comment: The site proposed for expansion is located directly on the shores of Biscayne National Park in an area that is extremely susceptible to sea level rise and the impacts of climate change. (**0228-2** [Yeager, Jerry])

Comment: Furthermore, expanding a nuclear power plant in an area that is ground zero for sea level rise threatens the future of South Florida. (**0228-7** [Yeager, Jerry])

Comment: I am especially worried that neither FPL nor the NRC have addressed the issue of sea level rise, which has the potential to reach up to six feet by the end of this century. (**0236-1** [Enfield, David])

Comment: The low-lying wetlands which surround Turkey Point contain some of the lowest elevations in South Florida. Even a half foot of sea level rise will be enough to inundate the 5,000 acres of canals used to cool the two reactors currently operating at this location. They are filled with hot and extremely salty water - as well as chemicals used to kill a recent algae outbreak in the canals. With scientists measuring ever-increasing sea level rise from the melting of our planet's remaining ice in addition to thermal expansion due to increased temperatures, those 6 inches of sea level rise are a virtual certainty. New nuclear reactors in this location will be sitting on islands in Biscayne Bay - quite possibly in the not so distant future. (**0240-6** [Commenters, Multiple])

Comment: There are many concerns that have been brought but my biggest concern is that the Turkey Point site is not safe, because it is vulnerable like Fukushmia to sea level rise and because it has problems with cooling its existing units. Neither of these concerns are addressed in the application submitted to your agency. (**0244-2** [Haber, Rochelle])

Comment: Expanding in this location that is so vulnerable to sea level rise and severe hurricanes is irresponsible. (**0245-2** [Lindsey, Jerrie])

Comment: The aforementioned article from Climate Central pointed out the deficiencies in FPL's projections concerning sea level rise and storm surges for its application for Units 6 and 7: [Commenter submitted the following two paragraphs from a website article regarding

maximum storm surge] During its safety assessment for the new reactors' applications at Turkey Point, FPL has modeled a worst-case scenario, based on what they estimate to be the highest tide conditions paired with the worst potential hurricane to strike the area -- plus an additional 10 percent for an extra margin of safety. Based on these estimates, FPL predicts the maximum storm surge at the location of the new Turkey Point reactors would likely be no higher than 24.8 feet, which is 1.2 feet below the plant's safety facilities. In particular, these calculations of a likely maximum storm surge include an estimate that sea level could rise by between 0.78 and 1 foot in Biscayne Bay during the next century. This rate of sea level rise was based on observations taken at a nearby NOAA tide gauge between the years 1931 and 1981 and then extrapolated forward. Scientists, however, have observed that in recent decades the rate of sea level rise has been accelerating. According to a Climate Central analysis of sea level rise in the same region, but based on readings for the most recent 30-year period, the rate of sea level rise around Turkey Point is already about 15 percent higher, or about 1.1 feet-per-century, than what FPL used in its assessment. Consequently, FPL's assessment that Turkey Point can withstand a worst-case scenario storm might fall short. There is already a growing consensus among scientists that the rate of sea level rise is higher than the IPCC estimated in their 2007 report. For example, a 2010 report from the National Academy of Sciences confirmed that the future rate of sea level rise may actually be higher than that projected by the 2007 IPCC assessment, because that report didn't take into account future ice losses from Greenland and Antarctica. Consequently, FPL has likely failed to account for how much sea level will rise at Turkey Point in the next 100 years. Because these rates of sea level rise are included in the calculations of how large storm surges could be at Turkey Point, FPL may also be underestimating their "worst-case scenario." (**0246-3** [Shlackman, Mara])

Comment: I would also be so bold to suggest to you that you contact Dr. Harold R. Wanless, Professor and Chair, Department of Geological Sciences at the University of Miami regarding the increase sea level rise in our State. (**0250-6** [Fulks, Anna Louise])

Comment: [E]xisting nuclear power reactors at Turkey Point have already exceeded the carrying capacity of the existing water resources, and have become dysfunctional. (**0252-3** [Van Leer, Sam])

Comment: As Sea-Level Rise (SLR) progresses, these problems will only get worse. There will be more salt intrusion into the aquifer, more hypersaline water, more algae bloom, and more toxic chemicals. (**0252-9** [Van Leer, Sam])

Comment: Furthermore, South Florida is vulnerable to the impacts of climate change, including storm surge, sea level rise, and increased incidents of other types of flooding. (**0253-4** [Bloom, Justin] [Campbell, Cara] [Causey, Charlie] [Cavros, George] [Chenoweth, Mike] [Daly, Meg] [England, Margaret] [Fuller, Manley] [Jones, George L.] [Keller, Alan] [Martin, Drew] [McLaughlin, Caroline] [Reynolds, Laura] [Silverstein, Rachel] [White, Paton] [Williams, Elinor])

Comment: Furthermore, South Florida is extremely susceptible to the impacts of climate change, including sea level rise, storm surge, and increased incidents of other types of flooding. (**0254-4** [Dudley, Dwight] [Lerner, Cindy] [Regalado, Tomas] [Stoddard, Philip K.])

Comment: If expanded, Turkey Point would become one of the largest nuclear power facilities in the country, located in an area that is ground zero for sea level rise. (**0258-2** [Field, Fran])

Comment: We surmise that a tsunami isn't necessary to poison the Atlantic; sea level rise alone will do it, assisting the Corexit and BP oil polluted Gulf Stream. The low-lying wetlands which surround Turkey Point contain some of the lowest elevations in South Florida. Even a half

foot of sea level rise will be enough to inundate the 5,000 acres of canals used to cool the two reactors currently operating at this location. They are filled with hot and extremely salty water - as well as chemicals used to kill a recent algae outbreak in the canals. (**0264-3** [Dwyer, John P.])

Comment: If expanded, Turkey Point would become one of the largest nuclear power facilities in the country, located in an area that is ground zero for sea level rise. (**0284-2** [Lopez, Josie])

Comment: Additionally, President Obama issued an Executive Order 13653 on November 1, 2013 that directs all agencies - federal, state and local - to incorporate sea level rise projections into planning and construction along US coasts (reference: https://www.whitehouse.gov/the-press-office/2013/11/01/executive-order-preparing-united-states-impacts-climate-change). Had that order been followed, the NRC would have automatically concluded that construction and operation of two additional reactors at Turkey Point, in an area that will be submerged due to sea level rise and to increased storm surges from stronger storms, is untenable and poses an unacceptable risk to a region that is ground zero for sea level rise. It poses an unacceptable risk for the South Florida, the state and the nation. (**0288-14** [Cleland, Noel] [Jackalone, Frank] [Mahoney, Stephen] [Matthews, Debbie] [Roff, Rhonda] [Scott, John] [Teas, Jim] [Ullman, Jonathan])

Comment: Florida and Power Light seeks to add two additional reactors to this location. The new reactors would not be immune from the underlying environmental and logistical problems affecting the existing reactors, in fact, they would exacerbate them. While there is a litany of concerns about the four reactors, an overwhelming factor against their future viability is climate change. According to government agencies, sea level rise will inundate the Turkey Point site within the lifetime of the proposed reactors. (**0288-4** [Cleland, Noel] [Jackalone, Frank] [Mahoney, Stephen] [Matthews, Debbie] [Roff, Rhonda] [Scott, John] [Teas, Jim] [Ullman, Jonathan])

Comment: There can be no fair analysis that does not take into effect climate change on the entire Turkey Point site: hotter water temperatures, significant sea level rise, increase storm surge and more severe hurricanes. (**0288-5** [Cleland, Noel] [Jackalone, Frank] [Mahoney, Stephen] [Matthews, Debbie] [Roff, Rhonda] [Scott, John] [Teas, Jim] [Ullman, Jonathan])

Comment: Even if FPL were to elevate the new reactors with limestone rock fill, they still cannot escape the impacts of sea level rise, storm surge, increased salinization, higher water tables, and increased severity of storms. These impacts will negatively affect plant access, operation, transmission and safe storage of nuclear waste. (**0288-9** [Cleland, Noel] [Jackalone, Frank] [Mahoney, Stephen] [Matthews, Debbie] [Roff, Rhonda] [Scott, John] [Teas, Jim] [Ullman, Jonathan])

Comment: The proposed expansion site is on the shores of Biscayne National Park in an area that is extremely susceptible to sea level rise and the impacts of climate change, making this a public safety issue. (**0295-3** [Dietrich, Chris OMeara])

Comment: We need to be pulling back from coastal development, particularly in Florida which is extremely vulnerable to the effects of sea rise and other factors of our changing climate. (**0297-2** [Strouble, Jackie])

Comment: With climate change sea level will rise. A nuclear plant in Florida will be very vulnerable to this sea level rise. If we do not also consider the effects on sea level on this expansion of Turkey Hill, we will also be wasting money and putting Florida's citizens at risk. (**0298-1** [Cafarelli, Cenie])

Comment: The site proposed for expansion of the Turkey Point Power Plant, in Homestead, Florida, is located directly on the shores of Biscayne National Park in an area that is extremely susceptible to sea level rise and the impacts of climate change[.] (**0299-1** [Salatino, Freda])

Comment: Finally, expanding a nuclear power plant in an area that is ground zero for sea level rise threatens the future of South Florida. (**0299-4** [Salatino, Freda])

Comment: Expanding this facility in the face of sea level rise is profoundly irrational and dangerous, as you surely know. (**0318-1** [Teasley, Regi])

Comment: The site proposed for expansion is located directly on the shores of Biscayne National Park in an area that is extremely susceptible to sea level rise, hurricanes and the impacts of climate change like large shifts of sand, changes in salinity of fresh water. (**0320-1** [Ericson, Del])

Comment: if global warming hits the planet, fla will be under water (**0327-1** [Anonymous, Anonymous])

Comment: It is fool-hardy to place such risky reactors at the very edge of a rising sea level. The eventual damage to people and the environment is too great for such a venture. (**0337-4** [Philips, Sally B.])

Comment: I wish we could see more debate in public about the wisdom of siting two more reactors at a site that will be ground zero for sea level rise and extreme weather and that is upwind of a vast, densely-populated urban area. (**0342-1** [Merleaux, Derek])

Comment: Putting nukes on Biscayne Bay has got to be one of the most senseless actions you could take. Are you paying no attention at all to what government scientists are saying about sea level rise? Are you planning to put these nukes on the equivalent of an offshore oil rig? (**0355-1** [Thomas, Bill])

Comment: The consensus of the scientific community is that, within ten years, today's high temperatures will be tomorrow's lows. NASA scientists have also predicted a world wide drought. We see that drought has been ongoing in California (for four years with no relief in sight) and other States as well as other countries, worldwide. We have experienced droughts here in South Florida in the past, and we know that the possibility exists for more droughts. (**0365-6** [Fischer, Antoinette])

Comment: I would like you to meet with University of Miami Professor Harold Wanless. (**0373-11** [Lee, Nancy])

Comment: The tide is rising. We don't want two more nuclear power plants built on fill. (**0373-3** [Lee, Nancy])

Comment: Until you talk to Harold Wanless Geologist about rising sea water this is really a stupid idea. I just don't think you are thinking straight. (**0373-8** [Lee, Nancy])

Comment: If the sea levels were to rise to a level of contact with the reactors, the consequences would be devastating. (**0400-1** [Eckert, Brenda])

Comment: Is this a new solution to the age-old problem of cooling a nuke reactor - by putting it under six feet of sea water?!? Wake UP and 'get more smarter'!! (**0414-1** [Standley, Ron])

Comment: Expansion will take place in an area susceptible to sea level rise and the f climate change, with a sensitive ecological habitat and f limited freshwater resources. Please halt the widespread negative environmental and public health and safety impacts and the serious threats to Biscayne National Park. (**0417-2** [Beattie, Jane])

Comment: How anyone could consider placing a nuclear power plant in Florida despite the projected sea level rise is dumbfounding. (**0440-3** [Hoyle, Lester and Judy])

Comment: At this very moment, Miami is spending $400 million to build sea walls and pumps and raise sidewalks 2 feet to cope with current and projected conditions. Since we don't answer to Rick Scott here's some concepts you must learn: Global Warming, Climate Change, Sea Level Rise, Sustainability. (**0440-4** [Hoyle, Lester and Judy])

Comment: Has anyone thought about the rising tides from climate change brought on by all that extra CO2? You know, as Fukashima showed, reactors don't work so well under water. Oh, I forgot; it's illegal to talk about that global warming thing in Florida. Forget it; just don't tell the NSA I brought it up. (**0443-1** [Jones, Gary])

Comment: Comment 8: The final Environmental Impact Statement should incorporate higher sea-level rise projections and local measurements of sea-level rise rates into its analysis of the risks presented by the Turkey Point Nuclear Plant Units 6 & 7 project. The DEIS states that "[s]ea level is projected to rise 1 to 4 ft. globally by 2100." DEIS at I-3. This figure comes from the U.S. Global Change Research Program, which is the only source for sea-level rise projections cited in the DEIS. In contrast, the National Oceanic and Atmospheric Administration (NOAA) has stated that "[n]o widely accepted method is currently available for producing probabilistic projections of sea level rise at actionable scales (i.e. regional and local)." http://tinyurl.com/NOAA-SLR at 1. Furthermore, there is broad uncertainty regarding the specific effects that glacial melting and thermal expansion of the oceans will have on rising sea levels. i. at 2. "[O]ne of the functions of a NEPA statement is to indicate the extent to which environmental effects are essentially unknown . . . . Reasonable forecasting and speculation is thus implicit in NEPA, and we must reject any attempt by agencies to shirk their responsibilities under NEPA by labeling any and all discussion of future environmental effects as 'crystal ball inquiry.'" *Scientists' Inst. for Pub. Info., Inc. v. Atomic Energy Comm'n*, 481 F.2d 1079, 1092 (D.C. Cir. 1973); *see also N. Plains Res. Council, Inc. v. Surface Transp. Bd*., 668 F.3d 1067, 1079 (9th Cir. 2011) (same). Therefore, when data is incomplete or uncertain as with sea-level rise projections, "reasonably foreseeable" includes "**impacts which have catastrophic consequences, even if their probability of occurrence is low**, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason." 40 CFR § 1502.22 (emphasis added). Based on the above, the final Environmental Impact Statement should account for multiple sea-level rise projections, including those with the highest projected sea-levels. In 2012, NOAA released four sea-level rise planning scenarios, the highest of which projected 6.6 feet of sea-level rise by 2100. Concerning these scenarios, NOAA recommended: The Highest Scenario should be considered in situations where there is little tolerance for risk (e.g. new infrastructure with a long anticipated life cycle **such as a power plant**). http://tinyurl.com/NOAA-SLR at 2 (emphasis added); *see id*. at 12 and 15. Moreover, scientists at the University of Miami have measured sea-level rise locally, finding even higher rates than predicted: [O]ver the past 15 years, the average annual increase [in sea level] is roughly 0.27./year, but over just the **past 5 years, it's about 0.97"/year**. http://www.rsmas.miami.edu/blog/2014/10/03/sea-level-rise-in-miami/ (emphasis added). Using this information and modeling from the National Hurricane Center, the City of Miami and the Village of Pinecrest commissioned a sea-level rise assessment for the proposed site of the new

reactors. That assessment is attached to these comments as **COM -- D**. It accounts for SLOSH MOM scenarios, the planned increases in elevation for the new facilities, and uses storm surge data for southern Biscayne Bay. The findings of this assessment demonstrate that even by the year 2030, storm surges could isolate the reactor site and inundate the industrial wastewater facility. It is important to note that this assessment displays information for mean tides only. The effects of a storm surge would be greater in a hurricane at high tide. Due to the uncertain nature of the data presented in the DEIS and the new reactors' low tolerance for risk, NEPA requires that the final Environmental Impact Statement consider greater potential sea levels based on existing credible scientific evidence. Additionally, the final Environmental Impact Statement should include existing, local measurements of rates of sea-level rise and account for more than static sea-level rise, which by itself does not reveal risks associated with more frequent and severe flooding. (**0456-14** [Miami, City])

Comment: Comment 9: In addition to Appendix I, the final Environmental Impact Statement should integrate subsections related to sea-level rise throughout its review. Appendix I of the DEIS contains the majority of the discussion on climate change and sea-level rise. Sea-level rise was likely relegated to a single appendix for ease of reference and to consolidate discussion on a complicated problem. Nevertheless, it is not the kind of problem that should be acknowledged separately from the rest of the environmental review. Instead, the potential consequences of sea-level rise should be incorporated into, and analyzed at, every stage of the review process. For example, the section discussing the transportation of radiological materials would benefit from its own analysis of how rising sea-levels might affect this particular process. (**0456-15** [Miami, City])

Comment: Comment 10: The final Environmental Impact Statement should examine how the Turkey Point Nuclear Plant Units 6 & 7 project's adverse environmental impacts are likely to undermine efforts at sea-level rise adaptation. The DEIS notes that, among other problems caused by climate change, "[s]ea-level rise will also push the freshwater-seawater interface further inland. This will put further stresses on freshwater resources inland." DEIS at I-5. These problems are likely to occur due to sea-level rise regardless of future activities at the Turkey Point site. However, the U.S. Environmental Protection Agency (EPA) has stated, in its April 2015 letter to the U.S. Army Corps of Engineers (USACE), that FPL's project "may result in substantial and unacceptable impacts to mangrove wetlands, sawgrass marshes and [submerged aquatic vegetation], which we consider to be [aquatic resources of national importance]." Attached as **COM -- B**. These environmental resources are significant not only in the context of the Clean Water Act, but also to the discussion concerning sea-level rise impacts. The problem of saltwater intrusion cannot be separated from sea-level rise, storm surge, and other threats to the public's potable water supply. Even without extreme rises in sea-level, storm surges can exacerbate saltwater intrusion. In contrast, mangrove roots stabilize shorelines and enhance water clarity. Sawgrass marshes function as natural water filtration systems. Placing the new reactors at Turkey Point threatens 300 acres of mangrove wetlands and 40 acres of sawgrass marshes. Hence, Miami agrees with the EPA's requests for additional analysis and its conclusion that the project should not be approved as currently proposed. Moreover, as these environmental resources provide important benefits related to water quality, the final Environmental Impact Statement should examine how their loss will exacerbate the consequences of sea-level rise and limit efforts at successful adaption. Similarly, NRC RAI EIS 7.2-3 (RAI No. 5768 Revision 2) requests from FPL a discussion of adaptions being considered to account for changes in environmental impacts due to sea-level rise up to the year 2050. This discussion should also be included in the final Environmental Impact Statement. (**0456-16** [Miami, City])

Comment: Comment 11: The final Environmental Impact Statement's analysis should include worst case and plausible scenarios. The DEIS notes that: Climatological changes might affect the average environmental risks of severe accidents because of changes in either severe accident probabilities or associated consequences. While the potential severity of storms and other natural phenomena might increase, nuclear power plants must be designed to withstand all creditable natural events at the site of concern. Increases in the severity of hurricanes with associated storm surges could increase the chance that a challenged safety system may not function. However, the core damage frequencies (CDFs) for the Advanced Passive 1000 (AP1000) pressurized water reactor design are very low and climate change is unlikely to change the CDFs appreciably. Therefore, even if consequences change as a result of climate change, severe accident risk is likely to remain SMALL because CDFs are so low. DEIS at I-13. It further states that "as long as floodwaters did not rise to the level of the plant grade, there would be no contribution to CDF. More detail [sic] evaluation of external flooding at Turkey Point site also confirmed that the flood level at probable maximum precipitation will be below the plant grade." DEIS at 5-130. These statements in the DEIS raise three questions that should be addressed in the final Environmental Impact Statement: •What sea-level rise projection was used to generate the maximum probable storm-surge contemplated above? •What operational lifetime was projected for the new reactors? •Was the worst case scenario hurricane drawn from a proper sample of storms? The first question does not require additional explanation. Concerning the second question, the U.S. Nuclear Regulatory Commission's Office of Nuclear Regulatory Research has confirmed that it is investigating the possibility of licensing reactors to operate for a total of 80 years and that it expects the first applications for these licenses to be submitted in the next couple years. Currently, nuclear reactors may not be licensed beyond a total of 60 years. FPL's most recent filings before the Florida Public Service Commission show that it plans to delay operation of the new reactors to the late 2020s. If the new reactors were eventually approved for a total of 80 years, it would extend their operation up to the year 2100, when NOAA's projections contemplate 6.6 feet of sea-level rise. Therefore, the final Environmental Impact Statement should account for an 80 year operating life of the proposed reactors when analyzing the potential impacts of sea-level rise near Turkey Point. Concerning the third question, new research into deeper climate histories suggests that, due to natural variability, the storm hazard profile of the recent era could be lower than what might be experienced in the future. *See* Donnelly and Woodruff, attached to these comments as **COM - C.** In short, it is possible that the intensity of future storms is being underestimated. (**0456-17** [Miami, City])

Comment: Comment 7: The final Environmental Impact Statement should examine and clarify how the operation of the Turkey Point Nuclear Plant Units 6 & 7 project, as currently proposed, might constrain attempts to adapt to climate change and to remedy the history of destabilizing uses and impacts the regional ecosystem has already suffered. The DEIS contemplates that demand for water by all users will increase significantly in Miami-Dade County before the new reactors begin operating. *See* DEIS at 2-176. Similarly, "[t]hermoelectric demand for power use is projected to increase from 2.1 Mgd (four-tenths of one percent of total demand) to 69.8 Mgd (about 10 percent of total demand) from 2005 to 2025, respectively." *Id*. At the least, this information should be updated to include the water being diverted to the FPL industrial wastewater facility. Moreover, the DEIS concludes that the "[a]dditional extraction of groundwater by [Miami-Dade County] to meet plant requirements for potable and service water is negligible compared to the current demand. Therefore, the [DEIS] concludes that operational groundwater-use impacts would be SMALL, and mitigation beyond the FDEP final Conditions of Certification would not be warranted." DEIS at 5-26. The conclusion that groundwater-user impacts would be small stands in contrast to the projection that thermoelectric demand will grow to 10 percent of all water demand in Miami-Dade County.

The relationship between these determinations should be explained more directly in the final Environmental Impact Statement. To the extent that an Environmental Impact Statement is a decision-making tool, it should also clarify the tradeoffs of pursuing the Turkey Point Nuclear Plant Units 6 & 7 project as currently proposed. As has been made clear, FPL facilities consume large volumes of water in a region that already has extremely limited freshwater resources. Any conflicts presented by the operation of the new reactors with investments in the Comprehensive Everglades Restoration Plan (CERP), protecting the Biscayne Aquifer from saltwater intrusion, or the consumption of potable water by the public should be made clear, not only in the body of the final Environmental Impact Statement, but also in the executive summary. As an additional matter, any decision based on the final Environmental Impact Statement would benefit from an examination of how the placement of the new reactors at Turkey Point might affect regional adaptation strategies. As sea levels rise, saltwater intrusion intensifies, and drinking water becomes more expensive, the South Florida region will be required to pursue a variety of adaptation strategies. The majority of these adaptations will be forced to occur during the operating life of the new reactors. The need for power identified in the DEIS is predicated on assumptions that may not be in line with these adaptive strategies and potential inconsistencies should be explored further. (**0456-27** [Miami, City])

Comment: Expand Consideration of Sea-Level Rise Scenarios and Related Impacts

Turkey Point is a low-lying peninsula bordered by a shallow bay to the east and the Everglades to the west. The proposed site of the new reactors is a mud island southwest of the current plant that is surrounded by the industrial wastewater facility and borders Biscayne Bay. DEIS at 3-2. The proposed site will be raised with fill to a finished grade elevation of 25.5 ft North American Vertical Datum 1988 (NAVD88). *Id*. As noted by the DEIS, the U.S. Global Change Research Program rates the vulnerability of the Turkey Point area to sea-level rise as "high" to "very high." DEIS at I-3. The DEIS further acknowledges that: Sea-level rise also is expected to "...accelerate saltwater intrusion into freshwater supplies from rivers, streams, and groundwater sources near the coast" and agricultural areas around Miami-Dade County "...are at risk of increased inundation and future loss of cropland with a projected loss of 37,500 acres in Florida with a 27-inch sea level rise." Water demand in southeastern Florida is projected to increase by more than 50 percent by 2060, relative to 2005, based on combined changes in population, socioeconomic conditions, and climate. *Id*. However, the DEIS merely acknowledges these issues as a matter distinct from the rest of its analysis. It does not incorporate the consequences of climate change into its broader review of the cumulative impacts that may be associated with the siting of new reactors at Turkey Point. (**0456-28** [Miami, City])

Comment: Seriously? You all want to expand a nuke plant in a prime spot for sea level rise? Is there no end to the stupidity that can be permitted by the NRC? Beyond poor siting (next to Biscayne National Park), consider also what will happen when this site is inundated by sea water, either through ocean rise or major storms. (**0459-1** [Smyke, Pete])

Comment: The proposed construction site is very susceptible to damage from storm surges and hurricanes. Both the facility and the required long-term radioactive waste storage would be at risk from such weather events and would also be susceptible over the long term to rises in sea level already being triggered by climate change. (**0463-3** [Gross, Cheryl A.])

Comment: It would also be incredibly dumb to build a couple more nukes that close to sea level, even if the science denying governor refuses to notice sea level rise. (**0470-1** [Lenz, Andrew])

Comment: With sea level rise, freshwater resources are in danger of sea contamination. (**0474-1** [Robinson, Angel])

Comment: No more nuclear plants in precarious and sensitive locations! Our nation needs to get real about the rising sea levels, an event we will witness in our lifetimes, and build our power grid accordingly, or we could pay for our folly with inestimable environmental damage. Florida is particularly vulnerable. (**0476-1** [Monfort, Brooke])

Comment: Furthermore, expanding a nuclear power plant in an area that is ground zero for sea level rise threatens the future of South Florida, especially with the Antarctic ice sheets melting so swiftly. (**0488-1** [Liesche, Ken])

Comment: The expansion of Turkey Point in Biscane National Park i s an irreplaceable national treasure in an area that is susceptible to sea level rise and the impacts of climate change. (**0493-1** [Davidson, Penny])

Comment: And projected sea level rise could have an adverse effect on this project. (**0497-1** [Brstow, Mary])

Comment: I am concerned for the future of my community. We are confronted by sea-level rise and a diminishing drinking water supply. FPL's project, as proposed, may needlessly endanger our sole source of freshwater by exacerbating saltwater intrusion. (**0515-2** [Regalado, Tomas])

Comment: Isn't anyone noticing the constant flooding episodes in Miami already? Sea levels are rising, especially noticeable here in Florida. Why stick our heads in the sand, and make believe it is not happening? (**0516-1** [Coffey, Rotraud])

Comment: The estimated sea level rise by the end of this century is from 1 to 2 meters(7 feet), maybe higher. While the proposed reactors and mechanical draft cooling towers may be sufficiently elevated and safe from day to day flooding. FPL's customer base will NOT have similar protections, hundreds of thousands, maybe more than a million South Florida's households will be risk of flooding during high tide & storm events. I.E. Demand for electricity will drop off as large portions of South Florida flood in a semi-permanent fashion. (**0545-2** [Keating, Tim])

Comment: Sea level rise makes the location of these plants irresponsible. I have lived in Florida all of my rather long life and seen what hurricanes can do in coastal areas; this is especially true in South Florida. (**0550-1** [H., Pat])

Comment: The low-lying wetlands which surround Turkey Point contain some of the lowest elevations in South Florida. Even a half foot of sea level rise will be enough to inundate the 5,000 acres of canals used to cool the two reactors currently operating at this location. They are filled with hot and extremely salty water -as well as chemicals used to kill a recent algae outbreak in the canals. With scientists measuring ever-increasing sea level rise from the melting of our planet's remaining ice in addition to thermal expansion due to increased temperatures, those 6 inches of sea level rise are a virtual certainty. New nuclear reactors in this location will be sitting on islands in Biscayne Bay -quite possibly in the not so distant future. (**0551-1** [Anonymous, Anonymous])

Comment: If expanded, Turkey Point would become one of the largest nuclear power facilities in the country, located in an area that is AT GROUND ZERO FOR SEA LEVEL RISE. (**0584-1** [Mazzuca, Rich])

Comment: Not only is it too near a National Park, it is also an area of ;potential sea level rise in our increasingly warmer oceans. This would threaten the freshwater in the area. (**0588-6** [Hanna, Jane])

Comment: This is 2015 and given the impact of climate change and the resulting sea level rise, one would think that intelligent forward thinking individuals would not consider an expensive, water intensive option like nuclear energy. (**0590-2** [Johnson, Diane])

Comment: In addition, South Florida is highly vulnerable to continuing and worsening drought as climate change continues to worsen. New nuclear power requires extreme amounts of precious fresh water supplies. Solar and wind power do not require any use of precious fresh water supplies. Nuclear power plants in Alabama and Tennessee and other states have been shut down because of drought. More nuclear power plants will be shut down when drought continues to get worse because of worsening climate change. (**0592-8** [Brexel, Sr., Charles])

Comment: The site is also vulnerable to the impacts of rising seas. Logically, it does not add up. (**0594-2** [Rapuano, Shannon])

Comment: It would be extremely irresponsible to site a nuclear reactor in South Florida where rising sea levels will threaten a major nuclear accident. (**0599-2** [Rock, Andrew])

Comment: Comment 9: The final Environmental Impact Statement should incorporate higher sea-level rise projections and local measurements of sea-level rise rates into its analysis of the risks presented by the Turkey Point Nuclear Plant Units 6 & 7 project. The DEIS states that "[s]ea level is projected to rise 1 to 4 ft. globally by 2100." DEIS at I-3. This figure comes from the U.S. Global Change Research Program, which is the only source for sea-level rise projections cited in the DEIS. In contrast, the National Oceanic and Atmospheric Administration ("NOAA") stated that "[n]o widely accepted method is currently available for producing probabilistic projections of sea level rise at actionable scales (i.e. regional and local)." http://tinyurl.com/NOAA-SLR at 1. Furthermore, there is broad uncertainty regarding the specific effects that glacial melting and thermal expansion of the oceans will have on rising sea levels. See id. at 2. "[O]ne of the functions of a NEPA statement is to indicate the extent to which environmental effects are essentially unknown . . . . Reasonable forecasting and speculation is thus implicit in NEPA, and we must reject any attempt by agencies to shirk their responsibilities under NEPA by labeling any and all discussion of future environmental effects as "crystal ball inquiry.'" *Scientists' Inst. for Pub. Info., Inc. v. Atomic Energy Comm'n, 481 F.2d 1079, 1092 (D.C. Cir. 1973); see also N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1079 (9th Cir. 2011) (same). Therefore, when data is incomplete or uncertain as with sea-level rise projections, "reasonably foreseeable" includes "**impacts which have catastrophic consequences, even if their probability of occurrence is low**, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason." 40 CFR § 1502.22 (emphasis added). Based on the above, the final Environmental Impact Statement should account for multiple sea-level rise projections, including those with the highest projected sea-levels. In 2012, NOAA released four sea-level rise planning scenarios, the highest of which projected 6.6 feet of sea-level rise by 2100. Concerning these scenarios, NOAA recommended: The Highest Scenario should be considered in situations where there is little tolerance for risk (e.g. new infrastructure with a long anticipated life cycle **such as a power plant**). http://tinyurl.com/NOAA-SLR at 2 (emphasis added); see id. at 12 and 15; see also Horton, Radley, et al. "New York City Panel on Climate Change 2015 Report Chapter 2: Sea Level Rise and Coastal Storms." Annals of the New York Academy of Sciences 1336.1 (2015): 36-44; Kopp, Robert E., et al. "Probabilistic 21st and 22nd century sea-level

projections at a global network of tide-gauge sites." Earth's Future 2, no. 8 (2014): 383-406. Moreover, scientists at the University of Miami have measured sea-level rise locally, finding even higher rates than predicted: [O]ver the past 15 years, the average annual increase [in sea level] is roughly 0.27./year, but over just the past 5 years, it's about 0.97./year. http://www.rsmas.miami.edu/blog/2014/10/03/sea-level-rise-in-miami/ (emphasis added). The acceleration measured by the University of Miami may stem from natural variability. Nonetheless, natural variability could exacerbate climate change signals for periods spanning multiple decades. Using this information and modeling from the National Hurricane Center, the City of Miami and the Village of Pinecrest commissioned a sea-level rise assessment for the proposed site of the new reactors. That assessment is attached to these comments as **COM - D**. It accounts for SLOSH MOM scenarios, the planned increases in elevation for the new facilities, and uses storm surge data for southern Biscayne Bay. The findings of this assessment demonstrate that even by the year 2030, storm surges could isolate the reactor site and inundate the industrial wastewater facility. It is important to note that this assessment displays information for mean tides only. The effects of a storm surge would be greater in a hurricane at high tide. Likewise, climate models predict longer stretches of dry days between more intense rain events in the subtropics. The combination of these conditions increases the likelihood of more severe floods in the region. Climate Change and Water Management in South Florida: Interdepartmental Climate Change Group, SOUTH FLORIDA WATER MANAGEMENT DISTRICT (Nov. 2009). Further, weakening of the Gulf Stream implies additional sea-level rise, which is not accounted for in the DEIS. Due to the uncertain nature of the data presented in the DEIS and the new reactors' low tolerance for risk, NEPA requires that the final Environmental Impact Statement consider greater potential sea levels based on existing credible scientific evidence. Additionally, the final Environmental Impact Statement should include existing, local measurements of rates of sea-level rise and account for more than static sea-level rise, which by itself does not reveal risks associated with more frequent and severe flooding. See, e.g., Sweet, William V., and Joseph Park. "From the extreme to the mean: Acceleration and tipping points of coastal inundation from sea level rise." Earth's Future 2.12 (2014): 579-600. (**0611-11** [Haber, Matthew S.])

Comment: Comment 10: In addition to Appendix I, the final Environmental Impact Statement should integrate subsections related to sea-level rise throughout its review. Appendix I of the DEIS contains the majority of the discussion on climate change and sea-level rise. Sea-level rise was likely relegated to a single appendix for ease of reference and to consolidate discussion on a complicated problem. Nevertheless, it is not the kind of problem that should be acknowledged only separately from the rest of the environmental review. Instead, the potential consequences of sea-level rise should be incorporated into, and analyzed at, every stage of the review process. For example, the section discussing the transportation of radiological materials would benefit from its own analysis of how rising sea-levels might affect this particular task. (**0611-12** [Haber, Matthew S.])

Comment: Comment 11: The final Environmental Impact Statement should examine how the Turkey Point Nuclear Plant Units 6 & 7 project's adverse environmental impacts are likely to undermine efforts at sea-level rise adaptation. The DEIS notes that, among other problems caused by climate change, "[s]ea-level rise will also push the freshwater-seawater interface further inland. This will put further stresses on freshwater resources inland." DEIS at I-5. These problems are likely to occur due to sea-level rise regardless of future activities at the Turkey Point site. However, the U.S. Environmental Protection Agency ("EPA") stated, in its April 2015 letter to the U.S. Army Corps of Engineers ("USACE"), that FPL's project "may result in substantial and unacceptable impacts to mangrove wetlands, sawgrass marshes and [submerged aquatic vegetation], which we consider to be [aquatic resources of national

importance]." Attached as **COM - B.** These environmental resources are significant not only in the context of the Clean Water Act, but also to the discussion concerning sea-level rise impacts. The problem of saltwater intrusion cannot be separated from sea-level rise, storm surge, and other threats to the public's potable water supply. Even without extreme rises in sea-level, storm surges can exacerbate saltwater intrusion. In contrast, mangrove roots stabilize shorelines and enhance water clarity. Sawgrass marshes function as natural water filtration systems. Placing the new reactors at Turkey Point threatens 300 acres of mangrove wetlands and 40 acres of sawgrass marshes. Hence, Miami agrees with the EPA's requests for additional analysis and its conclusion that the project should not be approved as currently proposed. Moreover, as these environmental resources provide important benefits related to water quality, the final Environmental Impact Statement should examine how their loss will exacerbate the consequences of sea-level rise and limit efforts at successful adaption. Similarly, NRC RAI EIS 7.2-3 (RAI No. 5768 Revision 2) requests from FPL a discussion of adaptions being considered to account for changes in environmental impacts due to sea-level rise up to the year 2050. This discussion should also be included in the final Environmental Impact Statement. (**0611-13** [Haber, Matthew S.])

Comment: Comment 8: The final Environmental Impact Statement should examine and clarify how the operation of the Turkey Point Nuclear Plant Units 6 & 7 project, as currently proposed, might constrain attempts to adapt to climate change and to remedy the history of destabilizing uses and impacts the regional ecosystem has already suffered. The DEIS contemplates that demand for water by all users will increase significantly in Miami-Dade County before the new reactors begin operating. See DEIS at 2-176. Similarly, *[t]hermoelectric demand for power use is projected to increase from 2.1 Mgd (four-tenths of one percent of total demand) to 69.8 Mgd (about 10 percent of total demand) from 2005 to 2025, respectively." Id. At the least, this information should be updated to include the water being diverted to the FPL industrial wastewater facility. Moreover, the DEIS concludes that the *[a]dditional extraction of groundwater by [Miami-Dade County] to meet plant requirements for potable and service water is negligible compared to the current demand. Therefore, the [DEIS] concludes that operational groundwater-use impacts would be SMALL, and mitigation beyond the FDEP final Conditions of Certification would not be warranted." DEIS at 5-26. The conclusion that groundwater-user impacts would be small contradicts the projection that thermoelectric demand will grow to 10 percent of all water demand in Miami-Dade County. The relationship between these determinations should be explained more directly in the final Environmental Impact Statement. To the extent that an Environmental Impact Statement is a decision-making tool, it should also clarify the tradeoffs of pursuing the Turkey Point Nuclear Plant Units 6 & 7 project as currently proposed. As has been made clear, FPL facilities consume large volumes of water in a region that already has extremely limited freshwater resources. Likely climate change scenarios for South Florida include a 3-11% and up to 20% reduction in rainfall that will further tax freshwater demand. See Vasubandhu et al., Climate Scenarios: A Florida-centric View, STATE UNIV. SYSTEM OF FLORIDA (Nov. 2011) (citing Enfield et al., Mid-Century Expectations for Tropical Cyclone Activity and Florida Rainfall); see also Climate Change and Water Management in South Florida: Interdepartmental Climate Change Group, SOUTH FLORIDA WATER MANAGEMENT DISTRICT (Nov. 2009). Any conflicts presented by the operation of the new reactors with investments in the Comprehensive Everglades Restoration Plan (*CERP"), protecting the Biscayne Aquifer from saltwater intrusion, or the consumption of potable water by the public should be made clear, not only in the body of the final Environmental Impact Statement, but also in the executive summary. As an additional matter, any decision based on the final Environmental Impact Statement would benefit from an examination of how the placement of the new reactors at Turkey Point might affect regional adaptation strategies. As sea levels rise, saltwater intrusion intensifies, and drinking water

becomes more expensive, the South Florida region will be required to pursue a variety of adaptation strategies. The majority of these adaptations will be forced to occur during the operating life of the new reactors. The need for power identified in the DEIS is predicated on assumptions that may not be in line with these adaptive strategies and potential inconsistencies should be explored further. (**0611-18** [Haber, Matthew S.])

Comment: Expand Consideration of Sea-Level Rise Scenarios and Related Impacts

Turkey Point is a low-lying peninsula bordered by a shallow bay to the east and the Everglades to the west. The proposed site of the new reactors is a mud island southwest of the current plant that is surrounded by the industrial wastewater facility and borders Biscayne Bay. DEIS at 3-2. The proposed site will be raised with fill to a finished grade elevation of 25.5 ft North American Vertical Datum 1988 (*NAVD88"). Id. As noted by the DEIS, the U.S. Global Change Research Program rates the vulnerability of the Turkey Point area to sea-level rise as *high" to *very high." DEIS at I-3. The DEIS further acknowledges that: Sea-level rise also is expected to **accelerate saltwater intrusion into freshwater supplies from rivers, streams, and groundwater sources near the coast" and agricultural areas around Miami-Dade County **are at risk of increased inundation and future loss of cropland with a projected loss of 37,500 acres in Florida with a 27-inch sea level rise." Water demand in southeastern Florida is projected to increase by more than 50 percent by 2060, relative to 2005, based on combined changes in population, socioeconomic conditions, and climate. Id. However, the DEIS merely acknowledges these issues as a matter distinct from the rest of its analysis. It does not incorporate the consequences of climate change into its broader review of the cumulative impacts that may be associated with the siting of new reactors at Turkey Point, nor does it assess the probability of 27 inches of sea-level rise being exceeded at various points in time. (**0611-19** [Haber, Matthew S.])

Comment: I understand that the Safety Evaluation Report is not subject to public hearing. Based on discussions with local experts on sea level rise, the USACE's projected one foot rise over the 35 year life of the project seems overly conservative. If FPL's nuclear unit 6 and 7 are approved and built, and they become islands within the next 1015 years due to one foot of SLR, the NRC will face review of its approval. (**0612-7** [Teas, James])

Comment: Section 3.2.2.1, Landscape and Stormwater Drainage (pg. 3-8): The proposed nuclear reactor Units 6 and 7, including cooling towers, makeup water reservoir, new substation and associated facilities, would be built on a filled "218 acre island" enclosed by a stabilized earth wall to the north, east, and west. A reinforced concrete wall could be constructed to the south. The elevation within the fill island would range from 19 feet to 26 feet North American Vertical Datum of 1988. With the threat of sea level rise in the foreseeable future, the EPA has concerns on what effect this may have on the surrounding infrastructure to this created island; there are concerns that rising sea levels could potentially surround the island at some point in the future during the lifespan of this project. Please provide information in the FEIS which would support construction of the project, considering the fact that even though the power units will be constructed on this island, the surrounding landscape may be impacted by sea level rise or storm surges that may affect the feasibility of the project, given the project purpose. FPL has stated that they provided substantial scientific data and testimony regarding the effects of sea level rise during the State site certification proceedings, and that the Recommended Order, adopted in the Final Order on Certification states: *"The plant design elevation accounts for more than maximum storm surge plus sea level rise. FPL has provided reasonable assurance that the project is not contrary to the public interest as it relates to the sea level rise."* The FEIS should evaluate, document and clarify the effectiveness of proposed measures to protect the facility from storm surges and rising sea level. (**0617-1-8** [Mueller, Heinz J.])

Comment: *Climate Change and Sea Level Rise.* The Turkey Point site is in a low-lying, flood-prone, (Section 2.2.1.4, p. 2-6) coastal area at or near sea level. It is often flooded by tides or freshwater runoff (Section 2.4.1.1, p. 2-74). Additionally, it is bounded by Biscayne Bay to the east, Card Sound to the south, and wetlands to the west. Florida Power & Light proposes to build the proposed action on a filled "island" (Section 3.2.2.1, p. 3-8). This island would contain the proposed two new nuclear units' power blocks and most of the associated infrastructure: the mechanical draft cooling towers, makeup-water reservoir, substation, underground injection control wells, and various small associated buildings. This island would be constructed on a vacant 218-acre mudflat, known as "Mud Island" (Section 4.1.1. I, pp. (4-4) - (4-6)). This 218-acre mudflat is to be excavated down to XX feet and then filled to a plant grade of 26 feet. This elevation is above the design basis flood elevation of 24.8 ft. (Section 5.11.2.4, p. 5-129). Additionally, this land island is to be enclosed by a stabilized earth perimeter wall on the north, east, and west sides and a reinforced concrete wall on the south side (Section 3.2.2.1, p. 3-8). This land island will also be surrounded by 4,370 acres (Section 2.3 .1, p. 2-42) or 5,900 acres (Section 2.2.1.6, p. 2-7) of existing man-made, unlined cooling canals of the industrial waste facility. It is unclear whether the land island will be 26 feet above these existing cooling canals. *Climate Change Adaptation*: NRC's analysis of climate-change effects (Appendix I) does not consider potential climate-change impacts to the proposed action, nor subsequent impacts to the surrounding environment. Instead it documents NRC's qualitative determination of the likely changes described in Chapter 5 (operational impacts) if the environment is altered in a manner consistent with current climate-change predictions (Appendix I, p. 1-1). ***Recommendations:*** EPA recommends NRC discuss potential climate-change impacts to the facility, resulting impacts to the surrounding communities, ecosystems, infrastructure, land uses, etc., and mitigation opportunities. Additionally, EPA recommends NRC use available sea-level rise and storm-surge models to quantify impacts to the proposed action, which can facilitate identification of associated impacts to the affected environment. For example, the USACE's Sea Level Rise analysis where alternatives are evaluated using "low," "intermediate," and "high" rates of future sea level rise for both "with" and "without" project conditions. [Footnote 1: Incorporating Sea Level Change in Civil Works Programs (31 December 2013) Department of the Army, U.S. Army Corps of Engineers, ER 1100-2-8162, Regulation No. 1100-2-8162, available at http://www.publications.usace.army.mil/Portals/76/Publications/EngineerRegulations/ER_1100-2-8162.pdf] (**0617-4-1** [Mueller, Heinz J.])

Comment: *Sea Level Rise and Regional Stormwater Management*: As noted by NRC, land was drained by a series of canals to support urban and agricultural development (Section 7.3.2.1, p. 7-22). The anticipated encroaching sea-level can reverse water transport by moving sea water into these canals. Thereby raising the water-surface level and decreasing stormwater storage potential within these canals. Moreover, the rising water-surface level within these canals reflects the saturation of the surrounding soils. Saturated soils are unable to store storm water. Additionally, sea level rise is expected to decrease the water elevation gradient along this canal-drainage system. Thereby reducing the capacity for gravity-driven drainage through the canal network. ***Recommendations:*** EPA recommends NRC consider the effects of sea level rise, storm surge, and extreme storm events upon the regional canal system and surrounding saturated soils and associated impacts to the proposed action. EPA recommends this analysis include the stability of the proposed 218-acre, 26-foot elevated, land island having a three-sided earthen berm. For example, FPL proposes to include the underground injection control wells within the elevated, 218-acre, land island (Section 4.1.1.1, p. 4-4). EPA recommends NRC discuss whether these canals, UIC wells, and the four proposed radial collector wells, will act as conduits to transport ground water under the influence of sea level rise into the proposed facility. As NRC has noted, the drainage canals also provide a conduit for seawater to flow inland at high tide (Section 2.3.3.2, p. 2-66). Additionally, the analysis should include the combined

effects of sea level rise combined storm surge and a heavy precipitation event. As NRC noted (Appendix I), the U.S. Global Change Research Program rates the vulnerability of the Turkey Point area to sea-level rise as "high" to "very high," and notes an "imminent threat of increased inland flooding during heavy rain events in low-lying coastal areas such as southeastern Florida, where just inches of sea level rise will impair the capacity of stormwater drainage systems to empty into the ocean." (**0617-4-4** [Mueller, Heinz J.])

Comment: *Sea Level Rise and Land Subsidence*: Prior work suggests that land subsidence rates in South Florida could be in the 0. 7 to 1.8 mm per year range, with Dade County at 1.1 mm per year, which could add 7 to 18 cm (or more) to sea level rise estimates for this area through the year 2080. [Footnote 3: Climate Change in Coastal Areas in Florida: Sea Level Rise Estimation and Economic Analysis to Year 2080, Center for Economic Forecasting and Analysis (2008). Available at http://www.cefa.fsu.edu/content/download/472341327898]. ***Recommendations:*** EPA recommends NRC discuss the potential impacts of filling a 218-acre mudflat, and thereby raising it to the proposed 26-foot plant grade, upon the Turkey Point area's land subsidence rate and affected environment. Additionally, EPA recommends NRC discuss this impact in context of projected sea level rise, storm surge, and extreme precipitation events. As stated earlier, the U.S. Global Change Research Program predicts the occurrence of more category 4 and 5 storms. (**0617-4-5** [Mueller, Heinz J.])

Comment: *Sea Level Rise and Shoreline erosion*: The proposed action is to be located in a low lying coastal area subject to shoreline erosion. It will impact 591 coastal acres. This includes 182 acres of mudflat, 32 acres of open water, and 89 acres of various mangrove types, sawgrass marsh, and mixed wetland hardwood (Section 4.3.1.1, pp. (4-40) - (4-42)). Additionally, the industrial wastewater facility covers another 5,600 acres along 5 miles of the Biscayne Bay shoreline (Section 2.3.1.1, p. 2-44). Moreover an existing barge-turning basin is to be enlarged by 4,356 ft^2 to accommodate large barges (Section 4.2.1.1, p. 4-27). Approximately 328 miles (40 percent) of Florida's sandy beaches are eroding enough to threaten existing developments and recreation areas. [Footnote 4: Saving Florida's VANISHING Shores, http://www.epa.gov/climatechange/Downloads/impacts-adaptation/saving_FL.pdf] According to the state Department of Environmental Protection, 485 miles of beaches (59%) already are experiencing erosion, with 387 miles experiencing "critical erosion. [Footnote 5: Florida's Resilient Coasts: A State Policy Framework for Adaptation to Climate Change, http://www.ces.fau.edu/files/projectslclimate_change/FI_ResilientCoast.pdf]." ***Recommendations:*** EPA recommends NRC examine the potential for shoreline erosion impacts associated with rising sea levels, storm surges, and increasing occurrence of Category 4 and 5 storms on the proposed action and associated impacts upon the affected environment. (**0617-4-6** [Mueller, Heinz J.])

Comment: 4) Evaluation of Sea-Level Rise, Future Hurricanes and Storms, and Climate Change Impacts

The NPS is concerned that the DEIS does not include a sufficient analysis of how sea-level rise, hurricanes and storms, and climate change may impact the proposed project and NPS resources affected by these changing conditions. These potential environmental impacts should be included in the DEIS. The DEIS does not include an analysis of sea-level rise as it pertains to the proposed action or the present facility, and its conclusions do not contain information which would indicate the effect of sea-level rise, including hurricanes and storms, demonstrating the potential effect on park resources. As discussed earlier, the concerns related to the IWF include the transfer of IWF water into the bay as a result of storm surge, including hurricanes.

As the NRC and USACE are aware, there is a broad range of sea-level rise projections for South Florida. While predicted sea-level for the life of the project varies, projections agree about one key feature - sea-level is rising and it will continue to rise at an increasing rate. Most importantly, sea-level rise at a particular site is not a smooth, steady rate of increase, but rather it will be varied and include pulses from climatic events (notably storm surge from hurricanes) that could connect, as noted earlier, the IWF with Biscayne Bay and release pollutants from the IWF and other facilities that are not elevated and strongly reinforced. The DEIS currently has no analysis or discussion of the impacts on movement of materials (especially toxic materials, nutrients, and turbidity) from the Units 6 and 7 to Biscayne NP and Biscayne Bay that may occur with hurricanes, storms, and storm surge on the site. The impact of these higher, more forceful storm surges must be evaluated.

The rate of sea-level rise in the region of the IWF is currently 2.4 mm/year and increasing. Projections by the Intergovernmental Panel on Climate Change (IPCC Fifth Assessment, 13.5, 2013) show coastal water levels gaining between 0.40 and 0.63 m by the end of the century, with related increases in coastal erosion and additive impacts on storm surge. Additionally, sea-level in Miami is directly affected by the flow rate of the Florida Current I Gulf Stream system. Reductions in flow rate and associated increases in sea-level along the East Coast of North America above the global sea-level rise rates are predicted for this system. At a minimum, a monitoring and adaptive management program that tracks local sea level, measures connectivity between the IWF and the Bay, and acts to minimize risk from IWF contaminants to Biscayne NP (by decreasing these contaminants and the connectivity between the IWF facility and Bay waters), should be in place.

Although the DEIS generally acknowledges that there is a range of potential sea level rise of 1 to 4 feet by the end of this century (the U.S. National Climate Estimate predicted up to 6.6 feet), there is no analysis of the impacts of even within this range of sea-level rise on the Turkey Point Facility, its infrastructure, IWF, or access roads. The DEIS contains no elevation comparisons with the estimated sea-level rise, showing how much of the site land would be lost under the estimated sea level rise scenarios. The analysis needs to consider how this land loss would affect plant operations. The NRC should analyze whether the plant will be able to operate under these various sea level scenarios and, if so, how environmental risks vary with differing operational and sea-level scenarios. Sea-level rise assessment should also include consideration of the South Miami-Dade Waste Water Treatment Plan, as this facility is proposed as the primary source of cooling water for the proposed Units 6 and 7.

Draft climate change guidance from the Council for Environmental Quality (CEQ) on how to consider the effects of greenhouse gas emissions and climate change in the evaluation of federal actions, as well as, guidance related to sea level rise and siting infrastructure from National Oceanic and Atmospheric Agency (NOAA) are available. Further guidance on this subject is provided by USACE Engineering and Construction Bulletin No. 2014-10 "Guidance for Incorporating Climate Change Impacts to Inland Hydrology in Civil Works Studies, Designs, and Projects"; Regulation No 1100-2-8162 "Incorporating Sea Level Change in Civil Works Programs"; and ETL 1100-2-1 Technical Letter 1100-2-1 "Procedures to Evaluate Sea Level Change: Impacts, Responses, and Adaptation. " The NPS recommends that NRC review these documents and update the DEIS as appropriate to account for climate change/sea level rise.

The DEIS should include assessment of how climate change and sea-level rise vulnerability changes risks associated with the proposed project and its long-term operations both in the analysis of alternatives as well as cumulative impacts. In this evaluation, climate change and sea-level rise related risks are dismissed as an criterion for risk assessment, with a statement

(page 941) that equates the risk of all alternatives: "The inland alternative sites could experience fewer impacts from sea-level rise, but may also experience greater impacts from other climate change indicators, such as rising temperature."

Because the NPS is required to manage parks for "future generations," we recommend that a revised DEIS provide more detail as to how radioactive waste would be stored before and after the forty-year license expire. Storing hazardous waste adjacent to Biscayne NP indefinitely poses great concern, especially because the region will face increased storm events and possibly more intense resulting from climate change and sea-level rise and it is unclear whether the storage facilities are capable of withstanding increased storm events resulting from climate change and sea-level rise.

The NPS acknowledges that a storm related analysis may be contained in the NRC's Safety Report and will not receive a public review. To increase transparency with the public, this information should be clearly articulated in revisions to the DEIS. We recognize the NRC may be constrained by their regulations and guidance to include applicable environmental information in their DEIS. (**0622-1-10** [Austin, Stan])

Comment: Climate Change and Sea-Level Rise[.] The NPS is concerned that the DEIS does not include a sufficient analysis of how sea-level rise, hurricanes and storms, and climate change may impact the proposed project and NPS resources affected by these changing conditions. As an example, the DEIS does not address how sea-level rise may impact plant operations or the availability of cooling water sourced from the South Miami-Dade Wastewater facility and a greater reliance on the RCWs. There is recent draft climate change guidance from the Council on Environmental Quality on how to consider the effects of greenhouse gas emissions and climate change in the evaluation of federal actions, as well as guidance related to sea level rise and siting infrastructure from National Oceanic and Atmospheric Administration. The NPS recommends that NRC review these or other related guidance documents and update the DEIS as appropriate to account for climate change/sea level rise. (**0623-5** [Austin, Stan])

Comment: The NPS asserts that the DEIS impact analysis associated with construction and operation of proposed Units 6 and 7 does not sufficiently address issues related to the environmental impacts of the proposed action on resources managed by the NPS. Based on our review of the DEIS, we have strong concerns that impact analysis described in the DEIS does not: 1) sufficiently utilize the best science/data/information (e.g., current salinity data or sea-level rise projections for modeling) to analyze the environmental effects of the proposed action on the affected environment, including Biscayne and Everglades NPs[.] (**0623-7** [Austin, Stan])

Comment: Green spaces and parks must be protected at all costs. It is now known by scientists that our country will be directly impacted from global warming due to arctic meltings. The Antarctic which scientist thought would be the glacier that would be the least impacted is melting at an accelerated rate both from the top and bottom (warm waters). The West side of the antarctic, ie the Amundson Sea, Larsen Band the Thwaites Ice Shelves will be gone in only a few years. The disappearance of the Amundson ice shelves will increase sea level by 15 feet! Miami and coastal communities need to act quickly to prevent and correct shoreline erosion. Our greenspaces, parks, green roofes, vertical/hanging gardens are key in prevent and reducing flooding. Dense communities have 55% runoff where green space communities only produce 10% runoff. (**0633-2** [Cornely, Tina])

Comment: Not enough effort has been made to determine the risk from sea level rise. These two new reactors will be built in an area that could be under water in the future. Even if these

reactors are being decommissioned at this time how easy will this be if sea level has risen in the surrounding area? It could also impact these reactors during their life time. The estimates of sea level rise continue to be debated. The numbers you are using could be low estimates. What if your estimates are incorrect? I recommend that you look at additional sources for sea level rise estimates. (**0641-12** [Martin, Drew])

Comment: Climate change could increase salt water intrusion even further increasing this stress level. Why add on two new reactors to increase the competition for fresh water? (**0641-3** [Martin, Drew])

Comment: Lastly, the current proposed plan has not accounted for the anticipated sea level rise in our coastal region. NOAA recommends that power plants account for a 3 to 6.6 feet sea level rise. The proposed FPL plan only accounts for a 1 foot rise. In a area where we are already experiencing problems with sea level rise, this type of irresponsible planning is unacceptable. (**0642-5** [Rawlins, Steve])

Comment: We surmise that a tsunami isnt necessary to poison the Atlantic; sea level rise alone will do it, assisting the Corexit and BP oil polluted Gulf Stream. The low-lying wetlands surrounding Turkey Point contain some of the lowest elevations in South Florida. Even a half foot of sea level rise will be enough to inundate the 5,000 acres of canals used to cool the two reactors currently operating at this location: They are filled with hot and extremely salty water as well as chemicals. (**0673-4** [Dwyer, John P.])

Comment: According to Professor Wanless, it's already too late. The oceans have already absorbed the critical amount of heat and are undermining the ice at the poles faster than anyone predicted. He says 75 years at best before the area south of Tampa/ Stewart is underwater--and notes that it will include Turkey Point's reactors and cooling pools containing 45 years worth of uranium rods. Miami will be Fukushima for the Atlantic. (**0673-8** [Dwyer, John P.])

Comment: Consider, too, that Biscayne Bay is at risk for sea-level rise. The low-lying wetlands that surround Turkey Point contain some of the lowest elevations in South Florida. Even a half-foot of sea level rise will be enough to inundate the 5,000 acres of canals used to cool the two reactors currently operating at this location. They are filled with hot and extremely salty water as well as chemicals used to kill a recent algae outbreak in the canals. With scientists measuring ever-increasing sea-level rise from the melting of our planet's remaining ice ill addition to thermal expansion due to increased temperatures, six inches of sea level rise are a certainty. New nuclear reactors in this location will be sitting on islands in Biscayne Bay quite possibly in the not so distant future. (**0674-4** [Dwyer, Karen])

Comment: The original decision to build nuclear reactors at Turkey Point, on a hurricane-swept coastline vulnerable to storm surge, was made a half a century before we understood climate change and sea-level rise. FPLs new reactors would operate until 2080, during which, the National Oceanic and Atmospheric Administration (NOAA) recommends that power plants account for three feet to 6.6 feet of sea-level rise. FPLs application accounts for only one foot of sea-level rise for that period, clearly unrealistic given the five inches of sea-level rise measured locally in the past five years. Even one foot of sea-level rise will inundate the area surrounding Turkey Point and turn the power plant into a remote island. A difference of two feet of sea-level rise will dramatically affect the height of future storm surges. FPLs assertion that new reactors will be safe from a storm surge because they are 26-feet above sea level, overlooks the facts that FPLs sea level standard is 27 years old; and the project does not properly account for

realistic storm surge projections. FPL ignores these facts to double down on a dangerous position based on yesterdays science. (**0675-6** [Rodriguez, Jose Javier])

Comment: Please remember that as global warming continues, the water level in the bay will rise. We do not want a nuclear power plant surrounded by water. (**0688-1** [Albers, Harold])

Comment: The risk in doing this project should be considered to be severely prohibitive, especially with Larsen-B ice shelf degradation continuing. (**0691-1** [Drevicky, John])

Comment: Even if our governor is "not a scientist" and doesn't want Floridians to discuss climate change, I hope that the U.S. Nuclear Regulatory Commission and Army Corps of Engineers include scientists and people who are smart enough to know that we'll need to deal with rising sea levels if even we don't talk about them. (**0693-1** [Dorn, Kathryn])

Comment: When the sea rises it would be inundated, that would be crazy wouldn't it? Do not risk the consequences Ms.'s Bladley and Megan Clouser. (**0695-2** [Nappe, Judith])

Comment: I would like to add these PowerPoint slides to the public record for your review of the Turkey Point EIS. They are closeups of the Turkey Point showing .5-6 feet of sea level rise and were prepared by Dr. Peter Harlem of Florida Atlantic University. As you will see, sea level rise will have an immediate and ongoing effect on the plant site and it's surrounding environment [Commenter attached figure showing a map of the effects of 6 ft sea level rise]. (**0702-1** [Kipnis, Dan])

Comment: Turkey Point EIS comments and slide #2 [Commenter attached figure showing a map of the effects of 6 ft sea level rise]. (**0703-1** [Kipnis, Dan])

Comment: The low-lying wetlands which surround Turkey Point contain some of the lowest elevations in South Florida: Even a half foot of sea level rise will be enough to inundate the 5,000 acres of canals used to cool the two reactors currently operating at this location. They are filled with hot and extremely salty water -as well as chemicals used to kill a recent algae outbreak in the canals. With scientists measuring ever-increasing sea level rise from the melting of our planet's remaining ice in addition to thermal expansion due to increased temperatures, those 6 inches of sea level rise are a virtual certainty. (**0712-3** [Almer, Anessa])

Comment: **NRC's Draft EIS is Flawed Because it Fails to Adequately Address the Impacts of Climate Change, Specifically, Sea Level Rise on the Turkey Point Site:** According to the NRC's Environmental Impact Statement for Combined Licenses (COLs) for Turkey Point Nuclear Plant Units 6 and 7, Draft Report for Comment (NUREG-2176) (Here in after DEIS): The impact of sea level rise on the safe operation of the proposed units is considered in the NRC's safety review and is not within the scope of environmental review. Results of the safety review can be found in the Safety Evaluation Report (SER). However, sea level rise will be considered as one of the contributing factors to the cumulative impact of the proposed action and other past, present, and reasonably foreseeable actions in Chapter 7 of the EIS. (I won't bother with citing the footnote in NRC's Draft EIS since it does function!) Sadly, the Huffington Post did a better job framing the issue of sea level rise at Turkey point in one graphic than the NRC did in nearly 1500 pages. [FIGURE: Turkey Point Nuclear Generating Station] (http://www.huffingtonpost.com/2014/05/19/maps-rising-seas-storms-threaten-flood-coasta1-nuclear-power-plantsn5233306.html) Yet NRC's DEIS seemingly fails to address the fact that the Turkey Point site will be an island during a storm surge by the time the proposed reactors would be operation should FP&L ever commit to building them. (**0716-7** [Riccio, Jim])

Comment: Why build here when the Army Corp of Engineers estimates that by 2030 (less than 15 years from now) the projected sea level rise for this area is 3-7 inches. Already the existing plant is drawing so much water that it creates problems for the counties future water supply. What are the negative impacts of your allowed increase to 104 degrees and why is the lower level kept in place for all other nuclear power plants? (**0718-1** [Buechler, Jerry])

Comment: Three, the costs that are related to safety. The information that I have is that NOAA has recommended power plants account for between 3 and 6 feet of sea level rise. And if this application is granted, basically the application is seeking approval for two new units on a low peninsula into a shallow bay that's already highly vulnerable to storm surge. That is a -- that is going to present costs that are hard to calculate. (**0721-1-6** [Rodriguez, Jose Javier])

Comment: Now what happens if you get both entrainment and sea level rise taking out the reclaimed water supply? Where do you get your water from then? That's not in the Environmental Impact Statement, and we know darn well it's going to come out of the L-31-E, same as they're drawing right now for Turkey Point 3 and 4, and that's going to conflict massively with the Southeast Everglades restoration of Coastal Everglades. (**0721-2-10** [Stoddard, Philip K.])

Comment: The third issue is an underestimation of sea level rise by a failure to consider how measured local rates of sea level rise differ from projected global rates and the effect of that uncertainty and viability of this project.

So Appendix I of the Impact Statement addresses climate change and sea level rise. And here's a quote: "Sea level is projected to rise 1 to 4 feet globally by the Year 2100." We heard where that came from earlier. So several reports list figures similar to this. But scientists at RSMAS, Rosenstiel School of Marine and Atmospheric Science at University of Miami on Virginia Key, have actually measured sea level rise rates in the Miami region, and it indicates higher rates of sea level rise are already happening locally. In the past five years the average rate has been .97 inches. That's almost an inch a year. So existing rates would yield a range of about 21 inches to about 78 inches, that's almost 2 feet to about 6-1/2 feet over the life of the plant. Now, that's just the current rate that we're seeing right now. And every scientific model indicates an exponential increase as we start seeing more of the ice melting at the poles. So the Draft Environmental Impact Statement likely underestimates sea level rise by using consensus global measures that don't match existing local rates of rise. (**0721-2-5** [Stoddard, Philip K.])

Comment: There's a fourth issue, and that's failure to consider the loss of wastewater as a cooling source because of reduced residential demand from conservation measures resulting from sea level rise induced salt water intrusion on the fresh water supply. We know that one foot of sea level rise is going to render our salt water exclusion gates on our canals ineffective. The salt water intrusion is going to come in, it's going to become uncontrollable and we're going to lose our fresh water supply. Well, you can bet that we're going to put in stringent conservation measures at that point because we're going to be doing reverse osmosis and paying through the nose for our water. So there will be a lot less water going into the waste supply. And so the Draft Environmental Impact Statement is incomplete in failing to consider the reduction in wastewater stream from reduced residential demand and force water conservation. (**0721-2-6** [Stoddard, Philip K.])

Comment: The fifth omission here is a failure to consider loss of wastewater as a cooling water source because of regional depopulation. Both the Miami-Dade Water Sewer Department and the Draft Environmental Impact Statement know that the people in Southeast Dade County are

likely to leave as the sea level comes up. If you're not there, you're not using water. The water treatment plant, even if it remains operational, is going to get less water in, less water out, less water to Turkey Point. (**0721-2-7** [Stoddard, Philip K.])

Comment: So, there's a failure to consider loss of wastewater as a cooling source because sea level rise impairs site access. (**0721-2-8** [Stoddard, Philip K.])

Comment: They're going to have to build causeways. They can build a causeway. It will be an island. Awkward but possible. (**0721-2-9** [Stoddard, Philip K.])

Comment: And, furthermore, South Florida not only being porous and porous area for water, it is also an incredibly unstable area for weather in the past. It's going to get even more unstable because of climate change, which is happening here. (**0721-29-2** [Yovel, Ephrat])

Comment: The studies that we have all relied on for the past six years as a region bring together a lot of science, a lot of reports, and an understanding that we, as a region, have come to use as our baseline of knowledge. Unfortunately it does not appear that those who are studying this very critical area, are appreciating and respecting the baseline of scientific data that we have all come to realize we must incorporate in to our responsibilities. Especially the elected officials who must be stewards for the future of our communities to assure that our land use and our building codes and our decision making in every realm of creating resilient communities incorporates what science tells us, which is, we are looking at anywhere from two to six feet of sea level rise by 2100. And when FPL comes in and says they will only be relying on one foot, that is inadequate to the needs that we all understand have to be incorporated. (**0721-3-1** [Lerner, Cindy])

Comment: The Draft Statement fails to address a failure of the plan to adequately plan for the sea level rise that's certain to come. The plan must be compliant with the NOAA report of 2012, the global sea level rise scenario for national climate assessment. In that review the report indicates over 8 million people live in areas at risk of coastal flooding, and many of the nation's assets related to military readiness, energy, commerce and ecosystems, are already located at or near the ocean. We have all of those. The report establishes a high confidence greater than nine in ten chances that the global mean sea level will rise at least eight inches, no more than six feet by 2100. The report indicates the highest scenario should be considered in situations where there's little tolerance for risk. Two new nuclear power plants, there should be no tolerance for risk. The new infrastructure has a long anticipated life cycle with this power plant and the failure to include the planning for the --up to six foot sea level rise is a fatal flaw. (**0721-3-3** [Lerner, Cindy])

Comment: Certainly we have different circumstances. We have sea level rise, and that in the end is what this really is all about. (**0721-30-6** [Ullman, John])

Comment: The analysis of sea level rise by the NRC and by FP&L is woefully inadequate. (**0721-30-8** [Ullman, John])

Comment: And I would suggest to you that the President's mandate is that all Federal agencies account for sea level rise. And this agency has failed to do so, and FP&L has failed to do so. And the President wants us to do that. (**0721-30-9** [Ullman, John])

Comment: [These issues are dwarfed by] sea level rise and climate change impacts, and the list goes on as we've heard tonight. (**0721-32-6** [Schlackman, Mara])

Comment: It does not realistically account for sea level rise, which is a safety concern as well. (**0721-4-3** [Regalado, Tomas])

Comment: FPL's application only accounts for one foot of sea level rise despite the fact that NOAA recommended to account for three to five feet of sea level rise. And because Turkey Point is located directly on the shoreline of Biscayne National Park it's already vulnerable to sea level rise, storm surge, flooding, hurricanes, et cetera, as some other people have said before. So we don't feel like this plant is safe. (**0722-14-3** [Kaul, Devika])

Comment: And the concern I want to raise today is one that probably won't occur in my lifetime so it's for the people of the future that I would like to talk. It seems that the estimates for sea rise have been continually been being raised. We have recently learned that the west end arctic ice sheet is inevitably going to slide into the sea. If that should ever happen with the east end arctic ice sheet, all bets are off as to how high the ocean is going to go. And that is my concern.

What I would suggest here is that a careful scientific analysis be made to determine at which point it would be prudent to say we now must close the plant if it is built. And if that point comes then there must be a plan already in place for the closing of the plant and the removal of all radioactive material from the coast to some safe place. And that safe place should be designated before the plant is built, not afterwards, and the method of removal should be designated before the plant is built and not afterwards.

Those are my concerns. I'm willing to assume, as we lawyers say, but not admit all of the good stuff. But the scientific estimates of the rise of the sea have all been too conservative and I think that should be taken into very careful consideration before this plant is built. (**0722-16-1** [Segor, Joseph C.])

Comment: After listening to everything about the ecological impacts, which I'm concerned about, but I feel that there is no real evidence of sea water rise. I've heard nobody say last year it rose all that much. All they say is within 30 years it rose. So if we stick with clean, nuclear power like other people have said, we will not impact the carbon footprint. And as far as it -- if it does rise, where are we all going to go? (**0722-19-1** [Hudak, Jill])

Comment: But I sat on the Miami Dade County Climate Change Task Force and I work with the City of Miami Beach Sea Level Rise Task Force and unfortunately the Mayor of Homestead probably won't like to hear this but the slides I'm talking about are sea level rise and it's environmentally important to this project. All of South Florida is going to change in the very near future; it's doing it right now.

I found it very interesting that the Army Corps of Engineers jurisdiction in the salt water is at the highest annual high tide. The Army Corps of Engineers under that scenario probably has jurisdiction over all of Miami Beach because we flood with saltwater at the highest tide of the year. That's what's going to happen in South Florida.

My objection to the siting of this plant and to the EIS is that it doesn't take the new and updated sea level rise predictions into consideration. It is using an older version of it, in the beginning it used no version of it at all, at least the NRC said it was not an issue. It's becoming an issue. One foot of sea level rise on the southeast coast will put most of Homestead and South Florida and Florida City and Cutler Bay and Turkey Point underwater. Now that's at high tide -- that's not at high tide, that's just under the water all the time at mean tide, all right?

At high tide you can add, if it's a three-foot tide or a four-foot tide, to that. My slides show this. It's very disturbing to see the amount of building going on down here and then a nuclear power plant knowing that this is going to happen. This is not "if," this is "when." And the latest observations by NOAA and even the Army Corps of Engineer talks about this, has a one-foot sea level rise sometime in the next 30 to 40 years. That means the plant would be finished and go into operation and it would be an island. (**0722-2-1** [Kipnis, Dan])

Comment: Now I guess Miami Dade County would have to come in and raise the roads to be above high tide, so that's a three or four foot rise in the roads so the workers can get to work. Or additionally, as it's going up, we probably would have to raise roads just to get the equipment in there and the men that are building the plant there. (**0722-2-2** [Kipnis, Dan])

Comment: Why build it when we know that environmentally it isn't going to help us there because we're going to run into problems that are not shown in that EIS because of sea level rise.

Two feet -- well, Miami Beach goes two feet also, so I have to tell you that. Doral's going three feet. We have about 67 percent of the land surface in Miami Dade County inside the UDB left so we're looking at a customer base that's really going to shrink because people are not going to live in the water. They won't be able to. (**0722-2-3** [Kipnis, Dan])

Comment: In addition, as Captain Dan Kipnis noted there is only one foot of sea level rising accounted for in this plan which is better than no sea level rise. But it is still not adequate to meet what NOAA has recommended which is to consider three to four feet of sea level rise to be more realistic to models and more conservative in planning. You know, this is really a question of how Miami wants to move into the future and whether or not we want to face this issue head-on and really prepare and plan for it or whether we want to be caught off-guard like some other places in the world have been when flooding and storm surge and storms in themselves have impacted critical infrastructure. And we don't want that to happen here in this really fragile and important area. And to affect a nuclear power plant that we all rely on as well. So to be more cautious here is really the best way to go, in my opinion. (**0722-7-6** [Silverstein, Rachel])

Comment: What I cannot understand, and I'm a simple fellow, is that if the president of the most powerful, respected nation in the world and our Federal government acknowledges and accepts the climate change is playing a role in endangering our water and our air, how can FPL deny an increasing footprint and power output will not stress an endangered environment? They have already answered higher acceptable water temperature levels. They are already using water from our canals that were set aside for restoration. They were already using waters from our aquifers on an emergency basis. (**0722-8-1** [Gonzalez, Javier])

Comment: As I mentioned earlier, I'm a simple fellow with no degree in law or science and I know that a lot of fancy language is being used but I do know that someone at the present is concerned about -- and said that climate change will have no bigger impact than in South Florida. And maybe, just maybe us simple and smart folk should revisit FPL's plan. And maybe we can conduct a supplemental EIS to review the water quality and climate change. (**0722-8-2** [Gonzalez, Javier])

Comment: And one of our biggest concerns and one of our residents' biggest concerns is climate change. It is the future. I won't get into the specifics and all the numbers but I know that [for] every young kid out there, this is a topic. And if this is a concern that we should be worried

about, truly FPL, you might want to take a look at this. This might not be the best idea. (**0722-8-3** [Gonzalez, Javier])

Comment: I have two articles that I'd like to leave with you. I won't go into them too much other than to say one is in the..."Miami Herald," I believe it was, or the "Sun Sentinel" by Brower. And her comments were "numerous studies show that the effects of carbon pollution on the environment, the United Nations Interglobal Panel on Climate Energy and Climate Change shows that it is extremely likely that human activities and greater greenhouse gases are responsible for more than half of the observed rise in global temperatures and that the global sea level will rise another 26 to 98 centimeters by 2100." (**0722-9-9** [Riley, Bill])

Comment: And even though I understand the Nuclear Regulatory Commission is not considering sea level rise as an important criteria in their Environmental Impact Statement, it's coming. It could be severe. We could be talking about a foot, worst case within ten, fifteen years. And we're talking about building nuclear power units on an island, basically, a future island. And I was here for Hurricane Andrew, as many of you were. I'm concerned about that. (**0723-5-5** [Teas, Jim])

Comment: The commenter provided a handout entitled "Turkey Point Immediate effect of SLR" prepared by Peter Harlem of Florida International University. The series of slides show extrapolated inundation maps for 0.5 ft to 6.0 ft of sea level rise at the Turkey Point plant. (**0725-1** [Kipnis, Dan])

Comment: If expanded, Turkey Point would become one of the largest nuclear power facilities in the country, located in an area that is ground zero for sea level rise. (**0728-1** [Gregory, Gregory B.])

Response: *Appendix I of the EIS documents the review team's consideration of the potential changes in impacts that may occur as a result of the changes in the environment resulting from global climate change including sea-level rise. The changes that were considered include potential changes in temperature, rainfall and the occurrence of severe weather events. As discussed in Appendix I, the review team considered the assessment presented in the most recent National Assessment. The 2014 National Assessment was conducted by a team of more than 300 experts guided by a 60-member Federal Advisory Committee and extensively reviewed by the public and experts, including Federal agencies and a panel of the National Academy of Sciences. The review team has also considered more recent estimates of sea level rise. The review team has added mention of research into a localize sea-level rise in South Florida associated with changes in regional ocean currents.*

The review team is aware that the sea-level rise of 1–4 ft by 2100 is not bounding. It is not implausible that sea level rise significantly in excess of 4 ft could occur by 2100. Such extreme sea-level rises would inundate much of South Florida making it uninhabitable. However, NEPA requires consideration of likely future scenarios not extreme future scenarios. However, the gradual increase in sea level and NRC's safety process protects the public health and safety.

Appendix I has been updated based on these comments.

Comment: I don't want what precious water we have used on this project. (**0008-15** [Finver, Jody])

Comment: We need the water for drinking, not cooling. (**0060-3** [Beckman, Yvonne and Douglas])

Comment: The new reactors will require 90 million gallons a day of Miami-Dade's treated wastewater for cooling. (**0078-5** [Wilansky, Laura Sue])

Comment: FPL's expansion would consume additional large quantities of fresh water which is already in short supply. (**0079-1** [Cathey, Turner])

Comment: These resources are vital for our well being and health. Please DON'T let FPLS to endanger our clean source of water. (**0088-4** [Lange, Alexandra])

Comment: I recommend that you disapprove any further processing of their Turkey Point Nuclear Power plant expansion proposal for the reasons summarized below 3) Nuclear plants consume vast amounts of water to keep reactors cool. FPL claims the new primary cooling system will use reclaimed wastewater, but that water is sorely needed for other uses. The project will increase usage of all Miami-Dade's available water by ten times, from one to 10 percent of supply, a massive impact for which there is no mitigation, in view of the projected skyrocketing forecast of water demand and declining water supply in the region. The project's assessment of its claim on fresh and salt water in the region is inadequate, failing to assess the loss it would cause to water needed for a rapidly growing population and severely threatened habitat in the coastal Everglades, Biscayne National Park, and South Dade County generally. (**0094-3** [Fairchild, David])

Comment: Operating two new reactors at Turkey Point could also have huge impacts on the quantity and quality of precious freshwater resources. (**0102-5** [Commenters, Multiple])

Comment: As you know operating two new reactors at Turkey Point could also have huge impacts on the quantity and quality of the area's limited freshwater supplies. (**0103-5** [Commenters, Multiple])

Comment: Comment 7. The DEIS is incomplete in failing to consider a third source of cooling water if the primary and secondary sources are compromised by SLR, or to consider the consequences of that outcome for residents and businesses of Miami-Dade County - The DEIS does not consider the possibility of losing both sources of cooling water, or the consequences. As detailed above, the treated wastewater eventually will be lost because of water conservation or regional depopulation, both caused by sea level rise. While the timeframe of SLR is uncertain at this date, the first loss scenario is almost certain to happen before the TPN 6&7 would be ready for decommissioning, and the second one could occur within that time frame as well. The proposed backup source of cooling water, the radial collector wells (RCWs) could become compromised by entrainment of hypersaline water from under the cooling canals (IWF). So what happens if the reactors at TPN 6&7 lose both sources of cooling water? The plant would be forced to compete directly with residential and businesses for the remaining sources of fresh water. Ironically the DEIS notes a projected increase in residential demand for freshwater over the same time period. ***The final EIS must consider the possibility and the consequence of losing both proposed cooling water sources.*** (**0106-10** [Stoddard, Philip K.])

Comment: Most of the problems and uncertainties identified concern cooling water operations. (**0106-2** [Stoddard, Philip K.])

Comment: Comment 5. The DEIS is incomplete in failing to consider reduction of the wastewater stream from reduced number of residences and businesses producing wastewater - The Miami-Dade Water Sewer Dept. has noted that the residential service area of the Southern Waste Water Treatment Facility is low in elevation, and will likely depopulate in the

face of SLR. The DEIS likewise notes: *"Climate change could lead to changes in the distribution of land use in Miami-Dade County and sea-level rise could lead to the loss of some inhabitable land in the county." [DEIS I.3.1.1 Land-Use Summary, p. I-4.]* Reduction in the number of customers in the southeast coastal regions of Miami-Dade County will reduce the amount of wastewater sent to the Southern Waste Water Treatment Facility, and thus the amount of treated wastewater water available for cooling TPN 6&7. ***The final EIS must consider eventual loss of wastewater as a cooling water source because of regional depopulation due to SLR.*** (**0106-8** [Stoddard, Philip K.])

Comment: The region surrounding the Turkey Point nuclear plant is an extremely complex and sensitive hydrological environment that is only becoming more complicated as human populations increase and the effects of global climate change emerge, including sea level rise. The history of the Everglades and the current costly restoration projects illustrate the long-term shortsightedness that has scarred Florida's waterways. When comparing types of energy generation, nuclear power has higher rates of both water withdrawal and consumption than traditional coal and natural gas and far more than renewable energy sources, such as wind and solar. Additionally, energy efficiency has the added benefit of substantially reducing energy needs, while simultaneously reducing water consumption. As we see FPL's projected figures for water demand increase for thermoelectric power generation, the NRC needs to fully evaluate current information about less water intensive energy alternatives, efficiency and renewables, including using a combination of these energy options. The NRC also needs to better analyze the impacts such a drastic increase in water demand from the power sector could cause to this area. (**0112-5** [Barczak, Sara])

Comment: The analysis of the impacts of the use and disposal of reclaimed wastewater is inadequate, particularly in terms of the characterization of constituents, the impacts of the construction of pipelines, and the impacts of wastewater reuse on CERP activities and goals. (**0113-1-5** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: The potential adverse impacts from use and reservation of reclaimed wastewater from the South District Water Treatment Plant to CERP and specifically, to BBCW, are not adequately discussed in the DEIS. BBCW, intended to restore freshwater flows in and around Biscayne Bay's littoral zone, is premised on the conveyance of freshwater that may include treated wastewater from Miami Dade County. The DEIS does not discuss the potential negative impacts to Everglades restoration efforts that may arise from the use of up to 90 MGD of reclaimed water to cool Units 6 & 7, water that may otherwise be used to supply freshwater to the BBCW project. (**0113-2-18** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: The DEIS fails to analyze the potential for the operations of radial collector wells to negatively impact the implementation of CERP, specifically the Biscayne Bay Coastal Wetlands (BBCW) project. BBCW is intended to restore freshwater flow to Biscayne Bay and Biscayne National Park, recharging sources of fresh groundwater and addressing high salinity in nearshore environments. Using radial wells to collect cooling water for Units 6 & 7 could negatively impact CERP goals of restoring freshwater flow to Biscayne Bay. Radial wells located at a depth of 40 feet may withdraw freshwater from the aquifer, potentially offsetting attempts to deliver more freshwater to Biscayne Bay's littoral zone. [Footnote 29: Florida Department of Environmental Protection, Determination of Completeness, FPL Turkey Point Units 6 & 7, August 10, 2009, 2.] (**0113-2-6** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: The plant is already endangering the water supply[.] (**0114-2** [Cunningham, Sue])

Comment: More reactors will need more cooling water....and that is not available. (**0114-4** [Cunningham, Sue])

Comment: [The new reactors] is not a wise use of our fresh water, which will become a limited resource over the next several decades. (**0126-3** [Pontier, Christine Hughes])

Comment: This expansion is said to enhance the economic value of the community, but it is not the economy I am worried about. I am worried about our water, it's amount, it's quality, and it's endangerment (**0127-2** [Cusidor, Teresa])

Comment: I do not want FPL to have 10% of waters usage. (**0127-4** [Cusidor, Teresa])

Comment: Not only does it jeopardize drinking water, it also makes the facility more vulnerable to rising sea levels and storm surge. (**0133-2** [Corral, Oscar])

Comment: I am writing today from my home to oppose the approval of FPL's two nuclear power at Turkey Point for the following reasons....2. The present plant and the new proposed plant use millions of gallons of fresh water and water from Biscayne Bay, ignoring the damage that will occur to the Everglades, Biscayne National Park and South Dade well fields. (**0136-2** [Levy, Morgan I.])

Comment: The draft EIS fails to account for the adverse and potentially deadly competition between a thirsty nuclear power plant and almost 4 million people, in one of the most highly populate areas of Florida. And water demand in southeast Florida, is projected to increase by more than 50% by 2060, relative to 2005, based on combined changes in population, socioeconomic conditions and climate. (**0145-9** [Lerner, Cindy])

Comment: Additionally, the operation of the existing reactors interferes with the National objectives of Everglades Restoration and further development of this site should incorporate the Federal projects intended to flood the land where the Turkey Point plants are located in order to restore Biscayne National Park's shoreline to estuary conditions. (**0172-3** [Cava, Daniella Levine])

Comment: Furthermore, we: are concerned that the operation of two new nuclear reactors could have significant impacts on the quantity and quality of our limited freshwater resources. Maintaining South Florida's water supply is critical to ensuring the future of our environment and our communities. (**0210-3** [Sharp, Andrea Heuson])

Comment: **Radial collector wells**. The Department is concerned that the operation of the radial collector wells (CWs), installed to provide a backup source of cooling water for Units 6 and 7,) has the potential to affect the salinity of Biscayne Bay (Bay). The lateral pipes associated with the CWs will be located 25 to 40 feet beneath the bottom of the Bay, but will draw water from the Bay itself. During operation of the CWs, the water withdrawn from the Bay will be replaced mostly by ocean water containing a typical ocean salinity of about 35 practical salinity units (psu). Consequently, operation of the CWs could negatively affect salinity (mesohaline; 5-18 psu) in this area of the Bay, and may undermine efforts of the Comprehensive Everglades Restoration Plan (CERP) in the region. Results from U.S. Geological Survey (USGS) salinity modeling of the effects of CWs, as provided in the DEIS, indicate that under the most conservative scenario (continuous pumping) the maximum salinity increase was .3 psu above the base condition in the immediate vicinity of the lateral pipes of the

CWs. However, most of the time salinity was within psu of the baseline condition. If the modelling is correct, the magnitude of change in salinity is not likely be ecologically significant (*i.e*., the flora and fauna probably will not be affected). Salinity in the Bay is frequently falls outside of the Restoration Coordination and Verification (RECOVER) performance measures targets established by CERP. Therefore, we are concerned that any further increases in the Bay's salinity may have adverse effects to the flora and fauna in area including the American crocodile. We recommend that FPL develop a monitoring plan to ensure that salinity in the Bay is consistent with the predicted modeling and develop an adaptive management plan to address what steps will be taken if salinity level exceed the 1 psu. We are also concerned that the operation of the CWs may exacerbate the hypersaline plume of ground water underneath the existing cooling canal network. The USGS modeling indicates that some hypersaline water beneath the cooling canals will be drawn into the CWs during extended periods of pumping. The increased gradient during CW pumping will likely increase the flow velocity of hypersaline water eastward under the Bay and may change the area affected by the hypersaline plume. It is unclear how this might affect salinity in the Bay; however, as previously indicated increased salinity in the Bay would have undesirable ecological effects to the Bay's ecosystem. Finally, operation of the CWs has the potential to adversely affect the local biota within the Bay due to the increase in downward vertical flow of water in the Bay's water column. The calculated average velocity of 0.0003 ft/min or about 0.4 ft/day is probably insignificant. However, a worst case modelling scenario presented in the DEIS, using an ultra-conservative approach, resulted in a vertical velocity of 0.43 ft/minute. This velocity could entrap small, weak-swimming organisms. Based on the design of the CW system, impingement and entrapment of organisms due to the operation of the CWs is unlikely. However, it could occur in a limited manner if the limestone above the CW laterals fractures and increase downwelling. Animals susceptible to impingement and entrapment include the eggs and larval forms of several species of fish and invertebrates. Also, a downward vertical flow would also likely replace high-nutrient pore water with low nutrient Bay water, and result in adverse effects to seagrasses. Other species potentially influenced by changes in sediment pore-water characteristics include polychaetes, amphipods, mollusks, and other benthic macro-invertebrates present in near shore locations above the CW laterals. Based on the potential adverse effects of the operation of the CWs, we recommend that a rigorous water monitoring program be employed in the Bay in association with the project. The Department supports the monitoring described in Section B of the Florida Department of Environmental Protection's Certificate of Conditions issued in May 2014. (**0227-9** [Stanley, Joyce])

Comment: Operating two new reactors at Turkey Point would also have huge impacts on the quantity and quality of precious freshwater resources. (**0228-5** [Yeager, Jerry])

Comment: The operation of two new nuclear reactors at Turkey Point would also likely have significant impacts on the quantity and quality of our limited freshwater resources. Maintaining our water supply here in South Florida is critical to ensuring the future of our communities. We are concerned that withdrawing massive amounts of freshwater needed for the plant's operations could increase salinity levels within Biscayne National Park and hasten freshwater intrusion into our limited freshwater supplies. Avoiding these impacts will be a far less costly option than the cost associated with alternative water supply development. (**0254-3** [Dudley, Dwight] [Lerner, Cindy] [Regalado, Tomas] [Stoddard, Philip K.])

Comment: Turkey Point's operations are already impacting Biscayne Bay's habitat, water quality, and salinity, which are vital for the health and productivity of the bay. The expansion of the power plant would only intensify and expand these negative impacts, posing significant threats to sensitive ecological areas and critical freshwater supplies. (**0258-4** [Field, Fran])

Comment: South Florida's water supply is a finite, dwindling resource that needs to be conserved in order to support the population. According to the Union of Concerned Scientists, nuclear fission is the most water intensive method of the principal thermoelectric generation options in terms of the amount of water withdrawn from sources. (**0288-12** [Cleland, Noel] [Jackalone, Frank] [Mahoney, Stephen] [Matthews, Debbie] [Roff, Rhonda] [Scott, John] [Teas, Jim] [Ullman, Jonathan])

Comment: Now a giant saline plume containing radioactive elements has formed underneath the plant and is drifting west, threatening the water supply for the Florida Keys. (**0288-3** [Cleland, Noel] [Jackalone, Frank] [Mahoney, Stephen] [Matthews, Debbie] [Roff, Rhonda] [Scott, John] [Teas, Jim] [Ullman, Jonathan])

Comment: Moreover, operating two new reactors at Turkey Point could have huge impacts on the quantity and quality of precious freshwater resources. The withdrawal of massive amounts of water from under Biscayne Bay as back-up cooling water could increase salinity levels within the Bay and hasten saltwater intrusion into our limited freshwater supplies. (**0299-3** [Salatino, Freda])

Comment: [T]hey have enough problems (and use enough water) with the 2 reactors they already have. Doubling that will double the problems and water consumption. (**0334-3** [Crystal, Chris])

Comment: It wasn't that many years ago that we had drought problems. If FP&L needs all the water they do for cooling and dealing with algae bloom, what happens when we have a shortage of rain (like California) or we have in the past. (**0334-4** [Crystal, Chris])

Comment: Power is useless without drinkable water for the consumers. (**0352-2** [Tingle, Peggy])

Comment: The new reactors will require 90 million gallons a day of Miami-Dades treated wastewater for cooling. (**0353-3** [Royce, M.])

Comment: Florida Power and Light is seeking permission to build two new nuclear reactors at its existing plant next to Biscayne National Park and other natural areas; the project would be highly water-intensive, likely threatening Biscayne Bay and the Biscayne Aquifer. (**0356-1** [Shlackman, Jed])

Comment: If there is insufficient treated wastewater for cooling the reactors, the radial wells used for back-up cooling would become one of the largest well-fields in the Southeast and could lead to further saltwater intrusion into the Biscayne Aquifer, a major problem already impinging on South Floridas limited freshwater supply. (**0356-12** [Shlackman, Jed])

Comment: The new reactors will require 90 million gallons a day of Miami-Dades treated wastewater for cooling. (**0356-9** [Shlackman, Jed])

Comment: There is too much water being used to cool the reactors if there isn't enough treated wastewater available, which I also don't like. There are already too many interests competing for our limited water supply, and I'm not even taking about the ecosystem and wildlife that depend on water. (**0361-2** [Berndgen, Michelle])

Comment: Wasting 90 million gallons of Miami-Dade's treated wastewater for cooling every day is not a good idea. (**0363-3** [Peters, Emily])

Comment: Construction and operations of the proposed nuclear reactors threaten to degrade water quality and damage the marine ecosystems of Biscayne National Park. In addition, the water usage of the additional units (projected by FPL in 2025 to include a 35% increase for public and commercial needs and a 3000% increase for thermoelectric power generation) is a threat to our aquifers and public water. (**0364-2** [Mahoney, Robert S.])

Comment: The amount of waste water 90 million gallons per day is inadequate for the cooling of the nuclear reactors. Although over 300 million gallons of waste water from Miami -Dade County Sewage Treatment Plant is pumped into Biscayne Bay on a daily basis, it is obviously impossible for that amount of water to be treated adequately for use at Turkey Point. The infrastructure simply does not exist. Miami-Dade County has made no progress whatsoever to begin the construction of a Sewage Processing Plant that will cleanse the water in a sustainable way, so that it would be reusable for Turkey Point or any other use. FPL has proposed building their own waste water treatment plant, and all parties need to take a good, hard look at that, as well. There remain many unanswered questions regarding the environmental impacts of such a plant, i.e. how and where would the resulting waste be disposed of? How many gallons of water per day could be cleansed properly for use at Turkey Point? (**0365-3** [Fischer, Antoinette])

Comment: The balance of nature becomes ever more precarious as more and more water is needed because of unbridled development, and large corporate usage. The water in our aquifer will have to be used with great conservatism. (**0365-7** [Fischer, Antoinette])

Comment: The two new reactors are a clear and present danger to the water supply. With two new reactors, Turkey Point would become one of the largest nuclear facilities in the country. They will require 90 million gallons a day of Miami-Dade's treated wastewater for cooling. The project would be highly water-intensive, potentially threatening both the Biscayne Bay and the Biscayne Aquifer. If there is insufficient treated wastewater for cooling the reactors, the radial wells used for back-up cooling would become one of the largest well-fields in the Southeast and could lead to further saltwater intrusion into the Biscayne Aquifer, already a major problem impinging on South Florida's limited freshwater supply. (**0366-9** [Griffith, Ed and Harriet])

Comment: The project would be highly water-intensive, potentially threatening Biscayne Bay and the Biscayne Aquifer. (**0370-2** [Vayu, Satya])

Comment: The new reactors will require 90 million gallons a day of Miami-Dades treated wastewater for cooling. (**0370-8** [Vayu, Satya])

Comment: I would like you to not allocate anymore water to the plant. (**0373-12** [Lee, Nancy])

Comment: NO WAY is this going to happen. Fresh water is running out all over the country because of our wrecklessness. This has become a matter of life and death. DO NOT destroy what's left of our fresh water. (**0401-1** [Foster, Beverly])

Comment: Operating two new reactors at Turkey Point will also have huge impacts on the quantity and quality of precious freshwater resources. (**0413-4** [Cobb, Tanya])

Comment: Comment 4: The final Environmental Impact Statement should include an analysis of alternatives to the radial collector well backup cooling system that are less likely to adversely impact the Biscayne Aquifer. The DEIS acknowledges that "[r]emoving relatively large volumes of water from the inland aquifer could lower the water table in the inland portion of the aquifer, affecting existing water-supply wells and increasing saltwater intrusion to

the Biscayne aquifer." DEIS at 5-13. In addition, it states that "the volume of water that would be removed [by the radial collector wells] from the inland aquifer is difficult to predict with certainty because it depends on several hydrogeologic features and parameters that are incompletely quantified." DEIS at 5-14. According to the DEIS, the highest estimated "volume of groundwater that could be removed from the Biscayne aquifer is 4,500 gpm during [radial collector well] operation . . . ." DEIS at 5-15. This amounts to about 6.48 million gallons of water per day from the Biscayne Aquifer during radial collector wells operation and about 388,800,000 gallons annually. During the proposed project's lifetime, Miami will likely face dwindling supplies of potable water as well as further difficulties preventing flooding and saltwater intrusion during wet and dry seasons respectively. Considering these challenges, 388,800,000 gallons appears to be a relatively large withdrawal of water from the Biscayne Aquifer. FPL's most recent filings before Florida's Public Service Commission indicate that the new reactors are now planned to enter service closer to 2027. Around that time, Miami-Dade County's Water and Sewer Department projects that demand for water will be much closer to capacity. *See* SFWMD Individual Use Permit for MDWASD Permit Number 13-00017-W (Exhibits 8A, 9, and 23). Therefore, the increased demand placed on the Biscayne Aquifer reserves by the radial collector wells could adversely impact both supply and management of this scare resource in the coming decades. *See* DEIS at 2-176. Moreover, withdrawing water from the Biscayne Aquifer is not a necessary consequence of siting the new reactors at Turkey Point. The goal of the final Environmental Impact Statement is to balance the need to implement an action against its impacts on the surrounding environment. In this instance, that need is for additional baseload power, and not for any specific facility contemplated in FPL's application. For example, Work Order #2, Task 1, Initial Water Source Alternative Technical Review Report, Section 5.0 (pages 3-4) indicated that operating the radial collector wells for use as a backup cooling system ranked fourth in FPL's analysis of cooling options. In contrast, drawing cooling water from the "Boulder Zone" (a South Florida injection zone) ranked second in this report. FPL's response to NRC RAI Number EIS 9.4-2 (RAI 5770) indicated that this option was not selected because the Boulder Zone is planned for use as an injection zone for wastewater. However, this does not address why the third ranked option was not selected or vetted further. Likewise, limiting the analysis in the DEIS to only the proposed radial collector wells as a backup cooling system is not the "hard look" required by the National Environmental Policy Act (NEPA). This backup cooling system is easily one of the most concerning parts of the Turkey Point Nuclear Plant Units 6 & 7 application. Since the final Environmental Impact Statement must independently assess the impacts of the Environmental Report submitted by FPL, it should also consider other approaches to providing cooling water to the reactors. The DEIS has already accomplished this task for some of the inland alternative sites by assessing potential cooling systems other than those proposed. The final Environmental Impact Statement must do the same for Turkey Point. (**0456-11** [Miami, City])

Comment: Comment 13: The final Environmental Impact Statement should examine impacts related to the loss of the backup cooling system. The radial collector well system may be unable to operate for a variety of reasons. The environmental impacts of losing this system should be examined by the final Environmental Impact Statement to meet the "hard look" imposed by NEPA. For example, the radial collector wells are not able to operate with water that is more than 1.5 times the salinity of Biscayne Bay. As has been noted previously, there is already a plume of hypersaline water in the aquifer beneath FPL's industrial wastewater facility. Since, the radial collector wells will be drawing water from this groundwater source, the final Environmental Impact Statement should examine and disclose how entrainment of the hypersaline water by the radial collector wells will impact the surrounding aquifer and operation of the nuclear plant. Likewise, the final Environmental Impact Statement should examine and disclose what outcomes will result if the primary source of cooling water is still unavailable after

FPL has exhausted the 60 days during which it is allowed to operate the radial collector well system. (**0456-20** [Miami, City])

Comment: FPL has stated that using reclaimed water provided by Miami-Dade County as the primary source of cooling water is a beneficial feature. This may be a compelling reason to place the new reactors in Miami-Dade County; however, if that is the case it should be explained more directly and thoroughly. On this point in particular, it is worth noting that Miami-Dade County has begun efforts to supplement its freshwater supply with desalinated water from the Upper Floridan Aquifer. Additional saltwater intrusion will only force local governments to impose stricter water conservation measures. Hence, the amount of reclaimed water available from Miami-Dade County will decline over time and will not be available for use as cooling water for much of the operating life of Turkey Point Nuclear Plant Units 6 & 7. (**0456-8** [Miami, City])

Comment: In defense of water, please protect our natural resources. (**0483-1** [Morrisse, Christine])

Comment: Fresh and clean water is essential to life. The two new reactors at Turkey Point could also have huge impacts on the quantity and quality of the area's limited freshwater supplies. (**0495-4** [Mazzarella, Rebecca])

Comment: FPL already has problems cooling the existing facilities and is using millions of gallons of fresh water from the aquifer to ameliorate their existing cooling problem. To add more capacity, which will require yet more water to cool the site, is irresponsible. (**0509-2** [Otto, Peter])

Comment: Given South Florida's limited sources of freshwater, FPL's project seems to be a shortsighted investment. (**0515-5** [Regalado, Tomas])

Comment: Building additional reactors so near our own drinking water and natural reserves should NOT be allowed. I don't think I really have to get too deep into this argument, I simply have to link you to a wikipedia page: https://en.wikipedia.org/wiki/Fukushima_Daiichi_nuclear_disaster. We must not forget the actual costs associated with a natural disaster that literally washes over a nuclear facility. Sure, we may not have tsunamis here, but we do have hurricanes, which bring HUGE storm surges. (**0570-3** [Martinez, Orlando A.])

Comment: Fresh drinking water is a concern all over the United States, especially out West. We should NOT be blind to this and think we are different. The current FPL nuclear facility at Turkey Point already is begging for MORE fresh water to keep its reactors cool. The cooling canals are not doing their jobs; even with additional water the cooling canals are overheating. This is not being satisfactorily addressed at the moment, nor in the proposal to EXPAND the facility. (**0570-4** [Martinez, Orlando A.])

Comment: No additional water draws should be allowed. Canal temperatures and salinity should be lowered. This environmental situation is incompatible with current operations much less expanded ones. (**0571-2** [Darden, Colgate])

Comment: In addition, the demands on the limited fresh water reserves of south Florida would be highly significant. (**0573-3** [Trauner, Keith])

Comment: we will have shortage of water, please don't allow this to happen (**0574-2** [Fuentes, Mariana])

Comment: There is not enough freshwater in the area and any further demands on available freshwater or loss of it due to plant operation are irresponsible and selfish. (**0598-3** [White, Barry J.])

Comment: FPL has stated that using reclaimed water provided by Miami-Dade County as the primary source of cooling water is a beneficial feature. This may be a compelling reason to place the new reactors in Miami-Dade County; however, if that is the case it should be explained more directly and thoroughly. On this point in particular, it is worth noting that Miami-Dade County has begun efforts to supplement its freshwater supply with desalinated water from the Upper Floridan Aquifer. Additional saltwater intrusion will only force local governments to impose stricter water conservation measures. Likely climate change scenarios for the region indicate that reductions in rainfall will further tax the available freshwater supply. See Vasubandhu et al., Climate Scenarios: A Florida-centric View, STATE UNIV. SYSTEM OF FLORIDA (Nov. 2011) (citing Enfield et al., Mid-Century Expectations for Tropical Cyclone Activity and Florida Rainfall); see also Climate Change and Water Management in South Florida: Interdepartmental Climate Change Group, SOUTH FLORIDA WATER MANAGEMENT DISTRICT (Nov. 2009). Hence, the amount of reclaimed water available from Miami-Dade County will decline over time and will not be available for use as cooling water for much of the operating life of Turkey Point Nuclear Plant Units 6 & 7. Accordingly, the final Environmental Impact Statement must directly explain the rationale for approving Turkey Point as the site of the new reactors. (**0611-1** [Haber, Matthew S.])

Comment: During the proposed project's lifetime, Miami will likely face dwindling supplies of potable water as well as further difficulties preventing flooding and saltwater intrusion. Considering these challenges, 388,800,000 gallons appears to be a relatively large withdrawal of water from the Biscayne Aquifer. FPL's most recent filings before Florida's Public Service Commission indicate that the new reactors are now planned to enter service closer to 2027. Around that time, Miami-Dade County's Water and Sewer Department projects that demand for water will be much closer to capacity. See SFWMD Individual Use Permit for MDWASD Permit Number 1300017-W (Exhibits 8A, 9, and 23). Therefore, the increased demand placed on the Biscayne Aquifer reserves by the radial collector wells could adversely impact both supply and management of this scare resource in the coming decades. See DEIS at 2-176. (**0611-2** [Haber, Matthew S.])

Comment: Comment 6: The final Environmental Impact Statement should update its analysis, in groundwater modeling and elsewhere, to include the effects of flooding FPL's industrial wastewater facility/cooling canal system with additional water from the L-31E canal and other sources. After the completion of the DEIS, the South Florida Water Management District ("SFWMD") issued a permit authorizing FPL to divert 100 million gallons of water per day from the L-31E canal to the industrial wastewater facility. SFWMD Consumptive Use Permit No. 13-05856-W; see also SFWMD Order No. 2015-020-DAO-WU; SFWMD Order No. 2015-034DAO-WU. Florida's Department of Environmental Protection ("FDEP") has also begun a process that would entitle FPL to draw an additional 14 million gallons of water per day from the Floridan Aquifer into its industrial wastewater facility. See http://tinyurl.com/TP3-5ConditionsDraftMod. Although both actions have been challenged, the former had been challenged by the City and the latter is currently being challenged by Miami-Dade County, the final Environmental Impact Statement should account for the presence of this additional water flow because its ostensible purpose is to flush hypersaline water out of FPL's facilities. As the SFWMD noted in late 2013, the consequences of flooding the FPL industrial wastewater facility are far from certain. See FPL Turkey Point Cooling Canal System Salinity Reduction Proposal Review, attached to these comments as **COM - A**. Likewise, the USGS model described by the

DEIS in Appendix G would need to account for this additional water flow. In addition, "[b]ecause the [USGS] model conserves mass, withdrawal of groundwater results in water being drawn from other sources to replace it, and the freshening in this region could be due to predicted inflow from either freshwater or marine waters." DEIS at G-35. Hence, the assumption appears to be that there will be a recharge of freshwater. This assumption is problematic and likely inaccurate. The final Environmental Impact Statement should address this assumption more directly. (**0611-6** [Haber, Matthew S.])

Comment: In addition to their waste water use, Turkey Point 6 and 7 would use vast quantities of drinking water, making it unavailable for people and agricultural uses. Florida already suffers from a lack of fresh water and the further encroachment upon our supply necessitated by the proposed plants would create a substantial and unjustifiable impingement upon the environment resulting in a hazard to human health. (**0615-3-2** [Bethune, David])

Comment: Water is Florida's most important environmental asset. In failing to fully examine the impact of both its proposed use of fresh water and the plant's effluent injection and wastewater aerosols, the draft EIS proves to be fatally incomplete. (**0615-3-6** [Bethune, David])

Comment: The estimated average rate of saltwater migration is between 525 feet per year in the northern part of the cooling canals, and 660 feet per year in the southern part, [FDEP AO OGC No. 14-0741.] Many municipal water supply systems to the west of the Turkey Point cooling water canals rely on the Biscayne aquifer, and if the hypersaline plume continues to migrate, these water supply systems could potentially need additional treatment, or alternative sources of water supply. We are concerned about the potential for additional and cumulative impacts to the sole source aquifer, in addition to the existing hypersaline impacts. Protecting the freshwater lens in southeast Miami-Dade County is also a critical priority, since this important resource supports critical marsh wetland communities, as well as irrigation and public water supply needs. This fresh water supply is needed to preserve and restore Biscayne National Park (BNP) and Biscayne Bay, and for supporting the Comprehensive Everglades Restoration Plan (CERP). We appreciate your efforts to minimize impacts from the proposed project by using reclaimed wastewater as cooling water. The DEIS also states that current alternative backup cooling water source plans call for saltwater supplied from horizontal radial collector wells installed in the Biscayne aquifer, between 25 and 40 feet beneath the bed of Biscayne Bay and adjacent to Biscayne National Park. The DEIS notes that the use of these wells as a backup source is limited to 60 days. However, there are concerns that FPL could eventually require more water from the radial collector wells than currently estimated, and that FPL may need to withdraw freshwater to supply the needs of the two new reactors, in the event that adverse circumstances arise and backup water sources fail to supply sufficient quantity. The FEIS should address contingency plans in detail. Concerns exist that future circumstances, such as draughts and/or temperature issues, may require freshwater withdrawals that could potentially impact water quantity and quality, and contribute to the risk of additional saltwater intrusion into groundwater supplies. Furthermore, there are concerns that water withdrawals from the radial collector wells could potentially contribute to increased hypersalinity. (**0617-1-18** [Mueller, Heinz J.])

Comment: Concerns regarding fresh water needs for Biscayne National Park (BNP), the Everglades National Park (ENP), the Comprehensive Everglades Restoration Plan (CERP), in addition to other fresh water needs in the area, need to be clarified in the Final Environmental Impact Statement (FEIS). The EPA has concerns regarding the project's fresh water supply requirements, cumulatively added to the existing fresh water needed to supply the existing Units 3 and 4, as well as for drinking water, agricultural and ecosystems in the region, in an

environment already experiencing saltwater intrusion. The Biscayne aquifer underlying the area is prone to saltwater intrusion because this area has low land-surface altitude and a low topographic gradient, and is bordered by sources of saltwater in Biscayne Bay, and, further east, by the Atlantic Ocean. Page 2-66 states that the most important factors contributing to the regional intrusion of saltwater from the ocean into the aquifer are rerouting of sheet flow to drainage canals and groundwater pumping. (**0617-1-3** [Mueller, Heinz J.])

Comment: 6) <u>Analysis of Impacts to CERP Projects and the BBCW Project</u>

One of the goals of the CERP is to increase freshwater flow to Biscayne NP to achieve more natural hydrologic conditions within the park that has been negatively impacted by implementation of the regional water supply and flood control project. Given the lack of specific localized information regarding the effect of the RCWs on nearshore salinity levels, the NPS disagrees with NRC's conclusion that the proposed action would have minimal effect on CERP and Phase 1 of the BBCW project. NPS remains concerned that the cumulative impacts resulting from this project could potentially negate current or potentially future efforts to increase freshwater flows to rehydrate wetlands and reduce point source pollution discharge into Biscayne NP and Biscayne Bay. A second phase of the BBCW project remains to be planned and authorized, but is reflected in overall salinity restoration target goals for the park. Detailed review of modeling results from the DEIS analysis show a potential for impacts to groundwater sources for CERP, as well as movement of the groundwater masses related to RCW operations. The BBCW Project Phase 1, which is intended to redistribute existing freshwater flows to Biscayne NP, is now entering the construction phase with operation to shortly follow.

This is an example where a model with finer spatial scale on the operation of the RCWs would provide information to determine whether the effects of the RCW operation negate or diminish efforts to rehydrate near shore coastal wetlands through the implementation of the BBCW Project, phase 1, authorized under the Water Resources Development Act of 2014. Generally the BBCW Project will divert an average of 59 percent of the annual coastal structure discharges from the S-123, S-21, S-21A and S-20F structures into Biscayne Bay. Anticipated environmental benefits include, among other things, improving the probability that the water within 500 meters from the shoreline will meet a desired salinity concentration of less than 20 psu. The NPS recommends development of a model with additional data, better calibration, and a finer scale will better show the likely potential localized impacts.

Although the BBCW Project is in the implementation phase, the CERP assumes a second phase for the project that would provide additional fresh water to Biscayne Bay. We recognize the difficulty in determining the environmental effects of the proposed action on a plan that is not yet planned or implemented with specificity including additional volumes of fresh water to be discharged, however, NPS believes it is important to acknowledge the future potential for this planned additional work to reintroduce more fresh water to the bay to benefit the various wildlife species that depend on the wetlands and on a healthy bay.

Additional information on the progress of the CERP may be obtained in the National Academy of Sciences' report "Progress Toward Restoring the Everglades: The Fifth Biennial Review, 2014." (**0622-1-14** [Austin, Stan])

Comment: *RCWs located below Biscayne Bay, offshore Turkey Point*[.] Four radial collector well caissons located on the Turkey Point Peninsula would serve as a backup water supply. Each RCW caisson would be approximately 30 feet in diameter and extend beneath the surface of Biscayne Bay to a depth between -35 to -45 feet. The laterals would be extremely close to the

marine boundary of Biscayne NP and be built in limestone terrain. Because FPL owns much of the land within the footprint for BBCW Phases 1 & 2, we once again encourage consideration of having this land transferred to EEL in preparation for the completion of both phases of BBCW project. We also strongly encourage the development of a comprehensive monitoring and adaptive management plan to ensure that any operational problems are judiciously addressed. (**0622-2-14** [Austin, Stan])

Comment: Water Quality Impacts and the Industrial Wastewater Facility (IWF)[.] The NPS is concerned that the DEIS does not fully analyze water quality impacts, which are derived from construction activities, associated cooling water drift, and the movement of IWF waters related to RCW operation, to NPS resources, especially cumulative impacts associated with the IWF. Recent developments relating to the operation of the IWF were not analyzed in the DEIS. The hyper-salinity and temperature in the IWF, including the use of regional system water under recent orders, must be evaluated as part of the past, present, and future cumulative impacts. Also, the IWF and its associated plume should be evaluated to better understand cumulative impacts from RCW operation on the hypersaline plume. Fundamentally, the NPS is concerned that the operation of the RCWs has the potential to affect the salinity of Biscayne Bay. The DEIS modeling demonstrated that RWC operations influenced salinity at a broad spatial scale. However, salinity variability at a scale finer than that addressed by modeling would provide more insight into localized potential ecological effects in southern Biscayne Bay. The NPS recommends more extensive analysis of the model output and some model modifications, including the consideration of more recent salinity data, to increase its spatial resolution to determine the extent to which RCW operations will adversely impact resources in Biscayne NP due to salinity changes. (**0623-4** [Austin, Stan])

Comment: In addition to this problem with surface water two new nuclear reactors will need to increase the amount of ground water required to cool these new reactors. Ground water supplies are already under stress from salt water intrusion and additional development in this area. (**0641-2** [Martin, Drew])

Comment: Water reuse may not provide adequate water supplies as a supplement to existing water supplies as we increase the needs of the community for reusable water. Some proponents suggest that water reuse can provide adequate water. This assumes that water reuse will not be needed for other needs. (**0641-4** [Martin, Drew])

Comment: This action would reduce the availability of fresh water to our community. In a populous state such as Florida which already experiences a lack of fresh water (in Miami-Dade county we already have water restrictions limiting us to two days a week to water outside) I believe that using 7 billion gallons of water from Biscayne Bay and aquifer for a back up cooling system is totally irresponsible. (**0642-2** [Rawlins, Steve])

Comment: In addition, it could harm our clean water supply. (**0654-3** [Guy, Sharon])

Comment: It would further destroy Florida's wild and poison our water. It is a disaster waiting to happen! (**0661-3** [Segal-Wright, Nicholas])

Comment: Nuclear plants consume vast amounts of water to keep reactors cool. FPL currently accounts for less than 1 percent of the water used in Miami-Dade County, but a nuclear expansion would raise that to 10 percent of water usage. In two decades, the demands on our limited water supply are already projected to skyrocket. FPL emphasizes that the primary cooling system will use reclaimed wastewater. But it ignores the inconvenient fact that its

backup cooling system will also draw over 7 billion gallons of water a year from Biscayne Bay and the Biscayne Aquifer, our only source of drinking water, threatening the coastal Everglades, Biscayne National Park, and South Dade well fields. Given the anticipated demands on our shrinking water supply, FPLs water grab is an irresponsible use of resources. In addition, on May 19th, 2015, FPL had to obtain an emergency permit from the South Florida Water Management District to pump more water into the Turkey Point cooling canals as a result of a cooling problem with the existing nuclear reactors that FPL has been dealing with for over a year. (**0675-2** [Rodriguez, Jose Javier])

Comment: The new reactors will require 90 million gallons a day of Miami-Dades treated wastewater for cooling. (**0676-5** [Kassel, Kerul])

Comment: If there is insufficient treated wastewater for cooling the reactors, the radial wells used for back-up cooling would become one of the largest well-fields in the Southeast and could lead to further saltwater intrusion into the Biscayne Aquifer, a major problem already impinging on South Floridas limited freshwater supply. (**0676-8** [Kassel, Kerul])

Comment: Additionally, the nuclear reactors use an enormous amount of fresh water for cooling that makes the Biscayne Aquifer more susceptible to salt water intrusion. According to the Union of Concerned Scientists, nuclear fission is the most water intensive method of the principal thermoelectric generation options in terms of the amount of water withdrawn from sources. In 2008, nuclear power plants withdrew 8 times as much freshwater as natural gas plants per unit of energy produced, and up to 11 percent more than the average coal plant. Our water supply is a finite resource that we need to conserve in order to support our South Florida population. (**0677-3** [Chiszar, Benjamin J.] [Jacobs, Lee] [Klopfer, Carol])

Comment: The Design and Operating two new reactors at Turkey Point should not have any effect on the quantity and quality of precious freshwater resources. The tech exist today to prevent any effect. (**0694-3** [Carpenter, Rory])

Comment: Turkey Point continues to consume large amounts of fresh water needed by the population increases expected in South Florida. Additional reactors will exacerbate the problems. Current cooling ponds for Turkey Point are at excessive temperatures. (**0710-2** [Platt, George Seth])

Comment: Number two is, some of the questions have alluded to the issues about water. Some of the information that's come to me is that if these new reactors are built, Turkey Point's use of our fresh water will go from 1 percent to 10 percent. Now, even if that's not accurate, somewhere in that range is. (**0721-1-5** [Rodriguez, Jose Javier])

Comment: So here we are, we're looking at a site. Obviously it's not working, and this EIS, if it's going to consider anything, should consider the fact that the system's broken, it's not working, 3 and 4 is a disaster, the cooling canal system is loading salt into our aquifer, evaporating 40 million gallons a day, and pushing a plume of pollution underneath our national parks toward the Newton Well Fields in Dade County. It is a disaster. And the thing is, it's all underground. And if there's a loophole, FPL has found it, and they are taking advantage of it for corporate gain. And so what we need to do is really consider the issues on the ground, the water consumption. This is all about water. It's a big water grab, in my opinion. And if all of the proposals go forward, FPL will be the single largest user in the State of Florida. And that surpasses Dade County at about 30.5 million gallons a day of water. Think about how big that is. So we're talking about water. We're spending $20 billion on Everglades restoration to get the

water right, to make sure that 8 million people have enough water to drink, to make sure we restore the Everglades. We have nowhere to store fresh water in South Florida. Yet, we're using an energy source that requires a lot of water. (**0721-10-2** [Reynolds, Laura])

Comment: So nuclear, we have water demand, fresh and saline[.] (**0721-11-5** [Roff, Rhonda])

Comment: It [building 6 and 7] will bring increased salinity and salt water intrusion and possibly over time, fouling the water supply for all of South Florida and the Keys[.] (**0721-12-9** [White, Barry J.])

Comment: But I do think that if there [are] problems finding water to cool existing reactors, then it indicates that there would be a problem having additional water to cool two new reactors. So it makes sense to me that you would resolve these problems before you would authorize the building of two new reactors. (**0721-13-2** [Martin, Drew])

Comment: So what have we learned from the President's speech today? We learned we need to save our water. We don't have enough. And this power plant is going to be a major water hog. No question about it. (**0721-30-3** [Ullman, John])

Comment: Nonetheless these issues are dwarfed, as I've said, by the voracious water consumption of Turkey Point, both presently with the dysfunctional cooling canals and the future needs to two additional reactors, (**0721-32-4** [Schlackman, Mara])

Comment: For the safety of our communities this plan must not be approved as proposed, and here is why: It will shrink the supply and quality of water and our fresh water sources. (**0721-4-2** [Regalado, Tomas])

Comment: And, water usage does not take in to account what would happen -- the Draft EIS report does not take account water usage and what would happen if the reclaimed water system fails; where would the water usage go or how would that be addressed. (**0721-5-8** [Mendez, Victoria])

Comment: The expansion of Turkey Point also has the potential to have huge impacts on our regional water resources. FP&L has proposed using millions of gallons of reclaimed wastewater as the primary source of cooling water for the new reactors. (**0721-9-5** [McLaughlin, Caroline])

Comment: [O]ne of the neat things I think that they're doing, they're engineering this project, is they're reclaiming wastewater from Miami Dade County to about 60 million gallons a day which would otherwise go down into Biscayne Bay or the ocean or the deep wells that we have. That this will also be reclaimed and recycled for continuing cooling. (**0722-13-7** [Duquette, Bill])

Comment: Our planet is bleeding and I think we have to make every effort to protect our planet and Biscayne Bay. We talk about water and how we're going to reuse water sewage. Miami Dade can't even get their pipes right. We're flooding Miami Dade, sewers backing up. They were supposed to replace pipes over the last 30 years, they did not do so and we're going to be counting on those pipes to provide water to this nuclear plant? What about the water that's not going to go to the Florida Keys because Turkey Point needs it? What's our water pressure going to be like in Turkey -- in Florida Keys? (**0722-17-3** [Swenson, Cyndee])

Comment: The withdrawal of this water would increase salinity levels in Biscayne that have already been drastically and dramatically changed by the draining of the Everglades and this would increase the rate of saltwater intrusion into our limited freshwater supplies. There's also

the potential for the contamination of our freshwater supplies by chemicals related to the nuclear power generation. (**0722-7-4** [Silverstein, Rachel])

Comment: One thing that we all have in common here is that we all drink water. And access to clean water and clean freshwater is absolutely critical and is something that can be lost here in South Florida and should be really considered very seriously in this project. (**0722-7-8** [Silverstein, Rachel])

Comment: I'm also impressed by the reuse factor with Miami Dade Water and Sewer Authority. This one project will meet 50 percent of the needs as far as reusing the effluent from the Water and Sewer Authority. That's significant. (**0723-1-6** [Wallace, Otis])

Comment: And whereas FPL's design of the Turkey Point Units 6 and 7 to make use of reclaimed water for cooling purposes and will assist our county and meet the regulatory requirements for reusing" -- I'm sorry -- "for increasing use of reclaimed water. (**0723-2-6** [Trowbridge, Mark])

Comment: From the environmental impact of -- I know recently the local papers talk about the wastewater discharge. We're one of the few counties, communities in Florida still discharging to the ocean or bay. So this project to control wastewater, treat wastewater and reuse it is going to happen one way or the other, appropriately. If Turkey Point 6 and 7 can use some of that water and help to use that for our cooling medium, that will help the environmental impact of all of us living in Dade County because we all make wastewater, to minimize that on our great area that we live. (**0723-6-3** [Murphy, Mike])

Comment: Let's talk about one of the really rough parts of the project, the use of recycled sewage to cool it. What happens when you run recycled sewage through cooling towers? First of all, what do you think that recycle sewage is? Is it pure H2O? No, not at all. Hundreds if not thousands of chemicals are still in there. The drinking water in Homestead has hundreds of chemicals below what they call the safety limit, but this stuff is in there. Lead, cadmium, arsenic, et cetera. The wastewater has even more. Household chemicals, cleaning fluids, viruses, bacteria. (**0723-9-14** [Schwartz, Matthew])

Response: *Turkey Point Units 6 and 7 would rely primarily on treated wastewater for operation. Treated wastewater is not suitable for potable water or most restoration activities because of its water chemistry. NRC staff did not identify other current or likely future demands for treated wastewater that are likely to conflict with the volume of treated wastewater proposed to be used by Units 6 and 7. The treated wastewater, while "fresh" in terms of salinity, is still not suitable for most other uses including municipal, agricultural, and CERP wetland restoration because concentrations of other contaminants and nutrients are too high. If this treated wastewater is not used by the proposed plant it would likely be injected into the Boulder Zone, at which point it would be unavailable for any beneficial use. Accordingly, it would be inaccurate to characterize the treated wastewater as a percentage of fresh water available for drinking, agricultural use, or the like.*

The Miami-Dade Water and Sewer Department (MDWASD) SDWTP has a capacity of about 300 MGD. The proposed plant would take about 73 MGD from the South District Plant. Under Florida law, MDC is required to end ocean discharge and, therefore, must substantially increase deep well disposal. Evaporation in the cooling towers of the proposed plant would consume some of the wastewater volume before the remainder is injected into the Boulder Zone.

While the NRC staff determined that the wastewater supply is reliable for power generation operations, FPL proposed a radial collector well (RCW) system as a backup water supply. As discussed in Appendix G, while the water withdrawn from the RCWs would predominately come from the Biscayne Bay, the review team did evaluate the amount of water that may come from the Biscayne Aquifer under various possible current and future conditions. Far smaller amounts of water would enter the RCWs from the hypersaline plume beneath the IWF than from the Bay. The potentiometric depression caused by the operation or the RCWs could cause the limited lens of freshwater in the Biscayne Aquifer northwest of the IWF to move slightly closer to the IWF under certain conditions. However, the staff determined that this change was minor.

In the unlikely situation that the reclaimed water supply would be unavailable and the FDEP restrictions on the duration of the RCWs would be met, and in the absence of the use of some other water source approved by the State of Florida, the plant would cease operation.

Neither the reclaimed water nor the backup RCW water provide a safety function. Plant safety systems do not rely on either water source. These water sources are only necessary for continued electrical power generation. The proposed RCW water supply capability as a backup water source was an FPL decision to ensure generation reliability and is not a requirement for plant safety.

Comment: The cooling canals at the current Turkey Point facility do not function properly for the existing site. Scarce water from the South Florida Acquifer must now be drawn to cool the reactors properly. The size of these canals are already a blight on our sensitive Florida landscape and the drawing down of water for cooling purposes endangers our drinking water supply. (**0053-2** [Sasiadek, Alfred])

Comment: The integrity of drinking water for the south Florida area is at stake. The water that FP&L would use to cool its power plants would affect the level of saltwater intrusion into the Biscayne Aquifer, the main source of drinking water for this area. FP&L also plans to curtail its current monitoring program for this, which is totally unacceptable. (**0073-1** [Commenters, Multiple])

Comment: FPL is already operating cooling based upon "emergency" draw down, so is using fresh water never anticipated in the original operating plan and that will only get worse. (**0091-2** [Boyce, Sheila])

Comment: Miami-Dade County asserts that the DEIS is inadequate with respect to the proposed radial collector wellfield (RCW) that would be constructed under the tidal waters of Biscayne Bay. The Biscayne Model, discussed in Appendix G, does not accurately represent the current surface water salinity conditions of the CCS. Historic monitoring data indicate that the salinity of the surface waters of the CCS has been steadily increasing since the early 1970s and this modeling does not appear to take this fact into account. Furthermore, data from the more recently implemented Uprate monitoring indicates that the salinity of the CCS has increased even more rapidly after the uprate of the existing nuclear units (Units 3 & 4) was completed and both units returned operating back to full capacity (around May 27, 2013) reaching salinity levels that are nearly three (3) times that of seawater. The increased salinity of the CCS surface water has compromised the system's ability to reduce the water temperature so that it can be used for cooling of Units 3 & 4 and forced FPL to seek an NRC license amendment to increase the ultimate heat sink (UHS) water temperature limit for the plant's cooling canal system in July of 2014. In August of 2014, the NRC Staff approved the proposed license amendments increasing the temperature specification for the UHS from 100ºF to 104ºF. The increased salinity and temperature of the CCS have also forced FPL to seek alternative

sources of water to discharge to the CCS in order to reduce the salinity and temperature of its surface waters in order to allow for the continued safe operation of the plant. The average post Uprate salinity at CCS surface water monitoring station TPSWCCS-1B between June 1, 2013 to April 30, 2015, is 76.35 PSU. Monitoring station TPSWCCS-1B is located in the vicinity of the NW corner of the CCS along canal 32, the station is equipped with water quality monitoring equipment that measures physical water parameters, including salinity, in one hour intervals. The CCS surface water salinity used for the model discussed in Appendix G was a constant 65 PSU. The use of salinity averages that underestimate the actual salinity of the CCS and that incorrectly assume that the salinity will not continue to increase over time is not appropriate as it does not simulate existing conditions and because it can lead to an underestimation of the impacts associated with CCS related issues including but not limited to salinity of the CCS groundwater plume that is mobilized by the operations of the proposed RCW. (**0110-1-7** [Hefty, Lee N.])

Comment: The NRC is aware that FPL has been experiencing significant problems related to cooling water and the cooling canal system (CCS) needed for their existing Turkey Point 3 and 4 reactors. Further, on March 23, 2015 an Atomic Safety and Licensing Board panel admitted a modified contention, based on the October 14, 2014 petition of Citizens Allied for Safe Energy, Inc. (CASE) who successfully requested a hearing on license amendments issued to FPL's Turkey Point reactor Units 3 and 4, which increased the ultimate heat sink (UHS) water temperature limit for the plant's cooling canal system (CCS). Contention 1, which is still pending, states: "The NRC's environmental assessment, in support of its finding of no significant impact related to the 2014 Turkey Point Units 3 and 4 license amendments, does not adequately address the impact of increased temperature and salinity in the CCS on saltwater intrusion arising from (1) migration out of the CCS; and (2) the withdrawal of fresh water from surrounding aquifers to mitigate conditions within the CCS."[5] [footnote 5: See March 23, 2015 ASLBP Memorandum and Order, http://pbadupws.nrc.gov/docs/ML1508/ML15082A197.pdf.] We believe there is new information regarding reactor Units 3 and 4 that affects the analysis and/or determinations in the DEIS for reactor Units 6 and 7. The NRC has a continuing obligation to update the Turkey Point 6 and 7 EIS with new and significant information and that information must be included and analyzed before an FEIS is issued. For instance, recent reports highlight an ever-worsening situation that could have implications for the proposed Turkey Point 6 and 7 reactors, including the possibility of piping reclaimed water from the Miami Dade County's southern sewer treatment plant which was also proposed to cool the two proposed new reactors:[6] [footnote 6: Jenny Staletovich, Miami Herald, "FPL needs more water to run Turkey Point," May 19, 2015. At http://www.miamiherald.com/news/local/environment/article21419787.html.] *"The utility obtained an emergency permit Tuesday from the South Florida Water Management District to pump more water into the 5,900-acre loop used to cool the plant's two nuclear reactors. But Miami-Dade County Commissioners added a strict caveat: they agreed to provide a permit to pump the water across sensitive wetlands only for a year and only if the utility comes up with a long-term fix. ... The canals first began running hot last summer after the utility completed work to increase power coming from the plant on southern Biscayne Bay. The hotter and increasingly saltier canals triggered persistent algae blooms, threatened to shut down the reactors and forced the utility to scramble to find ways to better control the system. But finding a solution has proved tricky and set off debates over South Florida's fragile water supply, with the county, the city of Miami, Biscayne National Park, environmentalists and even rock miners raising objections. In addition to raising the risk of power outages, the canals have pushed an underground saltwater plume closer to drinking water supplies. Last summer, after the Nuclear Regulatory Commission agreed to allow operating temperatures to rise to 104 degrees, the hottest in the nation, FPL began looking for water to cool and freshen the canals. The company won temporary*

permission to pull water from the nearby L-31 canal -- between August and October, the utility pumped 1,135 million gallons or about four times what all of Miami-Dade County uses in a day. The utility hoped to find a more permanent solution by drilling six new wells to pump up to 14 million gallons of water a day from the Floridan aquifer, a source deep beneath the shallow Biscayne Aquifer that supplies most of the county's drinking water. But local government officials and environmental groups have fought FPL's plans, filing appeals and arguing that diverting water to the plant could derail Everglades restoration efforts intended to revive Biscayne Bay, where increasing salinity threatens marine life. County staff also said adding freshwater could also worsen the movement of underground saltwater. ... Pulling water from the L-31, he explained, is intended to keep the canals working only until six wells can be drilled to pump water from the Floridan for long-term relief. FPL is also now talking with the county about piping reclaimed water from the county's southern sewer treatment plant -- water it also intends to use to cool two new reactors now being considered by the NRC. However, that water must be cleaned first and Scroggs said the utility has not yet determined the standards for its use." (**0112-6** [Barczak, Sara])

Comment: The expansion also threatens the goals of CERP through potential negative impacts to the benefits of BBCW. One of the primary objectives of BBCW is to rehydrate coastal wetlands located adjacent to Turkey Point and to restore overland and subsurface water flows. Plans to withdraw water from Biscayne Bay using radial collector wells as a backup cooling water supply for Units 6 & 7 will likely draw freshwater away from what is needed for restoration, as discussed in greater detail in Section II, and operations could detract from benefits realized as a result of restoration efforts. (**0113-1-11** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: The DEIS does not adequately address the cumulative impacts of constructing and operating Units 6 & 7 on salinity levels in groundwater, surface water, the Biscayne Aquifer, and Biscayne Bay. (**0113-1-7** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: According to NEPA, cumulative impacts are those that occur from the "incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions." [Footnote 37: 40 C.F.R. § 1508.7] Every year, the SFWMD conducts fall agricultural draw downs in Miami-Dade County in order to manipulate groundwater storage to support agricultural interests at the end of the wet season. The result of these actions include the rapid release of water at the end of the wet season and an artificially early start to the dry season. [Footnote 38: Kearns, E. J., A. Renshaw, and S. Bellmund. Environmental Impacts of the Annual Agricultural Drawdown in Southern Miami Dade County, Abstract, American Geophysical Union, 2008.] The dry season is therefore unnaturally dry, causing habitat loss, salinity issues and other negative ecological consequences. [Footnote 39: Ibid.] The DEIS fails to include a discussion of how these annual draw downs, when coupled with the existing hypersaline plume and proposed operations of Units 6 & 7, will cumulatively impact salinity levels within Biscayne Bay and the Biscayne Aquifer. (**0113-2-11** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: We are currently being forced to share our drinking water source with FPL as a result of the failure of their Cooling Canal system to sufficiently cool the canals after the current nuclear plants had an "uprate" in 2014. The predictions that FPL relied on in 2008 when they first applied under the Florida Power Plant Siting Act to "uprate" the allowable amount of electricity generated by the two nuclear facilities at Turkey Point, Units 3 & 4 were wrong. In

their application they represented that the uprate would cause only an insignificant temperature increase. As a result of their failed predictions, they sought emergency relief from the NRC, to increase the temperature cutoff to 104 degrees. Based on their failure to accurately predict or play out the consequences of various scenarios, the predicted increase in water temperature entering the cooling canals, and the predicted salinity were not in fact accurate, and as a result, a management plan was required, to avert a crisis scenario of water heated to over 104 degrees. (**0145-4** [Lerner, Cindy])

Comment: Further, failure to address the current crisis, the instability of Turkey Point and its entire cooling canal system as it functions today, under emergency permits, is a fatal flaw by ignoring a current crisis that may never be resolved. The Draft EIS report must take into account under what circumstances would FPL manage operations of cooling canals in a manner that does not impact surface waters of our aquifer, and how that would factor into the determination that this site could function with two new plants, if the proposed new Cooling towers failed, or the re use water failed, and its cumulative impact to maintaining both 3 & 4 and a proposed new 6& 7. (**0145-7** [Lerner, Cindy])

Comment: No less the warmer water from the cooling systems creating an algae bloom and the amount of water it would take to cool (**0147-2** [Jones, Joan and Robert])

Comment: The Nuclear Regulatory Commission draft Environmental Impact Statement needs to incorporate recent data showing the negative impact caused by the "uprate" for Turkey Point nuclear power units 3 & 4 into the final analysis. Miami-Dade environmental regulators have opined that the NRC approved increase in energy output and increased temperature for the cooling canals and are causing an acceleration of hypersaline conditions which is accelerating saltwater intrusion into Miami-Dade's drinking water aquifer. (**0172-4** [Cava, Daniella Levine])

Comment: Prior environmental impact statements conducted by the NRC indicated that the uprate project would have minimal environmental impact, yet just months after Florida Power and Light initiated the increased power output at the plants, the water temperature in the cooling canal system spiked to unacceptable levels. To mitigate the impact that the NRC had previously determined was not going to happen, FPL petitioned to draw up to 100 million gallons of water per day that would otherwise flow to Biscayne National Park in order to try to cool down the overheated canals. According to the Miami Herald, in just 7 months, over one billion gallons of water had been diverted to the power plant during that emergency period. FPL has requested to continue this emergency draw from the South Florida Water Management District for another two years in an attempt to control the excessive temperature that continues to plague the existing system. (**0172-5** [Cava, Daniella Levine])

Comment: The DEIS fails to include an adequate analysis of the direct, indirect, and cumulative impacts of the proposed radial collector well system, including its impact on the available regional water supply. (**0208-6** [Ritz, David])

Comment: The DEIS does not adequately address the cumulative impacts of constructing and operating Units 6 & 7 on salinity levels in groundwater, surface water, the Biscayne Aquifer, and Biscayne Bay. (**0208-8** [Ritz, David])

Comment: Hypersaline water is being discharged into the waters and mangrove swamps of Biscayne National Park and and the Biscayne Bay Aquatic Preserve. (**0252-6** [Van Leer, Sam])

Comment: This utility is victimizing Miami residents in the following ways:--starting to draw in 2014 more fresh water from our aquifer supply because its cooling canals are no longer cooling discharged water fast enough. This endangers our drinking water supply by increasing salt water intrusion into the aquifer. (**0283-4** [Compel, Jr., Joseph])

Comment: The issue of super heated water is another insurmountable problem. There is a history of this problem which has been chronicled by The Miami Herald. It is public knowledge that the hot water produced by the nuclear reactors does not cool down as it is expected to, and Turkey Point was threatened with a shutdown for this reason. We are experiencing record heat, and there is no way for the heated water to cool down as temperatures will continue to hit record highs year after year. (**0365-5** [Fischer, Antoinette])

Comment: The salinity in the cooling canals is too much and the canals are too hot. You are using our precious water to cool the canals more. Israel uses all of its reuse water. In the future we will have to use all of ours as well. If you legislate the water for this plant we won't have it to use for our precious tropical plant agriculture. Did you know that in the continental US florida is the only place where tropical plants grow. (**0373-4** [Lee, Nancy])

Comment: I am greatly concerned about the large impacts Turkey Point has already had on the quantity and quality of limited freshwater resources, a situation that will only worsen with more reactors. The withdrawal of massive amounts of water from under Biscayne Bay as back-up cooling water could increase salinity levels within the Bay and hasten saltwater intrusion into limited freshwater supplies--the full impacts of which have not been thoroughly analyzed in the draft Environmental Impact Statement. (**0379-6** [Commenters, Multiple])

Comment: Just remember, that the operators of Turkey Point, the way it is already, have so underdesigned the cooling systems that they had to get a waiver to degrade even more of the aquifer and Biscayne Bay by pumping even more water, and now, they want this exception that was granted to be permanent! (**0435-1** [West, Eric])

Comment: Comment 6: The final Environmental Impact Statement should update its analysis, in the USGS model and elsewhere, to include the effects of flooding FPL's industrial wastewater facility/cooling canal system with additional water from the L-31E canal and other sources. After the completion of the DEIS, the South Florida Water Management District (SFWMD) issued an order authorizing FPL to divert 100 million gallons of water per day from the L-31E canal to the industrial wastewater facility. SFWMD Order No. 2015-020-DAO-WU. Florida's Department of Environmental Protection (FDEP) has also begun a process that would entitle FPL to draw an additional 14 million gallons of water per day from the Floridan Aquifer into its industrial wastewater facility. *See* http://tinyurl.com/TP3-5ConditionsDraftMod. Although both actions are being challenged, the former by the City and the latter by Miami-Dade County, the final Environmental Impact Statement should account for the presence of this additional water flow because its ostensible purpose is to flush hypersaline water out of FPL's facilities. As the SFWMD noted in late 2013, the consequences of flooding the FPL industrial wastewater facility are far from certain. *See FPL Turkey Point Cooling Canal System Salinity Reduction Proposal Review*, attached to these comments as **COM - A.** Likewise, the USGS model described by the DEIS in Appendix G would need to account for this additional water flow. In addition, "[b]ecause the [USGS] model conserves mass, withdrawal of groundwater results in water being drawn from other sources to replace it, and the freshening in this region could be due to predicted inflow from either freshwater or marine waters." DEIS at G-35. Hence, the assumption appears to be that there will be a recharge of freshwater. The final Environmental Impact Statement should address this assumption more directly. The final

Environmental Impact Statement should also update the USGS model to account for sea-level rise over the radial collector well system's operating life and address: The possibility that flushing the FPL industrial wastewater facility with additional water from the L-31E canal (in a manner that does not prevent evaporation or the resulting salinity increases) will push saltier water underground, The effect on the inland aquifer of seawater releases from the radial collector wells into the FPL industrial wastewater facility, and The potential for increased salinity levels in the inland aquifer resulting from future sea-level rise and storm surge hazards at the Turkey Point site, as well as the effects of this increased salinity on South Florida's freshwater resources. Moreover, the City echoes Miami-Dade County's concerns related to the area across which the USGS model predicts average salinities over Biscayne Bay. The model should include an analysis that more narrowly focuses on southern Biscayne Bay. The broad focus of the USGS model obscures the true potential impacts of operating the radial collector wells in a fragile aquatic ecosystem. The decision of the Nuclear Regulatory Commission, and cooperating agencies, of whether or not to approve the Turkey Point Nuclear Plant Units 6 & 7 application will likely rely on the findings of this model. The final Environmental Impact Statement, or a Supplemental Environment Impact Statement, should address these issues by refining the USGS model. (**0456-13** [Miami, City])

Comment: In addition: The existing power plant infrastructure has demonstrably impacted the Biscayne Aquifer already, The cooling canals' continuing problems with salinity, temperature increases, and algae blooms reveal the difficulties of operating a power plant at Turkey Point while minimizing environmental damage, and FPL's requests to divert large amounts of freshwater to Turkey Point come within the context of a region that currently lacks sufficient freshwater resources for Everglades restoration and faces a diminishing supply for public consumption. Since FPL has not stated that it intends to replace the existing reactors with the new reactors contemplated in this application, it is likely that placing additional reactors at the site will only constrain efforts to resolve these issues. (**0456-6** [Miami, City])

Comment: During 2014 the NRC granted a FPL request to continue operating reactor units 3 & 4 when cooling discharge temperatures exceeded 100 degrees Fahrenheit. This was a combination of newly increased up rating of power on reactor units 3 & 4 to 2644MWt each, and high ambient temperatures. Ambient air temperatures is a combination atmospheric conditions and the localized waste heat sources in the vicinity ~6.6GWt range. With the proposed addition of units 6 and 7, thermal waste dissipation on site will increase to ~11 GWt (peak) for a period of at least ten years until reactor units 3 and 4 are finally retired. This extra atmospheric thermal energy will further decrease the evaporation and the cooling ability of the 5,800 miles of cooling canals which support NG/Oil Units 1,2 and Reactor Units 3, 4. (**0545-3** [Keating, Tim])

Comment: What dangerous pollutants will escape in the cooling water to the bay? (**0550-4** [H., Pat])

Comment: Problems with cooling ponds at the existing Turkey Point 3 and 4 reactors have already led to unprecedented use of freshwater by those plants as they attempt to reverse the toxic salinity the plants already introduce into Biscayne Bay. The water cycle in South Florida simply cannot afford the demands of four nuclear plants and the NRC cannot permit their radioactive effluents to be released in such close proximity to local drinking water supplies as the Turkey Point siting would require. (**0615-3-3** [Bethune, David])

Comment: The NRC acknowledges the hydraulic connection between the cooling canal system (CCS)/industrial wastewater facility (IWF) and the hydrologic complex, especially during the tidal cycle (page 2-46) and states, *"Recently, the IWF has experienced algal blooms,*

increased water temperatures, and increases in concentrations in salinity and nutrients. The precise cause of this anomaly is not understood at this time." However, the FEIS should further evaluate whether the overheated water in the canal, with increased nutrients due to concentrations resulting from evaporation, contributed to the formation of the algal blooms. EPA is concerned regarding the interconnection of the IWF, Biscayne Aquifer and Biscayne Bay. NRC acknowledges this connection when it states, "*Hydraulic heads in monitoring wells near Biscayne Bay fluctuated in response to tidal cycles indicating a potential for tide-induced flow between the bay, shallow groundwater and the cooling canals in this area of the IWF"."* (page 2-68.) On page 2-69, NRC also discusses a FPL study that examines the dynamic processes between the IWF, surface water and groundwater as it is related to water quality, but does not discuss the results of that study. NRC also discusses a required monitoring study of the IWF to evaluate the *"horizontal and vertical hydrologic exchanges with the surrounding environment"*. EPA requests that the NRC better describe the existing condition of the current operations of Units 3 and 4, and related water quality impacts, in the FEIS. EPA also understands that the IWF is used for the existing nuclear reactors (Units 3 and 4), and that cooling water from the new units 6 and 7, will use reclaimed water from MDWSD, and the blowdown from the cooling tower will be discharged into the Boulder Zone via UIC wells. (**0617-1-14** [Mueller, Heinz J.])

Comment: The DEIS discusses operational surface water quality impacts associated with the IWF {page 5-19, 5.2.1.4). The DEIS individually examines the surface water quality impacts associated with excavation dewatering, stormwater discharge, muck spoil runoff and drift deposition. However, the DEIS does not holistically and additively analyze these additional stresses to the IWF. Also, the NRC does not discuss these additional wastewater stresses to the IWF and potential impacts to the underlying groundwater. (**0617-1-16** [Mueller, Heinz J.])

Comment: The DEIS states that FPL intends to place the construction dewatering water into the cooling canals. Other information indicates that dewatering water and other wastewaters generated during construction will be injected via a Class I injection well permitted by FDEP (page 4-30). This needs to be clarified in the FEIS. Estimated discharges from these waste streams would be 1200 gpm, or I.73 mgd, of discharge into the IWF for approximately 1 year (page 3-23). The DEIS does not discuss the composition of the constituents in the wastewater. FPL also intends to drain all of the new facilities' stormwater discharge into the IWF (pages 3-8 and 3-27). On page 4-36 (4.2.3.1), NRC also states, *"Because the transport of sediment in the stormwater runoff from the disturbed area would be minimized by the use of the BMPs, and controlled by a stormwater-retention basin, the effects of offsite water quality are expected to be minor."* The DEIS discusses volumes and potential pollutants of stormwater and wastewater to be placed in the IWF (page 5-19); however, the document did not discuss the types of stormwater retention basins and other best management practices (BMPs). The FDEP permit does not include information regarding possible BMPs. Additionally, FPL intends to place dewatering wastewater in the IWF as well. The NRC considered impacts of the excavation dewatering activities (4.2.3.2, page 4-37), but in relationship to inflows caused by excavation dewatering, and relationship to outflows due to the cooling canals canal seepage (mass balance). (**0617-1-19** [Mueller, Heinz J.])

Comment: We appreciate your efforts to minimize project impacts for the proposed Units 6 and 7 by using reclaimed wastewater from the Miami-Dade Water and Sewer Department (MDWSD) treatment system as cooling water, with the alternative source being groundwater supplied from horizontal radial collector wells installed in the Biscayne Aquifer on the Turkey Point peninsula. The lateral collector wells would extend up to 900 feet from the central caisson beneath Biscayne Bay (page 3-25). We appreciate the plans to avoid releasing blowdown to surface water bodies. However, based on the EPA's review of the DEIS, there are a number of serious

concerns regarding the direct, indirect and cumulative impacts of this project, and further information and clarification is needed. (**0617-1-2** [Mueller, Heinz J.])

Comment: EPA also recommends that the NRC consider and evaluate the additive impacts of the additional wastewater discharges (excavation dewatering, stormwater runoff activities, muck spoil runoff and drift disposition) into the IWF as a result of constructing the new reactors (Units 6 and 7), specifically as it relates to the hypersalinity plume and Biscayne aquifer and associated drinking water wells. (**0617-1-21** [Mueller, Heinz J.])

Comment: ***Recommendations:*** Page 2-45 of the DEIS states that the cooling canal system/industrial wastewater facility *" ... is a closed-cycle cooling system, but is not a closed hydrologic system."* EPA notes that since this is not a closed cycle hydrologic system, and therefore the FEIS should include a more in-depth discussion relating to the cumulative impacts associated with the hydrologic complex. The FEIS should include a water balance calculation for the site that shows all the potential sources of water supplying the site, and discharges and other releases from the site under normal operating conditions. This balance should include seepages from the canal system and changes in evaporative losses (e.g., changes in thermal load due to projected completion of the conversion to synchronous condenser mode for Units 1 and 2). Additionally, the FEIS should discuss the releases or seepages from the Industrial Waste Facility (IWF). Specifically, the FEIS should document the presence of any direct releases from the IWF to the surrounding surface waters via breaches in the berms. (**0617-1-4** [Mueller, Heinz J.])

Comment: *Indirect and Cumulative Impacts.* Several potential cumulative and indirect project impacts are of particular concern at Turkey Point, particularly radionuclides in surface water and groundwater, along with hypersalinity. Also, issues related to all nuclear power plants, including spent nuclear fuel storage, transportation and disposition, and groundwater monitoring for radionuclides, will require continued monitoring as the project progresses. The existing unlined Industrial Waste Facility (IWF)/Cooling Canal System (CCS) for Units 3 and 4 has issues regarding radionuclides and hypersalinity releases to the aquifer complex. Increasing water withdrawals from the canals, combined with additional groundwater withdrawals, could result in changing the level of the groundwater complex in the area surrounding the open interval of the withdrawal wells, eventually resulting in surface water impacts. EPA is concerned regarding the proposed project's potential for cumulative impacts on the migration of the existing hypersaline plume, particularly since the quantity of water in the cooling water canals will increase as a result of this project. EPA is especially concerned with ensuring the protection of public drinking water wells located to the west. Therefore, as a result of the proposed changes, further migration of the hypersaline plume is expected, and there is likely to be an increase in the rate of westward migration, increasing the potential for contact with offsite wells. EPA has concerns regarding the adjacent Biscayne Bay and the surrounding terrestrial environment, particularly that operation of additional units could potentially contribute to existing issues, and thereby increase cumulative impacts and environmental stressors. EPA has concerns that historical operating conditions at the site, combined with future construction and operation of new units, could result in increased saltwater intrusion, increased levels of radionuclides in water, and proximity of a hypersaline plume and sole source aquifer impacts. ***Recommendations:*** The FEIS should evaluate the environmental stressors, in their entirety, on the ecosystem surrounding Turkey Point. The potential impacts of current operations, combined with future groundwater withdrawals needed for construction and operation of the facility, should be fully evaluated, and impacts should be avoided to the maximum extent feasible. The issue of impacts on water supply wells should be thoroughly evaluated and discussed in the FEIS. The westward movement of the plume as a result of continued use of the cooling water canals should be

projected through predictive modeling extending through the expected operation of the project. The project team should explain what steps will be taken to monitor and protect drinking water supplies in the event that the hypersaline plume encounters a public water supply well. (**0617-4-10** [Mueller, Heinz J.])

Comment: Monitoring and Adaptive Management. EPA is concerned about the numerous environmental issues and sustainability related to the project, particularly the current operations of the IWF. The development of the hypersalinity plume, the recent uprate waiver for salinity and temperature, and pumping of water from the L31E canal and other sources to the IWF cause concern that the IWF may not be ecologically viable in the long term. EPA is concerned that the need to place additional water into the IWF in order for it to remain functional is not a long term solution, since the IWF is needed for the proposed project. EPA is particularly concerned regarding the drainage of Unit 6 and 7's construction and post-construction stormwater into the existing IWF, especially considering the numerous issues related to the current operations of the IWF. Given these uncertainties, as well as uncertainties related to climate change (especially increases in storms and sea level rise, operations of the RCW, and possible exacerbation of the hypersalinity plume), EPA believes that a monitoring and adaptive management plan is needed to prepare for any future, unforeseen environmental issues related to the construction and operation of Units 6 and 7. Therefore, EPA requests that NRC and USACE (with resource agency collaboration) develop a robust monitoring and adaptive management plan. ***Recommendations:*** EPA recommends that NRC and USACE develop a monitoring and adaptive management plan with collaboration from resource agencies, and other stakeholders, for inclusion in the FEIS. Further, EPA recommends NRC and USACE commit to the implementation of the monitoring and adaptive management plan in the Record of Decision (ROD). (**0617-4-13** [Mueller, Heinz J.])

Comment: 2) <u>Evaluation and Analysis of the Extended Operation of the RCW</u>

The NPS is concerned about the potential for adverse impacts to park resources from continued and extended operation of the RCWs, particularly operating scenarios involving either the combination of RCW water with the primary wastewater supply or using RCW water in place of reused wastewater for the primary source of cooling. It is reasonably foreseeable that future wastewater supplied for reuse by Miami-Dade County may have unforeseen limitations. For example, sea-level rise and saltwater intrusion could decrease the availability and raise the cost of this water supply - a risk that was not assessed in the DEIS. As stated in the DEIS (page 3-9, lines 1-9), FPL intends to use RCW water in combination with wastewater or as a replacement for wastewater should it become less available or unavailable in the future. More specifically, the NPS is concerned that the DEIS does not contain information to evaluate whether the operation of the RCW could draw the subterranean hypersaline plume further eastward into Biscayne NP.

Although the model spatial resolution may be too coarse to describe local impacts, results indicate the potential for RCW operation to affect the regional hydrologic system within the boundaries of Biscayne NP and Biscayne Bay Coastal Wetlands (BBCW) restoration project. The model report shows that continuous pumping scenarios yielded year round effects on water stages and salinity, especially to the northwest of the RCW site. In addition, all USGS model scenarios of RCW effects assumed that waters within the IWF, also known as the cooling canal system, had a constant salinity of 65 psu. Recent IWF salinity, following implementation of the uprate of Units 3 and 4, has risen to 90 psu and FDEP recently ordered actions (water additions to the IWF) to decrease salinity to 35 psu. Such action will increase head pressure difference and decrease the salinity and density difference between IWF and Biscayne Bay waters,

possibly increasing RCW operational influence on transporting water from the IWF waters toward the bay which in tum could affect resources of Biscayne Bay NP.

The NPS recommends that additional scenarios that extend the period of RCW operation and that vary IWF stages and salinity should be assessed with an appropriately scaled model to quantify this uncertain risk to Biscayne NP. This analysis should include an adequate assessment of how these operations could affect freshwater availability for current and future BBCW restoration projects. (**0622-1-3** [Austin, Stan])

Comment: Extended Operation of the RCWs[.] The NPS is concerned about the potential for adverse impacts to park resources from continued and extended operation of the RCWs, particularly operating scenarios involving either the combination of RCW water with the primary wastewater supply or using RCW water in place of reused wastewater for the primary source of cooling. More specifically, the NPS is concerned that the DEIS does not contain information to evaluate whether the operation of the RCW could draw the subterranean hypersaline plume further eastward into Biscayne NP. The NPS recommends that additional scenarios that extend the period of RCW operation and vary IWF stages and salinity should be assessed with an appropriately scaled model to quantify this uncertain risk to Biscayne NP. (**0623-3** [Austin, Stan])

Comment: We must consider the cumulative impacts of the water use with what's happening on the ground with 3 and 4. And if that's not in an EIS then, unfortunately, you need to do a supplemental EIS. (**0721-10-4** [Reynolds, Laura])

Comment: I want to talk briefly about fresh water. I think that the radial canals will not work properly. I think we need to look at the salt water plume that's underneath Biscayne Bay and in the area there[.] (**0721-13-6** [Martin, Drew])

Comment: [We need to look at] the extreme salinity that's been caused, and I think these problems will continue. (**0721-13-8** [Martin, Drew])

Comment: Already there's a algal bloom that's expanding uncontrolled from the cooling canal that's already existing at the Turkey Point site and the expansion of Turkey Point has the potential to further impact those regional water resources. The proposed radial collector wells which stretch underneath Biscayne Bay and would require as much as 7.4 billion gallons of water a year. To put that into perspective, the entire Florida Keys uses just over 6 billion gallons of water a year. That's over a billion gallons of water more than the entire Florida Keys. (**0722-7-3** [Silverstein, Rachel])

Response: *The IWF (also called the cooling-canal system) is not a feature of the design of proposed Units 6 and 7. The IWF provides cooling for Units 3 and 4. The IWF also previously provided cooling for Units 1 and 2, both of which have been converted to function to stabilize the grid and no longer generate power. To the extent comments relate solely to the current state of the IWF and its operation in connection with the existing Turkey Point units, the comments fall outside the scope of the EIS, which is the environmental impacts of the proposed new units. Nonetheless, the IWF is a feature of the site on which Units 6 and 7 are proposed to be constructed and operated. In describing the environmental setting for the proposed action, the review team disclosed that construction and operation of the IWF has affected the quality of shallow groundwater and the Biscayne Bay. Nothing in recent events has significantly altered the review team's understanding of the IWF. As discussed in the EIS, potential effects on the IWF from building and operating proposed Units 6 and 7 are very limited. These include effects resulting from: 1) discharge of groundwater from excavation dewatering and storm water to the*

IWF while building the plants, 2) runoff to the IWF from muck added to the berms, and 3) cooling tower drift deposition landing on the IWF. Analyses presented in the EIS show that these changes are expected to result in minor changes to the water levels or chemistry of the IWF. The EIS acknowledges that operation of the proposed RCWs installed beneath the Biscayne Bay could move hypersaline water from the IWF toward the RCWs. Any increase in volume and concentration of the seepage from the IWF to the underlying portion of the Biscayne aquifer is not expected to have a noticeable impact on the quality of groundwater in the areas of the Biscayne aquifer that meet USDW criteria for TDS. After publication of the draft EIS, because of potential changes in the future environmental baseline, the review team performed additional groundwater modeling of the interaction between the planned RCWs, the existing hypersaline plume, and the IWF using a two-dimensional cross section model and a limited-extent three-dimensional model. These simulations were performed to determine whether the postulated changes in the environmental baseline would alter the review team's findings from the draft EIS regarding the effects of RCW pumping. The effects of climate related sea-level rise were also simulated. Model results were added to the Section 5.2 of EIS and details of the modeling and results are presented in EIS Appendix G.

Comment: 3) <u>Evaluation of Water Quality Impacts and Associated Cumulative Impacts from the IWF</u>

The NPS is concerned that the DEIS does not fully analyze water quality impacts to NPS resources, especially cumulative impacts associated with the IWF. Recent developments relating to the operation of the IWF and subsequent environmental concerns were not analyzed in the DEIS. The hyper-salinity and temperature in the IWF, including the use of regional system water under recent orders and actions now underway to address this issue, must be evaluated as part of the past, present and future cumulative impacts. These recent actions of increased withdrawals from the regional system have currently decreased the amount of freshwater going to Biscayne NP and Biscayne Bay. This information should be included in a revised DEIS along with appropriate adjustments to impact assessments that include this updated baseline condition. Additionally, the levees surrounding the IWF are relatively low in height. Therefore, the transport of high salinity and high temperature IWF water into Biscayne NP and Biscayne Bay with sea level rise and storm conditions should be considered in an updated analysis related to the effect of anticipated sea level rise.

We are concerned that operation of the RCWs has the potential to affect the salinity of Biscayne Bay. Ecological responses to salinity depend upon both the magnitude and variability of salinity exposure. The CERP is attempting to restore both of these components by decreasing high salinity peaks in the dry season and changing the seasonal timing of low salinity (extending low salinity well into the dry season, and decreasing harmful rapid drops in salinity). For BBCW, there is particular focus on salinity in the near-shore zone within 500 meters of the shoreline, where hypersalinity and high variability occur. The modeling in the DEIS demonstrated that RWC operations influenced salinity at a broad spatial scale. However as described previously, modeling salinity variability at a finer scale would provide more insight into localized potential ecological effects in southern Biscayne Bay. For these reasons, the NPS recommends that additional modeling be conducted to include more recent salinity data, assumptions concerning redistributed freshwater flow into the park as a result of the BBCW Project, and at an appropriate scale to determine the extent to which RCW operations will effect salinity changes and have potential adverse impacts to resources in near-shore coastal waters of Biscayne NP.

The DEIS concludes that changes in the hydrology and chemistry of the IWF caused by construction of Unit 6 and 7 will not impact Biscayne NP and Biscayne Bay. We have concerns

regarding the methodology used to draw this conclusion and how pulses of nutrients and dissolved organic matter from dewatering and stored muck could potentially move toward the bay, thereby increasing the risk of near-shore algal blooms. Our concerns regarding the impact of Units 6 and 7 construction activities are now heightened by changes in IWF hydrologic management. These construction activities, when combined with planned freshwater or brackish water additions from canals and the Florida aquifer, intended to decrease IWF salinity, will raise water levels in the IWF. This will change both head and density differences among water parcels of the IWF, groundwater, and bay water, changing patterns of advection and dispersion and associated water quality risks. This scenario was not evaluated in the DEIS. The NPS is concerned that these changes in water levels, combined with nutrient and other material inputs from construction, will significantly increase the risk of industrial waste water and materials being transported or dispersed into adjacent Biscayne NP and Biscayne Bay, consequently increasing the risk of ecological impacts. (**0622-1-4** [Austin, Stan])

Response: *The review team demonstrated that the impacts of changes in water chemistry from dewatering and leaching of the muck piles is expected to be small and within the normal range of variability in the IWF. The review team also computed the impact of an unrealistically conservative bounding release of the nutrients to Card Sound and Biscayne Bay and also determined they were within the range of typical variability.*

Construction activities would require temporary dewatering of areas below the water table. Pumps would remove the water from these holes and discharge it into the IWF. To minimize the amount of water that needs to be pumped, barriers would be used around the holes. Because the IWF and Mud Island are hydraulically connected, there is no net change in water volume. Removal of muck to allow placement of fill material that would raise grade for the plant would result in saturated muck draining. Again this results in no net change in the water volume, but it could make nutrients and other chemicals that would drain into the IWF more available. Once the dewatered muck is piled on the berms, nutrients and chemicals can continue to be leached by rainfall and enter the IWF. Technologies implemented as Best Management Practice (BMPs) for managing dewatering and leaching problems are mature and reliable. FPL also has the unique option of possibly using the UIC system to dispose of nutrient-laden dewatering drainage, and leachate at the Turkey Point site. The review team was advised by SFWMD that there was nothing about the Turkey Point site that would suggest that the existing suite of available BMPs would not be sufficient.

The review team acknowledges that operation of the RCWs would decrease the piezometric head in the vicinity of the RCW and cause increased lateral movement to the east of the hypersaline plume underneath the IWF (assuming the remediation of the hypersaline plume under the Consent Agreement is unsuccessful). However, without an upward impelling force, the hypersaline plume would remain well below the bay floor. The review team has not been able to identify any credible upward impelling force that would offset the tendency of the denser hypersaline water to sink.

Comment: The Turkey Point units 6 & 7 fails to address the toxicity of the drift from the cooling towers if chemical-laden municipal wastewater is used to cool the reactors. There is no analysis of the chemical reaction products and the chemical decomposition products that would form when the wastewater is heated. These unknown products would then be dispersed over the land and water via the cooling towers. There has been no environmental impact analysis of this random dispersal of completely unknown chemicals. (**0054-1** [Kasenow, Lisa])

Comment: Comment 8. The DEIS is incomplete because it gives no context for evaluating the safety of the chemicals projected to be released. Nor does it show quantitative mapping of aerosol accumulation, though the data are probably available. Specifically, the DEIS does not list safe accumulation levels for the list of chemicals that will be released as aerosols, nor does it compare the projected levels to the safe accumulation levels - Cooling water will be evaporated in cooling towers with blowdown preventing escape of most aerosols. Nonetheless, some aerosols will escape the towers and blow out across Biscayne National Park and the coastal Everglades on the prevailing winds: *"Small droplets of water (drift) and salt particles would be emitted from the cooling towers during operation. For the Turkey Point Units 6 and 7 combined drift rate from the circulating-water system and service-water system towers the expected maximum drift rate would be approximately 8 gpm (Table 3-6)." [DEIS p. 5-9]* The DEIS projects 4,207,680 gal/year aerosol drift, and a 4 year accumulation cycle. Dispersion models predict a non-uniform distribution of aerosols across the region, with greater accumulation near the plant. Thus, use of reclaimed wastewater will introduce myriad waste chemicals into the nearby reaches of Biscayne Bay and the Southeast Coastal Everglades. The DEIS gives no context for evaluating safety of the chemicals to be released. It lists projected amounts, but does not provide other key information. Absent are diagrams showing how fallout varies over the area. Likewise absent are safety data to evaluate the possible effects of chemicals that accumulate. What are the safe accumulation levels? While soluble chemicals like chloride might reach saturation after 4 years time, the same is not true for hydrocarbons and metals that bioaccumulate. They may continue to concentrate in the ecosystem for longer, reaching greater concentrations over periods longer than four years. ***The final EIS must better estimate accumulation levels and better detail spatial distribution of listed wastewater chemicals released as aerosols and compare those levels to levels shown safe for aquatic organisms.*** (**0106-11** [Stoddard, Philip K.])

Comment: Your choice of locating two nuclear reactors at Biscayne and Everglades National Parks are at risk for using 90 million gallons per day of recycled Miami-Dade County sewage and wastewater which will not be pure H2O and will be released over Biscayne Bay and surrounding wetlands along with steam in the planned cooling towers. (**0153-1** [Goldman, Emanuel])

Comment: The EIS also fails to analyze impact of particulate drift from the nuclear cooling towers. The impact cannot be known at this time because the chemical content of the drift is unknown. (**0200-1** [Kasenow, Lisa])

Comment: The powerful new reactors (1,117 MW each) are to be cooled primarily by 90 million gallons per day of recycled Miami-Dade County sewage and wastewater. This water will not be pure H2O - and some will be released over Biscayne Bay and surrounding wetlands along with steam in the planned cooling towers. (**0240-3** [Commenters, Multiple])

Comment: The draft EIS also omits any analysis of the chemical constituents of the aerosolized effluents as well as any modeling of the synergistic effects of adding two new plants a site which has already reached unacceptable levels of fresh water use. Furthermore, the draft EIS neglects any study of the impact of the radial collector wells on the salinity of the waters of Biscayne Bay National Park, an irreplaceable environmental resource. (**0615-3-5** [Bethune, David])

Comment: References to the State of Florida Site Certification Process[.] The NPS recommends that the hydrology and ecology sections in the DEIS be strengthened by including references to important documents from the State of Florida Site Certification Process, especially as it relates to the cooling tower plume issue. We also encourage the NRC to draw

from the extensive technical and scientific literature of the SFWMD who are the local sponsors of the C&SFP with the USACE and are the local experts on hydrology and water operations. They are also the primary water operations regulatory agency of the State of Florida. This extensive collection of materials is both peer reviewed and online and should be included in the DEIS. (**0622-1-28** [Austin, Stan])

Comment: Release of Chemicals of Emerging Concern CCECs)

The NPS has a number of questions/concerns relating to the release of CECs originating from reclaimed water and released via the operation of Units 6 and 7 onto the Turkey Point facility and into Biscayne NP and how they are analyzed in the DEIS:

Page 5-10

Lines 19-20: The DEIS states, "This conservative approach assumes no loss of contaminants via removal ..., biodegradation, or volatilization." Since biodegradation of some compounds (e.g., 4-nonylphenol, triclosan) can result in more toxic compounds than the parent compound, we suggest that more information be included along with additional discussion of how biodegradation of contaminants are affected by drift deposition.

Lines 30-31: The DEIS states that "... the review team first performed a screening-level assessment to identify chemicals and constituents likely to occur at ecologically relevant concentrations in both reclaimed water and Biscayne Bay seawater obtained from the RCW system." NPS requests an explanation of how the review team determined which chemicals and constituents were likely to occur at ecologically relevant concentrations; how these concentrations were determined; and how the review team determined which species and which endpoints to use for these ecologically relevant concentrations. Revisions to the DEIS should include an outline of the screening-level assessment process in addition to the information regarding these questions.

Lines 41-44: The DEIS states, "...were compared to existing EPA freshwater and marine water-quality criteria, which are readily available for many compounds and believed to be protective of aquatic life." Were freshwater water-quality criteria applied to marine species if marine water-quality criteria were not available? Lines 22-25 on p.5-53 highlight this possibility. If this was done, the screening-level assessment needs to be conducted again since the toxicity of compounds are greater in seawater and brackish waters than in freshwater.

Page 5-11, Table 5-1 contains footnote (c) that indicates the contaminant with the lowest environmental effect concentration. However, there does not appear to be a contaminant (or concentration) annotated with a (c) in the table. (**0622-1-5** [Austin, Stan])

Comment: You think they can get them all out? No. That's going through the cooling towers. You think it's pure H2O steam coming out of there? No. Volatile gases mixed in with it plus droplets called drift. That drift contains the wastewater. Those are little tiny droplets of wastewater spreading out over Biscayne Bay, spreading out over your community, your children are going to be breathing that in. (**0723-9-15** [Schwartz, Matthew])

Response: *In Section 5.2.1.1 of the EIS, the review team disclosed that the chemicals in the reclaimed water include contaminants of emerging concern (CECs) and the review team has provided a representative calculation of the amount of the CECs available in the drift. The review team determined that the drift rate would be small (8 gpm); chemicals in the water*

treatment process may degrade; there is some potential for volatilization of CECs in the cooling towers, so they would not be deposited locally as drift; mixing and dilution would occur as the chemicals combine with other surface water bodies; and given the ubiquitous presence of chemicals in the environment, the projected alterations to the water quality would likely be undetectable. The review team employed conservative estimates of wet deposition based on air quality models applied consistent with NRC guidance.

The review team disclosed the existence of CECs in the EIS and performed a conservative analysis to demonstrate the small amount of material being released to fully advise the public. NEPA does not require an encyclopedic characterization of all the possible CECs that may be in the reclaimed wastewater and even natural water bodies. As with any other constituent, if EPA changes existing standards or adds new standards such as for CECs, changes may be necessary in the future.

Comment: Further, if the expansion of Turkey Point does occur, it could have profound and unacceptable environmental impacts to regional water resources, Biscayne and Everglades National Parks, wildlife, wetlands and threaten public health and safety. There are more affordable, less water-intensive ways for FPL to meet energy demand[1] [Footnote 1: See http://www.cleanenergy.org/wp-content/uploads/F_SACE_CleanenergysolutionstoTurkeyPtreactors_040915.pdf.] while protecting the environment and addressing climate change. (**0112-2** [Barczak, Sara])

Comment: In the description of the affected environment there is an extensive discussion of the locational environment around southeastern edge of Everglades NP, however there is no description of Biscayne NP's watershed which is contiguous to the plant which would include a discussion of the surface and groundwater flow to Biscayne NP as well as the surface water operations contiguous to the plant site that affect the near shore coastal environment. The watershed to the west and northwest of the plant is the Central & Southern Florida Project canals, Miami-Dade County canals and the groundwater made up of the Biscayne Aquifer an unconfined aquifer. Together these components control the water level and water flow of this area and are responsible for the ecological structure of Biscayne NP and its adjacent wetlands. In turn, these systems are operated to accommodate the dense population of Miami-Dade County. (**0622-1-29** [Austin, Stan])

Response: *Section 9.2 of the EIS describes the review team's assessment of water usage by alternative energy systems water. The review team identified some energy alternatives that use less water than the proposed plant (e.g. combined cycle, and solar). However, given that the plant is using treated wastewater that would otherwise be immediately disposed by deep well injection, the review team determined that water use is not relevant as a determinate in this case.*

Comment: Likewise, limiting the analysis in the DEIS to only the proposed radial collector wells as a backup cooling system is not the "hard look" required by the National Environmental Policy Act ("NEPA"). This backup cooling system is easily one of the most concerning parts of the Turkey Point Nuclear Plant Units 6 & 7 application. Since the final Environmental Impact Statement must independently assess the impacts of the Environmental Report submitted by FPL, it should also consider other approaches to providing cooling water to the reactors. The DEIS has already accomplished this task for some of the inland alternative sites by assessing potential cooling systems other than those proposed. The final Environmental Impact Statement must do the same for Turkey Point. (**0611-3** [Haber, Matthew S.])

Response: *Alternative water sources for Turkey Point are discussed in Section 9.4 of the EIS. Withdrawal of water from marine sources, including Biscayne Bay, Card Sound, and the Atlantic Ocean (including locations such as the barge-turning basin or Card Sound Canal) was considered. Other surface-water sources, including the IWF cooling canals and offsite sources such as a new freshwater reservoir, were also considered. The review team considered several groundwater sources, including the Biscayne aquifer, the Upper Floridan aquifer, and the zone of the Lower Floridan aquifer that is commonly referred to as the Boulder Zone. None of these alternatives were environmentally preferable to the proposed water sources. No changes to the EIS were made based on this comment.*

Comment: *Stormwater Management Design Event*: NRC states the stormwater management system for the new plant area will be designed to handle a 25-year, 72-hour design storm event (Section 3.4.2. l, p. 3-30). ***Recommendations:*** EPA recommends NRC provided some supporting environmental information justifying the sufficiency of a 25-year, 72-hour design storm event for this facility in this area. As noted by NRC, the U.S. Global Change Research Program has determined that extreme heavy precipitation events are expected to increase in frequency and intensity. For example, an event that now occurs once in 20 years is projected to occur 2 to 3 times as often by the end of the century. Heavy precipitation events are expected to have a 20-percent increase in the amount of precipitation falling. While the number of tropical storms occurring around the globe will decrease, those that occur will be stronger in force, yielding more Category 4 and 5 storms. Rainfall rates associated with tropical storms are expected to be greater, *" ... with projected increases of about 20 percent averaged near the center of hurricanes"* (GCRP 2014-TN3472). (Appendix I, p. 1-3) (**0617-4-2** [Mueller, Heinz J.])

Comment: *Stormwater Management Cooling Canals*: NRC states the storm water runoff will be directed to the existing cooling canals of the existing industrial wastewater facility. ***Recommendations:*** EPA recommends NRC discuss the impacts of heavy precipitation events, sea level rise, and storm surge on the existing cooling canals and their stormwater-management effectiveness and associated impacts to the affected environment. For example during the hurricane season of 2004, Hurricanes Frances and Jeanne created high-water surges of over 18 feet (Section 9.3.2.4, p. 9-70). Reportedly, storm surge can range up to 20 feet and last a day in known extreme cases. [Footnote 2: Miami-Dade Sea Level Rise Task Force Report and Recommendations, July 1, 2014, available at heep://www.miamidade.gov/planning/library/reportsfsea-level-rise-final-report.pdf] Moreover, NRC qualitatively presumes the unlined cooling canals' water-surface elevation will rise in response to sea level rise (Appendix I, p.1-5). EPA recommends that the cooling canals' water elevations be analyzed in context of sea-level rise projections and the resulting impacts assessed. (**0617-4-3** [Mueller, Heinz J.])

Response: *Appendix I includes a discussion of stormwater management as related to climate change. Stormwater management is regulated by the EPA, and while the NRC discloses the impacts of storm water management in NRC EISs, the NRC does not intrude on the EPA's decisions regarding nonradiological pollutant discharges into receiving waters. Additional information is available in Section E.2.32, in which the NRC responds to comments regarding climate change, and Appendix I, which includes the NRC analysis of climate change issues associated with the proposed action. The storm surge of 18 ft that was mentioned in one comment refers to the storm surge on the confined Lake Okeechobee and is not related to coastal storm surge at the proposed site.*

Comment: The DEIS individually views the surface water quality impacts associated with excavation dewatering, stormwater discharge, muck spoil run off and drift disposition, but does not holistically and additively analyze these additional stresses to the IWF. Also, the DEIS does not discuss these additional wastewater stresses to the IWF, and potential impacts to the underlying groundwater. The DEIS notes that the impacts would be minor; however, it does not discuss possible impacts related to the hypersalinity plume. The EPA is concerned that these additional wastewater activities would further stress the IWF and potentially worsen the hypersalinity plume, cumulatively and adversely impacting the Biscayne Aquifer. We note that additional waters will be added to the IWF to address the heating and hypersalinity issues, however, the extent to which the additional waters will alleviate the hypersalinity levels in the plume is unclear. **Recommendations:** The FEIS should clarify whether remediation measures are planned to remedy the serious issues that exist with hypersalinity migration. Also, the FEIS should provide more detail regarding the dewatering and stormwater activities (including types of pollutants, volumes, types of BMPs and stormwater-retention basins). (**0617-1-20** [Mueller, Heinz J.])

Response: *The review team is aware that regulatory actions by state and county agencies have been undertaken to mitigate the inland migration of the hypersaline plume. The staff has updated the EIS to include a discussion of these in Section 2.3. The review team also included discussion in Sections 5.2, 7.2, and Appendix G to explain modeling performed to confirm that the review team's conclusions in the draft EIS would not be changed as a result of these new actions.*

Comment: There are instances in the DEIS where the DEIS characterizes the stormwater would be "discharged" into the industrial wastewater facility (IWF). FPL's ER uses the terms "routed" or "released" due to FPL's National Pollutant Discharge Elimination Permit. For example ER Subsection 3.6.3.2 states: "Stormwater would be **routed** to the industrial wastewater facility." Additionally, ER Subsection 4.2.1.1.3 states, "During construction, surface water runoff would be **released** to the industrial wastewater facility. Instances in the DEIS include (emphasis added): a. Appendix F-2, Section 2.1, Page 2-2, Lines 1-2: Appendix F-2: "Eventually, stormwater would be **discharged** into nearby canals of the existing industrial wastewater facility (IWF)." b. DEIS Appendix F-3, Section 2.0, Page 2-1, Line 23: Appendix F-3 states: "Stormwater would then be collected and **discharged** into nearby cooling canals of the existing industrial wastewater facility (IWF)." c. DEIS Appendix F-3, Subsection 4.1.1.2, Page 4-3, Lines 7-8: Appendix F-3 states "Water or effluent associated with RCW construction would be **discharged** into the IWF and not directly released into nearshore areas." d. DEIS Appendix F-3, Subsection 4.1.1.2, Page 4-3, Lines 14-15: NFMS BA states, "This water, and other effluents or stormwater associated with construction activities, would be **discharged** into the IWF." (**0619-1-15** [Maher, William])

Response: *The review team understands that the term "discharge" has a specific meaning under the Federal Water Pollution Control Act, commonly referred to as the Clean Water Act. The review team revised the use of term discharge to avoid confusion with National Pollutant Discharge Elimination System (NPDES) permit process designations under the Clean Water Act.*

Comment: To enlarge the plant and contaminate the bay waters would be wrong! (**0368-1** [Casey, Sr., Robert J.])

Comment: Some of the water that cools the reactors could be released over Biscayne Bay and surrounding wetlands along with steam in the planned cooling towers. (**0537-3** [Anonymous, Judi])

Comment: [F]ind other ways of recycling sewage and wastewater. Releasing sewage and wastewater over Biscayne Bay will destory the welands and also the reason people come to visit, clean water and beaches. DON'T MAKE THIS AREA A GIANT CESSPOOL! (**0630-2** [Montalvo, Stephanie])

Comment: The hot water that will be released as a result of cooling, the nuclear waste that we have no way of safely dealing with, the electrical lines that will kill birds and mar the beauty of the landscape make it an unacceptable plan. (**0635-3** [Seiman, Rhonda])

Response: *The majority of the treated wastewater would be evaporated in the cooling towers, and the residual (blowdown) would be injected into the deep Boulder Zone, as is common for wastewater in South Florida. The only pathway for wastewater to enter the landscape would be from drift from the cooling towers. The review team assessed this in Section 5.2 of the EIS and determined the changes from the cooling towers would be undetectable. No changes to the EIS were made based on this comment.*

Comment: According to the Draft Environmental Impact Statement, the cooling towers for proposed Reactors 6 and 7 will deposit an average of 50 million gallons a day of radioactive salt water as aerosol for 60 days a year[.] (**0721-12-2** [White, Barry J.])

Response: *The only radioactive material in the drift would be that already in the treated wastewater. The design of the reactor does not transfer radiation to the water that can become drift. The daily drift rate would be 11,520 gpd not the 50,000,000 gpd the commenter states. No changes were made to the EIS based on this comment.*

Comment: This [renewable energy] would save the people money on future electric bills and begin to mitigate climate change and the rising sea levels that already are impacting Key West and Miami Beach (both of which flood during King high tide and full moon events). I have been called several times as a Miami Beach firefighter to pump out and squeegee peoples homes during these events. (**0718-5** [Buechler, Jerry])

Response: *Climate change and sea-level rise are discussed in Appendix I and alternative energy systems are discussed in Section 9.2. No changes were made to the EIS based on this comment.*

Comment: The most dangerous scenario for Turkey Point is also the most likely to occur, an extended station blackout combined with extensive site flooding due to a hurricane. Although extended station blackout and storm surge flooding have taken place at Turkey Point already and are expected to continue or even increase in the future as a result of climate change, the draft EIS fails to examine any aspect of this site-specific scenario. (**0615-2-27** [Bethune, David])

Comment: Point is 25 feet above sea level. Access roads are at approximately 14 feet. The rest of Miami-Dade County is at pretty much sea level. Any storm surge of just 2 or 3 feet would not allow access to the plant. No access to the cooling canals or the plants could cause a potential meltdown. (**0721-5-4** [Mendez, Victoria])

Response: *The NRC staff documents their review of the applicant's safety assessment in the Safety Evaluation Report. This review considers discussion of storm surge and sea-level rise in Section 2.4. Also, the proposed units do not rely on the cooling canals for any safety function; rather, in the event normal cooling is lost, the AP1000 design provides safety-related cooling through passive means, including water stored in tanks onsite. These tanks need not be refilled*

for 72 hours from the time normal cooling is lost. No changes were made to the EIS based on this comment.

Comment: The project components most relevant to FKNMS include the filling of 1,000 acres of wetlands for construction of the Units 6 and 7 and related infrastructure, the location and materials placed in Spoils Area B, and the impacts of building and operating radial collector wells. Impacts from these project components may include sediment and nutrient run-off and hypersaline and hyperthermal water quality conditions. These adverse impacts will most directly affect the aquatic resources and water quality of Biscayne Bay, Card Sound and vicinity; however, there could be downstream impact on FKNMS resources. FKNMS regulations (15 CFR 922.163(a)(4)(ii)) prohibit discharging or depositing, from beyond the boundary of the Sanctuary, any material or other matter that subsequently enters the Sanctuary and injures a Sanctuary resource or quality. Therefore, FKNMS recommends reviewing these project components to ensure that impacts to aquatic resources and water quality are adequately addressed. (**0618-1** [Morton, Sean])

Response: *The topics discussed in this comment regarding the Florida Keys National Marine Sanctuary (FKNMS) were addressed in Sections 4.2 and 5.2 of the EIS. Based on information that became available after publication of the draft EIS, the review team has also updated and expanded the discussions in Sections 2.3, 4.2, 5.2, and Appendix G.*

Comment: In early 2015, FPL announced the change of the commercial operation dates (CODs) for Units 6 & 7 from 2022 and 2023 to 2027 and 2028, respectively. A new and significant information review was conducted by FPL where it was concluded that there would not be an impact to any significance level or conclusion drawn in the ER with respect to the change in CODs. There are instances in the DEIS, however, where references to CODs differ from the newly announced CODs. Instances in the DEIS include:...DEIS Appendix I, Section I.2, Page I-2, Lines 32-42: In DEIS Appendix I.2, the DEIS states: "Florida Power and Light Company (FPL) has indicated that, if the COLs are granted, it expects to initiate commercial operations in the third quarter of 2022 and third quarter of 2023 for Units 6 and 7, respectively (FPL 2014-TN4058)... The review team considers use of GCRP impacts report projections for the 2071-2099 period under a continued increasing emissions scenario to be a conservative proxy for likely future conditions encompassing the licensing action, and for assessing the effects of climate change on the resource area impact levels presented in this EIS." (**0619-1-8** [Maher, William])

Comment: There are instances in the DEIS where there are inconsistencies and/or discrepancies relating to authorizations, permitting and certifications. Instances in the DEIS include (emphasis added):...DEIS Subsection 5.2.3.1, Page 5-26, Lines 19-20: The DEIS states: "Wastewater from the sanitary and potable water systems would be **discharged to the municipal sewer system**." However, wastewater from these facilities will be discharged to the Boulder Zone via deep injection wells as described in ER Section 3.3: "This water would also be the source for potable water, the demineralized water system, fire protection, and miscellaneous water users. Effluents would be **discharged to the Boulder Zone via deep injection wells** permitted by the Florida Department of Environmental Protection (FDEP) underground injection control program." (**0619-2-12** [Maher, William])

Comment: Inconsistencies identified in draft EIS and ER, Rev 6: Subsection 2.3.2.1, Page 2-58, Lines 4-8 "For the local area, **32 permitted surface-water users**...include landscaping, agriculture, industrial, and "(a golf course) (FPL 2014-TN4058). Landscape...largest number

(31) of permitted users..." ER Table 2.3-25 ER Table 2.3-25 lists **34 surface water permits** (31 landscape, 1 agriculture, 1 industrial, 1 golf course). (**0619-2-19** [Maher, William])

Comment: There are instances in the DEIS where there are inconsistencies and/or discrepancies relating to authorizations, permitting and certifications. Instances in the DEIS include (emphasis added):...DEIS Section 4.2, Page 4-25, Lines 39-40 and DEIS Section 5.2, Page 5-6, Lines 38-39: In both instances, the DEIS states: "Consumptive use of surface water and groundwater would require a permit from the FDEP or the water-management district." The consumptive use authorizations are part of the Conditions of Certification. (**0619-2-9** [Maher, William])

Response: *The review team has confirmed the information in these comments and corrected the EIS accordingly.*

Comment: There are instances in the DEIS where there are inconsistencies and/or discrepancies relating to authorizations, permitting and certifications. Instances in the DEIS include (emphasis added):...DEIS Appendix F-2, Section 1.0, Page 1-1, Lines 19-20 and DEIS Appendix F-3, Section 1.0, Page 1-1, Line 27-28: Appendix F-2 states: "The SCA process provides a certification that **encompasses all licenses** needed for appropriate Florida State, regional, and local agencies." (Nearly identical language is found in Appendix F-3 as cited). ER Section 1.2 states: "*Pursuant to the Florida Electrical Power Plant Siting Act (PPSA) all state, regional and local permits, **except for certain local land use and zoning approvals and certain state issued licenses required under federally delegated or approved permit programs**, are covered under a single "Certification"." h. DEIS Appendix F-3, Subsection 3.1.1.1, Page 3-5, Line 24 and DEIS Appendix F-4, Subsection 2.3.4, Page 2-10, Lines 13-14: Appendix F-3 states: "FPL **has proposed that** RCW use would be limited to 60 days per year (FPL 2012-TN2688)." (Nearly identical language is found in Appendix F-4 as cited). Condition of Certification, Section B. VI. C.2.b.i.(3) states, "**Licensee shall be authorized** to operate the RCW system up to sixty (60) days and withdraw a maximum volume of 7,465 MG in any consecutive twelve (12) month period [equivalent to sixty (60) days at full capacity of 124.416 MGD]." i. DEIS Appendix H, Table H-1: Appendix H, Table H-1 does not include the USACE Section 408 permit. However, ER Table 1.2-1 lists the USACE Section 408 permit (3rd item in the ER Table 1.2-1). j. DEIS Appendix H, Page H-5 to H-8, Table H-1: Appendix H, Table H-1: Federal, State and Local Environmental Permits and Authorizations, under "Description of Requirement" states the following were issued May 19, 2014 under Final Conditions of Certification: i. NPDES storm water operations permit for industrial activities ii. Exploratory well construction permit iii. UIC well construction permit (allows for the construction and operational testing of additional injection and dual zone monitoring wells). iv. Class I well operation permit v. Prevention of significant deterioration construction permit vi. Modification of Industrial Wastewater Treatment Facility permit vii. NPDES construction stormwater permit viii. Operation of Class V, Group 3 domestic wastewater injection (gravity flow) well ix. Title V Operations Permit - 0250003-010-AV x. Title V Operations Permit - 0250003-21-AV xi. Well Construction Permit ER Table 1.2-1, Authorizations for Turkey Point Units 6 & 7, states: "*Pursuant to the Florida Electrical Power Plant Siting Act (PPSA) all state, regional and local permits, **except for certain local land use and zoning approvals and certain state issued licenses required under federally delegated or approved permit programs**, are covered under a single "Certification". Because the Certification is the sole license of the state and any agency required for construction and operation of the proposed electrical power plant, it is not necessary to apply for permits individually." **These permits are not issued as part of the Site Certification.** (**0619-2-14** [Maher, William])

Response: *Table H-1 in Appendix H has been modified to show the permit status provided by FPL in the ER. The documents in Appendix F are consultation documents submitted to the U.S. Fish and Wildlife Service (FWS) as part of ESA Section 7 consultation between the NRC, the USACE, and the FWS, and were not edited.*

Comment: DEIS Subsection 9.3.1.7, Pages 9-40 through 9-43, general comment: The DEIS discusses the alternative water supply scenarios analyzed by FPL for the three inland sites. Among the water supply features considered were a 3,000 acre reservoir to retain excess flow from the Kissimmee River/Lake Okeechobee system and a reverse osmosis groundwater treatment system to reduce cooling tower drift salinity to protect sensitive plant and animal communities from salt drift. On page 9-42, the DEIS states that the review team was "unable to confirm" (based solely on drift rates provided for the Units 6 & 7 cooling towers) that salt deposition would be sufficiently adverse to preclude the use of groundwater without reverse osmosis. This is inconsistent with FPL's analysis of salt drift impacts presented in the Turkey Point Units 6 & 7 Section 404(b)(1) Alternatives Analysis (DEIS Reference FPL 2011-TN1374 at 63-64), particularly the differences in susceptibility of plant species in coastal compared to inland areas. Additionally, the DEIS review team assumed that increased groundwater use "could reduce or eliminate the requirement for a surface-water reservoir" and thus performed a water supply analysis configured without a surface-water reservoir or a reverse osmosis groundwater treatment system, and concluded the inland sites are not environmentally preferable to Turkey Point. FPL maintains, based on its consultation with the South Florida Water Management District (SFWMD) and its experience with the practicability of siting, permitting, and operating power plants in Florida, that these features would be required for these sites. FPL nonetheless recognizes that the DEIS analysis is conservative for the purpose of NEPA alternative sites analysis because its assumptions tend to underestimate the environmental impacts of the inland alternatives compared to the Turkey Point site. The DEIS also recognizes that the NEPA analysis performed by the NRC is "necessarily imprecise" and that any evaluation of a particular alternative site "must have a wide range of uncertainty" (page 9-243). Therefore, FPL does not object to the DEIS excluding the reverse osmosis groundwater treatment facility and reservoir water supply impact assumptions. However, as the DEIS explains on page 9-43, there is significant uncertainty regarding whether a power plant could be sited at one of these three sites without surface water supply features. In light of other independent regulatory actions, the EIS should clarify that the assumptions regarding reverse osmosis groundwater treatment and onsite reservoirs are based on a reconnaissance-level NEPA review and do not represent a regulatory determination on their practicability. (**0619-5-17** [Maher, William])

Response: *As stated in the EIS, the staff acknowledges that there is considerable uncertainty regarding how the cooling system might actually be implemented if the plant were to be built at one of the inland alternative sites. The staff modified the text in Section 9.3.1.6 to further clarify that were such a plant to be built, State regulatory agencies may require actions to mitigate cooling system impacts, such as building a reservoir to store water or implementing reverse osmosis to reduce the impacts from cooling-tower drift.*

E.2.8 Comments Concerning Hydrology - Groundwater

Comment: DEIS Appendix G, Section G.3.1, Page G-22, Paragraph 2: The DEIS states: "FPL completed the pumped well on the Turkey Point peninsula as an open borehole **from 22 to 46 ft** below ground surface and with cemented casing above that depth. They also completed **five observation wells** with the top of the **open interval at a depth of 22 ft in each well**, and the bottom of the open interval at depths varying between 41 and 46 ft." This discussion of the

monitoring wells used in the aquifer pumping test is inconsistent with the description in the ER Subsection 2.3.1.2.2.3, page 2.3-30 and the cited reference (FPL 2009-TN1263). **ER 2.3.1.2.2.3 states 7 observation wells** at distances of **925 ft to 2704 ft away** from the pumped well. (**0619-7-17** [Maher, William])

Response: *Although seven observation wells were completed, these were at five unique locations. Only four wells were used in the FPL analysis because no response was observed at the most distant well. To clarify, the text in Appendix G was reworded.*

Comment: DEIS Appendix G, Subsection G.3.2.1, Page G-28: Subsection "Model Results-Radial Collector Wells": There are instances in this subsection where the values, which describe the results presented in the FSAR Table 2CC-211, are consistent with an earlier revision of FPL's FSAR Table 2CC-211 but are inconsistent with FPL's FSAR Table 2CC-211 Revision. These instances include (emphasis added): a. The DEIS states: "Only 0.3 percent of the water produced was predicted by the base case model..." The FSAR reports base case percentage as **0.2 percent**. b. The DEIS states: "This "worst-case" analysis predicted that **1.5 percent**...from the Biscayne aquifer." The FSAR reports worst case percentage as **1.4 percent**. c. The DEIS states: "The base case model predicted that **1.9** percent...A "worst" case of **3.3 percent** of the extracted water coming from the industrial wastewater facility..." The FSAR reports base case percentage as **2.0 percent** and the worst percentage is **3.2 percent**. (**0619-7-18** [Maher, William])

Comment: Appendix G, Subsection G.3.2.1, Page G-29: Subsection "Assessment - Radial Collector Wells": Page G-29, 2nd to last paragraph, first line: The DEIS states: "FPL's base case model predicted that **1.9 percent** of the water extracted by the RCW would come from the industrial wastewater facility." FSAR Table 2CC-211 reports the percentage as of RCW flow originating from the industrial waste facility as **2.0** percent. (emphasis added) (**0619-7-19** [Maher, William])

Comment: Appendix G, Subsection G.3.2.1, Page G-30: Subsection "Model Results-Inflow to Power Block Excavations": The DEIS states: "The FPL model predicted that pumping rates of **140** and **136 gpm** would be necessary for dewatering the excavations at Units 6 and 7, respectively." These values have been updated. Revision 6 of the ER, Subsection 4.2.1.1.1, and FSAR Appendix 2CC Section 9.0, states the excavation dewatering pumping rates as 96 gpm for each of the two units. (emphasis added) (**0619-7-20** [Maher, William])

Response: *The values in the EIS were updated to be consistent with those presented in Revision 6 of the FSAR.*

Comment: Appendix G, Subsection G.3.2.2, Page G-33: Subsection "Numerical Modeling": The DEIS states (last paragraph of page G-33): "...the total RCW pumping rate was set to **470,965** cubic meters per day (m3/d) (**86,400 gpm**)..." However, according to cited reference, USGS document "Estimated Effects of Proposed Radial Collector Well Pumpage Near Turkey Point Nuclear Facility, Miami-Dade County, Florida. (NRC 2014-TN3078, page 9): "The total rate of pumping...is **490,536** m^3/d or approximately **90,000 gallons per minute** (gal/min)." These values should be reconciled for consistency. (emphasis added) (**0619-7-21** [Maher, William])

Response: *The RCW pumping rate used in the USGS model was corrected in Appendix G to "490,536 m^3/d or approximately 90,000 gallons per minute (gal/min)" as stated in the USGS report titled "Estimated Effects of Proposed Radial Collector Well Pumpage Near Turkey Point Nuclear Facility, Miami-Dade County, Florida" (NRC 2014-TN3078).*

Comment: Appendix G, Subsection G.3.3.2, Page G-49, Lines 6-7: The DEIS states: "...using the maximum MCU hydraulic conductivity from the range of values shown in Table G-25..." Table G-25 only shows one value for hydraulic conductivity. Table G-24 contains hydraulic conductivity values for the MCU. (**0619-7-22** [Maher, William])

Response: *The text was changed to refer to the correct table listing core sample analyses (currently Table G-24).*

Comment: [T]here's no guarantee that it [the reactor] won't affect the aquifer. (**0008-8** [Finver, Jody])

Comment: 1. The integrity of the drinking water for South Florida will be affected as FPL would use this same water to cool its power plants thereby affecting the level of salt intrusion into the Biscayne Aquifer, the main source of drinking water for this area. I find it totally unacceptable that FPL also plans to curtail its current monitoring program for this. (**0077-1** [de Armas, Maria Cristina])

Comment: If there is insufficient treated wastewater for cooling the reactors, the wells used for back-up cooling would become one of the largest well-fields in the Southeast, and could lead to further saltwater intrusion into the Biscayne Aquifer, a huge problem already impinging on South Florida's limited freshwater resources. (**0078-9** [Wilansky, Laura Sue])

Comment: The withdrawal of massive amounts of water from under Biscayne Bay as back-up cooling water could increase salinity levels within the Bay and hasten saltwater intrusion into our limited freshwater supplies. (**0102-6** [Commenters, Multiple])

Comment: The withdrawal of massive amounts of water from under Biscayne National Park as backup cooling water could increase salinity levels within the bay and hasten saltwater intrusion into the aquifer. (**0103-6** [Commenters, Multiple])

Comment: Furthermore, as noted in the DEIS, removing large volumes of water from the aquifer could impact water-supply levels and ultimately increase saltwater intrusion into the Biscayne Aquifer. [Footnote 18: NRC, DEIS, 5-13.] South Florida's water supply is already extremely vulnerable to the impacts of salt water intrusion and an acceleration of the degradation of our water supply as a result of this project is unacceptable. Such potential impacts must be fully analyzed in the DEIS to comply with NRC regulations that require a complete discussion of the potential negative impacts of a project. [Footnote 19: 10 C.F.R. § 51.45(b).] (**0113-1-17** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: The existing two 693 MW Westinghouse units (Unite 3 & 4) are already consuming a huge amount of water from the Floridian aquifer 14 MGD, which is already exhibiting signs of being over pumped. Even with the present pumping the cooling water temperature in the canals has increased from 100 to 104 degrees and FPL has received permission to use more water. (**0187-3** [Meyer-Steele, Shawn])

Comment: We are deeply concerned about our close proximity to the plant and how this EIS has not at all taken into account the current failing operations of the Cooling Canal System (CCS) and the lack of regional water supply in the area. It has come to our attention that FPL has been applying for every available water source in the region. This concerns us not only because it will impact restoration efforts we as taxpayers spend billions on, but because it

threatens our ability to continue using the Floridian Aquifer as our primary water source. (**0208-1** [Ritz, David])

Comment: Withdrawing massive amounts of water from under Biscayne Bay as back-up cooling water would increase salinity levels within the Bay and speed-up saltwater intrusion into our limited freshwater supplies. (**0228-6** [Yeager, Jerry])

Comment: [A] clue would also be the Biscayne Aquifer with its surrounding limestone which is important to our drinking water. (**0250-8** [Fulks, Anna Louise])

Comment: The cooling canals have led to salt intrusion into our aquifer - our fresh water supply. (**0252-5** [Van Leer, Sam])

Comment: Furthermore, we are concerned that the operation of two new nuclear reactors could have significant impacts on the quantity and quality of our limited freshwater resources. Maintaining South Florida's water supply is critical to ensuring the future of our environment and our communities. We are concerned that withdrawing massive amounts of freshwater from underneath Biscayne Bay could increase salinity levels within Biscayne National Park and hasten saltwater intrusion into freshwater resources. (**0253-3** [Bloom, Justin] [Campbell, Cara] [Causey, Charlie] [Cavros, George] [Chenoweth, Mike] [Daly, Meg] [England, Margaret] [Fuller, Manley] [Jones, George L.] [Keller, Alan] [Martin, Drew] [McLaughlin, Caroline] [Reynolds, Laura] [Silverstein, Rachel] [White, Paton] [Williams, Elinor])

Comment: I don't want FPL to build these 2 nuclear reactors because it is not environmentally responsible through the huge amount of fresh water consumption. This is unsustainable and irresponsible. (**0269-1** [Gomez, Christian])

Comment: We are also concerned about the new radial wells and their impact on groundwater supplies and salinity levels. (**0288-8** [Cleland, Noel] [Jackalone, Frank] [Mahoney, Stephen] [Matthews, Debbie] [Roff, Rhonda] [Scott, John] [Teas, Jim] [Ullman, Jonathan])

Comment: Our aquifers and fresh water resources should not be further depleted by water hogging nuclear energy. We need to protect the Bay and the greater drinking water needs of South Florida--not hasten salt water intrusion. (**0323-1** [Jennings, Cara])

Comment: Nuclear power is not clean. The reactors threaten to degrade our water quality which is of tremendous concern with a very large increase in thermoelectric power generation, according to the studies done on this project. It is a real potential threat to our aquifers and our public drinking water. (**0340-1** [Tweeton, Tanya])

Comment: [T]he increasing salinity of the water in those canals and the in-land advance of salt water intrusion and its effect on our aquifer are already at alarming levels. (**0341-3** [Daniels, Bonnie])

Comment: The aquifers that we depend on for drinking water, would be impacted. (**0360-3** [Palmer, Majorie])

Comment: The amount of water needed to cool these nuclear reactors on a daily basis is simply not available without depleting the Biscayne Bay aquifer so rapidly that salt water intrusion will completely destroy our fresh water supply. The educated community is already aware that there is a certain amount of salt water intrusion due to the current operation of Turkey Point. There should be absolutely no water taken from the aquifer for use by FPL under

any circumstances. This can only mean that there can be no more nuclear reactors. (**0365-2** [Fischer, Antoinette])

Comment: If FPL sees this as a solution, then why do they also need to draw on the Biscayne Bay aquifer. Apparently, the 90 million gallons of waste water that they would produce would be inadequate since FPL is also asking for an unknown quantity of water from the aquifer. This would guarantee a huge, and unsustainable drain off of the aquifer. (**0365-4** [Fischer, Antoinette])

Comment: If there is insufficient treated wastewater for cooling the reactors, the radial wells used for back-up cooling would become one of the largest well-fields in the Southeast and could lead to further saltwater intrusion into the Biscayne Aquifer, a major problem already impinging on South Floridas limited freshwater supply. (**0370-11** [Vayu, Satya])

Comment: The withdrawal of massive amounts of water from under Biscayne Bay as back-up cooling water will increase salinity levels within the Bay and hasten saltwater intrusion into our limited freshwater supplies. (**0413-5** [Cobb, Tanya])

Comment: Saltwater intrusion into the areas fresh waters will affect the land, the wildlife, and the company's use of fresh water for backup cooling. This shows a definite lack of foresight in planning. (**0437-2** [Livingston, C. J.])

Comment: Prioritize Avoiding Potential for Impacts to the Biscayne Aquifer and National Parks. Radial collector wells located on the Turkey Point peninsula are planned to supply backup cooling water for the proposed reactors. The installation of this backup system "would involve drilling of lateral collector wells in the Biscayne aquifer beneath Biscayne Bay." DEIS at 4-28. According to its state license, FPL is authorized to operate the radial collector wells for 60 days each year and withdraw a maximum volume of over 7 billion gallons of water during that time, the equivalent of 124 million gallons per day. If constructed, the radial collector wells would likely become the largest wells in Florida by daily permitted volume when pumping. The majority of pumped water is projected to come from Biscayne Bay rather than the Biscayne Aquifer itself. Even so, the radial collector wells may put the City at risk because the "Biscayne aquifer is the sole source of potable water in Miami-Dade County, Florida." ML14287A481. However, the determination that the backup radial collector well system will have "minor impacts on groundwater users is based on the reliability of the [primary cooling] water supply," and not the prudence of drilling radial collector well laterals into a sole source aquifer. DEIS at 7-12. (**0456-10** [Miami, City])

Comment: Comment 5: The final Environmental Impact Statement should give greater weight to the potential for adverse impacts to environmentally significant resources in its risk analysis. Operation of the radial collector wells would remove water from Biscayne Bay, the FPL industrial wastewater facility (also referred to as cooling canals), and the Biscayne Aquifer in an area adjacent to Biscayne National Park. DEIS at 2-27. It is also worth noting that there is a plume of hypersaline water in the portion of the Biscayne Aquifer underneath the FPL industrial wastewater facility. The DEIS acknowledges this fact and predicts that some of the hypersaline water would be drawn into the radial collector well system, which "may change the area affected by the hypersaline plume." DEIS at 5-15. Therefore, the most direct risk of operating the radial collector wells would be an increase in the amount of saltwater intrusion caused by removing groundwater from the inland portion of the Biscayne Aquifer. DEIS at 5-27. Similarly, the intermittent usage of the backup cooling system "could result in an increase of hypersaline flow into the aquifer beneath the bay that could migrate into the bay when the [radial collector well system] is not operating." DEIS at G-29. The introduction of this hypersaline water

into Biscayne Bay may irreparably damage or destroy local seagrass beds, a critical habitat for several endangered species. A similar pattern occurred in the fall of 1987, causing an abrupt and widespread mortality event in the Florida Bay seagrass community. *See* http://tinyurl.com/SeagrassHabitatRestoration2013 at 11-12, 14-15. Seagrass mortality continued due to hypersaline conditions in Florida Bay through 1995 and had negative consequences for a variety of marine life. *Id*. The DEIS also notes that there is the potential for adverse effects on threatened species, including American crocodile, that inhabit the FPL industrial wastewater facility due salt drift and deposition from cooling-tower operation while the radial collector wells are being used. DEIS at 5-54. Furthermore, there is the potential for the entrainment of microscopic organisms and larvae. Due to the myriad risks presented by the radial collector wells and the vulnerable nature of the surrounding ecosystem, the final Environmental Impact Statement should place additional emphasis on avoiding the potential for adverse impacts to, and place additional weight on protecting, environmentally significant resources. (**0456-12** [Miami, City])

Comment: Florida's water resources are already under severe strain. The plant will require 90 million gallons a day of Miami-Dade's wastewater for cooling, with wells tapping the aquifer to meet any additional needs. Such withdrawals could increase salinity levels within Biscayne Bay and hasten further saltwater contamination of the aquifer. Additionally, even treated wastewater contains numerous contaminants which may be emitted into the air in vented steam, potentially impacting air and water quality, human health and aquatic and terrestrial wildlife. (**0463-1** [Gross, Cheryl A.])

Comment: Florida's aquifer is so critical, and so close to the ground it is critical not to do anything to violate its integrity! (**0503-1** [Keaton, Rebecca])

Comment: This area is also extremely vulnerable to the withdrawal of massive amounts of water from under Biscayne Bay as back-up cooling water. (**0591-2** [Lange, Barbara])

Comment: Therefore, the most direct risk to the surrounding environment of operating the radial collector wells would be an increase in the amount of saltwater intrusion caused by removing groundwater from the inland portion of the Biscayne Aquifer. DEIS at 5-27. (**0611-4** [Haber, Matthew S.])

Comment: Due to the myriad risks presented by the radial collector wells and the vulnerable nature of the surrounding ecosystem, the final Environmental Impact Statement should place additional emphasis on avoiding the potential for adverse impacts to, and place additional weight on protecting, environmentally significant resources. As noted in Comment 4, this may come in the form of an alternate backup cooling system proposed by the review team staff. (**0611-5** [Haber, Matthew S.])

Comment: The senior NRC staff member presiding over the event demonstrated a total ignorance of hydrological conditions in South Florida and around the Turkey Point site when she announced that staff had determined the impact to local water supplies would be "small." The assembled public spent the rest of the evening learning just how many critical environmental facts draft EIS had failed to uncover. (**0615-1-5** [Bethune, David])

Comment: The withdrawal of massive amounts of water from under Biscayne National Park as backup cooling water could increase salinity levels within the bay and hasten saltwater intrusion into the aquifer, which is already likely to increase as the sea level rises. (**0693-3** [Dorn, Kathryn])

Comment: The first one is, you know, the integrity of the drinking water for the South Florida area is at risk. The water that FP&L would use to cool its power plants would affect the level of salt water intrusion into the Biscayne aquifer, the main source of drinking water for this area. FP&L also plans to curtail its current monitoring program for this, which is totally unacceptable. (**0721-31-3** [Almirola, Alejandro])

Comment: First of all, this project can cause contamination of our groundwater. The proposed radial collector wells would remove billions of gallons of water each year from the bay which could increase salinity levels and increase the rate also of hot water intrusion into our limited freshwater supply. (**0722-14-2** [Kaul, Devika])

Comment: There's a lot of issues about nuclear power that we need to worry about with respect to safety. But you know, I think the major point is that the water supply here, (**0723-12-12** [Henry, Jim])

Comment: ...we have to look very carefully at the assumptions they've been making about water. (**0723-12-9** [Henry, Jim])

Comment: Furthermore, the backup cooling system for the new reactors can become one of the largest well fields in terms of water consumption in the entire southeast region of this country. Proposed radial collector wells will stretch out underneath Biscayne Bay removing as much as 7.4 billion gallons of water per year. To put that number into perspective, the entire Florida Keys uses just over 6 billion gallons of water per year. The withdrawal of this water will increase salinity in Biscayne Bay and could increase the rate of saltwater intrusion into our limited freshwater resources. (**0723-4-7** [McLaughlin, Caroline])

Comment: [I]t needs to be done in a safe and secure manner so that way we don't have any intrusions into the aquifers or into the Biscayne. (**0723-8-8** [McDuffie, Stephen])

Response: *The comments primarily focus on two issues raised in connection with operation of the RCWs, namely, the possibility for saltwater intrusion into the Biscayne aquifer, and the possibility for increasing the salinity of the water in Biscayne Bay. To the extent the comments also raise other issues, such as the continued availability of reclaimed wastewater for cooling, those issues are addressed in separate responses. Using reclaimed wastewater as the primary source of cooling water for the proposed reactors would not result in removal of water from Biscayne aquifer or Biscayne Bay, and would not increase the salinity of the aquifer or the Bay.*

In regard to the Biscayne aquifer, saltwater from the sea has already intruded into the groundwater in the Biscayne aquifer in the vicinity of the Turkey Point site, which has resulted in elevated salinity in that groundwater. This saltwater intrusion from the sea is unrelated to operations at Turkey Point. Because of its elevated salinity, groundwater from the Biscayne aquifer in the vicinity of the Turkey Point site cannot be used as a drinking water source without treatment. Seepage of saline water from the IWF cooling canals associated with the existing Turkey Point Units 3 and 4 has also resulted in locally higher groundwater salinity near the cooling canals. Analyses from the USGS groundwater-surface water model presented in the EIS show that in the absence of remediation of the IWF hypersaline plume, increases in groundwater salinity may occur inland from Turkey Point because of movement of the existing hypersaline plume. This would occur regardless of whether or not the proposed units are built and operated. The model-predicted increase in groundwater salinity is not caused by RCW pumping or other activities related to the proposed units. The model-predicted increase in groundwater salinity also does not reach the location of drinking water wells.

Analyses presented in the EIS predict that the RCW system would draw water primarily from the overlying Biscayne Bay with only a small portion coming from inland portions of the Biscayne aquifer. Nonetheless, the review team revised the text in Sections 2.3, 5.2, and G.3.2 of the EIS to expand and clarify the process and findings of the analysis of the potential alteration of the hypersaline plume caused by the operation of the RCW system. In additional to the review team's conceptual understanding of the processes that would occur with RCW operation, the review team considered three independent modeling studies that are all consistent in projecting that RCW operation would result in only insignificant alterations to both the Biscayne Bay and the surficial aquifer. The review team considered a wide range of baseline environmental conditions to reflect the uncertainty in the baseline environment associated with various proposed actions associated with the IWF, climate change, and geohydrologic parameter uncertainty. While the environmental baseline may change significantly, the incremental alteration to the hypersaline plume associated with operation of the RCWs remains minor.

The review team has responded to similar comments in Section E.2.7, regarding surface water.

Comment: The results of the groundwater modeling discussed in Appendix G appear to indicate that the operation of the RCW would impact salinity in Biscayne Bay by capturing freshwater canal discharges to the bay. Specifically the last paragraph of page 35 of Appendix G concludes that "... When the proximal canals are discharging fresh water into the bay and pumping is occurring, the pumping may capture this fresher water, preventing it from contributing to overall dilution of the bay." Regarding water quality impacts of the RCW, It is stated on page 5 to 26, lines 35 to 38 of the DEIS that "Operation of the RCWs, if and when needed during operation of Units 6 and 7 would not result in discharges to Biscayne Bay because they are used only to withdraw saltwater. Therefore, the staff determined that the impact of any potential changes in surface-water chemistry as a result of the use of the RCWs on Biscayne Bay water quality would be minor." Based on this last statement it does not appear that DEIS evaluated the potential adverse impacts of operating the RCW resulting from its consumption of freshwater discharges to the bay on restoration projects aimed at reducing the salinity of Biscayne Bay through the rehydration of coastal wetlands to reestablish fresh water sheet flow patterns to the bay. One such restoration project includes the Comprehensive Everglades Restoration Plan (CERP) Biscayne Bay Coastal Wetlands project (BBCW). (**0110-1-10** [Hefty, Lee N.])

Response: *The EIS discusses USGS conducted modeling of potential impacts of the radial collector wells (RCWs) on surface water and the Biscayne aquifer using a linked surface water-groundwater model. The results showed that some of the water going to the RCWs would come from the regional canals. The model examined interactions near the mouth of the Mowry Canal and found that pumping of the RCWs results in an increase of downward leakage of surface water, including canal water, into the aquifer. However, the modeling showed that the overall effect on groundwater/surface-water fluxes in the Mowry Canal Basin are small; the reduction in base flow to the bay could be less than 10 percent of the base flow with no RCWs pumping. The modeling also showed that capture of canal water by the RCWs occurs primarily during the wet season, when the canals are discharging freshwater to the bay. Additional discussion has been added to the EIS to clarify the use of model results and expected monitoring requirements for Biscayne Bay and the Biscayne aquifer.*

Comment: The Boulder Zone deep aquifier that is going to be used with an injection system to absorb the treated liquid (which will most likely be radioactive) is literally scary! (**0074-2** [Streit, Didi])

Comment: However the discharge of this waste water will have an adverse impact on our ground water, which will contaminate our drinking water source. Turkey Point has now begun to compete with the people of these two counties for consumptive use of our freshwater source, to cool the current canals, and the FPL proposal for the two new plants would also rely on the Biscayne Aquifer by the use of radial collector wells which would also draw water from the same source, the Biscayne Aquifer. (**0145-8** [Lerner, Cindy])

Comment: The analysis of the impacts of the use and disposal of reclaimed wastewater is inadequate. We are concerned that the proposal to store the waste in the boulder zone will fail and impact the Floridian Aquifer and impact our drinking water. (**0208-7** [Ritz, David])

Comment: Clarify Uncertainties Related to the Deep Injection of Wastewater. The application plans for disposal of waste by use of deep injection wells. The purpose of this system is to diffuse waste water with aquifer water over the long term by sending it beneath the "Boulder Zone" (a South Florida injection zone). At present, the formation of this injection zone is not fully understood by geologists and little data exists on its lateral flow capabilities. Moreover, the proposed discharge method for the disposal of treated liquid radioactive waste is not practiced by any other power plant in the U.S. **Comment 14: The final Environmental Impact Statement should disclose uncertainties related to the deep injection of wastewater and the probable final disposition of the waste.** The final Environmental Impact Statement should "indicate the extent to which environmental effects are essentially unknown . . . ." *Scientists' Inst. for Pub. Info., Inc. v. Atomic Energy Comm'n*, 481 F.2d 1079, 1092 (D.C. Cir. 1973). Hence, to the extent that such information is known, the final Environmental Impact Statement should disclose where effluent from the nuclear plant might migrate. Similarly, although the east-west tidal forces on groundwater are not well understood, the final Environmental Impact Statement should discuss the probability that the north-south shallower slope of the dolomite in the Boulder Zone will push the wastewater north of the injection site. (**0456-21** [Miami, City])

Comment: Possible effect of long-term injection of wastewater into Boulder Zone. The maximum injection rate appears to be between 84 and 85 Mgd. Have calculations been made to determine if the Lower Floridan Aquifer can accommodate between 30.066 and 31.205 Ggy for the expected 35 year life of the two proposed nuclear units 6 and 7? (**0612-3** [Teas, James])

Comment: Possible upward migration of wastewater due to underestimate in injection rates. At higher injection rates, upward migration of wastewater has previously been seen: "Upward migration of treated municipal wastewater injected into the Boulder Zone has been observed 12 mi north of the proposed Turkey Point site at the Miami-Dade SDWWTP, where injection rates are around 97 Mgd. (2-55). Is it possible that the estimated maximum 84-85 Mgd might be exceeded by 14% and lead to 97 Mgd injection rates, which could migrate upwardly? (**0612-4** [Teas, James])

Comment: Possibility of migration of wastewater into Atlantic Ocean over 35 year life of project. "It is thought that the Boulder Zone connects to the Atlantic Ocean at a depth of about 2,500 ft about 25 mi off the coast of Miami." (2-53). Is it possible that wastewater from the deep injection wells could end up in the Atlantic Ocean over the expected life of units 6 and 7? (**0612-5** [Teas, James])

Comment: The radioactive portion of the waste water is proposed to be diverted to underground wells located near important aquifers and fresh water supplies, exposing the residents, animals, and plants in the surrounding areas to water laced with tritium and other

dangerous radioactive isotopes. Two nearby municipal water supplies have already filed comments with the NRC objecting to the proposed injection of chemically and radioactive contaminated wastewater so near to their communities' drinking water supplies. (**0615-3-1** [Bethune, David])

Comment: The draft EIS is incomplete because it fails to examine the migration paths of effluent water from the proposed plant's deep injection wells and the resulting threat to the water supply of 4 million people. (**0615-3-4** [Bethune, David])

Comment: *Underground injection of effluents.* The DEIS states that blowdown water from the cooling towers, and other plant discharge effluents from proposed Units 6 and 7, would be collected in a sump and injected into the Boulder Zone, a cavernous, high-permeability South Florida geologic horizon within the Lower Floridan aquifer system. The surrounding surface water bodies would neither be directly used for the primary water supply, nor for the heat sink for the proposed Units 6 and 7. However, we have concerns regarding the potential for vertical migration of the injectate, as no adequate confining zone has been shown to exist between the injection zone and lowermost underground source of drinking water (USDW). Several investigations by the United States Geological Survey (USGS) in southeast Florida (the latest is USGS Scientific Investigations Report 2015-5013) have shown that the limited confinement which may exist between the Lower Floridan and Upper Floridan has been reduced or eliminated by karst features and faulting. FPL has not produced any documentation to delineate karst features or faults in the Floridan which may significantly alter hydraulics of the injectate at this facility. Further, additional data, including conducting more comprehensive aquifer testing and incorporation of karst features and fault delineation, as well as results of aquifer testing into predictive modeling, are needed to assess potential injectate impacts on USDWs. In addition to injection in the Boulder Zone creating upward gradients, the Upper Floridan is proposed to be used as a source of cooling water, also creating upward gradients from the Lower Floridan, with the potential to impact the USDWs in the area. (**0617-1-22** [Mueller, Heinz J.])

Comment: Let's look at some of the other impacts from this plant. The injectate. Somebody was talking about putting it down earlier during the presentation, 3,000 feet below ground. Out of sight, out of mind; really? That's called the Boulder Zone. Everything goes into the Boulder Zone. When we flush our toilets most of it goes into the Boulder Zone. The drillers out in the western Everglades, I had a discussion with them at the Raccoon Point drilling sites in the Big Cypress National Preserve. They talked about lowering pipes, 50 foot sections of pipes down into their wells, which are about 2 miles below ground. They hit the Boulder Zone and a 50-foot pipe hit the bottom and turned sideways. It's a cavern. It's a deep undersea cavern in this area where they're planning on dumping the injectate from this well. Where does it go? It goes out to the Atlantic. Sewage, wastewater, oil drilling fluids, and now the injectate from this new Turkey Point 6 and 7. What are the consequences of that to the Atlantic Ocean? Doesn't disappear. There's no such thing as a free lunch, there's no way. (**0721-22-8** [Schwartz, Matthew])

Comment: Deep well injection of either raw sewage or anything I think is problematic and a bad idea in South Florida where that stuff moves around underground. You never know where it's going to pop up, and it does move. So let's not kid ourselves thinking that, you know, hey, let's put it down 3,000 feet, the problem will go away. That's not going to happen. Eventually it's going to resurface somewhere. I would highly recommend we also get on our State Reps about banning all deep well injection, no matter what it is. It's a bad idea. (**0721-24-3** [Eastman, John])

Comment: [Wastewater will be] injected into the earth. That can't be controlled. We've heard about the problems with the radial wells that would be used for backup cooling, the salt water intrusion into the aquifer, which is already a huge problem. (**0721-28-7** [Wilansky, Laura Sue])

Comment: FPL has proposed using millions of [gallons of] reclaimed wastewater as the primary source of cooling water for the proposed new reactors and this wastewater would then, after use, to back into our groundwater where it would be adding chemical contaminants to our groundwater supplies. We have very, very vulnerable groundwater to contamination.

A study was done a few years ago where some dyes were put near a wellhead and it was expected that they would take a few days to weeks to be detected by special detectors. And they put in the red dye and within a few hours, people's laundry were turning pink in their washing machines. We have very vulnerable, vulnerable water supply to contamination so it has to be really taken very seriously and considered very carefully which I feel that the EIS has not done adequately. (**0722-7-5** [Silverstein, Rachel])

Comment: Even this idea of shooting the water deep into the ground, these kinds of concepts may work when you have a different kind of stone or granite to receive them. (**0723-11-2** [Berendsohn, Catherine])

Comment: The expansion of Turkey Point also has the potential to have huge impacts on regional water resources. FPL is proposing using millions of gallons of reclaimed wastewater as the primary source of cooling water for the new reactors. After used, some of this wastewater will be discharged directly underground. The possible impacts of adding chemical contaminants into our groundwater supplies have not been adequately analyzed by this EIS. (**0723-4-6** [McLaughlin, Caroline])

Comment: All of our prescriptions go down, we're using deep well injection -- I've got to mention that, too.

Deep well injection. Out of sight, out of mind? The boulder zone 3,000 feet deep. Run that boulder zone east, what happens? You reach the continental shelf. It can't keep going. The continental shelf is lower. The boulder zone empties out into the Atlantic. So that wastewater, that hot wastewater ends up in the Atlantic. Is that in the DEIS? I know they're not going to answer that. That's where the boulder zone empties out into. (**0723-9-18** [Schwartz, Matthew])

Response: *As described in Section 5.2 of the EIS, cooling tower blowdown water and other liquid waste streams would be injected into the highly permeable Boulder Zone, which is approximately 2,900 to 3,500 ft below ground in the Lower Floridan aquifer. This aquifer contains water that has approximately the same salinity as seawater and is used for injection of treated municipal wastewater throughout South Florida. As discussed in the EIS, there is a 1,465 ft thick sequence of mostly low-permeability rock strata called the MCU (Middle Confining Unit) between the Boulder Zone and the overlying Upper Floridan Aquifer. The Upper Floridan aquifer is classified as an USDW (Underground Source of Drinking Water) where the TDS concentration is 10,000 mg/L or less. The depth of the USDW was confirmed by sampling of the monitoring intervals within the FDEP permitted dual-zone monitoring well that was constructed at the Turkey Point site after the construction of the exploratory/injection well. The monitoring intervals are at 1,450-1,490 ft and 1,860-1,905 ft below ground surface. These comments express concern about the proposed injection of effluent from the Turkey Point site, the nature of the geologic zones that would be used for injection and confinement, and the*

impact on water resources, especially the Upper Floridan aquifer and the Biscayne aquifer, if injected fluid were to migrate out of the Boulder Zone.

To evaluate the potential impacts of deep well injection of effluent at the Turkey Point site the review team took a number of steps, which are discussed in greater detail in the revised sections of the final EIS. The staff 1) reviewed regional and site specific studies that evaluated the confining ability of the MCU, the causes and extent of upwelling at other deep well injection sites, the extent of injection plume migration, and risk to human health and the environment of deep well injection; 2) compared hydrogeological conditions and parameters from these sites to conditions and parameters at the proposed site; 3) evaluated numerical modeling of the flow of injected wastewater presented by the applicant and performed confirmatory calculations; and 4) considered the injection well testing and groundwater monitoring requirements of the FDEP UIC program.

Based on this evaluation, the review team concluded that, in general, the matrix of the MCU would confine injected effluent and that incidences of upwelling at other sites have been coincident with features that provide vertical pathways for upward migration. As documented in Sections 2.3.1.2 and 5.2.1.3 of the EIS, the review team is aware of recent research showing that "karst-collapse structures" exist in some places in South Florida and may provide a pathway for injectate to move upward through some thickness of the expected confining layers. At a location beneath Biscayne Bay, deformation associated with collapse structures has been found to extend from the MCU to above the Upper Floridan aquifer (Cunningham 2015-TN4574). A collapse structure was implicated in the observed migration of injected wastewater from the Boulder Zone to the uppermost permeable zone within the Lower Floridan aquifer at an injection well operated by the City of Sunrise in Broward County (Cunningham 2014-TN4051). Migration of contaminants above the Lower Floridan aquifer was not observed at this site and significant migration to the Upper Floridan aquifer due to natural features has not been definitively identified at any site. Substantial fracturing of the confining layers is not evident at the Turkey Point site.

The EIS discusses several studies that have attributed upwelling at deep well injection sites to vertical pathways created by improper well construction or casing failure. The studies indicated that wells were either drilled through but completed above the most significant confining portions of the MCU or that completed wells deviated from previously drilled pilot holes. These issues are not expected at the Turkey Point site because its hydrogeology is better understood. Also, pilot holes would be cemented and injection wells would have multiple concentric casings that terminate in and seal each confining zone. The FDEP UIC Permit also requires testing of confinement and monitoring for upwelling at each injection well. However, studies of other injection sites indicate that if rapid vertical migration occurs along preferential pathways created by well construction issues or natural features it is not likely to reach the Upper Floridan Aquifer. This is discussed in greater detail in Sections 2.3.1.2, 3.2.2.2, and 5.2.1.3 of the updated EIS. As discussed in Section 5.2.1.3 and Appendix G of the EIS, only a minimal pressure buildup in the injection zone is expected during injection based on calculations that considered the expected rate of injection and buoyancy of the reclaimed makeup water used for cooling. One comment expressed concern that the Turkey Point site might also experience upward migration if injection rates exceeded that of the SDWWTP, where upwelling has occurred. Reclaimed water from the SDWWTP would be the primary source of makeup water at Turkey Point, however injection rates would be significantly less at the Turkey Point site (20 Mgd vs 97 Mgd). Injection rates at Turkey Point may temporarily be as high as 90 Mgd when saltwater from the RCWs is used. Despite higher injection rates, the potential for upward migration of this saltier water would be less than reclaimed water because the saltwater used for

cooling would be denser and less buoyant, causing it to sink to the base of the Boulder Zone. In addition, multiple studies have indicated that upwelling at the SDWWTP may be primarily a result of improperly constructed injection wells (Walsh and Price 2010-TN3656; McNeill 2002-TN4571).

Calculations and modeling discussed in EIS Section 5.2.1.3 also indicate that horizontal flow of the plume within the Boulder Zone would be limited and would not extend to beneath the locations of the nearest offsite water-supply well in the overlying Upper Floridan aquifer (7.7 mi) or flow to surface water bodies, such as the Atlantic Ocean. Modeling indicates that dilution would significantly reduce the concentrations of cooling water chemical constituents within the injected plume, which are already very low at the point of injection due to advanced treatment now required at the SDWWTP, where the cooling water would primarily be sourced.

As for potential contamination of the Biscayne aquifer, the Biscayne aquifer is a near-surface aquifer which is separated from the Boulder Zone at the Turkey Point site by about 2800 ft, a large portion of which is confining strata. Therefore, impact to the Biscayne Aquifer is so unlikely as to be speculative.

Additionally, the review team recognize that the UIC permitting process required by the FDEP will address uncertainty through further characterization and testing of the ability of the MCU to confine and the Boulder Zone to receive injected effluent. This additional characterization and testing are required before each of the injection wells are permitted at the Turkey Point site and these wells would be frequently monitored during operation for the evidence of upwelling of injected effluent. Finally, EIS Sections 5.2.1.3 and 5.2.3.2 discuss risk assessments of wastewater disposal methods in southeast Florida, which indicate that risk from deep well injection to human health is low and decreases dramatically as distance from the injection well to potential receptors increases, even when upwelling has reached drinking water aquifers.

As discussed in several comments, the injected water would include radionuclides, however these radiological constituents would be mixed and diluted to concentrations below regulatory limits before being injected. The review team performed a conservative evaluation and determined that radiological dose limits to the public would not be exceeded. This is documented in EIS Sections 5.2.1.3, 5.9, and in Appendix G.

Another comment indicated that the geology and hydrogeology of the Boulder Zone is not well understood. As discussed in Sections 2.3.1.2, 5.2.1.3, and Appendix G of the final EIS, because of the deep and isolated location of the Boulder Zone and its subsequent widespread use as a wastewater injection zone in South Florida, testing and a number of regional and site specific studies have been conducted to characterize this zone. This information addresses flow direction and rates of water within the Boulder Zone, the capacity to receive injected wastewater, and the effect of overlying confining units on flow direction. The review team used this information to evaluate the potential for impacts from deep well injection at the Turkey Point site.

For the reasons discussed above, the review team determined that impacts of deep well injection at the Turkey Point site on water resources would be SMALL. Detailed documentation of these studies and the review team's evaluation is provided in updated sections 2.3, 5.2, 7.2, and Appendix G of the final EIS.

Comment: Comment 1. The DEIS is incomplete in that it makes no analysis of the effects of entrainment of the hypersaline plume, and the likely resulting consequences for

demand on water from other sources, i.e., fresh water from the Coastal Everglades or bay water from Biscayne National Park, if the RCW system is tainted by the hypersaline plume- Radial collector wells (RCWs) under the site will draw water from beneath the plant when water is unavailable from the wastewater treatment plant. The DEIS attempts to model how water will flow underground into the RCWs, yet the DEIS admits that the models used to project underground flow of ground water were insufficient to determine how water of different density (i.e., from salinity differences) will move through the ground: *"The steady-state nature of the FPL model and the assumption of constant density fluids make the model inadequate for modeling this potential scenario." [DEIS p. G-29];* How water of differing densities moves is critically important because of the hypersaline plume underneath the existing cooling canals (the so-called "Industrial Waste Facility" or IWF). According to the DEIS [p. 3-30], the cooling system cannot operate if the cooling water becomes more than 1.5x the saline concentration of bay water. However, the hypersaline plume is already approximately twice the salinity of water in Biscayne Bay prior to entering the cooling system, and it could get worse: continued operation of TPN 3 & 4 has the capacity to further expand or relocate the hypersaline plume, either by continued concentration of water through heating and evaporation, or by displacement with water pumped in. Entrainment of the underground hypersaline plume into the RCWs could halt operation of the plant. Specifically, if the water entering the RCWs included 70% or more of water with the salinity of the hypersaline plume, the plant could not operate. Failure of the RCWs to provide water of sufficiently low salinity would place the cooling demand squarely on aboveground sources, either the L31E canal or Biscayne Bay itself. ***The final EIS must consider possible loss of usable cooling water caused by RCW entrainment of hypersaline plume under the IWF.*** (**0106-4** [Stoddard, Philip K.])

Comment: Given the complexity of the current issues associated with the Cooling Canal System (CCS) and the uncertainty about its adverse hydrologic and other impacts, MDC believes that the recommendation for more detailed modeling is more than warranted for the EIS evaluation of the proposed RCW. The RCW in-and-of-themselves can potentially have significant hydrologic and other impacts which can likely exacerbate the existing CCS impacts. Did the NRC EIS reviewers conclude that the aforementioned recommendation for more detailed modeling was not warranted? MDC therefore recommends that a model capable of providing a more detailed understanding of how the proposed RCW can influence the CCS hypersaline plume now and how it will influence it in the future when Units 3 & 4 are decommissioned and the CCS circulating pumps are either not operated at all or operated at a much reduced rate. This model needs a much higher resolution and needs to be able to identify source waters through particle tracking. Most importantly, any analysis that relies primarily on model output that predicts average salinities of Biscayne Bay across large areas as a surrogate for impacts is totally inadequate to examine hydrologic impacts to the aquifer and surface waters. In addition, if the model cannot determine whether water quality standards with Biscayne Bay would be violated by operation of the radial collector well field, then additional study would be warranted prior to approval either as part of this EIS or through a supplemental EIS. (**0110-1-12** [Hefty, Lee N.])

Comment: The DEIS fails to include an adequate analysis of the direct, indirect, and cumulative impacts of proposed radial collector well system, including cumulative impacts associated with the cooling canal system (CCS) industrial wastewater facility (IWF) and CERP. (**0113-1-4** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: The DEIS does not adequately discuss potential cumulative impacts caused by the existing underground hypersaline plume produced by the current operations of the CCS. The

findings of the uprate monitoring program for Units 3 & 4 identified the presence of CCS water in shallow groundwater (approximately 25' to 30') in wetlands adjacent to Biscayne Bay. [Footnote 23: West, B. United States Department of the Interior, National Park Service Letter to A. Williamson, U.S. Nuclear Regulatory Commission, November 25, 2014, SER PC, 6.] Radial wells will be constructed at approximately the same depth. According to FPL's groundwater modeling, the RCWs would draw approximately 2% of its water from the Industrial Wastewater Facility (IWF) cooling canal system. [Footnote 24: NRC, DEIS, 5-14] The DEIS acknowledges that the operations of the radial collector wells could impact the movements of the hypersaline plume, likely increasing the flow velocity of hypersaline water eastward under Biscayne and changing the area impacted by the plume. [Footnote 25: Ibid., 5-16.] The DEIS states that "intermittent operation [of the radial collector wells] could result in an increase of hypersaline flow into the aquifer beneath the bay that could migrate into the bay when the RCW is not operating." [Footnote 26: Ibid., G-29.] Despite admitting the potential for interactions, the DEIS fails to adequately analyze the adverse environmental impacts that could result if CCS water were to appear in the bay due to the operations of the radial collector wells. (**0113-2-3** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: In discussing such interactions, the DEIS admits that, "the steady-state nature of the FPL model and the assumption of constant density fluids make the model inadequate for modeling this potential scenario," [Footnote 28: Ibid., G-29.] in effect admitting uncertainty as to the interactions between the radial collector wells and hypersaline water from the plume. Despite the fact that the proposed system of radial collector wells would be located within or adjacent to the plume and will impact the movement and location of the plume, the DEIS fails to provide an adequate discussion of the ways in which the movement and composition of the plume may be affected by radial collector well withdrawals. There is an insufficient analysis of how the wells may capture or affect water from the plume and inadequate information regarding the possible impacts associated with causing plume water to flow towards the radial wells. (**0113-2-5** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: Our principal concern is the ongoing westward migration of hypersaline groundwater through the aquifer in the vicinity of the Turkey Point facility. FPL should implement a plan to address the saline groundwater contamination emanating from its Cooling Canal System ("CCS") at Turkey Point. Groundwater modelling can be very subjective due to uncertainty caused by limited model assumptions and characterization data. It is very important that the results from both the USGS and the FPL groundwater models be carefully analyzed to address the impacts of migration of hypersaline groundwater from the Turkey Point CCS. 2. There is need for further hydrological studies to show how the increase in temperature from the Turkey Point facility will affect the plant's cooling system, as well as the adjacent surface and groundwater. (**0211-1** [Malefatto, Alfred])

Comment: Most of the problems and uncertainties identified concerning cooling water operations. The first of these is the failure to consider loss of useable cooling water caused by the radial collector wells entrainment sucking in the hypersaline plume underneath the cooling canals, which is known as the industrial waste facility. It's what they think of our southeast Everglades. Radial collector wells under the site will draw water from beneath the plant when water is unavailable from the wastewater treatment plant. The Impact Statement attempts to model how water will flow underground to the radial collector wells. But, the Impact Statement admits that the models used to project underground flow of groundwater were not sufficient to determine how water of different densities, such as from differences in salinity, will move through the ground. You have to recognize, there's a hypersaline plume underneath Turkey

Point. And I'll keep referring to it. It's dense water about twice the salinity of the surrounding bay water. And the Draft EIS says, "The steady state nature of the FP&L model and the assumption of constant density fluids makes the model inadequate for modeling this potential scenario." That's from the Impact Statement, page G-29. So this uncertainty is critically important because of the hypersaline plume underneath the existing cooling canals. So according to the Impact Statement the cooling system cannot operate with more than -- at more than one-and-a-half times the salinity of bay water. But the hypersaline plume is twice the salinity of bay water. So if they entrain 70 percent or more of the plume, the radial collector well system cannot work for cooling the plant. (**0721-2-2** [Stoddard, Philip K.])

Response: *In regard to the Biscayne aquifer, saltwater from the sea has already intruded into the groundwater in the Biscayne aquifer in the vicinity of the Turkey Point site, which has resulted in elevated salinity in that groundwater. This saltwater intrusion from the sea is unrelated to operations at Turkey Point. Because of its elevated salinity, groundwater from the Biscayne aquifer in the vicinity of Turkey Point site cannot be used as a drinking water source without treatment. Seepage of saline water from the cooling canals associated with existing Turkey Point Units 3 and 4 has also resulted in locally higher groundwater salinity near the IWF cooling canals. Cumulative impacts of the proposed RCW pumping on the existing hypersaline plume were considered in the EIS.*

Analyses from the USGS groundwater-surface water model presented in the EIS show that in the absence of remediation of the IWF hypersaline plume, increases in groundwater salinity may occur inland from Turkey Point because of movement of the existing hypersaline plume, regardless of whether or not the proposed units are built and operated. The model-predicted increase in ground water salinity is not caused by RCW pumping or other activities related to the proposed units. The model-predicted increase in groundwater salinity also does not reach the location of drinking water wells. The NRC review team acknowledges that the distribution of contaminants from the cooling canals in groundwater beneath Biscayne Bay could be affected to by pumping of the planned RCWs beneath Biscayne Bay. Several comments indicate that the FPL groundwater model provides limited insight into groundwater behavior because it does not consider density differences. The review team evaluation documented in the draft EIS made the same point, and this is why the review team commissioned the USGS to perform additional groundwater modeling that is also documented in the EIS and which accounts for density differences.

Nonetheless, after publication of the draft EIS, the review team performed additional groundwater modeling of the interaction between the planned RCWs, the existing hypersaline plume, and the cooling canals using a two-dimensional cross section model and a limited-extent three-dimensional model that accounts for variable fluid density. The review team also evaluated the combined impacts from proposed remediation of the hypersaline groundwater plume and sea level rise. Additional discussion has been added to the EIS to clarify (1) the use of model results, 2) the conceptual understanding of the hydrologic system, and 3) aquifer monitoring requirements. The review team considered this additional information in determining the impact of building and operating the proposed plants on groundwater in the Biscayne aquifer.

In short, results of analyses presented in the EIS show that activities related to building and operating the proposed units would have minor effects on the salinity of the Biscayne aquifer or Biscayne Bay and would also not negatively impact efforts to remediate the existing hypersaline plume associated with Units 3 and 4. Inputs to the IWF related to building the new units would be limited to adding muck to the IWF berms and discharge of water from excavation dewatering

for a limited time at a maximum rate that is approximately 0.06 percent of the recirculating flow rate water of the IWF. The water quality of the dewatering discharge would be similar to the aquifer water quality.

Comment: MISSLEADING STATEMENT [terminating the current monitoring program for the Turkey Point power plant cooling canals that may very well affect the level of saltwater intrusion into the Biscayne Aquifer, the main source of drinking water for South Florida]. (**0685-14** [Batista, Carlos])

Response: *State and local agencies currently require monitoring of the cooling canals and nearby groundwater and Biscayne Bay, and the NRC review team is not aware of any plan or proposal to discontinue that monitoring. No changes were made to the EIS in response to this comment.*

Comment: MDC strongly emphasizes that the state certification for the Units 6 & 7 project, issued on May 19, 2013, was issued at a time when the impacts of the implementation of the Units 3 & 4 Uprate were not yet evident because some of the water quality monitoring data were either not yet available or had not yet been reviewed and analyzed. The most noteworthy issue to point out as it relates to the evaluation of the Units 6 & 7 project proposed RCW is the significant increase in the tritium concentration at the deep well of monitoring well cluster TPGW10, which is located on Biscayne Bay slightly north and east of the Turkey Point Plant and within the cone of influence of the proposed RCW, see Figure 1. (**0110-1-8** [Hefty, Lee N.])

Response: *The comment correctly states that there has been an increase in the concentration of tritium in groundwater near the Turkey Point site. Information in the EIS shows that this tritium and other constituents originating from the seepage of cooling-canal water have migrated into the groundwater in the vicinity of Turkey Point. The concentrations of tritium found in the aquifer, at less than 25 percent of the drinking water standard, are much lower than concentrations considered a health concern. The distribution of tritium and the other constituents in the aquifer could be affected to some degree by pumping of the planned RCWs beneath Biscayne Bay as a backup supply of cooling water. However, there is a very large volume of treated municipal wastewater available for this purpose, but the treated wastewater is not suitable for normal uses of freshwater, such as for drinking or agriculture. Accordingly, the treated municipal wastewater can be used for cooling proposed Turkey Point Units 6 and 7 without affecting the ability to meet demands for freshwater. MDWASD is required to direct 60 percent of the wastewater flows to reuse by 2025 and to cease using ocean outfalls by 2025 under the Florida State Ocean Outfall Legislation Compliance Plan, Chapter 2008-232 Laws of Florida Wastewater Disposal/Ocean Outfalls [Section 403.086 (9), Florida Statutes and Amendment CS/SB 444]. Therefore, the NRC staff concluded that the reclaimed-water supply is reliable and the RCWs would likely be used infrequently and for short durations. The review team nonetheless considered the potential impacts from migration of groundwater constituents including tritium in the review team evaluation of potential effects of operating the RCWs, which is set forth in Section 5.2.1.2 of the EIS. After publication of the draft EIS, the review team performed additional groundwater modeling of the interaction between the planned RCWs, the existing hypersaline plume, and the cooling canals using a two-dimensional cross-section model and a limited-extent three-dimensional model that accounted for fluid density effects caused by salinity and temperature. The results showed that changes in the concentration of salinity and other constituents in the aquifer near the site and beneath Biscayne Bay would be minor and would not have significant effects on drinking water wells or the water in Biscayne Bay.*

Comment: In September of 2012, tritium was identified by DEP, the SFWMD and MDC as the tracer to delineate vertical and horizontal extent of the CCS hypersaline plume. The increase in tritium concentration at TPGW-10D first became evident in the quarterly monitoring results for the June 2012 sampling, which coincides with the time that Unit 3 was being uprated and not all circulating pumps were operating, see Figure 2 attached. MDC believes that this is a significant finding because it appears to suggest that mobilization of the CCS hypersaline plume under the bay towards the area where the RCW are proposed to be installed may have been facilitated by the reduction in operation of the CCS circulating pumps. It is important to note the results of the aquifer performance test that FPL provided in support of the proposed radial collector wells. Although FPL did not provide the types of data that MDC requested, the limited data that was provided should be carefully reviewed. Most noteworthy are the extremely high levels of sulfate detected in the monitoring wells during the test in addition to the elevated sulfate levels in the surface waters of Biscayne Bay. These data suggest that the highly contaminated water beneath the cooling canals was drawn into the surface waters of Biscayne Bay, albeit with a much lower pumping volume during the test than would be realized when the radial collector wells are in operation. Determining whether operation of the radial collector wells, which would be the largest well field in Miami-Dade County in terms of daily pumped volumes, would result in violations of applicable water quality standards in the tidal waters of Biscayne Bay including Biscayne National Park is necessary. (**0110-1-9** [Hefty, Lee N.])

Response: *The NRC review team did review data from the pumping test on the Turkey Point peninsula, including the elevated sulfate concentrations. In addition to the review team's conceptual understanding of the processes that would occur with RCW operation, the review team considered three independent modeling studies that are all consistent in projecting only insignificant alterations to both the Biscayne Bay and the surficial aquifer, even in view of the observed elevated sulfate concentrations . The review team considered a wide range of baseline environmental conditions to reflect the uncertainty in the baseline environment associated with various proposed actions associated with the IWF, climate change, and geohydrologic parameter uncertainty. While the environmental baseline may change significantly, the incremental alteration to the hypersaline plume associated with operation of the RCWs remains minor. In view of the above, the review team revised the text in Sections 2.3, 5.2, and G.3.2 of the EIS to expand and clarify the process and findings of the analysis of the potential alteration of the hypersaline plume caused by the operation of the RCW system.*

Comment: Section 2.3, Water (pg. 2-26): The DEIS states that the alternate cooling water source supplied by the radial collector wells would be limited to a maximum of 60 days per year by the Florida State Conditions of Certification. The DEIS is not clear regarding what contingency plans will be implemented should the 60 day limitation be exhausted and the reclaim water supply is not available. FPL has stated that the Conditions of Certification addresses the contingency plan for emergency water allocation. Please clarify this issue with a detailed explanation of contingency plans in the FEIS. (**0617-1-7** [Mueller, Heinz J.])

Response: *Cooling the main condenser is not a safety function in the AP1000 design. Accordingly, there is no NRC requirement for a contingency plan to supply backup cooling water to the main condenser if reclaimed water is not available and the 60-day limitation on RCW pumping is exhausted. The plant can be safely shut down if water is not available from either source. Safety-related cooling water is stored onsite, and can be replenished from multiple sources. While the EIS analysis assumes that the RCWs would not operate more than 60 days per year, the primary source of cooling water—reclaimed wastewater from the MDWASD—should be highly reliable, and therefore the availability of backup cooling water supplies need not be evaluated. Further, the review team also considered alternative sources*

of cooling water in EIS Section 9.4.2, none of which are environmentally preferable to the proposed sources of cooling water. In view of the high reliability of the reclaimed wastewater source and the availability of the RCW system as a backup, there is no need to consider additional backup sources of cooling water.

Comment: However, the IWF will be accepting wastewater from the new reactors (Units 6 and 7), and these additional wastewater streams include excavation dewatering, stormwater run-off, muck spoil run off and drift deposition. There is a potential for these additional wastewater streams to increase nutrient loading, including nitrate, for which EPA has set a drinking water maximum contaminant level (MCL), to the underlying Biscayne Aquifer, (an Underground Source of Drinking Water under the SOWA), given the existing hydrologic connection between the IWF and groundwater. (**0617-1-15** [Mueller, Heinz J.])

Response: *As discussed in the EIS, the combined impacts of the planned discharge of groundwater from excavation dewatering and stormwater to the CCS while building the plants, and the chemical inputs to the CCS from muck spoils runoff and cooling-tower drift are expected to cause minor changes in the water levels and chemistry of the CCS. Potential changes in nitrate concentration from muck runoff are presented in the EIS. Water from the CCS does currently seep into the Biscayne aquifer below the CCS beneath the site. However, the EIS analysis shows that the effects of the expected volume and concentration of any seepage resulting from discharges to the CCS during plant construction would be minor and temporary. Any increase in volume and concentration of the seepage from the CCS to the underlying portion of the Biscayne aquifer due to construction of proposed Units 6 and 7 is not expected to have a noticeable impact on the quality of groundwater in the areas of the Biscayne aquifer that meet USDW criteria for TDS. The review team also responded to similar comments in E.2.7, "Comments concerning hydrology - surface water."*

Comment: The EPA has several serious concerns related to groundwater, with the paramount concern being the condition of the Biscayne Aquifer, an EPA-designated sole source aquifer serving as a drinking water resource in the south Florida area. The Biscayne aquifer has already suffered significant and unacceptable hypersalinity impacts, and the EPA is concerned that the proposed project may result in further migration of the hypersaline plume. (**0617-1-17** [Mueller, Heinz J.])

Response: *After publication of the draft EIS, the review team used a third model, called the RTF (Review Team Focused) model, to performed additional groundwater modeling of the interaction between the planned RCWs, the existing hypersaline plume, and the cooling canals. This third model included using a two-dimensional cross-section model and a limited-extent three-dimensional model. Simulations were performed to better understand how the existing hypersaline plume may be affected by RCW pumping combined with remediation actions recently stipulated in a consent agreement between FPL and Miami-Dade County.*

The RTF model was useful in showing salinity changes that occur in the aquifer near the RCWs when the wells are operated. The results showed that when the wells are not operating, hypersaline water from the cooling canals is present in the high permeability zone where the well laterals are installed. This saline water is drawn into the wells during the first few days of RCW pumping, resulting in increasing, then decreasing salinity at the well. The RTF model predicts that the salinity of the water produced by the operating RCW would eventually drop to about the concentration of the bay water. Water flowing down through the bed of the bay and into the RCWs is therefore expected to have about the same salinity as bay water. When RCW pumping ceases, water in the high permeability zone again increases in salinity because of the

migration of water from the hypersaline plume. This migration of hypersaline water into the high permeability zone would occur regardless of the presence of the RCWs.

Predicted future change in sea level and its effect on interactions between the RCWs and the hypersaline plume were also simulated. The additional modeling confirmed that pumping of the RCWs would move hypersaline water toward the RCWs and would remove some groundwater captured by the RCWs from the hypersaline plume region of the Biscayne aquifer. The model also indicated that RCW pumping is not likely to reduce the effectiveness of hypersaline plume remediation actions specified in the consent agreement. Additional discussion of the potential impacts of the proposed new units on groundwater in the Biscayne aquifer has been added to the EIS to reflect these results.

Comment: These are just some of the more obvious impacts from this expansion. When the first two nuclear reactors and fossil fuel plants were completed at Turkey Point, regulators failed to consider the impacts of dumping hot water (used for cooling the generators) directly into Biscayne Bay. When the 5,000 acres of cooling canals - likely the largest radiator on the planet (and clearly visible from space) - were carved out of natural mangrove habitat to correct the problem, regulators again failed to consider that the extremely hot salty water would drop through the surrounding limestone and degrade the underlying Biscayne Aquifer. The known risks from this project are bad enough - very hard to plan for the unknown and unconsidered risks as well as inevitable human error. (**0240-12** [Commenters, Multiple])

Comment: The EPA has several serious concerns related to groundwater, with the paramount concern being the condition of the Biscayne Aquifer, an EPA-designated sole source aquifer serving as a drinking water resource in the south Florida area. The Biscayne aquifer has already suffered significant and unacceptable hypersalinity impacts, and the EPA is concerned that the proposed project may result in further migration of the hypersaline plume. (**0617-1-17** [Mueller, Heinz J.])

Response: *The salinity and total dissolved solids TDS in the water in the Biscayne aquifer in the vicinity of Turkey Point exceed USDW standards because of saltwater intrusion from the sea and intrusion of the CCS hypersaline plume. As a result, the Biscayne aquifer near the site cannot be used as a drinking water source without treatment. In south Florida, the amount of saltwater intrusion has increased over the past several decades for reasons unrelated to operations at Turkey Point, including the drainage of wetlands and groundwater pumping in inland areas. Seepage of hypersaline water from the CCS (cooling canal system) associated with the existing Turkey Point Units 3 and 4 has also resulted in areas of groundwater salinity higher than seawater near the CCS.*

As discussed in the EIS, only the RCWs (radial collector wells), which are planned as a back-up cooling water source for Units 6 and 7, and limited inputs to the CCS while building the plants are expected to have any potential impact on the salinity of groundwater in the Biscayne aquifer. As discussed in the EIS, the combined impacts of the planned discharge of groundwater from excavation dewatering and stormwater to the CCS while building the plants, and the chemical inputs to the CCS from muck spoils runoff and cooling tower drift during plant operations are expected to cause minor changes in the water levels, salinity, or other chemical concentrations of the CCS. As stated in the EIS, saline water drawn from the RCWs beneath Biscayne Bay would only be used when reclaimed treated wastewater is not available in sufficient quantity or quality, and for a maximum of 60 days per year as permitted under the Florida State COCs. The potential effects of operating the RCWs are described in Section 5.2.1.2 of the EIS. During the limited periods of RCW pumping, some water would be removed

from the Biscayne Aquifer, which would potentially cause hypersaline water to move under Biscayne Bay toward the RCWs. The review team evaluated information about the reliability of the components of the reclaimed-water system and determined that the RCW supply system would be likely be called into use infrequently and for durations much shorter than 60 days. The review team determined that proposed use of the RCWs as a backup supply of cooling water for short periods of time is likely to have small impacts on groundwater users or on the extent of saltwater intrusion based on the FPL model analysis, USGS modeling analysis, the NRC review team's modeling of the CCS-RCW interaction, and the knowledge that environmental monitoring and potential mitigation measures are required under the COCs imposed by Florida State. The review team responded to similar comments in Section E.2.7, "Comments concerning hydrology – surface water."

Comment: Comprehensive Everglades Restoration Plan (CERP). The EPA is concerned with the project's potential impacts to CERP. The CERP is a 30 year, $10-12 billion ecosystem project designed to restore the greater Everglades ecosystem. CERP is the largest ecosystem restoration project in the US, and although the Corps and the South Florida Water Management District (SFWMD) are the primary cost share partners, several other local, state, Federal agencies (including EPA), and NGOs are active partners in CERP. A primary goal of CERP is to restore flows to the greater Everglades and Everglades National Park (ENP). One of the CERP projects is the Biscayne Bay Coastal Wetlands (BBCW) project. EPA is concerned that the proposed project will impact BBCW. In particular, L-31E canal is an important part of BBCW. The DEIS states: *"Groundwater flow in the Biscayne aquifer is also affected by an interceptor ditch adjacent to the west side of the cooling canals and east of the L-31E Canal. Water is pumped from the interceptor ditch into the IWF cooling canals when needed to maintain a water level in the ditch that is lower than the water level in the L-31E Canal. This is designed to keep groundwater from moving westward from the interceptor ditch toward the L-31E Canal and keep cooling canal water from affecting groundwater quality to the west (FPL 2014-TN4069). However, because deeper permeable layers within the Biscayne aquifer may be isolated from hydraulic head in the ditch by lower permeability layers, it is possible that some water from the cooling canals could move to the west. As discussed in Section 2.2.3 below, monitoring by FPL indicates that hypersaline water from the cooling canals has moved west of the L31-E Canal in the deeper part of the Biscayne aquifer."* Also, when discussing project components of the BBCW, the DEIS states, *"L-31 East Flow Way -isolation of the L-31E Canal from the major discharge canals and allowing freshwater flow through the L-31E Levee into saltwater marsh. Pump stations and culverts are to be added to facilitate freshwater discharges."* The FEIS should clarify whether the NRC anticipates that the proposed project will continue to use water from L-31E to augment waters for the IWF, and if so, what the impacts would be to the L31N canal. Also, impacts to the Biscayne Aquifer and further movement of the saline water into Biscayne Bay should be further defined and detailed. The SFWMD permitted FPL to continue pumping water from L31E canal into the IWF for 2 years, but there is no discussion regarding this subject in the DEIS. EPA is concerned that continued use of the L31E canal as a source of water for the cooling canal system could impact the success of the BBCW and possibly exacerbate movement of salinity through the Biscayne Aquifer. (**0617-1-25** [Mueller, Heinz J.])

Response: *There is no plan for the proposed Units 6 and 7 to use any water from the L-31E Canal or any other freshwater canals. The addition of water to the IWF from the L-31E Canal and any other sources is unrelated to planned Units 6 and 7, which would not use the IWF for cooling. In addition to the review team's conceptual understanding of the processes that would occur with RCW operation, the review team considered three independent modeling studies that are all consistent in projecting that RCW operation would result in only insignificant alterations to both the Biscayne Bay and the surficial aquifer. The review team considered a wide range of*

baseline environmental conditions to reflect the uncertainty in the baseline environment associated with various proposed actions associated with the IWF, climate change and geohydrologic parameter uncertainty. While the environmental baseline may change significantly, the incremental alteration to the hypersaline plume associated with operation of the RCWs remains minor. The review team revised the text in Sections 2.3, 5.2, and G.3.2 of the EIS to expand and clarify the process and findings of the analysis of the potential alteration of the hypersaline plume caused by the operation of the RCW system.

Comment: ***Recommendations:*** The EPA recommends that the FEIS better describe the interaction between the FPL's use of L31E canals for the IWF in the existing facility, and proposed project and potential impacts to the BBCW and Biscayne Aquifer. The EPA also recommends that the FEIS discuss the 2-year SFWMD permit to pump water from the L31E canal into the IWF, and resulting impacts to BBCW and Biscayne Aquifer. EPA also notes that, effective July 14, 2014, SFWMD updated consumptive use permitting (CUP) criteria as part of a statewide effort headed by the FDEP, and joined by all five water management districts. The FEIS should document any changes to existing or future permitting actions relative to this criteria. (**0617-1-26** [Mueller, Heinz J.])

Response: *The building and operation of the proposed plants has no significant nexus with the SFWMD permitting of FPL's request to pump water from the L-31E Canal into the IWF or with the consumptive use permitting criteria mentioned in the comment. In addition to the review team's conceptual understanding of the processes that would occur with RCW operation, the review team considered three independent modeling studies that are all consistent in projecting only insignificant alterations to both the Biscayne Bay and the surficial aquifer. The review team considered a wide range of baseline environmental conditions to reflect the uncertainty in the baseline environment associated with various proposed actions associated with the IWF, climate change, and geohydrologic parameter uncertainty. While the environmental baseline may change significantly, the incremental alteration to the hypersaline plume associated with operation of the RCWs remains minor. The review team revised the text in Sections 2.3, 5.2, and G.3.2 of the EIS to expand and clarify the process and findings of the analysis of the potential alteration of the hypersaline plume caused by the operation of the RCW system.*

Comment: *Radionuclides.* Existing and historic operations at Turkey Point have resulted in radionuclides (tritium) migrating into the hydrologic complex. The DEIS discusses deep-well injection scenarios and postulated doses in Section 5.9.3.3. One of these scenarios includes postulated maximum radionuclide concentrations of tritium, strontium and cesium (page 5-108). Although the DEIS states that there would be no observable health impacts on the public from normal operation of the proposed units (page 5-109), EPA has concerns regarding potential environmental pathways and cumulative impacts related to radionuclides. ***Recommendations:*** The FEIS should provide updated information regarding the progress with defining the extent of the tritium contamination. Updated sampling data should be included or referenced in the FEIS, with modeling information included regarding potential cumulative impacts. (**0617-2-1** [Mueller, Heinz J.])

Response: *Information about the distribution of tritium in the Biscayne aquifer that resulted from the seepage of water from the IWF cooling canals is provided in Chapter 2 of the draft EIS. This information was collected by the Units 3 and 4 Uprate Monitoring Project. FPL is also undertaking a groundwater monitoring program as delineated in the SFWMD's "FPL Turkey Point Power Plant Groundwater, Surface Water, and Ecological Monitoring Plan" (SFWMD 2009-TN149). In this plan, FPL commits to monitoring tritium as a "tracer suite" for tracking the movement of the CCS plume. This plan also states: "The Agencies and FPL recognize that the*

concentrations of tritium from the CCS water are expected to fall below the regulatory standard used to identify the potential for human health concerns. Accordingly it is mutually understood tritium is being monitored only as a potential tracer for identifying contributions of CCS water as a source."

Comment: ...hot water leaching through porous limestone [is unacceptable]. (**0245-5** [Lindsey, Jerrie])

Comment: Possibility of excess thermal discharge into Boulder Zone. In the event that the cooling towers, designed to dissipate a heat load of 22 7.63 x 109 Btu/hr (1.53 x 1010 Btu/hr for both units) (3-25) are unable to discharge this amount of thermal energy, then heated wastewater would likely enter the deep injection well. Has any research been done to calculate the impact of the additional BTUs on the water in the Lower Floridan Aquifer? (**0612-1** [Teas, James])

Comment: Possibility of upward migration occurring at lower than 85 Mgd maximum injection rate due to increased wastewater buoyancy. "An EPA study of 93 deep-well injection facilities in South Florida also indicates that fluid movement underground is influenced by buoyancy created by temperature and density differences between native and injected waters." (2-56). Is it possible that heated wastewater, which would affect it temperature and therefore, its buoyancy, could exhibit upward migration at lower injection rates? (**0612-2** [Teas, James])

Comment: The proposal is to take the waste hot heated water from the nuclear reactors and pump it underground, deep injection. My question is, for the NRC, has this been done, and what -- has anyone done any research? Are there any impacts on pumping heated effluent down into deep well injection, not just injecting effluent? (**0723-5-6** [Teas, Jim])

Response: *As discussed in the EIS, an overall upward hydraulic gradient is expected to develop in the Boulder Zone because of the warmth and relatively low salinity of the injected reclaimed water after it has gone through the cooling towers.*

After passing through the cooling system, the injected effluent would be warmer than the native water in the Boulder Zone. In addition, reclaimed water would be less saline that native water in the Boulder Zone. As a result, the injected effluent from reclaimed water would be more buoyant. The higher buoyancy of the wastewater does increase the upward driving force. In general, salinity differences contribute more to buoyancy than thermal differences. However, both the thermal and salinity components of buoyancy were evaluated as part of the analysis of the impacts of deep well injection in the EIS. Thermal impacts on the fate and transport of injected effluent were evaluated in numerical modeling performed by FPL and described in Section 5.2.1.3 of the EIS. Information provided in the EIS was summarized from an FPL report describing this modeling effort in greater detail (FPL2013-TN3931). While the actual maximum expected temperature differential between injected and native Boulder Zone waters is expected to be 14ºF, FPL used an extreme temperature differential of 50ºF in modeling to determine the impacts on vertical migration. Based on this, FPL determined that effluent injected into the Boulder Zone at the decreased rate (relative to current SDWWTP injection rates) would migrate approximately 300 ft into the base of the 1,450 ft thick MCU at the end of the 100-year simulation. This estimate of vertical migration was confirmed by the review team through independent calculations, as described in Section 5.2.1.3 and Appendix G of the EIS.

This indicates that upward migration is expected to be limited by low-permeability confining units. Additional information has been added to the EIS to better describe the confining nature

of low-permeability units within the MCU, the causes of vertical migration where it has been observed at other injection sites, and the expected fate and transport of injected effluent at the Turkey Point site. Results from regional and site-specific modeling, studies of deep well injection, and characterization of geology at the site support the review team conclusion that significant upwelling out of the Boulder Zone is not expected to occur and that, if upwelling does occur, it would not likely impact the Upper Floridan aquifer. Additionally, the construction, testing and monitoring requirements of the FDEP UIC program are designed to provide more characterization of the nature of geology at the injection site and detect and mitigate any upwelling that may occur. This is discussed in greater detail in the updated sections of the EIS mentioned above.

Comment: In addition, due to substrata, Florida is a well-known hotspot for sinkholes. (**0440-6** [Hoyle, Lester and Judy])

Response: *Extensive geological and geophysical studies were performed by the applicant to make sure that there were no caverns beneath the proposed plant structures that could collapse and create a sinkhole. The potential for sinkholes to affect plant structures is primarily a safety concern and is addressed in the applicant's Final Safety Analysis Report and the NRC's Safety Evaluation Report. An environmental impact might result from contaminated water entering the shallow aquifer by draining into a sinkhole if one were to develop during construction of facilities such as pipelines or power lines. FPL has committed to following BMPs designed to stop such contamination of both surface water and groundwater. Therefore, the staff determined that environmental impacts from potential sinkhole formation associated with building and operating proposed Units 6 and 7 would be negligible. No changes were made to the EIS based on this comment.*

Comment: I note that tritiated water, due to wastewater passing through the nuclear reactors, cannot be separated out: "Liquid radioactive effluent would be discharged to the deep-injection wells" (3-34). Should there be upward migration of wastewater from the Booulder Zone, it will come with its own built-in tracer. (**0612-6** [Teas, James])

Response: *As described in the EIS, tritium and other radionuclides would be injected to the Boulder Zone and could be used as a tracer of water movement. No changes were made to the EIS in response to this comment.*

Comment: And the second question is, given the limited capacity of the Biscayne Bay aquifer, has the Draft, the reviewers who drew up the Draft, looked at the whole aquifer and all the various impacts that it suffers now? The draw-downs for example, or the effects, rather, of the proposed enlargement of rock mining in northwest Dade County, which would affect both the Everglades and the aquifer itself. And factor that into a model which projects forward the future of the aquifer. Or has the study been so narrow that it's artificial and has no relationship to the life of the whole aquifer and the needs of the population dependent on it? (**0721-17-2** [Breslin, Tom])

Response: *Chapter 7 of the EIS analyzes the cumulative impacts of the proposed Turkey Point Units 6 and 7, and other past, present, and reasonably foreseeable projects, on water use and water quality. This analysis includes cumulative impacts from the mining of fill needed to build the proposed plants and other rock mining activities. There is also information in the water sections of the EIS, including newly added information to reflect additional review team modeling, concerning the potential effects of the proposed units on the Biscayne aquifer. No changes were made to the EIS in response to this comment.*

Comment: After use some of this wastewater would be discharged underground. The possible impacts of adding chemical contaminants into our groundwater has not been adequately analyzed in this EIS. Furthermore, the backup cooling system for the new reactors could become one of the largest well fields in terms of water consumption in the entire Southeast region of the United States. Proposed radial collector wells would stretch out underneath Biscayne Bay, removing as much as 7.4 billion gallons of water per year. Just in comparison, the entire Florida Keys uses just over 6 billion gallons of water per year. The withdrawal of this water could increase salinity in Biscayne Bay and increase the rate of salt water intrusion into our very limited fresh water resources. (**0721-9-6** [McLaughlin, Caroline])

Comment: We risk poisoning our water sources at our grave peril. (**0732-1** [Horiwitz, Laura])

Response: *After cooling the plant, the reclaimed water would be injected into the saline Boulder Zone aquifer. As described in the draft EIS, upward migration from the Boulder zone to shallower aquifers used for drinking water is expected to be limited by low permeability confining units. If upward leakage of wastewater through the confining layers did occur, it would likely be detected in the overlying monitoring wells and mitigated as required by the FDEP UIC program. The potential impact of upward leakage is assessed in Appendix G of the EIS and discussed in EIS Section 5.2.1.3.*

In regard to the Biscayne aquifer, saltwater from the sea has already intruded into the groundwater in the Biscayne aquifer in the vicinity of the Turkey Point site, which has resulted in elevated salinity in that groundwater. This saltwater intrusion from the sea is unrelated to operations at Turkey Point. Because of its elevated salinity, groundwater from the Biscayne aquifer in the vicinity of the Turkey Point site cannot be used as a drinking water source without treatment. Seepage of saline water from the cooling canals associated with the existing Turkey Point Units 3 and 4 has also resulted in locally higher groundwater salinity near the IWF cooling canals. Cumulative impacts of the proposed RCW pumping on the existing hypersaline plume were considered in the EIS.

Analyses from the USGS groundwater-surface water model presented in the EIS show that in the absence of remediation of the IWF hypersaline plume, increases in groundwater salinity may occur inland from Turkey Point because of movement of the existing hypersaline plume, regardless of whether or not the proposed units are built and operated. The model-predicted increase in groundwater salinity is not caused by RCW pumping or other activities related to the proposed units. The model-predicted increase in groundwater salinity also does not reach the location of existing drinking water wells.

As stated in the draft EIS, saline water from the RCWs beneath Biscayne Bay would only be used when reclaimed treated wastewater is not available in sufficient quantity or quality, and for a maximum of 60 days per year that is permitted under the Florida State COCs. The potential effects of operating the RCWs are described in Section 5.2.1.2 of the draft EIS. During the limited periods of RCW pumping, some water would be removed from the Biscayne Aquifer, which would potentially cause hypersaline water to move under Biscayne Bay toward the RCWs. The review team evaluated information about the reliability of the components of the reclaimed-water system and determined that the RCW supply system would likely be called into use infrequently and for durations much shorter than 60 days. The review team determined that proposed use of the RCWs as a backup supply of cooling water for short periods of time is likely to have small impacts on groundwater users or on the extent of saltwater intrusion based on the FPL model analysis, modeling analysis performed by the USGS, the NRC staff's modeling of the

CCS-RCW interaction, and the knowledge that environmental monitoring and potential mitigation measures are required under the COCs imposed by Florida State imposed.

Comment: Although the proposal by FPL for Turkey Point 6 and 7 indicates they will rely on Cooling towers and reclaimed water, as opposed to the current cooling canals system used for TP 3&4, the draft statement fails to account for the several potential scenarios of a failure of, or destruction of the cooling towers, or failure of a sufficient amount of the predicted required reuse water from Miami Dade County water and sewer. If either system fails, the backup plan would have to rely on the upper Floridan aquifer, thereby perpetually competing with the sole source of drinking water for four million plus residents in South Florida. (**0145-3** [Lerner, Cindy])

Response: *The review team considers the failure or destruction of the cooling towers to be very unlikely. There is no plan to use the Upper Floridan aquifer for cooling water. Reclaimed wastewater would be the primary source of cooling water for the proposed reactors. Saline water from the RCWs beneath Biscayne Bay would only be used when reclaimed treated wastewater is not available in sufficient quantity or quality, and for a maximum of 60 days per year that is permitted under the Florida State COCs. There is a very large volume of treated municipal wastewater that can be used without affecting the ability to meet demands for fresh water. MDWASD is required to direct 60 percent of the wastewater flows to reuse by 2025 and to cease using ocean outfalls by 2025 under the Florida State Ocean Outfall Legislation Compliance Plan Chapter 2008-232 Laws of Florida Wastewater Disposal/Ocean Outfalls [Section 403.086 (9), Florida Statutes and Amendment CS/SB 444].*

Comment: The first concern is that the Draft EIS fails to adequately account for the significant and substantial cumulative adverse impact that the proposed two new nuclear power plants will have on our water supply, the Biscayne Aquifer fed by the Upper Floridan Aquifer as a result of the current crisis conditions and management plan operating for Turkey Point 3&4. While there was a finding that the Biscayne Aquifer is both vulnerable to the significant water usage needs of the Turkey Point Plant and critical to the continual supply of fresh water to Miami Dade and Broward Counties, the Draft EIS has admittedly not addressed the current crisis conditions under which Turkey Point 3& 4 operate. This is a fatal flaw. (**0145-2** [Lerner, Cindy])

Response: *Chapter 7 of the draft EIS analyzes the cumulative impacts of proposed Turkey Point Units 6 and 7, and other past, present, and reasonably foreseeable projects on water use and water quality. Information in the water sections of the EIS, including newly added information, acknowledges the existing site conditions related to Units 3 and 4. Water in the Biscayne aquifer in the vicinity of Turkey Point has elevated salinity and TDS above USDW standards because of saltwater intrusion from the sea and it cannot be used as a drinking water source without treatment. In South Florida, the amount of saltwater intrusion has increased over the past several decades because of the drainage of wetlands and groundwater pumping in inland areas that is unrelated to operations at Turkey Point. Seepage of hypersaline water from the CCS (cooling canal system) associated with the existing Turkey Point Units 3 and 4 has also resulted in areas of groundwater salinity higher than seawater near the CCS. As discussed in the draft EIS, only the RCWs (radial collector wells), planned as a back-up cooling water source, and limited inputs to the CCS while building the plants are expected to have any potential impact on the salinity of groundwater in the Biscayne aquifer. As discussed in the draft EIS, the combined impacts of the planned discharge of groundwater from excavation dewatering and storm water to the CCS while building the plants, and the chemical inputs to the CCS from muck spoils runoff and cooling tower drift are expected to cause minor changes in the water levels, salinity, or other chemical concentrations of the CCS. As stated in the draft EIS, saline water from the RCWs beneath Biscayne Bay would only be used when reclaimed treated*

wastewater is not available in sufficient quantity or quality, and for a maximum of 60 days per year that is permitted under the Florida State Conditions of Certification (COCs). The potential effects of operating the RCWs are described in Section 5.2.1.2 of the draft EIS. During the limited periods of RCW pumping, some water would be removed from the Biscayne Aquifer, which would potentially cause hypersaline water to move under Biscayne Bay toward the RCWs. The review team evaluated information about the reliability of the components of the reclaimed-water system and determined that the RCW supply system would likely be called into use infrequently and for durations much shorter than 60 days. The review team determined that proposed use of the RCWs as a backup supply of cooling water for short periods of time is likely to have small impacts on groundwater users or on the extent of saltwater intrusion based on the FPL model analysis, modeling analysis performed by the USGS, the NRC review team's modeling of the CCS-RCW interaction, and the knowledge that environmental monitoring and potential mitigation measures are required under the COCs imposed by Florida State.

Comment: FPL now consumes vast amounts of our precious water and continues to plan for future use, by drilling six Upper Floridan production wells, and the pumping of 14 million gallons per day from those wells into the Cooling canal system. The permitted temperature of 100 degrees can not be sustained, in fact it had heated to as high as 104 degrees, without the additional draw of waters from the canal and or the aquifer, This necessitated that FPL seek a permit to utilize up to 100 million gallons a day of water from the L-31 canal, a canal which is a critical component of the health of Biscayne Bay. FPL has also sought permission from the State of. Florida to pump 14 million gallons per day of water from the Upper Floridan Aquifer into the Cooling Canal system and they have received approval to draw 1 million gallons a day for a temporary period of time. However, FPL is now seeking a permit to extend access to these water resources for the next two years, hoping that they will solve the problem in that time period. At present time FPL does not have a long term solution. (**0145-5** [Lerner, Cindy])

Response: *There is no plan for the proposed units 6 and 7 to use any water from the L-31E Canal or any other freshwater canals. The addition of water to the IWF from the L-31E Canal, the upper Floridan aquifer, or other sources is unrelated to building or operating planned Units 6 and 7, which would not use the IWF (industrial wastewater facility) for cooling. Water in the Biscayne aquifer in the vicinity of Turkey Point has elevated salinity because of saltwater intrusion from the sea and cannot be used as a drinking water source without treatment. In South Florida, the amount of saltwater intrusion has increased over the past several decades because of the drainage of wetlands and groundwater pumping in inland areas that is unrelated to operations at Turkey Point. However, seepage of saline water from the cooling canals associated with the existing Turkey Point Units 3 and 4 has also resulted in locally higher groundwater salinity near the cooling canals. Water in the cooling canals has a higher salinity than seawater. Although the water in the cooling canals is not directly connected to Biscayne Bay or Card Sound, there is groundwater flow back and forth between the cooling canals and the Biscayne Aquifer beneath Biscayne Bay. This exchange of water would occur regardless of whether proposed Units 6 and 7 are built or operated.*

However, the construction and operation of Units 6 and 7 would affect the Biscayne aquifer in some ways that are described in the draft EIS. Some groundwater would be removed from the aquifer during plant construction by dewatering of the proposed plant excavations. Some groundwater would also be removed during plant operation by pumping from the proposed RCWs (radial collector wells) as a backup source of makeup water for reactor cooling. Saline water from the RCWs beneath Biscayne Bay would only be used when reclaimed treated wastewater is not available in sufficient quantity or quality, and for a maximum of 60 days per year that is permitted under the Florida State COCs (Conditions of Certification). These limited

periods of pumping of the RCWs would reduce the hydraulic head in the aquifer beneath Biscayne Bay near the wells and, therefore, would remove some water from the aquifer. However, the proportion of water flowing into the RCWs from the aquifer is expected to be small, and more than 95 percent of the water would flow into the RCWs from the overlying Biscayne Bay. This estimate is supported by separate groundwater modeling efforts performed by FPL and by the USGS. The models indicated that pumping the RCWs for less than 60 days per year is unlikely to cause a noticeable change in the existing extent of salt water intrusion or to noticeably lower groundwater levels so as to affect other users of the Biscayne aquifer.

The review team recognizes that complete knowledge of the hydrologic system associated with the RCWs is not now available, and that uncertainties therefore remain in the impact analysis. Further, future operational and environmental conditions are not known with certainty. A vast number of future scenarios are plausible. The sources of uncertainty in the RCW analysis include: heterogeneity in subsurface parameters, lack of experience with RCW systems in carbonate strata, and uncertainty in the potential need for using the backup water supply. Uncertainties in the future site environment include: freshening of the IWF cooling canals, remediation of the subsurface hypersaline plume, and the magnitude and rate of future sea-level rise.

Determinations in this EIS related to groundwater are based on the FPL numerical model analysis, the USGS model analysis, the review team's independent numerical modeling analysis, and the review team's knowledge and expertise. The conceptual models that served as the basis for the numerical models are based on available characterization information for the Turkey Point site and surrounding region. Uncertainties in the information and conceptual model were addressed in some cases by performing multiple model runs while varying key parameters in the model and in other cases by using conservative parameter values. However, uncertainties remain that do not allow the review team to assert that no other conceptual models that may result in more adverse impacts from RCW operation are plausible. Heterogeneity in subsurface parameters, lack of experience with RCW systems in carbonate strata, and uncertainty in the future site environment (e.g., freshening of IWF, remediation of subsurface hypersaline plume, sea-level rise) all warrant the review team to exercise care to avoid relying on numerical models alone. Because of this, the review team does not rely solely on the output of any numerical model.

Numerical models are numerical representations of complex processes occurring in three dimensions over time. The appropriate role of a numerical model is to test assumptions of the behavior of complex systems. While running a numerical model numerous times with different parameters cannot compensate for all uncertainties, the models employed here have been tested and benchmarked within the conditions that limit their application. In this assessment the review team used models to test possible consequences of changes in the affected environment and uncertainty in some subsurface parameters within the capability of the models employed. This information was combined with the geography of the RCW field (such as the relatively short distance from the laterals to the bottom of Biscayne Bay relative to the distance from the laterals to the Homestead well fields) and the COC requirement of a monitoring program with mitigation options. The review team determined that the proposed monitoring of RCW construction and operation that is included is sufficient to detect unexpected behavior in a timely manner. While all possible mitigation measures have not yet been spelled out, in accordance with the COCs, the review team considers the ultimate mitigation of ceasing operation of the RCWs as ensuring prevention of any impacts in a timely manner. "When harm occurs, or is imminent, SFWMD will require Licensee to modify withdrawal rates or mitigate the harm" (FDEP 2014-TN4371).

Comment: II. The Analysis of Direct, Indirect, and Cumulative Impacts of Proposed Radial Collector Wells is Inadequate. Some of our principal concerns regarding the potential adverse environmental impacts of this project are centered on the operation of the radial collector wells and their impacts on surrounding ecological areas. In order to dissipate waste heat generated by Units 6 & 7, two sources of water are identified for use in the DEIS. Up to 90 million gallons of water per day (MGD) of reclaimed wastewater from Miami Dade County will be used as the primary source of cooling water. However, when this water source is unavailable or insufficient in supply, radial collector wells will draw water from under Biscayne Bay as a backup water supply. The DEIS proposes the construction of four radial collector wells, which according to FPL, will withdraw saltwater from the Biscayne Aquifer. Radial wells would extend 900 feet horizontally beneath Biscayne Bay and would be installed approximately 25 to 40 feet below sediment surface. [Footnote 9: United States Nuclear Regulatory Commission, Environmental Impact Statement for Combined Licenses (COLs) for Turkey Point Nuclear Plant Units 6 and 7, February 2015, NUREG-2176, 3-9.] Operation of the radial collector wells is to be limited to 60 days per year, with a maximum of volume of 7.5 billion gallons of water that may be pumped during that period. [Footnote 10: NRC, DEIS, 5-13.] It is important to note that radial collector well structures would be located under navigable Waters of the United States, as regulated under the Clean Water Act. [Footnote 11: 40 C.F.R. § 230.3.] Radial collector wells such as those described in the DEIS have never before been constructed in an estuarine environment anywhere else in the world. [Footnote 12: West, B. United States Department of the Interior, National Park Service Letter to A. Williamson, U.S. Nuclear Regulatory Commission, November 25, 2014, SER PC, 6.] A huge degree of uncertainty comes into play when predicting the impacts of the construction and operations of these wells on the surrounding environment, including the resources of Biscayne National Park, which are within the cone of influence of the radial collector wells. Despite the fact that radial wells will be located in the underlying aquifer, the primary source of intake water will be water from Biscayne Bay. According to the DEIS, "if the radial collector wells are used, the water would be pumped directly from the Biscayne aquifer beneath the bay and most of this water would be drawn downward from Biscayne Bay in an area adjacent to Biscayne National Park." [Footnote 13: NRC, DEIS, 2-27.] The DEIS fails to include an adequate analysis of these potential adverse impacts that could be caused by the installation and operation of radial collector wells. The DEIS does not adequately analyze the potential for radial collector wells to impact salinity levels in Biscayne Bay and associated potential impacts on benthic flora and fauna. The DEIS acknowledges that 98% of water draw via the radial collector wells would come from Biscayne Bay, noting the hydrological connections between the aquifer and the bay. [Footnote 14: Ibid., 498.] However, it is possible that, due to these connections, pumping operations will draw down the freshwater lens found in the bay, impacting the flora, fauna and salinity of Biscayne Bay. According to the Florida Department of Environmental Protection (FDEP), radial wells located at a depth of 40 feet may ultimately withdraw freshwater from the aquifer, resulting in potential impacts to the seabed and salinity within the Bay. [Footnote 15: Florida Department of Environmental Protection, Determination of Completeness, FPL Turkey Point Units 6 & 7, August 10, 2009, 2.] Neither Biscayne Bay nor Biscayne Aquifer is characterized by a constant salinity. Rather, both the bay and the aquifer are subject to spatial and temporal variations in salinity. [Footnote 16: Miami-Dade County, Third Completeness Comments for Plant and Non-Transmission Line Portions of the FPL Site Certification Application - Turkey Point Units 6 & 7, May 28, 2010, 25.] The salinity model upon which the impacts analysis is based is inadequate and was not developed for the true scale at which the wells will operate. The DEIS admits that models used to predict the underground flow of water into the radial collector wells are insufficient to identify how water of different density (caused by differences in salinity) will move through the ground. [Footnote 17: NRC, DEIS, G-29.] (**0113-1-15** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Response: *Reclaimed wastewater would be the primary source of cooling water for the proposed reactors. Saline water from the RCWs (radial collector wells) beneath Biscayne Bay would only be used when reclaimed treated wastewater is not available in sufficient quantity or quality, and for a maximum of 60 days per year that is permitted under the Florida State COCs (Conditions of Certification). The NRC review team used modeling performed by the USGS and documented in Appendix G of the draft EIS to evaluate potential adverse impacts to Biscayne Bay that could be caused by operation of RCWs. This included predictions of salinity time series based on continuous year-round pumping of the RCWs at locations in Biscayne Bay, including locations that were close to and north of the Turkey Point site. As stated in the draft EIS, the review team selected two different dates during the simulation period that showed either a relatively large positive salinity difference, or a relatively large negative salinity difference between the continuous pumping scenario and the base case (60 day per year pumping). The model results indicated that the salinity difference between the continuous pumping scenario and the base case (no pumping) was mostly within ±1 psu, with only transient increases to near 2 psu.*

The review team examined the spatial distribution results on the dates when simulated salinity differences were relatively large and found that the largest increases were less than about +2.3 psu. Also, the salinity increases greater than +1 psu occurred in a relatively small area (14.4 km^2 [5.57 mi^2]) located north of the Turkey Point site (Appendix G, Figure G-8); the maximum salinity within this area was about 30.8 psu. The review team examined the spatial distribution results on a date when large salinity decreases of less than 1 psu occurred in an area that was 24.2 km^2 (9.33 mi^2) in size located north of Turkey Point (Appendix G, Figure G-10); the maximum salinity within this area was about 31.8 psu. Overall, these simulation results show that the temporal and spatial variation of salinity with continuous RCW pumping are expected to be minimal. The review team notes that the actual duration of pumping would not be continuous. As required by the FDEP COCs, operation of the RCWs is limited to 60 days per year. This short duration of pumping would reduce alterations of salinity within Biscayne Bay. Therefore, the effect on Biscayne Bay salinity of any permitted pumping would be much reduced from the already minimal salinity change calculated by the USGS modeling of a continuous pumping scenario. Sections 4.3.2 and 5.3.2 of the EIS have been revised to include experimental results to support assessment of RCW effects on seagrass and other aquatic resources. State of Florida required monitoring and surveys for seagrass and marine organisms are also included in Sections 4.3.2 and 5.3.2. The additional information does not change the impact determination that the effects to aquatic resources in these locations from dredging and RCW installation and operation are minor.

The review team recognizes that complete knowledge of the hydrologic system associated with the RCWs is not now available, and that uncertainties therefore remain in the impact analysis. A vast number of future scenarios are plausible. The sources of uncertainty in the RCW analysis include heterogeneity in subsurface parameters, lack of experience with RCW systems in carbonate strata, and uncertainty in the potential need for using the backup water supply. Uncertainties in the future site environment include: freshening of IWF cooling canals, remediation of the subsurface hypersaline plume, and the magnitude and rate of future sea-level rise.

Determinations in this EIS related to groundwater are based on the FPL numerical model analysis, the USGS model analysis, the review team's independent numerical modeling analysis, and the review team's knowledge and expertise. The conceptual models that served as the basis for the numerical models are based on available characterization information for the Turkey Point site and surrounding region. Uncertainties in the information and conceptual

model were addressed in some cases by performing multiple model runs while varying key parameters in the model and in other cases by using conservative parameter values. However, uncertainties remain that do not allow the review team to assert that no other conceptual models that may result in more adverse impacts from RCW operation are plausible. Heterogeneity in subsurface parameters, lack of experience with RCW systems in carbonate strata, and uncertainty in the future site environment (e.g., freshening of IWF, remediation of subsurface hypersaline plume, sea-level rise) all warrant the review team to exercise care to avoid relying on numerical models alone. Because of this, the review team does not rely solely on the output of any numerical model.

Numerical models are numerical representations of complex processes occurring in three dimensions over time. The appropriate role of a numerical model is to test assumptions of the behavior of complex systems. While even running a numerical model numerous times with different parameters cannot compensate for all uncertainties, the models employed here have been tested and benchmarked within the conditions that limit their application. In this assessment the review team used models to test possible consequences of changes in the affected environment and uncertainty in some subsurface parameters within the capability of the models employed. This information was combined with the geography of the RCW field (such as the relatively short distance from the laterals to the bottom of Biscayne Bay relative to the distance from the laterals to the Homestead well fields) and the COC requirement of a monitoring program with mitigation options. The review team determined that the proposed monitoring of RCW construction and operation that is included is sufficient to detect unexpected behavior in a timely manner. While all possible mitigation measures have not yet been spelled out, in accordance with the COC, the review team considers the ultimate mitigation of ceasing operation of the RCWs as ensuring prevention of any impacts in a timely manner. "When harm occurs, or is imminent, SFWMD will require Licensee to modify withdrawal rates or mitigate the harm" (FDEP 2014-TN4371).

Cooling the main condenser is not a safety function in the AP1000 design. Accordingly, there is no NRC requirement for a contingency plan to supply for emergency backup cooling water to the main condenser if reclaimed water is not available and the 60-day limitation on RCW pumping is exhausted. The plant can be safely shut down if water is not available from either source. Safety-related cooling water is stored onsite and can be replenished from multiple sources. The EIS analysis assumes that the RCWs would not operate more than 60 days per year, the primary source of cooling water—reclaimed wastewater from the MDWASD—should be highly reliable, and therefore the availability of backup cooling-water supplies need not be evaluated. Further, the NRC staff also considered alternative sources of cooling water in EIS Section 9.4.2, none of which are environmentally preferable to the proposed sources of cooling water. In view of the high reliability of the reclaimed wastewater source and the availability of the RCW system as a backup, there is no need to consider additional backup sources of cooling water.

Comment: There are already a host of serious groundwater concerns given the complicated hydrology and hydrogeology in the surrounding area, which will be further exacerbated by increased demand for freshwater resources and the effects of climate change, particularly sea level rise. However, we would like to bring attention to the August 17, 2010 contention that SACE and other joint intervenors submitted, which was accepted in part by the Atomic Safety and Licensing Board Panel on February 28, 2011[7] [Footnote 7: See http://pbadupws.nrc.gov/docs/ML1105/ML110591003.pdf.] and is still pending today.[8] [Footnote 8: See a discussion of the 2.1 contention in the Joint Intervenors' Request for Leave to Respond to NRC Staff's Answers to FPL's Motion for Summary Disposition and Alternatively, Joint

Intervenors' Conditional Motion to Admit Second Amended Contention NEPA 2.1, August 20, 2012. At http://pbadupws.nrc.gov/docs/ML1223/ML12233A743.pdf.] Contention 2.1 as modified states, "The ER is deficient in concluding that the environmental impacts from FPL's proposed deep injection wells will be "small" because the chemical concentrations in ER Rev. 3 Table 3.6-2 for ethylbenzene, heptachlor, tetrachloroethylene, and toluene may be inaccurate and unreliable. Accurate and reliable calculations of the concentrations of those chemicals in the wastewater are necessary so it might reasonably be concluded that those chemicals will not adversely impact the groundwater should they migrate from the Boulder Zone to the Upper Floridan Aquifer." (**0112-7** [Barczak, Sara])

Comment: The primary source of cooling water for the operations of Unit 6 & 7 would be reclaimed water from the Miami-Dade Water and Sewer Department (MDWSD). This water would be discharged into the Boulder Zone of the Lower Floridan Aquifer using twelve underground injection wells. The DEIS does not include an adequate analysis of the impacts that may arise from the disposal of this, wastewater -which contains ethylbenzene, heltachlor, tetrachloroethylene, and toluene- into the Boulder Zone using these wells. Moreover, the impacts of these contaminants migrating upward and into the Upper Floridan Aquifer are not adequately addressed. The DEIS also does not include an adequate discussion and evaluation of the impacts associated with the construction of pipelines needed to convey reclaimed wastewater to the plant's wastewater treatment facility. (**0113-2-7** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Response: *When the NRC issued the draft EIS in February 2015, a contention regarding the environmental impact of four chemical constituents in the wastewater—ethylbenzene, heptachlor, tetrachloroethylene, and toluene—was pending in litigation before an Atomic Safety and Licensing Board (Board). See Florida Power & Light Co. (Turkey Point Units 6 and 7), LBP-16-3, 83 NRC 169, 172 (2016) (LBP-16-3). In December 2015, FPL filed a Motion for Summary Disposition (Motion) of the pending contention, relying, in part on additional measurements of the concentrations of the four chemical constituents, which the Board granted, in part (LBP-16-3, 83 NRC at 177-79). The Board did not dismiss the contention, but reformulated it to read: "The DEIS is deficient in concluding that the environmental impacts from FPL's proposed deep injection wells will be 'small.' The chemicals ethylbenzene, heptachlor, tetrachloroethylene, and toluene in the wastewater injections at concentrations listed in DEIS Table 3-5 may adversely impact the groundwater should they migrate from the Boulder Zone to the Upper Floridan Aquifer." LBP-16-3, 83 NRC at 186.*

The concentrations of constituents present in reclaimed water listed in Table 3-5 are calculated to represent the water quality expected at the point of injection at the Turkey Point site. The concentrations of the four constituents included in the contention and listed in EIS Table 3-5 are all below the EPA maximum contaminant levels (or MCLs) allowed for drinking water. As mentioned above, eight additional samples were collected at the SDWWTP from 2013 to 2014 to better understand seasonal variation of the concentrations of the four constituents listed in the contention. Concentrations for these constituents collected through this additional sampling were below both EPA MCLs and laboratory method detection limits, as indicated in the footnotes to Table 3-5. These results also could illustrate the effect of advanced treatment which had recently been implemented at SDWWTP in order to provide additional protection to USDWs (NRC 2015-TN4773). This additional treatment was required by FDEP and has been described as being, "as effective as confinement of fluids in protecting USDWs from contaminants in wastewater" (EPA 2005-TN4766). The more recent results represent the future reclaimed water that would be received by Turkey Point and do not reflect the additional

reduction that would occur due to treatment, volatilization, and dilution at the Turkey Point site before injection.

The review team has revised Sections 2.3 and 5.2 of the final EIS regarding the evaluation of the impact of deep well injection of effluent at the Turkey Point site. The final EIS includes more recent studies related to regional and site geology, causes and extent of upwelling where it has occurred, modeling of fate and transport of injected wastewater, risk assessments of the impacts of deep well injection in South Florida, and a more complete discussion of the review team evaluation.

As described in the EIS, the review team took a number of steps to evaluate the potential impacts of deep well injection of effluent at the Turkey Point site. The staff 1) reviewed regional and site specific studies that evaluated the confining ability of the MCU, the causes and extent of upwelling at other deep well injection sites, the extent of injection plume migration, and risk to human health and the environment of deep well injection; 2) compared hydrogeological conditions and parameters from these sites to conditions and parameters at the proposed site; 3) evaluated numerical modeling of the flow of injected wastewater presented by the applicant and performed confirmatory calculations; and 4) considered the injection well testing and groundwater monitoring requirements of the FDEP UIC program.

Based on this evaluation, the review team concluded that, in general, the matrix of the MCU would confine injected effluent and that incidences of upwelling at other sites have been coincident with features that provide vertical pathways for upward migration such as fractures or improperly completed wells. Site data indicate that substantial fracturing of the confining layers is not evident at the Turkey Point site and well construction-related issues are not expected to create potential for upwelling at the Turkey Point site because of improved understanding of the confining zones within the MCU and improved construction techniques. However, studies of other injection sites indicate that if rapid vertical migration occurs, it is not likely to reach the Upper Floridan aquifer. This is discussed in greater detail in Sections 2.3.1.2, 3.2.2.2, and 5.2.1.3 of the updated EIS.

Calculations and modeling discussed in EIS Section 5.2.1.3 also indicate that horizontal flow of the plume within the Boulder Zone would be limited and is not expected to extend to beneath the locations of the nearest offsite water-supply well in the overlying Upper Floridan aquifer (7.7 mi) or flow to surface water bodies, such as the Atlantic Ocean. Modeling indicates that dilution along the flowpath could significantly reduce (by as much as 95 percent) the already low or undetectable concentrations of constituents within the injected effluent. As a result, it is not reasonable that concentrations would be detectable in offsite areas.

The review team also recognizes that the UIC permitting process required by the FDEP would require further characterization and testing of the ability of the MCU to confine and the Boulder Zone to receive injected effluent. The additional characterization and testing are required before each of the additional injection wells are permitted at the Turkey Point site. In addition, these wells would be frequently monitored during operation for the evidence of upwelling of injected effluent.

Finally, EIS Sections 5.2.1.3 and 5.2.3.2 discuss risk assessments of wastewater disposal methods in southeast Florida. The risk assessments included modeling of conservative transport scenarios that evaluated expected concentrations of a number of representative constituents in injected wastewater at locations that included the USDW, the Upper Floridan aquifer, and the Biscayne aquifer. One risk analysis specifically evaluated the expected

concentration of tetrachloroethylene at the USDW and a well within the Upper Floridan aquifer in Dade County resulting from both matrix flow and rapid preferential flow through the MCU (EPA 2003-TN4759). In these scenarios, the initial injected concentration of tetrachloroethylene was slightly lower than the MCL and higher than the concentration expected for injected effluent at Turkey Point (Table 3-5). The initial concentrations were calculated to be reduced by 95 percent to 100 percent when they reached the USDW and the well within the Upper Floridan aquifer. The studies indicate that human health risk decreases as distance from the injection well to potential receptors increases. As a result, the assessments conclude that risk from deep well injection to human health is low even when upwelling has reached drinking water aquifers. If the concentrations expected for Turkey Point effluent were used as the initial concentration in this analysis, the expected final concentrations expected at the USDW or Upper Floridan aquifer well would also be so low as to be undetectable. However, the Boulder Zone is not used as a groundwater source, wastewater is not expected to migrate upward into the Upper Floridan aquifer, and the Upper Floridan aquifer, which is brackish, is not used as a source of groundwater within the expected migration extent of the injected cooling water from the Turkey Point site.

For the reasons discussed above, the review team determined that impacts of deep well injection at the Turkey Point site on water resources would be SMALL. Detailed documentation of these studies and the review team's updated evaluation is provided in updated Sections 2.3, 5.2, 7.2, and Appendix G of the final EIS.

Comment: The impacts analysis included in the DEIS regarding the impacts of the radial collector wells, already inadequate, is premised on the assumption that sufficient water supply will be available from reclaimed wastewater throughout the lifespan of this project. The determination that the operations of the radial collector wells would have minor impacts on groundwater is dependent on the reliability of reclaimed water. [Footnote 21: NRC, DEIS, 7-12.] Due to inherent uncertainties and risk regarding the continued future availability and supply of treated wastewater as cooling water, the impacts from the potential increased usage of radial collector wells beyond the 60 days identified in the DEIS must be analyzed. Such discussion should include possible adverse impacts to Biscayne National Park, benthic habitats and organisms, saltwater intrusion, migration of the hypersaline plume, and water levels at freshwater supply wells. (**0113-2-1** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: The reactor cooling water that does not evaporate from the cooling towers will be injected 3,000 feet into the lower Florida aquifer, called the Boulder Zone. Because, according to the DEIS, it will stay there forever; out of sight, out of mind. But most of those billions of gallons of water will actually be fresh water. Only 3 percent of the water on the planet is fresh water and only 1 percent of that is available. So to produce electricity for Florida, Georgia, and the rest of the nation, FPL will take reclaimed fresh water out of the South Florida water system, now laden with residual chemicals and reactor descaling agents, and send it into the earth never to be seen again. (**0721-12-6** [White, Barry J.])

Response: *Reclaimed wastewater would be the primary source of cooling water for the proposed reactors. Saline water from the RCWs beneath Biscayne Bay would only be used when reclaimed treated wastewater is not available in sufficient quantity or quality, and for a maximum of 60 days per year that is permitted under the Florida State COCs. A very large volume of treated municipal wastewater is available for this purpose, but the treated wastewater is not suitable for normal uses of fresh water, such as for drinking or agriculture. Accordingly, the treated municipal wastewater can be used for cooling proposed Turkey Point Units 6 and 7*

without affecting the ability to meet demands for fresh water. MDWASD is required to direct 60 percent of the wastewater flows to reuse by 2025 and to cease using ocean outfalls by 2025 under the Florida State Ocean Outfall Legislation Compliance Plan Chapter 2008-232 Laws of Florida Wastewater Disposal/Ocean Outfalls [Section 403.086 (9), Florida Statutes and Amendment CS/SB 444]. Therefore, the NRC staff concluded that the reclaimed water supply is reliable. The review team determined that proposed use of the RCWs as a backup supply of cooling water for short periods of time is likely to have small impacts on groundwater users or on the extent of saltwater intrusion based on the FPL model analysis, USGS modeling analysis, the NRC review team's modeling of the CCS-RCW interaction, and the knowledge that environmental monitoring and potential mitigation measures are required under the COCs imposed by Florida State imposed.

Cooling the main condenser is not a safety function in the AP1000 design. Accordingly, there is no NRC requirement for a contingency plan to supply for emergency backup cooling water to the main condenser if reclaimed water is not available and the 60-day limitation on RCW pumping is exhausted. The plant can be safely shut down if water is not available from either source. Safety-related cooling water is stored onsite, and can be replenished from multiple sources. The EIS analysis assumes that the RCWs would not operate more than 60 days per year, the primary source of cooling water—reclaimed wastewater from the MDWASD—should be highly reliable, and therefore the availability of backup cooling-water supplies need not be evaluated. Further, the NRC staff also considered alternative sources of cooling water in EIS Section 9.4.2, none of which are environmentally preferable to the proposed sources of cooling water. In view of the high reliability of the reclaimed wastewater source and the availability of the RCW system as a backup, there is no need to consider additional backup sources of cooling water.

Comment: Comment 7: The final Environmental Impact Statement must not rely on the FPL or USGS groundwater models. The City echoes Miami-Dade County's concerns related to the area across which the USGS model predicts average salinities over Biscayne Bay. The model should include an analysis that more narrowly focuses on southern Biscayne Bay. **The USGS model is too coarse:** The broad focus of the USGS model obscures the true potential impacts of operating the radial collector wells in a fragile aquatic ecosystem. The USGS model has inadequate spatial resolution and is inadequately formulated to predict the salinity redistribution at the Turkey Point site that will result from the operation of the radial collector wells. The USGS model is not a new model that was developed to address the response of the Turkey Point site to the operation of the radial collector wells. Rather, the USGS model is a minimally modified previous model (Lohmann et al., 2012) that was originally developed to predict regional groundwater conditions at the county scale and associated Biscayne Bay salinity during 1996-2004. The individual cell sizes in the USGS model are too coarse to adequately resolve the groundwater response to the operation of the radial collector wells on the Turkey Point site. The horizontal dimensions of each cell are 500 m x 500 m (about 0.3 mi x 0.3 mi). Any changes in groundwater conditions on these scales are simply averaged out. Groundwater and salinity variations over these scales cannot be resolved at all, drawdowns near the radial collector wells (expected to be on the order of meters) cannot be determined accurately, the distribution of flow along the radial collector wells cannot be modeled at all, and individual cooling canals cannot be separated. **The USGS model does not properly represent the cooling canals:** Further, the USGS model does not adequately represent the presence of the cooling canals, which are major hydrologic features at the Turkey Point site. In reality, the water surface elevations in the cooling canals will fluctuate in tandem with the groundwater elevations at the site, and the groundwater elevations will respond to the operation of the radial collector wells. In contrast to this reality, the USGS model represents the water surface

elevations in the cooling canals as having a pre-specified elevation regardless of pumping from the radial collector wells. This approach precludes the model from determining actual water surface elevations in the cooling canals and actual groundwater elevations that will occur on the site in response to operation of the radial collector wells. A review of the USGS model results for the baseline conditions shows that the volume of water withdrawn from the cooling canals is approximately 28% of the volume pumped from the radial collector wells. Although not all of the water leaking from the cooling canals ends up being pumped by the radial collector wells, the upper limit of 28% of the pumpage volume gives further support to the significant influence that the cooling canals have on the geohydrology and underline the need to accurately represent both the cooling canals and the radial collector wells in the model. (**0611-7** [Haber, Matthew S.])

Response: *The USGS modeled potential impacts of the RCWs on surface water and the Biscayne aquifer using a linked surface water-groundwater model. The key issues related to the grid size employed in the USGS model are whether (1) Biscayne Bay can be treated as well-mixed, (2) the effects of fresh water capture by the RCWs are adequately modeled, and (3) the RCW and IWF are adequately modeled. As described in Appendix G of the draft EIS, the USGS analysis had relatively large grid cells and assumed the surface water (notably Biscayne Bay) to be vertically mixed. The review team determined that because of the shallow depths of Biscayne Bay, particularly near Turkey Point, the vertical mixing assumption was not unreasonable for the examination of potential RCW impacts on salinity in Biscayne Bay. While localized areas of salinity stratification may develop, wind mixing is expected to keep Biscayne Bay well mixed. The analysis used two-dimensional circulation, which is driven in response to wind forcing and tidal elevation boundary conditions. Because of the relatively rapid mixing of Biscayne Bay, the 500 m cell size is also not expected to have a significant effect on the bay salinities predicted by the model.*

In regard to freshwater discharge to the Biscayne Bay, the USGS model was applied to assess the potential capture of relatively fresh water from the inland aquifer and the regional canals. The large cell size of the model would tend to conservatively overestimate these effects. As for the RCWs and IWF, the RCWs were represented by four cells in the model, which is adequate to calculate drawdown at the wells and provide volumetric estimates of the sources of water captured by the RCWs. The existing cooling canals associated with Units 3 and 4 were represented as a head boundary in the USGS model with 70 individual cells for the entire extent of the cooling canals. Grid resolution of the USGS model is also adequate to represent the IWF as such a boundary condition. As described in the USGS model report referenced in the draft EIS, the cooling canal head boundary varied over time and was estimated using water-level data collected in the cooling canals and the interceptor ditch during 2008–2009.

The NRC staff determined that the impact of the limited RCW operations on Biscayne Bay salinity would be minor because the effect on salinity of water in the bay would likely be less than the natural observed variation in salinity of the bay. However, uncertainties in the model parameters and configuration, as well as uncertainty in future conditions, such as RCW usage and the magnitude and rate of future sea-level rise, lead to uncertainty in the determination of potential impacts on the salinity of Biscayne Bay. Because of this, the review team did not rely solely on the output of the FPL or USGS models. The review team determined that the proposed monitoring of RCW operations that is included in the COCs is sufficient to detect unexpected impacts on the bay in a timely manner. While all possible mitigation measures are not detailed at this time, in accordance with the COCs, the review team considers the ultimate mitigation of ceasing operation of the RCWs as ensuring prevention of any impacts in a timely

manner. "When harm occurs, or is imminent, SFWMD will require Licensee to modify withdrawal rates or mitigate the harm" (FDEP 2014-TN4371).

Cooling the main condenser is not a safety function in the AP1000 design. Accordingly, there is no NRC requirement for a contingency plan to supply emergency backup cooling water to the main condenser if reclaimed water is not available and the 60-day limitation on RCW pumping is exhausted. The plant can be safely shut down if water is not available from either source. Safety-related cooling water is stored onsite, and can be replenished from multiple sources. The EIS analysis assumes that the RCWs would not operate for more than 60 days per year, the primary source of cooling water—reclaimed wastewater from the MDWASD—should be highly reliable, and therefore the availability of backup cooling-water supplies need not be evaluated. Further, the review team also considered alternative sources of cooling water in EIS Section 9.4.2, none of which are environmentally preferable to the proposed sources of cooling water. In view of the high reliability of the reclaimed wastewater source and the availability of the RCW system as a backup, there is no need to consider additional backup sources of cooling water.

Comment: The USGS model baseline is not representative: The USGS model uses as baseline conditions those that occurred in the period 1996-2004, and assesses the impact of the operation of the radial collector wells relative to conditions that existed in this 9-year time period. However, the USGS model report does not demonstrate that the 9-year time period used in the model is representative of more recent hydrologic conditions. Such an analysis is essential to validate applying the model results to the future hydrologic environment in which the radial collectors will likely be operating. This validation could have been done by showing that groundwater levels in a more recent 9-year time period is statistically indistinguishable from the 1996-2004 period. Statistical analyses performed on groundwater elevations near the site, at wells G-1183 and G-3356 using the t-test for population differences, show that wet-season and annual groundwater fluctuations in the 9-year period of 2005-2013 are statistically different at the 90% confidence level from the fluctuations in the 1996-2004 baseline period. Chin, D.A., 2013, Water Quality Engineering in Natural Systems, Second Edition, Wiley, Hoboken, New Jersey. Hence, the validity of using 1996-2004 conditions as a baseline for assessing the impact of the radial collector wells at the Turkey Point site is questionable. In addition, the USGS report does not compare the more recent salinity fluctuations (e.g., 2005-2013) to the 1996-2004 salinity fluctuations to establish that the assumed baseline salinities are representative of current or future baseline conditions. Further, the USGS model shows that the 19962004 discharges from the Mowry Canal can significantly affect the salinities in the area of Biscayne Bay that recharges the radial collector wells, yet there is no demonstration that the quantity and timing of the Mowry Canal discharges used in the model are representative of later (e.g., 2005-2013) or even future conditions. This particular issue is important because, as reported by USGS, the radial collector wells could withdraw sufficient fresh canal-discharge water so as to lead to significantly increased salinities in Biscayne Bay, which would otherwise be the recipient of this fresh water. (**0611-8** [Haber, Matthew S.])

Comment: Limitations of the USGS model: Aside from the aforementioned flaws with the USGS model, there are several other model limitations each of which could negatively impact the accuracy of the model. These limitations include: (1) The use of the 1-year (20082009) correlation between water levels in the L-31E canal and the cooling canals to establish the elevations in the cooling canals without demonstrating that that this correlation does not vary temporally or even recognizing that this correlation will almost certainly be different when the radial collector wells are in operation; (2) artificially limiting the leakage rates from the cooling canals; (3) assigning the same salinity to all cooling canals and setting the salinity based on

data available before 2011; and (4) adding cooling canals to the model without recalibrating the model, especially at the Turkey Point site, to account for the presence of the cooling canals. Given the strong influence of the cooling canals on the salinity of the underlying groundwater the Turkey Point site, it is particularly important that the cooling canals be modeled accurately. Key model limitations explicitly self-reported by USGS (Lohmann, 2014) are: (1) the discretization of the model may be too coarse to accurately represent characteristics of interest for potential groundwater pumping in the Turkey Point area; (2) the model simulates the surface water as a single layer with a single salinity value, effectively representing it as completely mixed column water, which is not realistic in the coastal zone, (3) the size of the model cells, 500 m by 500 m, is too large to accurately represent the individual cooling canals (4) spatial averaging may result in more subdued effects than would be simulated at a finer scale, (5) to estimate and evaluate the water sources for the radial collector wells more fully, finer spatial discretization and additional evaluation tools, such as particle tracking, are needed, (6) the model period represents a recent 9-yr period with limited variability of hydrologic conditions, and (7) in order to fully represent the effects of the radial collector wells on the system, additional simulations of extreme dry periods, wet periods, sea-level rises, and effects from regional restoration efforts would need to be evaluated. Given all of the aforementioned limitations of the USGS model, it is apparent that the salinity of the cooling canals at the FPL industrial wastewater facility will exert a significant influence on the salinity distribution and groundwater flow that will occur in response to the operation of the radial collector wells. Further, since the USGS model is not able to accurately resolve the spatial variations in salinity and groundwater flows at the Turkey Point site, and the USGS model does not demonstrate that 1996-2004 baseline conditions adequately represents the conditions under which the radial collector wells are likely to operate (and noting that groundwater levels in 2005-2013 were significantly different than in 1996-2004) it must be concluded that the salinity effects of the cooling canals in the Turkey Point site are not adequately represented in the USGS model. (**0611-9** [Haber, Matthew S.])

Response: *The purpose of the USGS model calculations was to predict the approximate magnitude of changes in hydraulic head and salinity in the shallow aquifer, and predict changes in the distribution of bay salinity that are likely to be caused by building and operating the proposed plants. The baseline of the USGS model based on conditions from 1996 to 2004 has changed, and the baseline would also change in the several years between 2015 and the time plant operation could begin. However, the purpose of the USGS model analyses is to understand changes that would occur because of building and operation the proposed plants. These changes from the baseline caused by the proposed units are not expected to be significantly altered because of different baselines that are caused by external factors such as weather or ongoing seepage from the IWF. Discharges from the Mowry Canal also change based on weather patterns and canal management practices and these variations could affect the salinity distributions in Biscayne Bay. However, these potential changes in baseline are not expected to result in significant changes in the impacts from excavation dewatering during plant construction or from limited operation of the RCWs (radial collector wells) as a backup water supply.*

Based on the expected reliability of the primary reclaimed water source, the RCWs would likely operate less than the 60 days per year permitted under the Florida State COCs (Conditions of Certification). The NRC staff determined that the impact of the limited RCW operations on the Biscayne Bay salinity would be minor because the effect on the salinity of water in the bay would likely be less than the natural observed variation in the salinity of the bay. However, uncertainties in the model parameters and configuration, as well as uncertainty in future conditions, such as RCW usage and the magnitude and rate of future sea level rise, lead to

uncertainty in the determination of potential impacts on the salinity of Biscayne Bay. Because of these uncertainties, the review team did not rely solely on the output of the FPL or USGS models. The review team determined that the proposed monitoring of RCW operations that is included in the COCs is sufficient to detect unexpected impacts on the bay in a timely manner. While all possible mitigation measures are not detailed at this time, in accordance with the COCs, the review team considers the ultimate mitigation of ceasing operation of the RCWs as ensuring prevention of any impacts in a timely manner. "When harm occurs, or is imminent, SFWMD will require Licensee to modify withdrawal rates or mitigate the harm" (FDEP 2014-TN4371).

Cooling the main condenser is not a safety function in the AP1000 design. Accordingly, there is no NRC requirement for a contingency plan to supply emergency backup cooling water to the main condenser if reclaimed water is not available and the 60-day limitation on RCW pumping is exhausted. The plant can be safely shut down if water is not available from either source. Safety-related cooling water is stored onsite and can be replenished from multiple sources. The EIS analysis assumes that the RCWs would not operate more than 60 days per year, the primary source of cooling water—reclaimed wastewater from the MDWASD—should be highly reliable, and therefore the availability of backup cooling-water supplies need not be evaluated. Further, the review team also considered alternative sources of cooling water in EIS Section 9.4.2, none of which are environmentally preferable to the proposed sources of cooling water. In view of the high reliability of the reclaimed wastewater source and the availability of the RCW system as a backup, there is no need to consider additional backup sources of cooling water.

Comment: The USGS model inaccurately represents the water pumped by the radial collector wells: Ultimately, the USGS model is not capable of determining what percentage of the water pumped from the radial collector wells is derived from the FPL industrial wastewater facility. This percentage is relevant because the industrial wastewater facility is the primary source of hypersaline water to the Biscayne Aquifer. Therefore, it has the potential to significantly affect the distribution of salinity in the groundwater that will result from the operation of the radial collector wells. The final Environmental Impact Statement should include an updated groundwater model to account for sea-level rise over the radial collector well system's operating life and address: •The possibility that flushing the FPL industrial wastewater facility with additional water from the L-31E canal (in a manner that does not prevent evaporation or the resulting salinity increases) will push saltier water underground, •The effect on the inland aquifer of seawater releases from the radial collector wells into the FPL industrial wastewater facility, and •The potential for increased salinity levels in the inland aquifer resulting from future sea-level rise and storm surge hazards at the Turkey Point site, as well as the effects of this increased salinity on South Florida's freshwater resources. The decision of the Nuclear Regulatory Commission, and cooperating agencies, of whether or not to approve the Turkey Point Nuclear Plant Units 6 & 7 application will likely rely on the findings of the USGS groundwater model. Due to the limitations of this model and the availability of more accurate data, NEPA requires that the final Environmental Impact Statement, or a Supplemental Environment Impact Statement, provide a more careful representation of the effects of the radial collector well system on the surrounding environment. (**0611-10** [Haber, Matthew S.])

Response: *The purpose of modeling presented in the draft EIS is to understand changes in the environment that would occur because of construction and operation of the proposed plants. The cooling canals and associated hypersaline plume are part of the expected background environment of the proposed plants. There is no plan for "releases from the radial collector wells into the FPL industrial wastewater facility" that is mentioned in the*

comment. Rather, the water from the RCWs would be used to cool the plant only when the primary reclaimed water source is not available, and the water remaining after that function is accomplished would be injected into the Boulder Zone.

After publication of the draft EIS, the review team performed additional groundwater modeling of the interaction between the planned RCWs, the existing hypersaline plume, and the cooling canals using a two-dimensional cross section model and a limited-extent three-dimensional model that accounted for variable density fluids. These simulations were performed to better understand the effects of RCW pumping on the existing hypersaline plume from the Units 3 and 4 cooling canals and resulting impacts to the salinity of the Biscayne aquifer. Planned remediation of the hypersaline and predicted sea level rise were also simulated. The results of this additional modeling have been added to the EIS. The addition of "freshening water" to the IWF from L-31E Canal or other sources is not related to the building or operation of the proposed plants, but is a potential change in the environmental baseline conditions. However, the review team determined that the very small head increases in the IWF caused by "freshening" combined with the resulting dilution of constituents in the IWF would result in minor changes in the amount of salt or other constituents seeping into the aquifer from the IWF.

Comment: 1) <u>Water Modeling</u>

Numerous DEIS assessments rely upon coarse-scale hydrologic models, whose scale and extent were too large to adequately determine localized environmental effects of the proposed action on NPS resources. Although the models utilized by the NRC answered some questions related to the effect of the proposed action on the regional hydro logic system, the scale of the model used by the NRC in conducting its impact assessment is not fine enough to effectively evaluate impacts to NPS resources located with portions of Biscayne NP from the removal or moderation of freshwater along the shoreline of the park, the removal of water within the park through groundwater withdrawal at the RCWs, and the potential for direct adverse impacts at the site of withdrawal on seagrass beds and seagrass faunal and benthic communities. The DEIS recognizes that each of the models used to evaluate the effects of the Unit 6 and 7 construction and operation (especially RCW operation) has shortcomings that result in significant uncertainty in the modeling results. In part, this limitation stems from model calibration, with crucial data being derived from a single, seven-day Aquifer Performance Test. During this non-replicated, short-term test, pumping rates were less than 10% of that proposed for the RCW and some monitoring equipment failures occurred. Given the variability of watershed and marine hydrologic conditions, additional tests were needed in order to better calibrate models and produce sufficiently accurate simulations.

The DEIS was informed by two hydrologic models developed by Florida Power and Light (FPL) and the U.S. Geological Survey (USGS):

<u>FPL Model</u>

The FPL model is a local (fine) scale, constant density groundwater model. Given the wide range of water body densities in the region (including low density freshwater, mesohaline-marine bay water, and hypersaline Industrial Wastewater Facility (IWF) water), this model could not simulate the effect of proposed Unit 6 and 7 construction and operations on saltwater movement in the Biscayne Aquifer, salinity in Biscayne Bay, and regional surface-water and groundwater levels. Consequently, the NRC commissioned additional modeling by the USGS.

<u>USGS Model</u>

The USGS model is a regional model, with a model grid too coarse to accurately simulate conditions within and under the IWF or adjacent to the RCWs. The model's accompanying report identified limitations that included: 1) the sizing of the model cells in 500 x 500 grids; 2) simulating surface water as a single layer with a single salinity value; and 3) an inability of the model to track the ultimate sources of water that flow to the RCWs. The report recommended that finer spatial discretization and additional evaluation tools, such as particle tracking, were needed to estimate and evaluate RCW water sources, and that additional simulations of extreme dry periods, wet periods, and effects from regional restoration efforts were needed in order to fully represent RCW effects on the system.

This model utilized calibration data from 1997-2004; however, newer groundwater data is available that would improve model calibration and validation. This data includes: - Salinity, temperature, and depth data collected at 15-minute intervals as part of the NPS salinity monitoring network. - Data from South Florida Water Management District (SFWMD) Comprehensive Everglades Restoration Plan (CERP) wells in the area. - Conductivity, temperature, and depth data collected hourly as part of the Turkey Point Units 3 and 4 Uprate Monitoring efforts.

These data show that average values do not represent the conditions that most affect biota in Biscayne Bay, which is better represented by finer scale hourly to daily salinity and temperature values. The modeling used to evaluate impacts from the RCWs would be improved to the appropriate scale for the necessary applications by calibrating with the available 15 minute salinity data from the Bay. The groundwater model would be improved if it used data for calibration and validation from groundwater wells installed as part of the Turkey Point Units 3 & 4 Uprate Monitoring which would improve the ability of the model to more accurately predict the effects of the proposed action on adjacent natural resources. These wells are located at shallow medium and deep locations in the Biscayne Aquifer. They are numbered 1-15 and are located through the model domain from just west of US highway 1 to three clusters located in Biscayne Bay (10, 14, 15). They provide hourly data for conductivity temperature and depth. Empirical findings from past work, such as the distribution and trends of tritium concentrations, have established that IWF waters are found in near-surface shallow groundwater (25 to 30 ft. deep) in wetlands adjacent to Biscayne Bay (Figure 1 [Tritium concentration time series in IWF well monitoring clusters showing increasing trends]). The NPS is concerned that since this is the same depth at which RCW intake pipes are expected to be located, that it is possible for IWF water to impact resources within Biscayne National Park (NP).

The NPS recommends that the NRC utilize improved model extent, model scale, and model calibration to accurately evaluate the appropriate spatial extent of these potential impacts to better characterize operations of the RCWs and the relative localized impacts of resulting movement of the hypersaline plume on surface waters and ground waters in the park and under the IWF, as well as the relative effects of sea-level rise on operations of the RCW system. This improved analysis will provide better information as to the effect of the proposed action in terms of changes in salinity and other impacts to near shore resources that occur within Biscayne NP in the vicinity of the RCWs. (**0622-1-2** [Austin, Stan])

Comment: Hydrologic Modeling[.] The NPS is concerned that numerous assessments in the DEIS rely upon hydrologic models, whose scale and extent were too large to adequately determine localized environmental effects of the proposed action on NPS resources. Although the model utilized by the NRC answered some questions related to the effect of the proposed action on the regional hydrologic system, the scale of the model used by the NRC in conducting its impact assessment is not fine enough to effectively evaluate impacts to NPS resources

located with portions of Biscayne NP from the removal or moderation of freshwater along the shoreline of the park, the removal of water within the park through groundwater withdrawal at the RCW s, and the potential for direct adverse impacts at the site of withdrawal on seagrass beds and seagrass faunal and benthic communities. The NRC should utilize newer data available from NPS and the South Florida Water Management District to improve the extent, scale, and calibration of the models to accurately evaluate the appropriate spatial extent of these potential impacts on park resources. Furthermore, the model should better characterize operations of the RCWs and the relative localized impacts of the resulting movement of the hypersaline plume that presently exists from the operation of the Industrial Wastewater Facility (IWF or cooling canals) used to cool the existing facility on surface and ground waters, as well as the relative effects of sea-level rise on operations of the RCW system. (**0623-2** [Austin, Stan])

Comment: The NPS asserts that the DEIS impact analysis associated with construction and operation of proposed Units 6 and 7 does not sufficiently address issues related to the environmental impacts of the proposed action on resources managed by the NPS. Based on our review of the DEIS, we have strong concerns that impact analysis described in the DEIS does not:...acknowledge scientific uncertainty associated with the effects of certain elements of the proposed action, including the use of groundwater collected from the RCWs on the resources of Biscayne NP[.] (**0623-8** [Austin, Stan])

Response: *The purpose of the modeling presented in the draft EIS is to understand potential changes in the environment that could occur because of construction and operation of proposed Units 6 and 7. The cooling canals and associated hypersaline plume are part of the background environment of the proposed plants. Three different groundwater models were used to evaluate different aspects of the RCW (radial collector well) pumping effects. FPL's groundwater model, documented in the Final Safety Analysis Report (FSAR), had a sufficiently small cell size to simulate the local effects of the RCW pumping on the aquifer and identify the likely sources of water that would be captured by the RCWs. This model provided valuable information about the sources of water captured by the RCWs and about the hydraulic head changes (drawdown) that could be expected. However, the FPL model did not account for the effects of variable density fluids that are caused by salinity and temperature differences.*

The USGS modeling was performed to evaluate the effects of variable density fluids on the model results. Although the USGS model cells were too large to simulate conditions at a small scale, this model provided valuable information about larger-scale groundwater salinity changes expected in areas affected by the hypersaline plume and areas farther inland. It also was useful in predicting the potential for RCW capture of water from the drainage canals, which reduces the amount of fresh water entering the bay from the canals. The review team is aware of Biscayne Bay salinity and temperature data available from the NPS salinity monitoring network and data available from the SFWMD and the Turkey Point Units 3 and 4 Uprate Monitoring. These data sets were used in the draft EIS descriptions of the site surface water and groundwater.

After publication of the draft EIS, the review team used a third model—the RTF (Review Team Focused model)—to perform additional groundwater modeling of the interaction between the planned RCWs, the existing hypersaline plume, and the cooling canals. This third model included a two-dimensional cross-section model and a limited-extent three-dimensional model. The review team used the RTF model to perform simulations to better understand how the existing hypersaline plume may be affected by RCW pumping combined with remediation actions recently stipulated in a consent agreement between FPL and Miami Dade County. The RTF model was useful in showing salinity changes that occur in the aquifer near the RCWs

when the wells are operated. The results showed that when the wells are not operating, hypersaline water from the cooling canals is present in the high-permeability zone where the well laterals are installed. This saline water is drawn into the wells during the first few days of RCW pumping, resulting in increasing, then decreasing salinity at the well. The RTF model predicts that the salinity of the water produced by the operating RCW eventually drops to about the concentration of the bay water. Water flowing down through the bed of the bay and into the RCWs is therefore expected to have about the same salinity as bay water. When RCW pumping ceases, water in the high-permeability zone again increases in salinity because of the migration of water from the hypersaline plume. This migration of hypersaline water into the high-permeability zone would occur regardless of the presence of the RCWs.

Predicted future change is sea level and its effect on interactions between the RCWs and the hypersaline plume were also simulated. The additional modeling confirmed that pumping of the RCWs would move hypersaline water toward the RCWs and would remove some groundwater captured by the RCWs from the hypersaline plume region of the Biscayne aquifer. The model also indicated that RCWs pumping is not likely to reduce the effectiveness of hypersaline plume remediation actions specified in the consent agreement.

Reclaimed wastewater would be the primary source of cooling water for the proposed reactors. Saline water from the RCWs beneath Biscayne Bay would only be used when reclaimed treated wastewater is not available in sufficient quantity or quality, and for a maximum of 60 days per year that is permitted under the Florida State COCs. A very large volume of treated municipal wastewater is available for this purpose, but the treated wastewater is not suitable for normal uses of freshwater, such as for drinking or agriculture. Accordingly, the treated municipal wastewater can be used for cooling proposed Turkey Point Units 6 and 7 without affecting the ability to meet demands for fresh water. Miami Dade Water and Sewer Department is required to direct 60 percent of the wastewater flows to reuse by 2025 and to cease using ocean outfalls by 2025 under the Florida State Ocean Outfall Legislation Compliance Plan Chapter 2008-232 Laws of Florida Wastewater Disposal/Ocean Outfalls [Section 403.086 (9), Florida Statutes and Amendment CS/SB 444]. Therefore, it is likely that the RCWs would be used less than the 60 days per year permitted under the COCs. Based on the modeling efforts described in the draft EIS, more than 90 percent of the water pumped when the RCWs are operating is expected to come from Biscayne Bay, and small amounts would come from the hypersaline plume beneath the cooling canals, the inland part of the Biscayne aquifer, and the drainage canals. The models described above predicted that limited pumping of the RCWs as a backup water supply for less than 60 days per year would not result in a significant change in the extent of salt water intrusion or to reduce the flow of relatively fresh water into Biscayne Bay compared to the variability that occurs under current conditions.

The review team recognizes that complete knowledge of the hydrologic system associated with the RCWs is not now available, and that uncertainties therefore remain in the impact analysis. A vast number of future scenarios are plausible. The sources of uncertainty in the RCW analysis include: heterogeneity in subsurface parameters, lack of experience with RCW systems in carbonate strata, and uncertainty in the potential need for using the backup water supply. The aquifer performance test used a pumping rate designed to create enough stress in the aquifer for measurable drawdown at the observation wells and estimate aquifer flow parameters. Repeating the test would not have produced significantly different results. Uncertainties in the future site environment include: freshening of IWF cooling canals, remediation of the subsurface hypersaline plume, and the magnitude and rate of future sea-level rise.

The determinations in this EIS related to groundwater are based on the FPL numerical model analysis, the USGS model analysis, the review team's independent numerical modeling analysis, and the review team's knowledge and expertise. The conceptual models that served as the basis for the numerical models are based on available characterization information for the Turkey Point site and surrounding region. Uncertainties in the information and conceptual model were addressed in some cases by performing multiple model runs while varying key parameters in the model and in other cases by using conservative parameter values. However, uncertainties remain that do not allow the review team to assert that no other conceptual models that may result in more adverse impacts from RCW operation are plausible. Heterogeneity in subsurface parameters, lack of experience with RCW systems in carbonate strata, and uncertainty in the future site environment (e.g., freshening of IWF, remediation of subsurface hypersaline plume, sea-level rise) all warrant the review team to exercise care to avoid relying on numerical models alone. Because of this, the review team does not rely solely on the output of any numerical model.

Numerical models are numerical representations of complex processes occurring in three dimensions over time. The appropriate role of a numerical model is to test assumptions of the behavior of complex systems. While even running a numerical model numerous times with different parameters cannot compensate for all uncertainties, the models employed here have been tested and benchmarked within the conditions that limit their application. In this assessment, the review team used models to test possible consequences of changes in the affected environment and uncertainty in some subsurface parameters within the capability of the models employed. This information was combined with the geography of the RCW field (such as the relatively short distance from the laterals to the bottom of Biscayne Bay relative to the distance from the laterals to the Homestead well fields) and the COC requirement of a monitoring program with mitigation options. The review team determined that the proposed monitoring of RCW construction and operation that is included is sufficient to detect unexpected behavior in a timely manner. While all possible mitigation measures have not yet been spelled out, in accordance with the COC, the review team considers the ultimate mitigation of ceasing operation of the RCWs as ensuring prevention of any impacts in a timely manner. "When harm occurs, or is imminent, SFWMD will require Licensee to modify withdrawal rates or mitigate the harm" (FDEP 2014-TN4371).

Cooling the main condenser is not a safety function in the AP1000 design. Accordingly, there is no NRC requirement for a contingency plan to supply emergency backup cooling water to the main condenser if reclaimed water is not available and the 60-day limitation on RCW pumping is exhausted. The plant can be safely shut down if water is not available from either source. Safety-related cooling water is stored onsite and can be replenished from multiple sources. The EIS analysis assumes that the RCWs would not operate more than 60 days per year, the primary source of cooling water—reclaimed wastewater from the MDWASD—should be highly reliable, and therefore the availability of backup cooling-water supplies need not be evaluated. Further, the review team also considered alternative sources of cooling water in EIS Section 9.4.2, none of which are environmentally preferable to the proposed sources of cooling water. In view of the high reliability of the reclaimed wastewater source and the availability of the RCW system as a backup, there is no need to consider additional backup sources of cooling water.

Comment: Analysis of Impacts to Comprehensive Everglades Restoration Plan (CERP) Projects and the Biscayne Bay Coastal Wetlands (BBCW) Project[.] One of the goals of the CERP is to increase freshwater flow to Biscayne NP to achieve more natural hydrologic conditions within the park that has been negatively impacted by implementation of the regional

water supply and flood control project. Given the lack of specific localized information regarding the effect of the RCW s on nearshore salinity levels, the NPS disagrees with NRC's conclusion that the proposed action would have minimal effect on CERP and Phase 1 of the BBCW project. NPS remains concerned that the cumulative impacts resulting from this project could potentially negate current or potentially future efforts to increase freshwater flows to rehydrate wetlands and reduce point source pollution discharge into Biscayne NP and Biscayne Bay. A second phase of the BBCW project remains to be planned and authorized, but is reflected in overall salinity restoration target goals for the park. Detailed review of modeling results from the DEIS analysis show a potential for impacts to groundwater sources for CERP, as well as movement of the groundwater masses related to RCW operations. The BBCW Project Phase 1, which is intended to redistribute existing freshwater flows to Biscayne NP, is now entering the construction phase with operation to shortly follow. (**0623-6** [Austin, Stan])

Response: *In Section 7.1, the draft EIS states "The primary surface-water use plan that could potentially be affected by Turkey Point Units 6 and 7 is the CERP (Comprehensive Everglades Restoration Program) (USACE 2010-TN113) and its component Biscayne Bay Wetlands Restoration Project (USACE/SFWMD 2011-TN1038)." The review team acknowledges that some freshwater entering Biscayne Bay, including additional water inputs facilitated by CERP projects could be captured by the RCWs when they are operating. However, a very large volume of treated municipal wastewater is available for this purpose, but the treated wastewater is not suitable for normal uses of freshwater, such as for drinking or agriculture. Accordingly, the treated municipal wastewater can be used for cooling proposed Turkey Point Units 6 and 7 without affecting the ability to meet demands for freshwater. MDWASD is required to direct 60 percent of the wastewater flows to reuse by 2025 and to cease using ocean outfalls by 2025 under the Florida State Ocean Outfall Legislation Compliance Plan Chapter 2008-232 Laws of Florida Wastewater Disposal/Ocean Outfalls [Section 403.086 (9), Florida Statutes and Amendment CS/SB 444]. The RCWs are likely to be used less than the 60 days per year permitted under the Florida State COCs. The review team also relies on the COC requirement for a monitoring program with mitigation options. The review team determined that the proposed monitoring of RCW construction and operation that is included is sufficient to detect unexpected behavior in a timely manner. While all possible mitigation measures are not detailed at this time, in accordance with the COC, the review team considers the ultimate mitigation of ceasing operation of the RCWs as ensuring prevention of any impacts in a timely manner. "When harm occurs, or is imminent, SFWMD will require Licensee to modify withdrawal rates or mitigate the harm" (FDEP 2014-TN4371)*

Cooling the main condenser is not a safety function in the AP1000 design. Accordingly, there is no NRC requirement for a contingency plan to supply emergency backup cooling water to the main condenser if reclaimed water is not available and the 60-day limitation on RCW pumping is exhausted. The plant can be safely shut down if water is not available from either source. Safety-related cooling water is stored onsite and can be replenished from multiple sources. The EIS analysis assumes that the RCWs would not operate more than 60 days per year, the primary source of cooling water—reclaimed wastewater from the MDWASD—should be highly reliable, and therefore the availability of backup cooling-water supplies need not be evaluated. Further, the review team also considered alternative sources of cooling water in EIS Section 9.4.2, none of which are environmentally preferable to the proposed sources of cooling water. In view of the high reliability of the reclaimed wastewater source and the availability of the RCW system as a backup, there is no need to consider additional backup sources of cooling water.

Comment: Inconsistencies identified in draft EIS and ER, Rev 6: Subsection 2.3.4.2, Page 2-71, Lines 10-12 "Each pair included a well completed in the Miami Limestone/Key Largo Limestone at depths...from **14 to 28 ft** and a well completed in the Fort Thompson Formation at depths...from **85 to 110 ft**..." ER Subsection 2.3.1.2.1.4 "Ten observation well pairs...completed to depths...from **24 to 110 feet bgs**...installed in the Miami Limestone/Key Largo Limestone and the Fort Thompson Formation." (**0619-2-20** [Maher, William])

Response: *According to ER Table 2.3-14 the open interval range for the shallow wells is 14–28 ft bgs and the open interval range for the lower wells is 85–110 ft bgs. Accordingly, the draft EIS and ER appear consistent, and the review team made no changes to the EIS.*

Comment: So the continued operation of Turkey Point 3 and 4 has the capacity to further relocate the hypersaline plume. So I think the Impact Statement is incomplete in that it makes no analyses of the effects of possible entrainment of the hypersaline plume and the likely resulting consequence for the demand on water from other sources --such as fresh water from the L-31-E canal -- if the radial collector well system is tainted with hypersaline plume. (**0721-2-3** [Stoddard, Philip K.])

Response: *As described in the draft EIS, seepage of hypersaline water from the CCS (cooling-canal system) associated with the existing Turkey Point Units 3 and 4 has resulted in areas of groundwater salinity higher than seawater near the CCS. This is part of the existing environment for the proposed Units 6 and 7. After publication of the draft EIS, the review team performed additional groundwater modeling of the interaction between the planned RCWs (radial collector wells), the existing hypersaline plume, and the cooling canals using a two-dimensional cross section model and a limited-extent three-dimensional model called the Review Team Focused (RTF) model.*

These simulations were performed to better understand the effects of RCW pumping on salinity in the aquifer beneath the bay combined with the existing hypersaline plume from the Unit 3 and 4 cooling canals and planned remediation actions. This model was useful in showing salinity changes that occur in the aquifer near the RCWs when the wells are operated. The results showed that when the wells are not operating, hypersaline water from the cooling canals is present in the high permeability zone where the well laterals are installed. This saline water is drawn into the wells during the first few days of RCW pumping, resulting in increasing, then decreasing salinity at the well. The RTF model predicts that the salinity of the water produced by the operating RCW eventually drops to about the concentration of the bay water. Water flowing down through the bed of the bay and into the RCWs is therefore expected to have about the same salinity as bay water. When RCW pumping ceases, water in the high permeability zone again increases in salinity because of the migration of water from the hypersaline plume. This migration of hypersaline water into the high-permeability zone would occur regardless of the presence of the RCWs.

Predicted future change in sea level and its effect on interactions between the RCWs and the hypersaline plume were also simulated. The additional modeling confirmed that pumping of the RCWs would move hypersaline water toward the RCWs and would remove some groundwater captured by the RCWs from the hypersaline plume region of the Biscayne aquifer. The model also indicated that RCWs pumping is not likely to reduce the effectiveness of hypersaline plume remediation actions specified in the consent order between FPL and Miami Dade County. Reclaimed wastewater would be the primary source of cooling water for the proposed reactors. Saline water from the RCWs beneath Biscayne Bay would only be used when reclaimed treated wastewater is not available in sufficient quantity or quality, and for a maximum

of 60 days per year that is permitted under the Florida State COCs. There is a very large volume of treated municipal wastewater available for this purpose, but the treated wastewater is not suitable for normal uses of fresh water, such as for drinking or agriculture. Accordingly, the treated municipal wastewater can be used for cooling for proposed Turkey Point Units 6 and 7 without affecting the ability to meet demands for fresh water. MDWASD is required to direct 60 percent of the wastewater flows to reuse by 2025 and to cease using ocean outfalls by 2025 under the Florida State Ocean Outfall Legislation Compliance Plan, Chapter 2008-232 Laws of Florida Wastewater Disposal/Ocean Outfalls [Section 403.086 (9), Florida Statutes and Amendment CS/SB 444]. Therefore, the NRC staff concluded that the reclaimed water supply is reliable and use of the RCWs for short periods of time is likely to have small impacts on groundwater users or on the extent of saltwater intrusion based on the FPL model analysis, USGS modeling analysis, the NRC review team's modeling of the CCS-RCW interaction, and the knowledge that environmental monitoring and potential mitigation measures are required under the COCs imposed by Florida State. Therefore, it is likely that the RCWs would be used less than the 60 days per year permitted under the COCs. Based on the review teams analysis, there is no reason to expect that building and operating the proposed plants would increase the impacts of the existing hypersaline plume or lead to additional demand for water from the L-31E Canal.

Comment: The current determination that there would not be an environmental problem with the proposed radial collector wells as long as they were not used more than 60 days per year. The current emergency use of Aquifer water has certainly gone far beyond any length of time imagined, and in fact is proposed to be used for at another two year, drawing 100 million gallons of water every single day. Thus the draft statement fails to comprehensively address the long term viability of providing fresh water to the plant as a backup to the reuse water. The potable drinking water resource for 2.5 million residents of Miami Dade County will be in competition for water drawn from the aquifer for the voraciously thirsty nuclear plants. (**0145-10** [Lerner, Cindy])

Response: *Reclaimed wastewater would be the primary source of cooling water for the proposed reactors. Saline water from the RCWs beneath Biscayne Bay would only be used when reclaimed treated wastewater is not available in sufficient quantity or quality, and for a maximum of 60 days per year that is permitted under the Florida State COCs. A very large volume of treated municipal wastewater is available for this purpose, but the treated wastewater is not suitable for normal uses of freshwater, such as for drinking or agriculture. Accordingly, the treated municipal wastewater can be used for cooling proposed Turkey Point Units 6 and 7 without affecting the ability to meet demands for freshwater. The MDWASD is required to direct 60 percent of the wastewater flows to reuse by 2025 and to cease using ocean outfalls by 2025 under the Florida State Ocean Outfall Legislation Compliance Plan, Chapter 2008-232 Laws of Florida Wastewater Disposal/Ocean Outfalls [Section 403.086 (9), Florida Statutes and Amendment CS/SB 444]. Therefore, the NRC staff concluded that the reclaimed-water supply is reliable and use of the RCWs for short periods of time is likely to have small impacts on groundwater users or on the extent of saltwater intrusion based on the FPL model analysis, USGS modeling analysis, the NRC review team's modeling of the CCS-RCW interaction, and the knowledge that environmental monitoring and potential mitigation measures are required under the COCs imposed by Florida State*

Cooling the main condenser is not a safety function in the AP1000 design. Accordingly, there is no NRC requirement for a contingency plan to supply emergency backup cooling water to the main condenser if reclaimed water is not available and the 60-day limitation on RCW pumping is exhausted. The plant can be safely shut down if water is not available from either source. Safety-related cooling water is stored onsite and can be replenished from multiple

sources. The EIS analysis assumes that the RCWs would not operate more than 60 days per year, the primary source of cooling water—reclaimed wastewater from the MDWASD—should be highly reliable, and therefore the availability of backup cooling-water supplies need not be evaluated. Further, the NRC staff also considered alternative sources of cooling water in EIS Section 9.4.2, none of which are environmentally preferable to the proposed sources of cooling water. In view of the high reliability of the reclaimed wastewater source and the availability of the RCW system as a backup, there is no need to consider additional backup sources of cooling water.

Comment: The potential for interactions between the operations of the radial collector wells and the hypersaline plume leads to inherent risks and potential environmental impacts that are not adequately addressed in the DEIS. The construction and operation of Units 6 & 7 will likely increase the input of materials into the CCS, altering the concentrations of dissolved contaminants. Interactions between radial collector wells and CCS waters could result in the transport of contaminants and nutrients into underground waters that are connected with the waters of Biscayne Bay, potentially causing algal blooms and indirect threats to its ecological health and sustainability. [Footnote 27: West, B. United States Department of the Interior, National Park Service Letter to A. Williamson, U.S. Nuclear Regulatory Commission, November 25, 2014, SER PC, 6-8.]The DEIS must analyze and review monitoring information regarding contaminants of environmental concern, such as salinity, nutrients, metals, and sulfate. (**0113-2-4** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Response: *As discussed in the draft EIS, the combined impacts of the planned discharge of groundwater from excavation dewatering and stormwater to the CCS while building the plants, and the chemical inputs to the Units 3 and 4 cooling canal system (CCS) from muck spoils runoff and cooling-tower drift are expected to cause minor changes in the water levels or chemistry of the CCS. Potential changes in nitrate concentration from muck runoff are presented in the draft EIS. Water from the CCS does seep into the Biscayne aquifer below the CCS beneath the site, as it has for decades. However, this seepage is not a result of planned Units 6 and 7, and the draft EIS analysis shows that the effects of the expected volume and concentration of the seepage would be minor and temporary. Any increase in volume and concentration of the seepage from the CCS to the underlying portion of the Biscayne aquifer is not expected to have a noticeable impact on the quality of groundwater in the areas of the Biscayne aquifer that meet USDW criteria for TDS.*

After publication of the draft EIS, the review team performed additional groundwater modeling of the interaction between the planned RCWs, the existing hypersaline plume, and the cooling canals using a two-dimensional cross-section model and a limited-extent three-dimensional model. The review team used the RTF (Review Team Focused) model, to perform simulations to better understand the effects of RCW pumping on salinity in the aquifer beneath the bay combined with the existing hypersaline plume from the Units 3 and 4 cooling canals and planned remediation actions.

The RTF model was useful in showing salinity changes that occur in the aquifer near the RCWs when the wells are operated. The results showed that when the wells are not operating hypersaline water from the cooling canals is present in the high-permeability zone where the well laterals are installed. This saline water is drawn into the wells during the first few days of RCW pumping, resulting in increasing, then decreasing, salinity at the well. The RTF model predicts that the salinity of the water produced by the operating RCW eventually drops to about the concentration of the bay water. Water flowing down through the bed of the bay and into the

RCWs is therefore expected to have about the same salinity as bay water. When RCW pumping ceases, water in the high-permeability zone again increases in salinity because of the migration of water from the hypersaline plume. This migration of hypersaline water into the high-permeability zone would occur regardless of the presence of the RCWs. Predicted future change is sea level and its effect on interactions between the RCWs and the hypersaline plume were also simulated. The additional modeling confirmed that pumping of the RCWs would move hypersaline water toward the RCWs and would remove some groundwater captured by the RCWs from the hypersaline plume region of the Biscayne aquifer. The model also indicated that RCWs pumping is not likely to reduce the effectiveness of hypersaline plume remediation actions specified in the consent order between FPL and Miami Dade County. Migration of metals and of nutrients from the cooling canals toward Biscayne Bay could occur when the RCWs are operated and then turned off. The constituents would tend to be removed from the aquifer and captured by the RCWs while they are operating. The concentration change of these constituents in the aquifer beneath the bay are expected to be proportional to salinity changes that were simulated in the additional limited 3D modeling. As described in the EIS, the salinity changes are small and would be further diluted and dispersed by water in the bay. It is unlikely that the very small mass of nutrients moving into the bay by this mechanism would contribute to algal blooms or increase concentration of metals by a noticeable degree.

Reclaimed wastewater would be the primary source of cooling water for the proposed reactors. Saline water from the RCWs beneath Biscayne Bay would only be used when reclaimed treated wastewater is not available in sufficient quantity or quality, and for a maximum of 60 days per year that is permitted under the Florida State COCs. A very large volume of treated municipal wastewater is available for this purpose, but the treated wastewater is not suitable for normal uses of freshwater, such as for drinking or agriculture. Accordingly, the treated municipal wastewater can be used as cooling water for proposed Turkey Point Units 6 and 7 without affecting the ability to meet demands for freshwater. MDWASD is required to direct 60 percent of the wastewater flows to reuse by 2025 and to cease using ocean outfalls by 2025 under the Florida State Ocean Outfall Legislation Compliance Plan, Chapter 2008-232 Laws of Florida Wastewater Disposal/Ocean Outfalls [Section 403.086 (9), Florida Statutes and Amendment CS/SB 444]. Therefore, the NRC staff concluded that the reclaimed-water supply is reliable and use of the RCWs for short periods of time would be likely to have small impacts on groundwater users or on the extent of saltwater intrusion based on the FPL model analysis, USGS modeling analysis, the NRC review team's modeling of the CCS-RCW interaction, and the knowledge that environmental monitoring and potential mitigation measures are required under the COCs imposed by Florida State. Therefore, it is likely that the RCWs would be used less than the 60 days per year permitted under the COCs.

Based on the modeling efforts described in the draft EIS, more than 90 percent of the water pumped when the RCWs are operating is expected to come from Biscayne Bay and small amounts would come from the hypersaline plume beneath the cooling canals, the inland part of the Biscayne aquifer, and the drainage canals. The models described above provided evidence that limited pumping of the RCWs as a backup water supply (less than 60 days per year) is unlikely to cause a noticeable change in the existing extent of saltwater intrusion or to reduce the flow of relatively freshwater into Biscayne Bay compared to the variability that occurs under current conditions. Dissolved nutrients and metals that may migrate from the CCS to the Biscayne aquifer would be approximately proportional to the modeled salinity movement and would not result in significant changes in the bay.

The review team recognizes that complete knowledge of the hydrologic system associated with the RCWs is not now available, and that uncertainties therefore remain in the impact

analysis. A vast number of future scenarios are plausible. The sources of uncertainty in the RCW analysis include heterogeneity in subsurface parameters, lack of experience with RCW systems in carbonate strata, and uncertainty in the potential need for using the backup water supply. Uncertainties in the future site environment include freshening of IWF cooling canals, remediation of the subsurface hypersaline plume, and the magnitude and rate of future sea-level rise.

The determinations in this EIS related to groundwater are based on the FPL numerical model analysis, the USGS model analysis, the review team's independent numerical modeling analysis, and the review team's knowledge and expertise. The conceptual models that served as the basis for the numerical models are based on available characterization information for the Turkey Point site and surrounding region. Uncertainties in the information and conceptual model were addressed in some cases by performing multiple model runs while varying key parameters in the model and in other cases by using conservative parameter values. However, uncertainties remain that do not allow the review team to assert that no other conceptual models that may result in more adverse impacts from RCW operation are plausible. Heterogeneity in subsurface parameters, lack of experience with RCW systems in carbonate strata, and uncertainty in the future site environment (e.g., freshening of IWF, remediation of subsurface hypersaline plume, sea-level rise) all warrant the review team to exercise care to avoid relying on numerical models alone. Because of this, the review team does not rely solely on the output of any numerical model.

Numerical models are numerical representations of complex processes occurring in three dimensions over time. The appropriate role of a numerical model is to test the assumptions of the behavior of complex systems. While even running a numerical model numerous times with different parameters cannot compensate for all uncertainties, the models employed here have been tested and benchmarked within the conditions that limit their application. In this assessment the review team analysts used models to test possible consequences of changes in the affected environment and uncertainty in some subsurface parameters within the capability of the models employed. This information was combined with the geography of the RCW field (such as the relatively short distance from the laterals to the bottom of Biscayne Bay relative to the distance from the laterals to the Homestead well fields) and the COC requirement of a monitoring program with mitigation options. The review team determined that the proposed monitoring of RCW construction and operation that is included is sufficient to detect unexpected behavior in a timely manner. While all possible mitigation measures have not yet been spelled out at this time, in accordance with the COC, the review team considers the ultimate mitigation of ceasing operation of the RCWs as ensuring prevention of any impacts in a timely manner. "When harm occurs, or is imminent, SFWMD would require Licensee to modify withdrawal rates or mitigate the harm" (FDEP 2014-TN4371).

Cooling the main condenser is not a safety function in the AP1000 design. Accordingly, there is no NRC requirement for a contingency plan to supply for emergency backup cooling water to the main condenser if reclaimed water is not available and the 60-day limitation on RCW pumping is exhausted. The plant can be safely shut down if water is not available from either source. Safety-related cooling water is stored onsite and can be replenished from multiple sources. The EIS analysis assumes that the RCWs would not operate more than 60 days per year, the primary source of cooling water—reclaimed wastewater from the MDWASD—should be highly reliable, and therefore the availability of backup cooling-water supplies need not be evaluated. Further, the review team also considered alternative sources of cooling water in EIS Section 9.4.2, none of which are environmentally preferable to the proposed sources of cooling water. In view of the high reliability of the reclaimed wastewater source and the availability of

the RCW system as a backup, there is no need to consider additional backup sources of cooling water.

Comment: As the NRC awaits the NEPA required studies, including this Draft EIS Statement and the final safety analysis, we have found that there are still significant environmental impacts that must be addressed. In reviewing the EIS on behalf of our residents --not only our residents but all of Southeast Florida we have several major concerns. The first of which is the major impact these plants will have on our water supply in the Biscayne aquifer. FPL's proposing using millions of gallons of reclaimed wastewater as the primary source of cooling for the two nuclear reactors. However, the discharge of the wastewater will still have an adverse impact on our groundwater. We've seen that the theory that went into the use of the cooling canals has fallen to pieces because it is completely dysfunctional. They are now requesting up to 100 million gallons a day for the next two years. When we questioned this morning, at the Government to Government session with the individuals conducting the study, whether they were incorporating the current crisis we see we are facing because we are now in competition with a very voraciously thirsty nuclear power plant for our source of drinking water. That issue is not being considered in the current EIS because these problems came to the forefront as they were concluding this EIS. So when we asked, will there be a supplemental Environmental Impact Statement where you do address what we are currently experiencing and have no way of knowing how long this could go on, it could go on indefinitely? We didn't get a clear answer, that there will be a supplement Environmental Impact Statement. And when we asked, how do you make a cumulative and thorough analysis without relying on the current crisis, we did not get a sufficient answer. (**0721-3-2** [Lerner, Cindy])

Response: *Water in the Biscayne aquifer in the vicinity of Turkey Point has elevated salinity and TDS above USDW standards because of saltwater intrusion from the sea and cannot be used as a drinking water source without treatment. In South Florida, the amount of saltwater intrusion has increased over the past several decades because of the drainage of wetlands and groundwater pumping in inland areas, which is unrelated to operations at Turkey Point. Seepage of hypersaline water from the CCS (cooling-canal system) associated with existing Turkey Point Units 3 and 4 has also resulted in areas of groundwater salinity higher than seawater near the CCS.*

As discussed in the draft EIS, only the RCWs (radial collector wells), planned as a backup cooling-water source, and limited inputs to the CCS while building the plants are expected to have any potential impact on the salinity of groundwater in the Biscayne aquifer. As discussed in the draft EIS, the combined impacts of the planned discharge of groundwater from excavation dewatering and stormwater to the CCS while building the plants, and the chemical inputs to the CCS from muck spoils runoff and cooling-tower drift, are expected to cause minor changes in the water levels, salinity, or other chemical concentrations of the CCS. As stated in the draft EIS, saline water from the RCWs beneath Biscayne Bay would only be used when reclaimed treated wastewater is not available in sufficient quantity or quality, and for a maximum of 60 days per year that is permitted under the Florida State COCs.

A very large volume of treated municipal wastewater is available for this purpose, but the treated wastewater is not suitable for normal uses of freshwater, such as for drinking or agriculture. Accordingly, the treated municipal wastewater can be used for cooling proposed Turkey Point Units 6 and 7 without affecting the ability to meet demands for freshwater. MDWASD is required to direct 60 percent of the wastewater flows to reuse by 2025 and to cease using ocean outfalls by 2025 under the Florida State Ocean Outfall Legislation Compliance Plan, Chapter 2008-232 Laws of Florida Wastewater Disposal/Ocean Outfalls

[Section 403.086 (9), Florida Statutes and Amendment CS/SB 444]. Therefore, the NRC staff concluded that the reclaimed-water supply is reliable and use of the RCWs for short periods of time is likely to have small impacts on groundwater users or on the extent of saltwater intrusion based on the FPL model analysis, USGS modeling analysis, the NRC review team's modeling of the CCS-RCW interaction, and the knowledge that environmental monitoring and potential mitigation measures are required under the COCs imposed by Florida State. If reclaimed water is not available and the 60-day limitation on RCW pumping is exhausted, the plant can be safely shut down.

Cooling the main condenser is not a safety function in the AP1000 design. Accordingly, there is no NRC requirement for a contingency plan to supply emergency backup cooling water to the main condenser if reclaimed water is not available and the 60-day limitation on RCW pumping is exhausted. The plant can be safely shut down if water is not available from either source. Safety-related cooling water is stored onsite and can be replenished from multiple sources. The EIS analysis assumes that the RCWs would not operate more than 60 days per year, the primary source of cooling water—reclaimed wastewater from the MDWASD—should be highly reliable, and therefore the availability of backup cooling-water supplies need not be evaluated. Further, the review team also considered alternative sources of cooling water in EIS Section 9.4.2, none of which are environmentally preferable to the proposed sources of cooling water. In view of the high reliability of the reclaimed wastewater source and the availability of the RCW system as a backup, there is no need to consider additional backup sources of cooling water.

Comment: The second omission is a failure to note a possible harm to Biscayne Bay National Park's eco system if the hypersaline plume is relocated into Biscayne Bay. The Draft Impact Statement indicates that intermittent pumping, which is what's proposed, could displace the hypersaline plume into the path of fresh water flowing eastward. Here's a quote: "Intermittent operation could result in an increase of hypersaline flow into the aquifer beneath the bay that could migrate into the bay when the radial collector wells are not operating." G-29. So emergence of the hypersaline water into Biscayne Bay could result in a localized hypersalinity that would kill sea grass beds in Biscayne National Park, which is what happened during a period of hypersalinity in Florida Bay in Everglades National Park in the early 1990's, and those areas of Everglades National Park remain dead zones to this day. So the Draft Impact Statement is incomplete because it doesn't evaluate the possible harm to the ecosystem of Biscayne Bay, Biscayne National Park if the hypersaline plume under the cooling canals is forced in to the Bay by pumping from the radial collector wells. (**0721-2-4** [Stoddard, Philip K.])

Response: *The review team acknowledges that the distribution of contaminants from the cooling canals in groundwater beneath Biscayne Bay could be affected to some degree by pumping of the planned RCWs beneath Biscayne Bay. After publication of the draft EIS, the NRC staff performed additional groundwater modeling of the interaction between the planned RCWs, the existing hypersaline plume, and the cooling canals using a two-dimensional cross-section model and a limited-extent three-dimensional model. The review team used the RTF (Review Team Focused) model, to perform simulations to better understand how the existing hypersaline plume may be affected by RCW pumping combined with remediation actions recently stipulated in the recent consent order between FPL and Miami-Dade County.*

This model was useful in showing salinity changes that occur in the aquifer near the RCWs when the wells are operated. The results showed that when the wells are not operating hypersaline water from the cooling canals is present in the high-permeability zone where the well laterals are installed. This saline water is drawn into the wells during the first few days of

RCW pumping, resulting in increasing, then decreasing, salinity at the well. The RTF model predicts that the salinity of the water produced by the operating RCW eventually drops to about the concentration of the bay water. Water flowing down through the bed of the bay and into the RCWs is therefore expected to have about the same salinity as bay water. When RCW pumping ceases, water in the high-permeability zone again increases in salinity because of the migration of water from the hypersaline plume. This migration of hypersaline water into the high-permeability zone would occur regardless of the presence of the RCWs.

Predicted future change in sea level and its effect on interactions between the RCWs and the hypersaline plume were also simulated. The additional modeling confirmed that pumping of the RCWs would move hypersaline water toward the RCWs and would remove some groundwater captured by the RCWs from the hypersaline plume region of the Biscayne aquifer. The model also indicated that RCWs pumping is not likely to reduce the effectiveness of hypersaline plume remediation actions specified in the consent order.

Reclaimed wastewater would be the primary source of cooling water for the proposed reactors. Saline water from the RCWs beneath Biscayne Bay would only be used when reclaimed treated wastewater is not available in sufficient quantity or quality, and for a maximum of 60 days per year that is permitted under the Florida State COCs. A very large volume of treated municipal wastewater is available for this purpose, but the treated wastewater is not suitable for normal uses of fresh water, such as for drinking or agriculture. Accordingly, the treated municipal wastewater can be used for cooling proposed Turkey Point Units 6 and 7 without affecting the ability to meet demands for fresh water. MDWASD is required to direct 60 percent of the wastewater flows to reuse by 2025 and to cease using ocean outfalls by 2025 under the Florida State Ocean Outfall Legislation Compliance Plan, Chapter 2008-232 Laws of Florida Wastewater Disposal/Ocean Outfalls [Section 403.086 (9), Florida Statutes and Amendment CS/SB 444]. Therefore, the NRC staff concluded that the reclaimed water supply is reliable, and it is likely that the RCWs would be used less than the 60 days per year permitted under the COCs. The modeling described above provided evidence that limited pumping of the RCWs as a backup water supply less than 60 days per year is unlikely to cause a significant increase in salinity within the bed of Biscayne Bay or within the bay itself compared to the variability that occurs under current conditions.

The review team recognizes that complete knowledge of the hydrologic system associated with the RCWs is not now available, and that uncertainties therefore remain in the impact analysis. A vast number of future scenarios are plausible. The sources of uncertainty in the RCW analysis include: heterogeneity in subsurface parameters, lack of experience with RCW systems in carbonate strata, and uncertainty in the potential need for using the backup water supply. Uncertainties in the future site environment include: freshening of IWF cooling canals, remediation of the subsurface hypersaline plume, and the magnitude and rate of future sea-level rise.

The determinations in this EIS related to groundwater are based on the FPL numerical model analysis, the USGS model analysis, the review team's independent numerical modeling analysis, and the review team's knowledge and expertise. The conceptual models that served as the basis for the numerical models are based on available characterization information for the Turkey Point site and surrounding region. Uncertainties in the information and conceptual model were addressed in some cases by performing multiple model runs while varying key parameters in the model and in other cases by using conservative parameter values. However, uncertainties remain that do not allow the review team to assert that no other conceptual models that may result in more adverse impacts from RCW operation are plausible. Heterogeneity in

subsurface parameters, lack of experience with RCW systems in carbonate strata, and uncertainty in the future site environment (e.g., freshening of IWF, remediation of subsurface hypersaline plume, sea-level rise) all warrant the review team to exercise care to avoid relying on numerical models alone. Because of this, the review team does not rely solely on the output of any numerical model.

Numerical models are numerical representations of complex processes occurring in three dimensions over time. The appropriate role of a numerical model is to test the assumptions of the behavior of complex systems. While even running a numerical model numerous times with different parameters cannot compensate for all uncertainties, the models employed here have been tested and benchmarked within the conditions that limit their application. In this assessment the review team analysts used models to test possible consequences of changes in the affected environment and uncertainty in some subsurface parameters within the capability of the models employed. This information was combined with the geography of the RCW field (such as the relatively short distance from the laterals to the bottom of Biscayne Bay relative to the distance from the laterals to the Homestead well fields) and the COC requirement of a monitoring program with mitigation options. The review team determined that the proposed monitoring of RCW construction and operation that is included is sufficient to detect unexpected behavior in a timely manner. While all possible mitigation measures have not yet been spelled out, in accordance with the COC, the review team considers the ultimate mitigation of ceasing operation of the RCWs as ensuring prevention of any impacts in a timely manner. "When harm occurs, or is imminent, SFWMD will require Licensee to modify withdrawal rates or mitigate the harm" (FDEP 2014-TN4371).

If reclaimed water is not available and the 60 day limitation on RCW pumping is exhausted, the plant can be safely shut down. Cooling the main condenser is not a safety function in the AP1000 design. Accordingly, there is no NRC requirement for a contingency plan to supply for emergency backup cooling water to the main condenser if reclaimed water is not available and the 60-day limitation on RCW pumping is exhausted. The plant can be safely shut down if water is not available from either source. Safety-related cooling water is stored onsite and can be replenished from multiple sources. The EIS analysis assumes that the RCWs would not operate more than 60 days per year, the primary source of cooling water—reclaimed wastewater from the MDWASD—should be highly reliable, and therefore the availability of backup cooling-water supplies need not be evaluated. Further, the NRC staff also considered alternative sources of cooling water in EIS Section 9.4.2, none of which are environmentally preferable to the proposed sources of cooling water. In view of the high reliability of the reclaimed wastewater source and the availability of the RCW system as a backup, there is no need to consider additional backup sources of cooling water.

Comment: Failure to Adequately Address the Cumulative Impacts of Constructing and Operating Units 6 & 7 on Salinity Levels in Groundwater, Surface Water, the Biscayne Aquifer, and Biscayne Bay

The DEIS fails to adequately address the cumulative impacts of constructing and operating Units 6 & 7 on salinity levels in groundwater, surface water, the Biscayne Aquifer, and Biscayne Bay. One of the most significant environmental impacts of the proposed action is the potential for greatly increased salinity levels in an ecosystem that is already stressed by high salinity. The construction and operation of Units 6 & 7 could lead to the expansion and continued migration of the underground hypersaline plume that is currently threatening groundwater supplies. Construction activities would likely add an increased amount of nutrients and dissolved organic materials into the CCS. Adverse environmental impacts could occur if these contaminants reach

the waters of Biscayne Bay. Increased salinities in the project area could result as cumulative impacts when combined with the use of radial wells that withdraw freshwater from Biscayne Bay and the Biscayne Aquifer (increasing salinity levels in the Bay); the reservation of municipal wastewater that might otherwise be used to provide freshwater to Biscayne Bay's littoral zone through BBCW; the failure of FPL to elevate the entire project area and its facilities to protect against saltwater intrusion from sea level rise and storm surge; and the use of injection wells that could increase salinities in the Floridan Aquifer. (**0113-2-10** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Response: *In addition to the review team's conceptual understanding of the processes that would occur with RCW operation, the review team considered three independent modeling studies that are all consistent in projecting only insignificant alterations to both the Biscayne Bay and the surficial aquifer. The review team considered a wide range of baseline environmental conditions to reflect the uncertainty in the baseline environment associated with various proposed actions associated with the industrial wastewater facility (IWF), climate change, and geohydrologic parameter uncertainty. While the environmental baseline may change significantly, the incremental alteration to the hypersaline plume associated with operation of the RCWs remains minor. All of these modeling studies are cumulative analyses. The review team considered both the impact of the proposed plant and a range of other future activities that may also change the environment at the same time. Regarding the potential use of reclaimed wastewater that could be used to "refresh" the Bay under the BBCW, or CERP based on the limited need for freshening water with impaired water quality, the range of available water sources, and the limitations on the timing of water withdrawals, NRC staff have not identified any noticeable effect on the surface water resources used to support CERP. Therefore, the NRC staff considered this practice to have minimal impacts. Moreover, reclaimed wastewater could not be used to "refresh" the Bay without additional treatment. The NRC staff revised the text in Sections 2.3, 5.2, and G.3.2 of the EIS to expand and clarify the process and findings of the analysis of the potential alteration of the hypersaline plume caused by the operation of the radial collector well (RCW) system.*

Comment: What are the impacts of this [drift] on the aquifer? (**0721-22-14** [Schwartz, Matthew])

Response: *As discussed in Section 5.3.1 of the EIS, cooling-tower drift would be deposited on the ground surface in the vicinity of the proposed Turkey Point Unit 6 and 7 mechanical draft cooling towers and the surface of the existing Units 3 and 4 cooling canals and the Biscayne Bay. Most of this drift would fall on Biscayne Bay and the existing cooling canals. As described in Chapter 3 of the EIS, drift of cooling water from the proposed plants cooling towers would total about 8 gpm. The effects of drift on the Bay and the existing cooling canals would be small because the amount of salt and other chemical constituents in the drift is negligible compared to the volume of the Bay and the cooling canals. In regard to the underlying Biscayne aquifer, the impact of salt and other chemical constituents in the drift would be expected to be negligible because the salinity of water in the aquifer in this area is already elevated by saltwater intrusion from the bay and by the hypersaline groundwater plume from the cooling canals.*

Comment: That's what the EIS is supposed to look at, what exactly is in that wastewater going in? (**0723-9-16** [Schwartz, Matthew])

Response: *Table 3-5 lists the constituents of the reclaimed wastewater and their concentrations at the point of injection. Table 5-2 lists those that would be released in cooling-tower drift (water droplets emitted from the cooling towers). Some of these constituents are volatile and would evaporate in the cooling towers, and some would be injected by deep wells*

into the Boulder Zone along with the remaining used cooling water. Sections 5.2 and 5.3 of the EIS include detailed descriptions of the constituents predicted to be present in cooling-tower drift, the rates and patterns of drift deposition, and the potential environmental impacts of the drift. No changes were made to the EIS in response to this comment.

Comment: Neither the draft EIS nor the EFH assessment describe another type of frac-out associated with horizontal directional drilling (HDD), the construction method for the RCWs. During HDD, drilling mud can escape into the environment through fractures in the rock potentially degrading EFH. The Southeast Florida Coral Reef Initiative's *Best Management Practices (BMPs) for Construction, Dredge and Fill and Other Activities Adjacent to Coral Reefs*[1] [footnote 1: 1 Available at: www.floridadep.org/coastal/programs/coral/reports/MICCI/MICCI_6_BMP_Manual.pdf] notes the risk of frac-outs occurring can be reduced through proper geotechnical assessment practices and prudent drill planning and execution. The BMPs also describe how the extent of damage from a frac-out can be limited by carefully monitoring the hydraulic pressure and having the appropriate response equipment and contingency plans ready in the event that a frac-out occurs. While these measures and BMPs are useful in reducing and limiting the occurrence of frac-outs, direct measures of borehole pressure may be necessary for the agencies to have reasonable assurance that damage from frac-outs would be minimal. Stauber et al. (2003) presents a method for predicting borehole pressure by means of a demand-capacity analysis. With a calculated maximum allowable borehole pressure curve for a given HDD bore profile, specifications could require borehole pressure be maintained below the maximum allowable value or to maintain rheological properties within specified limits. (**0724-6** [Fay, Virginia M.])

Response: *The Florida State Conditions of Certification require following submission and approval of a drilling plan for construction of the radial collector wells and contingency plans for natural or man-made uncontrolled release of excavated material (State of Florida 2014-TN3637). These plans will include "Best Management Practices" such as those mentioned in the comment. FPL has also provided a plan stating that the laterals would be drilled using a reverse circulation method with water from the formation as the drilling fluid and cuttings being circulated from the drill bit back to the central radial caisson, where the fluid and cuttings would be collected. No drilling mud would be used. Accordingly, a "frac-out" that would result in flow of any material into the bay, is not a possibility.*

Comment: The NMFS requests the NRC update final EIS and EFH assessment to describe plans to perform close monitoring along the RCW lateral pipelines during construction to ensure frac-outs are identified and remediated immediately and, if necessary, compensatory mitigation implemented. To assist with developing this monitoring plan for the Turkey Point RCWs, the NMFS will send separate from this letter monitoring plans used by the NMFS, USACE, and Florida Department of Environmental Protection (FDEP) for similar projects. (**0724-7** [Fay, Virginia M.])

Response: *Best Management Practices (BMPs) would be used during the construction of the RCW caissons and laterals. These BMPs would involve monitoring along the laterals, as mentioned in the comment. Monitoring and contingency plans would also be required by the Florida State COCs and would limit the potential impacts on Biscayne Bay that might result from the release of material such as drill cuttings through natural or induced fractures. The review team understands further that the RCW laterals would be drilled using a reverse circulation method with water from the formation serving as the drilling fluid and cuttings being circulated from the drill bit back to the central radial caisson, where the fluid and cuttings would be*

collected. No drilling mud would be used. No changes were made to the EIS in response to this comment.

Comment: DEIS Subsection 4.2.1: There are inconsistencies in the DEIS regarding the duration of dewatering activities: a. DEIS Subsection 4.2.1.1, Page 4-27, Lines 37-41: The DEIS states: "...the expected dewatering flow rate into the IWF would be 1,000 gpm for 13 weeks, followed by 1,200 gpm for 13 weeks, followed by an extended period at 200 gpm. However, taking a conservative approach, FPL assumed that the maximum dewatering flows would be 1,200 gpm for 1 year followed by 200 gpm for a period of about 24 months." b. DEIS Subsection 4.2.1.2, Page 4-29, Lines 26-29: The DEIS states: "FPL (2014-TN4058) estimated that a maximum of 1,000 gpm of groundwater would be pumped for up to 13 weeks at each of the two deep excavation pits during the initial excavation and grouting phase, followed by a 24-month period of pumping at up to 200 gpm."; c. DEIS Subsection 4.2.1.4, Page 4-33, Lines 17-19: The DEIS states: "The 1,200 gpm (1.7 Mgd) discharge that could occur over the course of a year..." The following explanation can be used to reconcile each of these inconsistencies: Because the start of the plant excavation would be staggered, the expected total maximum dewatering flow rate into the IWF would be 1,000 gpm for 6 months, followed by 1,200 gpm for 6 months, followed by 400 gpm for 18 months and then 200 gpm for 6 months. However, taking a conservative approach, FPL assumed that the maximum dewatering flows would be 1,200 gpm for 1 year followed by 400 gpm for a period of about 24 months. (**0619-4-2** [Maher, William])

Response: *The EIS was modified to clarify the expected flow rates from the excavations and the more conservative flow rates applied in the FPL analysis.*

Comment: DEIS Subsection 7.2.2.2, Page 7-15, Lines 17-19: The DEIS states: "FPL determined that adding the requested **2,000 gpm** of brackish water would increase the water level of the canals by 0.25 ft (Tetra Tech 2014-TN4126) and eventually reduce salinity to approximately that of Biscayne Bay." The reference states: "The first model configuration, called the unconstrained model, predicted water levels in the CCS considering the addition of **14 mgd** of Floridan water. This model was used to determine the increase in canal stage that would likely result from the added inflow: an average of 0.25 ft due to the Floridan-based inflow". The 14 mgd stated in the reference is equivalent to 9722 gpm, which is inconsistent with the 2000 gpm stated in the DEIS. (emphasis added) (**0619-5-8** [Maher, William])

Response: *The expected flow of water for IWF freshening was corrected to 14 Mgd.*

Comment: The other point that I heard brought up is the water re-injection into the wells. Currently that is the process that Miami-Dade uses with their wastewater, they re-inject into the wells -- into the groundwater. The only difference we're doing is we're taking that water, treating it, using it to cool our reactor and then re-injecting it. So the process is actually cleaner than the current process that Miami-Dade has for disposing of wastewater. (**0721-15-10** [Kuraza, Devon])

Response: *The EIS discusses changes to the reclaimed water, including higher water temperature, increase salinity, and the addition of other waste streams that include radionuclides, caused by its use in cooling the proposed reactors. However, the review team agrees that there is a benefit in using reclaimed water. MDWASD is required to direct 60 percent of its wastewater flows to reuse by 2025 and to cease using ocean outfalls by 2025 under the Florida State Ocean Outfall Legislation Compliance Plan (Miami-Dade County 2013-TN4786).*

Comment: We also have to look at the assumptions that you're making about the water supply, the radial well collectors and how well they'll operate under super-salinity conditions. And the wastewater supply which is drying up in South Florida. This plant is going to assume that you're going to consumer 50 million gallons a day of water, and that's huge. This is just for 6 and 7, incremental demand. (**0723-12-14** [Henry, Jim])

Response: *Higher salinity of cooling water resulting from capture of some hypersaline plume water by the RCWs would not have a significant effect on the plant cooling system. The NRC review team determined that the RCWs are likely to be used infrequently and for short durations. There is a very large volume of treated municipal wastewater that can be used for cooling the proposed plants without affecting the ability to meet demands for freshwater. MDWASD is required to direct 60 percent of the wastewater flows to reuse by 2025 and to cease using ocean outfalls by 2025 under the Florida State Ocean Outfall Legislation Compliance Plan Chapter 2008-232 Laws of Florida Wastewater Disposal/Ocean Outfalls [Section 403.086 (9), Florida Statutes and Amendment CS/SB 444].*

E.2.9 Comments Concerning Ecology - Terrestrial

Comment: It's [the reactor] going to destroy wetlands[.] (**0008-7** [Finver, Jody])

Response: *The EIS acknowledges that building the new reactors and associated facilities would unavoidably result in the loss of wetland acreage and functions. Impacts on wetlands are described in Sections 4.3.1 and 5.3.1 of the EIS. Section 4.3.1.6 outlines the applicant's proposed wetland mitigation measures and how those mitigation measures would offset wetland functions lost. No changes were made to the EIS as a result of this comment.*

Comment: Potential mitigation measures are speculative, inadequate, and based on incomplete information. (**0113-1-9** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: The DEIS fails to comply with NEPA because its determinations of the project's environmental impacts, dismissal of other alternatives, and recommendation to issue the COL are based on speculative mitigation measures that have not been adequately analyzed. NEPA requires an analysis and discussion of the extent to which adverse effects can be avoided. [Footnote 53: Roberston v. Methow Valley Citizens Council, 490 U.S. 332, 315-352, 1989, 352.] Therefore, the DEIS is insufficient in satisfying the requirements of NEPA because it merely lists "possible" and "potential" mitigation measures for terrestrial impacts of the project. [Footnote 54: Neighbors of Cuddy Mountain v. U.S. Forest Service, 137F.3d 1372, 1380, 9th Cir.1, 1998.] It fails to adequately analyze the effectiveness of the proposed measures in mitigating project impacts, [Footnote 55: NRC, DEIS, 4-3, 4-69, 4-72.] despite the fact that an "essential component of a reasonably complete mitigation discussion is an assessment of whether the proposed mitigation measures can be effective." [Footnote 56: S. Fork Band Council of W. Shoshone of Nevada v. U.S. Department of Interior, 588F.3d 718, 727, 9th Cir., 2009.] Notwithstanding the failure of the DEIS to adequately analyze the efficacy of "proposed" or "possible" mitigation activities, the DEIS gives an impact category to wetland and terrestrial impacts and recommends that the COL be issued based on potential mitigation measures described in the Environmental Report and DEIS. [Footnote 57: NRC, DEIS, 10-28.] The determination of an impact level category for each resource area is based on the assumption the mitigation activities are implemented. "Proposed mitigation efforts" are listed and include an in-lieu fee program, mitigation banks, or permittee responsible mitigation. [Footnote 58: Ibid., 106.] It is unclear as to which combination of mitigation measures will actually be implemented,

considering that some possible mitigation options, including the NPS Hole-in-the Donut Mitigation Bank, are not federally approved and that some programs are not approved by the U.S. Army Corps of Engineers. [Footnote 59: Ibid., 4-71.] Furthermore, the DEIS does not describe why and how mitigation measures will sufficiently offset the loss of wetlands anticipated as a result of this project. In order to comply with NEPA, a more thorough analysis of concrete and actionable mitigation measures must be included in an EIS. The NRC repeatedly states that the U.S. Army Corps of Engineers has not evaluated the proposed mitigation measures because the applicant has not demonstrated that wetland impacts have been avoided or minimized according to Clean Water Act section 404(b)(1) guidelines. [Footnote 60: Ibid., 4-69, 4-70, 4-73.] An evaluation of proposed mitigation measures by the Corps is expected as part of the Corps' Record of Decision, which will not be made until after the Final EIS is issued. Furthermore, the DEIS indicates that further mitigation for wetland and listed species impacts may be required. [Footnote 61: Ibid., 4-72.] It is premature for the NRC to issue a DEIS, assign impact analyses to affected resources, dismiss other alternatives, and issue a preliminary recommendation to issue a COL prior to any substantive analysis of the effectiveness of mitigation measures. The information requirement to make such a determination must be included in the DEIS, rather than any future decision-making process. After reviewing the proposed mitigation for the project, the EPA determined that a permit for the project should not be issued because of "substantial and unacceptable impacts to mangrove wetlands, sawgrass marshes, and submerged aquatic vegetation." [Footnote 62: Gattiana, J. L., United States Environmental Protection Agency Letter to Colonel Alan M. Dodd, U.S. Army Corps of Engineers, April 9, 2015, 4.] Pursuant to the Clean Water Act 404(b)(1) Guidelines [Footnote 63: 40 C.F.R. § 230.91(c).] and a February 6, 1990 Memorandum of Agreement between the Corps and the EPA regarding the Determination of Mitigation under the Clean Water Act 404(b)(1), "an applicant must demonstrate avoidance and minimization of wetland impacts before compensatory mitigation can be considered." [Footnote 64: Gattiana, J. L., United States Environmental Protection Agency Letter to Colonel Alan M. Dodd, U.S. Army Corps of Engineers, April 9, 2015, 3.] The DEIS must therefore include a more substantial discussion and analysis of mitigation measures, rather than a mere identification of "possible" or "potential" mitigation activities, and a sufficient discussion of how mitigation activities would effectively offset the impacts of the proposed projects. In consideration of the fact that the proposed project will have significant negative impacts to the ecology and health of Biscayne Bay, Biscayne National Park, and adjacent sensitive ecological areas, any consideration of adequate mitigation must include mitigation activities that offset these negative impacts by improving the health of these important ecological areas. The BBCW project aims to improve the health of nearshore and wetland areas of Biscayne Bay and Biscayne National Park by rehydrating coastal wetlands. In order to achieve the goals of this project, significant water storage and delivery must be developed in the area adjacent to Turkey Point Power Plant. Much of the lands needed for public ownership to proceed with the project are currently owned and managed by FPL. Transferring such land into public ownership for the purposes of BBCW as originally envisioned by CERP would go a long way towards achieving Everglades restoration goals and the restoration of critical wetland habitat and function in Biscayne Bay. Thus, mitigation measures should include the transfer of FPL land within the footprint of the original and complete BBCW project to public ownership. (**0113-2-14** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Response: *The EIS discusses the applicant's conceptual approach for mitigating impacts on wetlands and other terrestrial ecology resources in Section 4.3.1.6 of the EIS. Although the EIS discussed mitigation at a conceptual level, the discussion is not speculative. The applicant has indicated that each of the mitigation measures discussed in the EIS would be implemented once the project proceeds. Most would be required under one or more Federal or State regulation(s)*

protecting wetlands or other sensitive ecological resources, such as Section 404 of the Clean Water Act, the ESA (Endangered Species Act), or the Florida Power Plant Siting Act. The discussions are based on recommendations and requirements from the local, State, and Federal regulatory agencies that regulate impacts on wetlands and habitat. No changes were made to the EIS specifically as a result of this comment, although the mitigation discussions, primarily addressed in Section 4.3.1.6, have been updated to reflect the latest information available from the applicant.

Comment: The loss of valuable habitat to expand is also unacceptable. We need to protect what is left. (**0066-3** [Wong, Christina])

Comment: *Access Roads[.]* According to the DEIS, "approximately 3 .3 miles of existing paved roads would be improved, and approximately 7 miles of unpaved roads would be paved to provide access to the site." Additionally, "a heavy-haul road would be created between the barge-unloading facility and the building site, which would disturb approximately 5 acres. The heavy-haul road would be 2 miles long and 24 ft. wide, and would include new heavy-haul bridges across the existing discharge and return cooling canals." A patchwork of new roads would further fragment important habitat for Florida Panthers and other wildlife, and create impediments for restoring hydrological flows. The NPS encourages land protection and restoration efforts, such as those under EEL, to offset these impacts. (**0622-2-13** [Austin, Stan])

Response: *Section 4.3.1 of the EIS acknowledges habitat losses and fragmentation caused by building the proposed facilities. Mitigation proposed by the applicant to address terrestrial ecology impacts from building the proposed new facilities in compliance with local and State regulatory requirements is presented in Section 4.3.1.6. No changes were made to the EIS as a result of these comments.*

Comment: The DEIS fails to provide an adequate analysis of the direct, indirect, and cumulative impacts of the construction and operation of transmission lines and access roads on sensitive wetlands, wildlife, and CERP activities. (**0113-1-6** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Response: *The NRC staff discusses in detail impacts of the construction and operation of transmission lines and access roads on sensitive wetlands and wildlife in Sections 4.3.1 and 5.3.1 of the EIS. Cumulative impacts on wetlands, wildlife, and CERP activities are addressed in Section 7.3. The review team has added additional detail to the impact discussions based on new information available subsequent to publication of the draft EIS, but made no changes to the EIS specifically as a result of this comment.*

Comment: *Pipelines (potable and reclaimed water)[.]* Pipelines would be installed between the MDWASD South District Wastewater Treatment Plant and the reclaimed water-treatment facility at the Turkey Point site. The potable water line would include approximately 10 miles of new pipeline, most of it along existing roads or corridors. Approximately 2.5 miles of pipeline construction would involve new land disturbance, and the pipeline would affect 326 acres, including 184 acres of wetlands. The reclaimed water pipeline would include approximately 9 miles of new pipeline, approximately 2.5 miles of which would be in a new pipeline corridor. According to the DEIS, approximately 1,886 ac of upland, forested, and wetland habitats would be affected as well as mangrove swamp, mixed wetland hardwoods, shrub and brushland, wetland shrubs, freshwater marsh, mixed rangeland, and herbaceous prairie. The NPS encourages land protection and restoration efforts, such as those under EEL (described above), to offset the pipeline-related impacts. (**0622-2-10** [Austin, Stan])

Comment: *Transmission line crossing under the Miami River[.]* According to USACE's public notice, "A short section of the proposed Davis-Miami 230-kV transmission line, at the crossing of the Miami River adjacent to the existing FPL Miami substation, is proposed to be constructed as an underground extruded dielectric cable system using cross-linked polyethylene insulating cables." The NPS encourages that consideration be given to restoring the Key Hole and Elliot Key Spoils area within Biscayne NP. The area has high natural value but needs to be cut and filled for restoration. (**0622-2-12** [Austin, Stan])

Response: *The comment provides recommendations for specific mitigation measures addressing impacts on sensitive natural habitats. The review team appreciates suggestions regarding possible mitigation measures but only considers mitigation proposed by the applicant or required by agencies specifically authorized to enforce the mitigation. No change was made to the EIS as a result of this comment.*

Comment: As detailed throughout our comments, the proposed project could have numerous adverse environmental impacts to our national parks and the treasured natural resources they were designated to protect. Specifically, threatened wildlife and wetland habitat in Everglades National Park could be harmed by the construction and operation of transmission line corridors in and adjacent to the park. (**0113-1-10** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Response: *Potential impacts on threatened and endangered species as well as wetlands as a result of transmission line construction are discussed in Sections 4.3.1.2 and 5.3.1.2 of the EIS. Although the analyses contained in both sections consider the unique setting of the proposed site and offsite rights-of-way in close proximity to Everglades National Park and Biscayne National Park, additional discussion was added to Section 4.3.1.3 about wildlife expected to regularly enter and leave National Park boundaries that could be affected by the proposed actions. Mitigation for impacts on wetlands and other terrestrial ecological resources from building the proposed facilities, including the transmission lines, is discussed in Section 4.3.1.6.*

Comment: In order to connect Units 6 & 7 to the power grid, FPL seeks to construct two new transmission line corridors. The proposed transmission line sites for the Western corridor are of primary concern due to their potential impacts on areas in and around Everglades National Park. The DEIS fails to adequately analyze the direct, indirect, and cumulative impacts of the construction and operation of transmission lines on wetlands, wildlife, and CERP. In its discussion of potential Western transmission line corridors, the DEIS limits its discussion to West Preferred and West Consensus corridors. The construction and operation of transmission lines and access roads in either of these corridors could cause an array of adverse environmental impacts, including impacts to wildlife, habitat, and wetland resources, such as freshwater marshes, wetland hardwoods, and wet prairies; the disruption of hydrologic flows; air and water pollution; viewshed impacts; and impacts to national park visitor experiences. [Footnote 32: Florida Department of Environmental Protection, Second Determination of Completeness, Transmission Lines, September 17, 2009, 1.] The project could harm water-dependent birds, such as migratory birds and federally listed wood storks and snail kites. Woods storks are listed as a federally threatened species due to habitat loss, fragmentation, and degradation. Wading birds such as the wood stork are at risk of collision with powerlines because of their large size and inability to navigate obstacles while flying. In a scientific evaluation of wood stork mortality, collisions with powerlines were listed as the most significant cause of death. [Footnote 33: Forrester, D.J. and Spalding, M.G., “Ibises, Spoonbills, Flamingos, and Storks: Trauma,” Parasites and Diseases of Wild Birds in Florida, 2003,

University Press of Florida, Gainesville, 227-228.] It is reasonable to anticipate that, given the high collision risk of wood storks and wading birds, the construction of powerlines in critical wood stork habitat will lead to a sustained level of mortality for these threatened species throughout the life of the project. The construction and operation of transmission lines could also lead to the degradation and fragmentation of critical wetland areas, disturbing birds during the construction process and creating a permanent risk of bird collisions and injuries from transmission lines and associated structures. (**0113-2-8** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Response: *Impacts on terrestrial resources from the proposed transmission lines are described in Sections 4.3.1.2 and 5.3.1.2 of the EIS and include consideration of direct, indirect, and cumulative impacts from building and operating those lines on wetlands and wildlife. Mitigation of the impacts on wetlands and other terrestrial ecological resources from building the proposed facilities, including the transmission lines, is discussed in Section 4.3.1.6. No changes to the EIS were made as a result of this comment.*

Comment: Impacts associated with the construction and operation of access roads associated with Units 6 & 7 on wetlands and wildlife are not adequately discussed and analyzed within the DEIS. Access roads will be constructed in and adjacent to wetlands and conservation lands, including on lands that are part of the Miami-Dade County Environmentally Endangered Lands Program. [Footnote 34: Miami-Dade County, Third Completeness Comments for Plant and Non-Transmission Line Portions of the FPL Site Certification Application- Turkey Point Units 6 & 7, May 28, 2010, 39.] The construction and operation of such roads could have a number of negative impacts, such as the disruption of ecological corridors and sheet flow and the degradation of conservation lands. [Footnote 35: Ibid., 39.] The DEIS lacks sufficient information regarding the possible overlap of access roads and wildlife corridors. The discussion of such impacts is cursory and as such fails to comply with the requirements of section 102(2) of NEPA. [Footnote 36: National Environmental Policy Act of 1969 §102(2) 42 U.S.C. § 4332.] (**0113-2-9** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Response: *Impacts on terrestrial resources from building and using the proposed temporary construction access roads are included in the scope of analysis of proposed onsite activities in Section 4.3.1.1. However, to provide increased clarity regarding the effects of the access roads, a separate header was added to Section 4.3.1.3 of the EIS to address the access road impact on Miami-Dade County Environmentally Endangered Lands.*

Comment: I am worried for animals that have been labeled "units of economy"instead of beings with active consciousnesses. (**0127-3** [Cusidor, Teresa])

Response: *Impacts on wildlife have been described in Sections 4.3.1, 5.3.1, and 7.3.1 of EIS using standardized and accepted ecological terminology, methodologies, and criteria as prescribed by State and Federal regulatory agencies. No changes were made to the EIS as a result of this comment.*

Comment: There will be negative impacts on the environment for both humans and other animals. (**0159-3** [Bazzone, Barbara])

Response: *Impacts on wildlife and their habitats are described in Sections 4.3.1, 4.3.2, 5.3.1, 5.3.2, 7.3.1, and 7.3.2 of the EIS. Impacts on and potential conflicts with human land uses are addressed in Sections 4.1, 5.1, and 7.1. Various other issues related to the quality of the*

environment on humans, e.g., aesthetics and air quality, are addressed in various other sections. No changes were made to the EIS as a result of this comment.

Comment: Please do not expand into this valuable habitat. (**0202-1** [Casper, Laurel])

Response: *Impacts on wildlife and their habitats are described in Sections 4.3.1, 4.3.2, 5.3.1, and 5.3.2 of the EIS. As is evident from the information contained in Section 4.3.1.1, much of the habitat encompassed by the proposed expansion has a history of previous disturbance or is in close proximity to existing disturbed areas. As is evident from the information contained in Section 4.3.1.2, much of the habitat encompassed by the expanded offsite facilities involved areas within or adjacent to existing utility corridors. No changes were made to the EIS as a result of this comment.*

Comment: Furthermore, nuclear reactors are known to impact wildlife in the region. (**0214-4** [Zerulla, Tanja])

Response: *Impacts on wildlife and their habitats are described in Sections 4.3.1, 4.3.2, 5.3.1, and 5.3.2 of the EIS. The discussion in these sections includes consideration of mitigation. The cumulative effects of the existing and new reactors on wildlife are addressed in Sections 7.3.1 and 7.3.2. No changes were made to the EIS as a result of this comment.*

Comment: Metals leach from the reactors into the environment, contaminating air, water, ground, plants, and other wildlife. (**0214-6** [Zerulla, Tanja])

Response: *All pathways for potential environmental impacts were considered in the EIS. Potential releases of pollutants to the air during operation of the reactors is addressed in Section 5.7. Potential release of pollutants to water during operation of the reactors is addressed in Section 5.2. The effects of potential releases of radiological pollutants on plants, wildlife, and other non-human biota are addressed as part of Section 5.9. Text has been added to Sections 5.3.1 and 5.3.2 specifically to address the potential for adverse effects on terrestrial and aquatic biota from releases of nonradiological pollutants.*

Comment: Everglade snail kite - If the Preferred corridor segment of the west transmission line in chosen as the preferred alternative, it will result in habitat loss for the snail kite and significantly increase the likelihood that snail kites are injured and killed due to collisions with transmission lines. Please indicate how FPL intends to minimize the adverse effects of the preferred segment of the west transmission line corridor to the snail kite. The Department notes that we have had discussions with FPL regarding moving the northern segment of west transmission line [*i.e.*, the currently proposed Preferred and Consensus corridors) much farther to the east, away from the Everglades National Park (ENP) and adjacent to existing development]. We believe that movement of this segment of the west transmission corridor as described will reduce potential adverse effects to the snail kite. We urge FPL to adopt this new corridor. If adoption of the new corridor does not occur, we recommend that FPL consider protecting currently unprotected wetlands habitat for the snail kite to minimize the adverse effects from the project. (**0227-1** [Stanley, Joyce])

Response: *Section 2.4.1.3 of the EIS describes the overlap of snail kite management areas and range with proposed facility construction locations. Sections 4.3.1.3 and 5.3.1.3 discuss potential impacts on the snail kite during installation and operation of transmission lines, and includes an evaluation of displacement, permanent habitat loss, and transmission line collision risks. Although not specific for snail kites, perch discouragers and flight diverters installed near*

stork colonies should reduce operational impacts on snail kites because their occurrence generally coincides with proximity to stork colonies. The review team concluded that the potential impact on the Everglade snail kite from the proposed actions could be noticeable at a population level. The FFWCC requires snail kite surveys in all suitable habitat as defined in the State of Florida COCs. If snail kites are observed, FPL is required to meet with the FFWCC and develop a detailed mitigation plan containing corrective action alternatives to be approved by the FFWCC. Additional mitigation may be required by the FWS as part of their ESA consultation process. No changes were made to the EIS as a result of this comment.

Comment: Florida bonneted bat - The project will result in the loss of potential suitable roosting habitat for the FBB within the Department's focus area for the species. To better ascertain the status of the FBB on the project site, we request that a pedestrian survey of all suitable roosting habitat for the FBB be conducted within the entire project footprint, including the footprint of the proposed transmission lines. The results of the survey should be provided to the Department for our review. We also recommend that FPL include a survey of potential roosting habitat prior (no earlier than a month prior) to any clearing activities to ensure no FBB have recently begun roosting in the clearance areas. (**0227-2** [Stanley, Joyce])

Response: *Although the Florida Fish and Wildlife Conservation Commission (FFWCC) did not require any species specific measures for the Florida bonneted bat within the State of Florida COCs issued on 5/19/14, they included this species with other Federally and State-listed species likely to occur within the area of the transmission line corridor and associated facilities. As such, FFWCC requires coordination for an assessment of all listed species including the Florida bonneted bat prior to clearing or preconstruction activities within the transmission line corridors. Additional surveys and assessments could be required by the FWS as part of their ESA consultation process. Section 2.4.1.3 of the EIS was expanded to include a discussion of the overlap of the proposed project sites with the FWS Florida Bonneted Bat Focus Area.*

Comment: Florida panther - The Biological Assessment states that the project will result in the loss of 69 acres of panther habitat located within the project footprint. This habitat is located in the Department's primary and secondary zones for the panther. FPL's consultant has applied the Department's panther habitat methodology (PHM) to the habitat types affected by the project and calculated that the 69 acres of panther habitat lost due to the project provide 412 Panther Habitat Units (PHUs). Based on the PHM, a total of 1,030 PHUs of panther habitat will need to be provided to offset the loss of panther habitat due to the project. We request a detailed habitat compensation plan indicating how FPL intends to provide 1,030 PHUs of panther habitat to offset the loss of panther habitat due to the project. (**0227-3** [Stanley, Joyce])

Response: *The State of Florida COCs issued by the Siting Board on 5/19/14 state that development of roads and pipeline corridors would affect 69 ac of Florida panther habitat within the FWS Panther Focus Area, with a value of 297 Panther Habitat Units. Although FPL's ER (Rev 6) states "Construction of new corridors, modification of existing corridors, and construction/modification of access roads will result in the alteration of panther habitat within the primary and secondary Panther Focus Area zones rather than a loss of habitat," the EIS states that the review team disagrees with this statement because habitat fragmentation has been identified in the FWS Florida Panther Recovery Plan (3rd revision dated 1 November, 2008) as a threat to panther survival. FPL-proposed mitigation activities for the Florida panther, addressed in Section 4.3.1.6, are designed to minimize threats of increased traffic and do not address habitat. Additional habitat mitigation could be required by the FWS as part of their EIS consultation. The discussion of potential impacts on the Florida panther in Section 4.3.1.3 of*

the EIS has been expanded to include more quantitative detail about panther habitat mitigation from the COCs and to present more detail drawn from the FWS Florida Panther Recovery Plan.

Comment: Wood Stork. The proposed west transmission line corridor for the project occurs within the core foraging areas (*i.e.*, all lands within 18.6 miles) of five active nesting colonies of the wood stork. As currently proposed the Preferred Corridor segment of west corridor transmission line occurs within about 1 mile or less of an active wood stork nest colony. Consequently, if this alternative is selected, it will likely result in injuries and deaths of wood storks and other bird species due to collisions with the transmission wires or towers during flight. If the transmission line cannot be re-sighted, we recommend considering additional compensation for impacts to wood stork above those currently being considered for wetland impacts. In addition, a wetlands mitigation plan that adequately compensates for the loss of wood stork foraging habitat due to the project should be developed. This should include a functional analysis of the loss of wood stork foraging habitat within the project footprint (including the transmission lines) through the application of the Fish and Wildlife Service's (FWS) Wood Stork Foraging Habitat Methodology (FWS, 2012). Please be aware that we consider all wetland types as suitable for wood stork foraging, and all wetland types lost due to the project should be included in the analysis. (**0227-6** [Stanley, Joyce])

Response: *Although impacts on the wood stork would be decreased if the West Consensus corridor were developed rather than the West Preferred corridor, impacts would still not be eliminated. Section 4.3.1.3 includes an assessment of potential impacts from both corridor options on the wood stork and acknowledges their proximity to wood stork nesting colonies. That discussion has been expanded to provide more detail about wood stork impacts and how the proposed wetland mitigation and other mitigation proposed by the applicant would help reduce adverse impacts on the wood stork.*

Comment: Additional Species. The Department requests species surveys be conducted (in appropriate habitat) for the Bartram's scrub-hairstreak butterfly and Florida leafwing butterfly. Botanical surveys should be conducted for crenulate lead-plant, deltoid spurge, Florida brickell-bush, Small's milkpea, tiny polygala, and Garber's spurge. (**0227-7** [Stanley, Joyce])

Response: *Sections 4.3.1.4 and 5.3.1.3 of the EIS discuss potential impacts on each of these species and acknowledges the possible adverse impacts on each. Coordination with FFWCC for an assessment of all Federally and State-listed species likely to occur within the transmission line corridor and associated facilities prior to clearing or preconstruction activities is required by the State of Florida COCs issued on 5/19/14. Additional surveys and assessment could be required by the FWS as part of their ESA consultation process. No changes were made to the EIS as a result of this comment.*

Comment: Endangering delicate, one-of-a-kind species is not a good idea. (**0363-4** [Peters, Emily])

Response: *This comment pertains to species rare enough to be Federally and/or State-listed as threatened or endangered. The EIS includes a thorough assessment of potential impacts from the project on Federal and State-threatened and endangered species and habitats in Sections 4.3.1 and 5.3.1 (for terrestrial species) and Sections 4.3.2.3 and 5.3.2.3 (for aquatic species). These sections also address mitigation proposed regarding impacts on threatened or endangered species. No changes were made to the EIS specifically as a result of this comment, although expanded information about threatened and endangered species has been added to the sections noted above in response to other comments.*

Comment: Section 4.3.1.6, Wetland Mitigation Plan (pg.4-70): The DEIS states that FPL instituted measures during project planning to avoid and minimize impacts on wetlands to the greatest extent practicable. Proposed avoidance and minimization measures include maximizing the previously disturbed areas, while minimizing use of areas with high-quality intact wetlands. The corridor selection for the reclaimed water pipeline, portable water pipeline, and transmission facilities maximized co-location with other existing or proposed infrastructure, to limit land disturbance. The Public Notice published by the USACE on March 13, 2015 stated that the project proposes impacts to 1000 acres of tidal and freshwater wetlands. FPL stated in their letter of May 14, 2015, addressed to USACE, that the correct number for the direct wetland impacts for the project is 710 acres, with temporary impacts to 50 acres. These include impacts to high quality, tidal mangrove wetlands. Mangrove wetlands located within south Florida form a vital component of the estuarine and marine environment, providing a major organic detrital base to the aquatic food chains, significant habitat for arboreal, intertidal and subtidal organisms, nesting sites, cover and foraging grounds for birds, and habitat for reptiles and mammals. Mangroves also provide protected nursery area for fishes, crustaceans, and shellfish. Mangroves are one of the most biologically productive ecosystems in the world, also serving as storm buffers by functioning as wind breaks, and through prop root baffling of wave action. Mangrove roots stabilize shorelines and fine substrates, reducing turbidity, and enhancing water clarity. Mangroves improve water quality and clarity by filtering upland runoff, and trapping waterborne sediments and debris. The cumulative loss of this habitat has reduced overall water quality and fisheries production within the south Florida ecosystem. For these reasons, the EPA considers these mangrove wetlands to be aquatic resources of national importance (ARNI). In addition, the proposed project would impact sawgrass marshes, which provide principal environmental values related to water quality and quantity. They serve as filter systems for water, and protect natural bodies of water from eutrophication. Numerous birds can be found in this community year-round, or for over-wintering. They also provide habitat for frogs, snails, and crayfish, which serve as food sources for larger protected animals that are found in this region. Protected animals that can be found in and around sawgrass marsh systems include the Everglades mink (Mustela vison evergladensis), Florida panther (Felis concolor coryi), snail kite (Rostrlzamus sociabilis), wood stork (Mycteria americana), and American alligator (Alligator mississippiensis). Therefore, the EPA considers sawgrass marshes to be ARNI. (**0617-1-28** [Mueller, Heinz J.])

Response: *The description of affected wetlands in Section 2.4.1.3 of the EIS has been expanded to indicate the status of mangrove wetlands and sawgrass marshes as aquatic resources of national importance ARNI (Aquatic Resources of National Importance), and the assessments of impacts on those wetlands have been expanded in Section 4.3.1.1 of the EIS to account for the ARNI status. The wetland mitigation measures discussed in Section 4.3.1.6 have been developed based on quantification of estimated losses and offsetting gains of wetland functions and values, including those provided by the presence of mangroves.*

Comment: Pipelines to transport reclaimed wastewater from the South Dade Water Treatment Plant to Turkey Point will be constructed in an area currently home to expansive wetlands using a corridor approximately nine miles long. [Footnote 30: NRC, DEIS, 3-20.]The DEIS must discuss how the construction and operation of these pipelines will impact wetlands, how FPL will properly avoid or mitigate impacts to wetlands, and whether reasonable alternatives exist to constructing pipelines in sensitive wetland areas. (**0113-2-16** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: The DEIS on Pages 1-2 and 10-2 states that the *"applicant proposes to discharge fill material into approximately 1,000 acres of jurisdictional wetlands to construct the proposed*

project." The correct number for the direct wetland impacts for the project is 710 acres. This corrected information was supplied to the Corps in FPL's May 7, 2010 letter to Paul Kruger modifying the federal dredge and fill permit application (FPLNNP-10-0151), as well as the July 2011 Turkey Point Units 6 & 7 Mitigation Plan Rev.2 and August 2012 Mitigation Plan Rev. 2 (USACE Supplement). As specified in the Table 1-1 of the Mitigation Plan Rev. 2 (USACE Supplement), the generating units and non-transmission facilities impact 402 wetland acres, while either of the transmission corridors is estimated to have no more than 308 acres of potential wetland impact thus totaling 710 acres of direct wetland impact. (**0619-1-2** [Maher, William])

Response: *The acreages of affected wetlands presented in the EIS have been updated to reflect the most recent information provided. Most notably, the wetland acreage noted in Section 4.3.1 as being permanently altered by development of the offsite transmission lines and pipelines has been substantially reduced to reflect more precise disturbance widths provided for the corridors by the applicant subsequent to publication of the draft EIS. Text in Chapters 1 and 10 was also modified to reflect the revised acreage of wetland impact.*

Comment: On December 11, 2014, the U.S. Fish and Wildlife Service published a final rule classifying the rufa subspecies of the red knot as threatened. A new and significant information review was conducted by FPL where it was concluded that there would not be an impact to any significance level or conclusion drawn in the ER with respect to the change in status of the rufa subspecies of the red knot. With respect to this change of designation, there remain instances in the DEIS where it states that the red knot is **proposed** as a Federally threatened/ endangered species (emphasis added): a. DEIS Subsection 2.4.1.3, Page 2-89, Lines 3-4: The DEIS states: "Red Knot (*Calidris canutus rufa*). The red knot is **proposed as a Federally threatened species** (78 FR 60024) (TN3199)." b. DEIS Subsection 2.4.1.3, Page 2-80, Table 2-13: DEIS Table 2-13 lists the "Rufa red knot" as "PT" (**Federally proposed threatened**). c. DEIS Subsection 9.3.2.3, Page 9-60, Table 9-8: DEIS Table 9-8 lists the "Federal Status" for the "Red knot" as "**Proposed Threatened**". d. DEIS Subsection 9.3.3.3, Page 9-115, Table 9-13: DEIS Table 9-13 lists the "Federal Status" for the "Red knot" as "**Proposed Threatened**". e. DEIS Subsection 9.3.4.3, Page 9-165, Table 9-18: DEIS Table 9-18 lists the "Federal Status" for the "Red knot" as "**Proposed Threatened**". f. DEIS Subsection 9.3.5.3, Page 9-211, Table 9-23: DEIS Table 9-23 lists the "Federal Status" for the "Red knot" as "**Proposed Endangered**". There are, however, two instances in the DEIS that list the rufa red knot as threatened (emphasis added): a. DEIS Subsection 4.3.1.3, Page 4-55, Line 19: The DEIS states: "Red Knot (*Calidris canutus rufa*) - **Threatened**." b. DEIS Subsection 7.3.1.1, Page 7-20, Lines 10-13: The DEIS states: "Listed wildlife that could likely be affected by building proposed Units 6 and 7 facilities include the eastern indigo snake (threatened; *Drymarchon corais couperi*),...red knot (**threatened**; *Calidris canutus*),..." Additionally, in two instances of the DEIS, the red knot is characterized as "not known to occur on the Turkey Point Property (emphasis added): a. DEIS Subsection 2.4.1.3, Page 2-89, Lines 4-18: The DEIS states: "As of 2008, the *rufa* subspecies is thought to have three biogeographically distinct populations, one of which winters in the Southeast United States including Georgia, South Carolina, and Florida (FWS 2013-TN3202)" **red knots have not been observed and are not known to occur on the Turkey Point property** or along the Atlantic Coast of Miami-Dade County."b. DEIS Subsection 4.3.1.3, Page 4-55, Lines 21-23: The DEIS states: "... **No record of red knots occurring on the Turkey Point** site has been found. However, suitable habitat exists on the site that would be affected by the proposed action..." However, ER Table 2.4-1 lists the "Red knot" as being observed during the late winter 2009 avian surveys—one Red knot was observed. The DEIS supports FPL's conclusion that there would not be an impact to any significance level or conclusion drawn in the ER. Specifically, in DEIS Subsection 4.3.1.3, pages 4-55 (lines 30-31),

and 4-65 (lines 18-19), and in DEIS Subsection 5.3.1.3, page 5-41 (lines 16-20), the NRC discusses its impact evaluation—in each instance the review team "expects that impacts would be minimal" in relation to the potential that the Red knot "could be expected to occasionally occur in small numbers at the Turkey Point site". (**0619-1-9** [Maher, William])

Response: *The comment identifies updated information about the status and occurrence of a listed species. Discussion of the rufa red knot in Sections 2.4.1.3, 4.3.1.3, and 5.3.1.3 has been updated based on information in this comment as well as updated information provided by the applicant regarding mitigation for impacts on habitat for migratory birds.*

Comment: There are instances in the DEIS where the impacts are characterized as affecting an entire transmission or pipeline corridor, when in reality, only a small percentage of the corridor will be impacted. Instances in the DEIS include (emphasis added): ...DEIS Subsection 7.3.1.1, Page 7-19, Lines 31-33: The DEIS states: "An additional **2,203 ac** of terrestrial habitats **would be affected** by the installation of potable and reclaimed water-supply systems..." FPL's response to NRC RAI Letter No. 1103093 (eRAI 5561), ML11192A042, dated July 7, 2011 states: "The land disturbance for each type of vicinity and region linear feature -transmission, pipeline, road -represents a corridor in which each feature will be located. The actual land disturbance for each feature are expected to be less, based on the requirements of that feature... Additionally, the pipeline disturbances are considered temporary. That is, the land disturbance will be restored to its original land use upon completion of construction/installation activities." h. DEIS Appendix F-2, Subsection 3.1.2, Page 3-6, Lines 3-4 and DEIS Appendix F-2, Subsection 3.1.2, Page 3-6, Lines 11-12: Appendix F-2 (lines 3-4) states: "Development of the East corridor would disturb approximately 1,635 ac of land." Appendix F-2 (lines 11-12) also states: "The route referred to as the "West Preferred corridor" occupies approximately 3,280 ac of land." This information does not take into account that the acreage listed is for a corridor, not the final right of way. The corridor will not be developed; the ROW within the corridor will be developed (ER Subsection 4.3.2.4). In addition in some locations the new facilities will be co-located with existing facilities (ER Subsection 2.2.2.2). ER Subsection 4.3.2.4 states: "The western and eastern transmission corridors represent the maximum extent of land presented for certification as part of the Site Certification Application (SCA) state process. The actual required right-of-ways will be determined post-certification, as will the location and amount of actual land requirements/disturbances necessary for transmission line construction. Therefore, the end-use land cover for these transmission corridors cannot be determined at this time." ER Subsection 2.2.2.2 states: "The Clear Sky-Davis portion of the East Preferred Corridor would use an existing, 19-mile-long, multicircuit FPL transmission line right-of-way. This right-of-way has the ability to accommodate the proposed single-circuit 230 kV line without the need for additional right-of-way. However, for a portion of the Davis to Miami corridor, new rights-of-way would be required, but much of the proposed corridor includes existing transportation rights-of-way (e.g., U.S. Route 1, Metrorail)" and "In some portions of the proposed Davis-Miami transmission line section, it would be collocated with other transmission lines on the existing right-of-way." i. DEIS Appendix F-2, Subsection 3.1.4, Page 3-6/3-7, Lines 40/2: Appendix F-2 states, with regard to the potable pipeline corridor: "...for the purposes of this BA, it is assumed the entire corridor would be disturbed. More than 184 ac of wetlands would be disturbed." The DEIS is presenting all acreage within the corridor as impact area, when only a small percentage of the corridor would be affected. COLA Rev 6 section 4.1.2.4 states, "Because of the commonality of the (potable) pipeline route with previous disturbance and/or new disturbance already expected to occur resulting from construction of other Units 6 & 7 project facilities (e.g., roadway improvements), construction of the underground pipelines would have minimal additional environmental impacts." In addition, the language does not state that these are temporary impacts. ER Subsection 4.1.2.4 states: "As described in Section 4.3,...and, **upon completion,**

the disturbed portions of the corridor would be graded to the contours of the surrounding landscape and revegetated or returned to previous land uses." j. DEIS Appendix F-2, Section 5.1, Page 5-1, Lines 5-8: Appendix F-2 states: "Development of lands within the Turkey Point site, including...**would result in the removal of more than 1,300 trees, including almost 550 trees of various palm species** (FPL 2011-TN1471)." Condition of Certification, Section B "Specific Conditions - Power Plant and Associated Facilities (Excluding Transmission Lines)", Subsection VII "Miami-Dade County", Item O. 13, page 89 states: "Prior to commencement of work within each segment of linear facilities (roads or pipelines), FPL shall revise the tree survey previously submitted in response to MDC completeness question 5-MDC-D-11 (July 2011). The revised tree survey will show all upland trees proposed to be removed, as well as a tree planting plan to mitigate for the tree canopy to be removed as required by Section 24-49 of Miami-Dade County Code." The tree survey was a baseline conducted to identify existing trees per MDC requirements. It does not indicate what trees would be removed. (**0619-1-20** [Maher, William])

Response: *This comment provides updated information about the quantification of impacts to terrestrial ecology resources. Using information available to the review team prior to preparing the draft EIS, the draft EIS conservatively bounded its assessment of terrestrial habitat impacts from building the proposed transmission lines and pipelines by assuming that all habitat within the designated corridors would be permanently altered. The review team subsequently sought and received from the applicant more precise information about the projected footprint of disturbance within the corridors. In general, the applicant was able to narrow the width of projected facility disturbance footprints, thereby allowing the review team to present a more precise and less broadly conservative assessment. The review team independently reviewed the updated information and following its verification used the information to reduce the projected extent of terrestrial habitat impacts accordingly in Section 4.3 of the EIS.*

Comment: There are instances in the DEIS with respect to the presented land use values in their respective tables, which are inconsistent with the cited source or not current with the most recent documentation/reference. Instances in the DEIS include (emphasis added):...DEIS Subsection 2.4.1.2, Page 2-78, Table 2-12: DEIS Table 2-12 contains the land use coverage acreages for the pipeline corridors by classification. The following inconsistencies are noted with the source cited for DEIS Table 2-12, (FPL 2014-TN4058, Table 2.2-6) (areas where the data is inconsistent with the most current reference are also indicated): i. The "Potable Water Pipeline Corridor" acreages for the "Forest (ac)", "Open Water (ac)", "Wetlands (ac)", and "Infrastructure (ac)" classifications are consistent with an earlier revision of FPL's ER but are inconsistent with FPL's ER Revision 6. The acreages listed in DEIS Table 2-12 for the "Forest (ac)", "Open Water (ac)", "Wetlands (ac)", and "Infrastructure (ac)" classifications are 7.69, 24.75, 159.95, and 39.21, respectively. In contrast, the summation of the acreages in ER Table 2.2-6, Revision 6, for the same major classifications are 7.65, 24.72, 158.95, and 39.19, respectively. ii. The "Reclaimed Water Pipeline Corridor" acreages for the "Uplands (ac)" and "Wetlands (ac)" classifications are inconsistent with ER Revision 6. The acreages listed in DEIS Table 2-12 for the "Uplands (ac)" and "Wetlands (ac)" classifications are 101.34 and 457.8, respectively. In contrast, the summation of the acreages in ER Table 2.2-6, Revision 6, for the same major classifications are 99.28 and 457.75, respectively. iii. For both the "Potable Water Pipeline Corridor" and "Reclaimed Water Pipeline Corridor" the acreage for the "Developed (ac)" classification is not consistent with ER Revision 6. The acreages listed in DEIS Table 2-12 for the "Developed (ac)" classification are 58.9 and 720.7 for the "Potable Water Pipeline Corridor" and "Reclaimed Water Pipeline Corridor", respectively. In contrast, the summation of the acreages in ER Table 2.2-6, Revision 6, for the "Developed (ac)" classification are 51.36 and 19.67 for the "Potable Water Pipeline Corridor" and "Reclaimed Water Pipeline Corridor",

respectively. iv. For both the "Potable Water Pipeline Corridor" and "Reclaimed Water Pipeline Corridor" the summation of the acreages do not equate to the values listed under the "Total Acres" in DEIS Table 2-12. Additionally, for the "Potable Water Pipeline Corridor", the value listed for the "Total Acres" is not consistent with ER Revision 6. (**0619-2-2** [Maher, William])

Comment: Numerical value inconsistencies within the draft EIS: Subsection 2.4.1.1, Page 2-74, Lines 28-31 "Terrestrial land cover on the Turkey Point site is presented in Table 2-2. Land on the Turkey Point site is used primarily for electric power facilities, and facilities for existing Turkey Point Units 1-5 occupy approximately **5,672 ac**, composing almost half of the Turkey Point site" DEIS Table 2-2 ER Table 2.2-1 The referenced table, DEIS Table 2-2, indicates that land use characterized as electric power, FLUCFCS code 831, totals **5,682.84 ac**. ER Table 2.2-1 also indicates land use characterized as electric power, FLUCFCS code 831, as **5,682.84 ac**. (**0619-2-31** [Maher, William])

Comment: Numerical value inconsistencies within the draft EIS: DEIS Subsection 4.3.1.3, Page 4-58, Lines 38-39 "Limpkin. More than **100 ac of mangrove habitat** would be permanently lost, although only 28 ac of the affected areas are high-quality mangrove habitat." DEIS Table 4-7 DEIS Table 4-9 ER Table 4.3-1 DEIS Table 4-7 presents this acreage as **77.4 ac**, and DEIS Table 4-9 presents this acreage as **80.8 ac**. ER Table 4.3-1 presents this acreage as **77.39 ac**[.] (**0619-2-35** [Maher, William])

Comment: There are instances in the DEIS with respect to the presented land use values in their respective tables, which are inconsistent with the cited source or not current with the most recent documentation/reference. Instances in the DEIS include (emphasis added):...DEIS Subsection 4.3.1.1, Page 4-43: DEIS Table 4-8, "Permanent Habitat Loss on the FPL Turkey Point Property Attributed to Building Units 6 and 7 Facilities", contains total acreage and wetland acreage values attributed to constructing Units 6 & 7. The following inconsistencies with the source (adapted) cited for DEIS Table 4-8, (FPL 2014-TN4058, Table 4.3-1 of Revision 6) are noted: i. The following acreage values do not reflect the values in ER Table 4.3-1, Revision 6, but rather reflects those of ER Table 4.3-1, Revision 4, prior to the relocation of the FPL Reclaimed Wastewater-Treatment Facility: the acreages for the "FPL Reclaimed Water-Treatment Facility (alternate location)", "Spoils Area B", and "Spoils Area C". ii. The wetland acreage value for the "FPL Reclaimed Water-Treatment Facility (alternate location)" include FLUCFCS code 437 Australian Pine; however, footnote b for DEIS Table 4-8 indicates that "all 500 and 600 series FLUCFCS codes and 743W are considered in this analysis to be wetlands". iii. Acreages are included for the "Treated Reclaimed Water Delivery Pipelines"; however, as noted in the table note for ER Table 4.3-1, Revision 6, "The treated reclaimed water supply pipeline is now fully within the heavy haul road disturbed area and is not separately considered". iv. the "Nuclear Administration Parking" should be titled "Nuclear Administration Building" as described in ER Table 4.3-1, Revision 6. v. DEIS Table 4-8 reports the total wetland acreage as **328.12 ac**. A summation of reconciled acreage values indicates that this number should be **316.16** ac. Also note, there are locations in the DEIS text that will require reconciliation. For example, DEIS Subsection 7.3.1.1, page 7-19, Lines 28-31. (**0619-2-6** [Maher, William])

Comment: DEIS Appendix F-2, Subsection 3.1.3, Page 3-6, Lines 35-37: USFWS BA states, "Although the exact location of the pipeline has not been determined within the corridor, burying the reclaimed water pipeline is expected to temporarily disturb approximately **327 ac** of the **1,876 ac** corridor." The area of temporary disturbance associated with installation of the reclaimed water pipeline is approximately 75 feet wide by 9 miles long (see comment 89, above), equaling approximately **82 acres**. ER Subsection 4.1.2.4 states: "The current land use of the **1886 acres** within this corridor, some smaller portion of which could be impacted with the

construction of the pipelines and right-of-way." DEIS Subsection 4.3.1.2, page 4-45, line 15 states: "Approximately **1,886 ac** of upland, forested, and wetland habitats as well as previously developed or disturbed lands would be affected by installation of the reclaimed water pipeline (Table 4-3)." (emphasis added) (**0619-6-10** [Maher, William])

Response: *The review team has reviewed all acreage figure information and updated acreage figures as appropriate in the Sections 2.4, 4.3, and 5.3 of the EIS. The updated acreage figures did not substantially alter the conclusions presented in the EIS.*

Comment: The NPS continues to be concerned that the construction of new powerlines, roads, and other infrastructure relating to the licensing of Turkey Point Units 6 and 7 would impact a great many federally threatened and endangered species. (**0622-2-1** [Austin, Stan])

Response: *The review team has met with representatives of the FWS on multiple occasions to discuss possible impacts on Federally listed species, including but not limited to, the American crocodile, Florida panther, wood stork, Everglade snail kite, manatee, and various species endemic to South Florida. The review team prepared a BA (Biological Assessment) evaluating each Federally listed species and included it in Appendix F of the draft EIS. The BA included the review team's professional opinion regarding the severity of possible effects on each Federally listed species as of its preparation in 2015. The team continued to work closely with the applicant and FWS to obtain and review updated information about possible effects on these species and the applicant's proposed mitigation. The proposed mitigation was developed by the applicant. Following continued coordination with the FWS, the review team prepared an updated table presenting updated effects conclusions about each listed species, including species newly listed or proposed for listing subsequent to publication of the draft EIS and initial BA (e.g., Miami tiger beetle). The review team provided that table to the FWS in August 2016. The final EIS discusses the review team's continued coordination with the FWS since the initial BA and updates the status of the review team's formal consultation efforts with FWS under ESA Section 7.*

Comment: The wood stork was originally listed as endangered, primarily due to loss, fragmentation, and degradation of the wetland habitats on which they depend. Since listing, the wood stork population has shown signs of improvement, and the range has been expanding northward. In June 2014, the U.S. Fish and Wildlife Service downlisted the wood stork from endangered to threatened in recognition of the expansion of the stork's population. Range-wide, the stork population reached the recovery criterion for downlisting of a 3-year running average of more than 6,000 nesting pairs. However, wood stork nesting falls well below the recovery criterion of more than 10,000 nesting pairs. In addition, the 5-year average stork nesting in the Everglades and Big Cypress Systems remains below the 2,500 nesting pairs that is another benchmark for delisting, as nesting in south Florida remains variable. While there have been improvements in wood stork nesting in the Everglades region, the majority of increases in wood stork nesting have occurred further north, outside of the species' historic range in the southeastern U.S. In the Everglades, nesting success tends to be irregular, with occasional "big" nesting years interspersed with several poor years, and in the big years, the success of the South Florida colonies is significant. In 2001, the Tamiami West colony supported approximately 25 percent of all wood stork nesting in the U.S. [Footnote 2: NPS. 2011. Everglades National Park Colonial Wading Bird Nesting Monitoring Data. 2011. South Florida Natural Resources Center at Everglades National Park. Footnote 3: U.S. Fish and Wildlife Service. 2012. Endangered and Threatened Wildlife and Plants; Reclassification of the Continental U.S. Breeding Population of the Wood Stork From Endangered to Threatened. Federal Register 77(247): 75947-75966.] As a result, increases in risk, particularly to adult storks, may

substantially reduce the productivity and nesting that currently occurs. Because of the reproductive strategy of wood storks, in which adults do not fledge young in every year, losses of breeding adults may have population-level consequences. Thus, we encourage the NRC to reconsider language in DEIS section 5.3.1 relating to the impact of FPL's proposed powerlines on wood storks and the role of FWS. While Section 7 consultation addresses projects that have the potential to "jeopardize" the existence of a species, this project could change the trajectory of the stork population and still not rise to a level of jeopardy. In the DEIS for the Acquisition of FPL Land in the East Everglades Expansion Area, the NPS concluded that impacts could be major for some species such as the threatened wood stork. This conclusion was reached due to the close proximity of the proposed powerlines to Everglades NP. For instance, the proposed powerlines pass within five miles of several wading bird colonies (species highly susceptible to collision) in an area where there are no existing powerlines. The proposed route travels within one mile of one of the largest and most consistent wading bird colonies in South Florida, which can support around ten thousand pairs of wading birds of several species. Taking into account site-specific detail, "minimal" may not adequately describe impacts to avian resources. The NPS maintains that since wetlands are recognized as areas where birds congregate - the large amount of wetlands in the corridor (and proximity to the Everglades) makes risk much higher than "normal." Some species, such as wood stork, may be more susceptible to collisions, especially with guy wires, leading to potentially high mortality and population-level changes. (**0622-1-20** [Austin, Stan])

Response: *Sections 4.3.1.3 and 5.3.1.3 include discussions of potential impacts of building and operating the project on the wood stork. These discussions are in addition to and consistent with the review team's evaluation of impacts on the wood stork in the BA developed for formal consultation under ESA Section 7. The wetland mitigation discussed in Section 4.3.1.6 of the EIS specifically accounts for impacts on wetlands in designated "core foraging areas" for the wood stork and calls for establishing offsetting wood stork habitat in areas used for the proposed wetland mitigation. The indicated EIS sections have been updated to address the latest information available on wood stork impacts and associated mitigation proposed by the applicant.*

Comment: The NPS recommends that NRC provide additional information and data related to species and habitat use, especially for habitats that will be used for construction such as the mudflat. (**0622-1-19** [Austin, Stan])

Response: *Section 4.3.1.1 of the EIS discusses in detail the impacts on wetlands and other terrestrial habitats from building the proposed facilities in the 218 ac plant area that includes the mudflat, and the remainder of Section 4.3.1.1 and Section 4.3.1.2 address impacts from building project facilities on other onsite and offsite terrestrial habitat. Regarding the mudflat, Section 4.3.1 has been updated where appropriate to discuss input from FWS about the loss of shorebird habitat provided by the mudflat and the establishment of compensatory shorebird habitat in the applicant's proposed wetland mitigation.*

Comment: Additionally, the DEIS did not analyze the effects of the proposed action upon the federally listed Red Knot. (**0622-1-18** [Austin, Stan])

Response: *Section 4.3.1.3 of the EIS contains analyses of the effects of the proposed preconstruction and construction activities on the rufa subspecies of red knot onsite and offsite. Section 5.3.1.3 considered operational impacts on the red knot. Without specific fauna surveys, the EIS conservatively assumes that all wildlife known to occur in the region would occur within all reasonably suitable habitats. Because the red knot is known to use mud flat and*

mangrove habitats, the loss of mudflat and mangrove habitat was assumed to affect this species. However, the review team concluded habitat loss due to building the new facilities was not substantial and operations would have minimal impact on this species. No changes were made to the EIS specifically in response to this comment.

Comment: DEIS Subsection 4.3.1.1, Page 4-42, Lines 11-16: The DEIS states "Loss of mangrove stands...This extent of permanent mangrove cover loss...is a noticeable impact. However, **some of the lost mangrove cover** is from remnant stands in tidal creeks that **have been isolated from Biscayne Bay by cooling canals**." ER Subsection 2.2.1.1.2, states: "Mangrove heads, remnants of the original tidal creeks, contain...**The connection between these creeks and Biscayne Bay were severed during construction** of the industrial wastewater facility." **All of the mangrove areas** proposed for permanent impact **are isolated** from Biscayne Bay by cooling canals, roads, and other existing plant-related development. (emphasis added) (**0619-4-3** [Maher, William])

Response: *The review team agrees that certain mangrove forest areas that would be lost to build the new facilities are spatially separated from Biscayne Bay by berms or other surface features. However, the review team disagrees that these areas are fully separated hydrologically or ecologically from Biscayne Bay. Additionally, approximately 3.98 ac of mangrove swamp lies within the path of the RCW delivery pipelines. This mangrove acreage is not separated in any way from Biscayne Bay. Section 4.3 of the EIS has been edited to discuss the degree of separation between the affected mangrove cover and Biscayne Bay. The edits did not substantially alter the overall conclusions presented in the EIS regarding impacts on wetlands and other terrestrial ecosystems.*

Comment: DEIS Subsection 2.4.1.4, Page 2-108, Lines 36-40: The DEIS states: "The **eastern indigo snake** is a...threatened species (FWS 2012-TN117; FNAI 2014-TN3668)... **None were observed** during recent surveys of the **transmission line corridors** (FPL 2014-TN4058)." The cited reference in the DEIS text, (FPL 2014-TN4058), is FPL's ER Revision 6. ER Subsection 2.4.1.2 states: "**Indigo snakes have been observed...**and at two locations in the Eastern Preferred **transmission line corridor** (in 2011)." (emphasis added) (**0619-3-11** [Maher, William])

Response: *Section 2.4.1 of the EIS was revised to indicate that the eastern indigo snake was observed at two locations in the proposed corridor for the eastern transmission line. This change did not substantially alter the conclusions regarding the eastern indigo snake in the EIS or BA.*

Comment: DEIS Subsection 2.4.1.1, Page 2-76, Lines 8-12: The DEIS states: "The raised fill areas contain maintained grasses as well as...and melaleuca (***Melaleuca quinquinervia***) (FPL 2014-TN4058)." The cited reference in the DEIS text, (FPL 2014-TN4058), is FPL's ER Revision 6. ER Section 2.4 includes a similar discussion of vegetation in these areas but does not include melaleuca (***Melaleuca quinquinervia***) (emphasis added) (**0619-3-9** [Maher, William])

Response: *Section 2.4 of the EIS has been revised to remove the mention of melaleuca in the subject area. This change did not substantially alter the conclusions presented in the EIS.*

Comment: DEIS Subsection 2.4.1.1, Page 2-76, Lines 3-6: DEIS Section 2.4.1.1 states: "**Wetland spoil areas** totaling about **9 ac** occur adjacent to remnant canals...(FPL 2014-TN4058)." The cited reference in the DEIS text, (FPL 2014-TN4058) is FPL's ER Revision 6. ER Section 2.4 states: "Wetland habitats within the Units 6 & 7 plant area and adjacent laydown area include...and **wetland spoil areas (10 acres)**. (emphasis added) (**0619-3-8** [Maher, William])

Response: *Table 4.3-1 of the Turkey Point Units 6 & 7 COL Application Part 3 – Environmental Report Revision 6 indicates 9.05 ac of wetland spoils (FLUCFCS [Florida Land Use, Cover, and Forms Classification System] class 743-WET) are present within the Turkey Point Units 6 and 7 plant area. No changes were made to the EIS as a result of this comment.*

Comment: DEIS Subsection 2.4.1.1, Page 2-74, Line 35-38: The DEIS states: "Most of the plant area comprises mudflats that are inundated annually for **3 to 4 months** and are sparsely vegetated with saltwort (*Batis* ***maritime***)...(FPL 2014-TN4058)." The cited reference in the DEIS text, (FPL 2014-TN4058), is FPL's ER Revision 6. The timeframe, 3 to 4 months, is consistent with an earlier revision of FPL's ER but does not reflect the timeframe given in FPL's ER Revision 6. ER, Revision 6, Section 2.4 states: "...the sparsely vegetated mudflats are typically inundated by water **7 to 8 months** out of the year and a few hardy plant species that can tolerate these conditions persist, including saltwort (*Batis* ***maritima***)..." (emphasis added) (**0619-3-7** [Maher, William])

Response: *The commenter provides incorrect information. Page 2.2-4 in Section 2.4 of Revision 6 of the Turkey Point Units 6 and 7 COL Application Part 3 – Environmental Report actually states "...the sparsely vegetated mudflats are typically inundated by water* ***3 to 4 months*** *out of the year and a few hardy plant species that can tolerate these conditions persist, including saltwort...". (emphasis added) No changes were made to the EIS as a result of this comment.*

Comment: There are instances in the DEIS with respect to the presented land use values in their respective tables, which are inconsistent with the cited source or not current with the most recent documentation/reference. Instances in the DEIS include (emphasis added):...DEIS Subsection 4.3.1, Page 4-44, Table 4-9: DEIS Table 4-9 contains acreage values for the Turkey Point Site by wetland FLUCFCS code. The following inconsistencies with the source (adapted) cited for DEIS Table 4-9, (FPL 2014-TN4058, Table 4.3-1 of Revision 6) are noted: i. The acreage listed under code 612-B is **40.4 ac**. The summation provided in ER Table 4.3-1 for code 612-B is **36.98 ac**. ii. The acreage listed under code 510 is **12.9 ac**. The summation provided in ER Table 4.3-1 for code 510 is **12.45 ac**. Additionally, in DEIS Table 4-7, the acreage listed under code 510 is **12.5 ac**. iii. DEIS Table 4-9 lists FLUCFCS code 617 "Mixed Wetland Hardwoods" with a permanent impact acreage value of 0.4. However, ER Table 4.3-1, does not list FLUCFCS code 617 or a corresponding acreage. iv. There are no numerical FLUCFCS codes listed for the corresponding FLUCFCS code descriptions: "Sawgrass Marsh", "Australian Pine", "Exotic Wetland Hardwoods", "Exotic Wetland Hardwoods-Australian Pine", and "Disturbed Land". v. The acreage in this table is characterized as permanent acreage but the table includes areas of temporary wetland impact. (**0619-2-7** [Maher, William])

Response: *The review team has reviewed and updated as appropriate the acreage data provided in the EIS. The updated acreage data did not substantially alter the conclusions presented in the EIS.*

Comment: The construction footprint for the Unit 6 and 7 reactors and associated infrastructure (*i.e*., cooling towers, make-up water reservoir, ancillary buildings *etc*.) is currently comprised largely of occasionally flooded mudflats that provide important habitat for shorebirds and wading birds. These trust resources are protected under the Migratory Bird Treaty Act (MBTA), 16 U.S.C. 703. According to the DEIS, the project will result in the loss of 182.05 acres of mud flats (listed as non-vegetated in Table 4-1) that provide habitat for shore birds and wading birds. To minimize the impacts of the project to migratory birds, the Department has requested that FPL compensate for the loss of mud flats (migratory bird habitat) that will be lost

from project construction. In past discussions with the Department, FPL has indicated that they may be able to create and maintain the same acreage of mud flat habitat in perpetuity on FPL-owned lands north of the project site. These lands are currently being leased for agricultural purposes. We request that FPL provide the Department with a detailed plan on how they intend to minimize and compensate for the loss of the migratory bird habitat. We further request that the NRC and U.S. Army Corps of Engineers include this plan, once approved by the Department, as a condition of any permit or authorization to offset the loss of habitat for shorebirds and wading birds. (**0227-8** [Stanley, Joyce])

Response: *The State of Florida COCs issued on 5/19/14 state that FPL must mitigate for loss of shorebird habitat in consultation with the FFWCC (Florida Fish and Wildlife Conservation Commission). FPL is also required to restore or preserve 170 ac of mudflat habitat within the Everglades Mitigation Bank as part of their wetlands mitigation plan, of which 5 credits shall be applied to offset loss of shorebird habitat instead of wetlands. Additional mitigation may be negotiated with FPL by the FWS as part of the ESA consultation process. Section 4.3.1.6 of the EIS has been updated to describe this required mitigation.*

Comment: Included in the project application are three new sets of powerlines (two of them will be 15 stories tall) to be run across and through the eastern section of what is currently Everglades National Park. Expected impacts include: increased electrocutions and collisions for birds (three federally threatened wood stork colonies are known to roost in the vicinity of the proposed lines); the spread of invasive plant species along a new, drivable access corridor[.] (**0240-9** [Commenters, Multiple])

Response: *Sections 5.3.1.2 and 5.3.1.3 of the EIS discuss avian mortality caused by the proposed new transmission lines, including electrocutions and collisions by wood storks, Everglade snail kites, and other large birds. FPL is required to install flight diverters on those wires identified by the FFWCC as being the most likely to cause avian collision mortality. FPL is also required to fund a mitigation effectiveness study that includes mortality monitoring and observations of flight behavior of any birds crossing transmission lines. Study results are to be provided to the FFWCC for discussion and evaluation, which could include additional mitigation or monitoring. Sections 4.3.1.3 and 5.3.1.2 of the EIS provide discussion of potential introduction of invasive plants both onsite and offsite as an environmental impact of the proposed actions. No changes were made to the EIS as a result of this comment.*

Comment: Constructing high tension power lines in the migratory pathways of birds is just one more unconscionable negative impact. (**0245-3** [Lindsey, Jerrie])

Response: *As stated in Section 4.3.1.3 of the EIS, migratory bird habitat would be altered and lost during installation of the proposed transmission lines. Section 5.3.1.3 of the EIS describes impacts of transmission operation on migratory birds, including collision and electrocution risk and measures required by the State of Florida to reduce and assess these risks. Additional mitigation may also be required by the FWS. No changes were made to the EIS as a result of this comment.*

Comment: A more immediate impact on wildlife that will result from construction of Units 6 and 7 arises from the powerlines that will be built through Everglades National Park to transmit the power from the reactors. I have observed one of the wood stork colonies in Everglades National Park that is in close proximity to the location where the powerlines and their supporting towers will be installed-there are three federally threatened wood stork colonies known to roost in the vicinity. The powerlines will increase electrocutions and collisions for wood storks and other

birds. It is well known that the wading bird population in the Everglades has already declined 90% over several decades; this loss should not be compounded with powerline infrastructure. (**0246-5** [Shlackman, Mara])

Response: *Section 2.4.1.3 and 2.4.1.4 of the EIS discuss known wood stork colony locations, management zones, and core foraging areas near the proposed transmission corridors. The discussion of wading bird population trends in the Biological Indicators portion of Section 2.4.1.3 of the EIS indicates that populations are significantly lower than historical levels, consistent with the comment. However, the subject EIS text also states that almost all wading bird species have recently increased in number and their populations are significantly greater than 10 percent of historical levels, and the wood stork population is also recovering as evidenced by the June, 2014 reclassification from endangered to threatened. Nonetheless, collision and electrocution mortality of wood storks and other wading birds were identified as a potential impact of the proposed actions in Sections 4.3.1.3 and 5.3.1.3 of the EIS. Mitigation of these risks to wood storks and monitoring to assess mitigation effectiveness as required by the State of Florida COCs were also discussed in Section 5.3.1.3 of the EIS. Information about recent wood stork population trends was added to the EIS as a result of this comment. The added information did not alter the review team's conclusions regarding impacts on the wood stork or on terrestrial ecology in general.*

Comment: Since other animals do not belong to humans at all, the least we can do is assiduously try to protect them as much as possible, after all the harm people have inflicted on them. (**0285-2** [Miller, Melissa])

Response: *Wildlife mitigation and protection measures are discussed in Sections 4.3.1.3 and 5.3.1.3 of the EIS. No changes were made to the EIS as a result of this comment.*

Comment: The planned expansion of Turkey Point is environmentally dangerous and unacceptable at a time when we are aware of the hazards of intruding on sensitive habitats. (**0307-1** [Rose, Aaron])

Response: *A description of sensitive habitats potentially affected by the proposed action was included in Section 2.4.1.3 of the EIS. Impacts on those habitats caused by project encroachment are provided in Sections 4.3.1.1 and 5.3.1.1 of the EIS. No changes were made to the EIS as a result of this comment.*

Comment: I worked at the Turkey Point Plant some years ago and witnessed the changes made in the surrounding ecosystems. (**0308-1** [Wallington, Victoria])

Response: *Changes in the South Florida terrestrial ecosystem, including ecological impacts from past actions, are described in Section 7.3.1.1 of the EIS and changes in the aquatic ecosystem are described in Section 7.3.2.1. The assessments of cumulative terrestrial and aquatic ecological impacts in Chapter 7 of the EIS were considered in the context of this history of rapid and substantial change from past actions. No changes were made to the EIS as a result of this comment.*

Comment: We are having salt water intrusion into the everglades. Salt Water plants are growing there. If there, then everywhere. (**0373-2** [Lee, Nancy])

Response: *Intrusion of saltwater into surface water and wetlands was not an issue of concern identified during consultation with Federal, State, and local environmental agencies. Therefore,*

this issue was not considered by the review team. Potential ecological effects of sea-level rise caused by global climate change are discussed in Appendix I of the EIS. No changes were made to the EIS as a result of this comment.

Comment: IN FOLLOWING THE NRC'S OWN GUIDELINES, THE EXPANSION OF TURKEY POINT COULD HAVE UNACCEPTABLE AND IRREVERSIBLE IMPACTS ON THESE TREASURED SITES. (**0449-2** [Benton-Janetta, Lori])

Response: *Impacts on terrestrial resources, including the wetlands and wildlife habitat referred to in the comment as "treasured sites", are discussed in Sections 4.3.1.1 and 5.3.1.1 of the EIS. No changes were made to the EIS as a result of this comment.*

Comment: That fragile piece of land has already been pushed beyond its limits endangering and destroying rare wetlands and wildlife. (**0598-2** [White, Barry J.])

Response: *The fragile piece of land referred to by the commenter is assumed to be the Turkey Point Site. Past development of the Turkey Point site is discussed in Sections 2.2.1.6 and 2.4.1.1 of the EIS. Ecological effects from past actions are discussed in Sections 7.3.1.1 of the EIS. Impacts from the proposed development of Units 6 and 7 to terrestrial resources, including wetlands and wildlife habitat, are described in Sections 4.3.1.1 and 5.3.1.1 of the EIS. No changes were made to the EIS as a result of this comment.*

Comment: Section 2.2.2.3, Makeup and Potable Water Systems (pg. 2-20): Table 2-6 lists 447.80 acres of wetlands within the reclaimed water pipeline corridor, and 159.95 acres within the potable water pipeline corridor. It also states (pg.4-9) that FPL proposes to grade the disturbed portions of the corridor to the contours of the surrounding landscape and re-vegetate or return these areas to previous land uses. The EPA appreciates the effort to minimize wetland impacts by this action. The EPA is still unclear on the total extent and type of permanent impacts which will occur due to this activity. Please clarify. (**0617-1-6** [Mueller, Heinz J.])

Response: *The EPA's appreciation of the applicant's effort to minimize wetland impacts is noted. In response to various comments on the EIS by the applicant (FPL), the review team has provided more precise details regarding the anticipated extent and permanence of impact from pipeline installation on the overlying terrestrial and wetland habitats in Section 4.3 of the EIS. This updated information has not changed the conclusions drawn in the EIS concerning potential impacts on wetlands and terrestrial habitats.*

Comment: Section 3.2.3.4, Support and Laydown Areas (pg. 3-20): The EPA requests that the FEIS provide additional avoidance and minimization efforts by restoring wetlands associated with support and laydown areas after construction is completed. Section 4.1.l .2, Pipelines (pg. 4-9) Table 4-3: Outlines major land use acreages for the pipelines but is not clear on the specific acres of wetlands to be impacted. Please provide more detail about wetland impacts for this activity, to be consistent with the format illustrated in Table 4-1 of the DEIS for the Turkey Point site. Section 4.1.1.3, Access Roadways (pg. 4-9) Table 4-4: Outlines major land use acreages for access road improvement but is not clear on the specific acres of wetlands to be impacted. Please provide more detail about wetland impacts for this activity, to be consistent with the format illustrated in Table 4-1 of the DEIS for the Turkey Point site. (**0617-1-9** [Mueller, Heinz J.])

Response: *In response to these comments and to various other comments received from the applicant (FPL), the review team has provided more precise details in the text and tables regarding the anticipated extent of impacts on terrestrial and wetland habitats from various*

project elements. Table 4-8 of the EIS states that 32.17 ac of wetlands lie within the Western Laydown Areas. FPL has stated that laydown areas would become permanent above-grade facilities and would not be restored as wetlands. This information was added to Section 4.3.1 of the EIS. The review team has also expanded the discussion in Section 4.3.1.6 of FPL's proposed Wetland Mitigation Plan, which does not include laydown areas within the Turkey Point site because these areas would be permanently filled. This updated information has not changed the conclusions drawn in the EIS concerning potential impacts on wetlands and terrestrial habitats.

Comment: Section 4.1.2, Transmission-Line Corridors and Associated Areas (pg. 4-15) Tables 4-5 and 4-6: Outlines major land use acreages for transmission-line corridors and associated areas, but is not clear on the specific acres of wetlands to be impacted. Please provide more detail regarding wetland impacts for this activity, to be consistent with the format illustrated in Table 4-1 of the DEIS for the Turkey Point site. (**0617-1-10** [Mueller, Heinz J.])

Response: *In response to this comment and to various other comments received from the applicant (FPL), the review team has provided more precise details regarding the anticipated extent of impacts on terrestrial and wetland habitats from each proposed offsite transmission line. Tables 4-5 and 4-6 have been updated accordingly. However, specific acreages for various land cover classifications are not available for proposed offsite corridors because the siting of transmission infrastructure has not been finalized. Although all lands within the corridors would not be developed, the review team conservatively concluded that all land area within proposed corridors could be developed and based conclusions on this approach. This updated information has not changed the conclusions drawn in the EIS concerning potential impacts on wetlands and terrestrial habitats. Wetland acreage figures within proposed transmission corridors are summarized in Table 4-10 of the EIS. The review team believes the format of the various tables of terrestrial habitat impact are sufficiently consistent and therefore has not altered the format of any of the subject tables.*

Comment: The EPA requests that the FEIS address additional measures that can be taken to avoid and minimize onsite tidal and freshwater wetland impacts. As stated previously, the Public Notice published by the USACE stated that the project proposes impacts to 1000 acres of tidal and freshwater wetlands, and FPL stated in their response to USACE that the correct number for the direct wetland impacts for the project is 710 acres, with temporary impacts to 50 acres. Project impacts will include impacts to ARNI. The FEIS should clarify the acreage that would be impacted. (**0617-1-29** [Mueller, Heinz J.])

Response: *In response to this comment and to comments from the applicant (FPL), the review team has provided more precise details in Section 4.3.1 of the EIS regarding the anticipated extent of impacts on terrestrial and wetland habitats from various project elements. Sections 2.4.1.1 and 4.3.1.1 of the EIS also now provide information about which of the affected wetlands are Aquatic Resources of National Importance (ARNI). This updated information, while providing a clearer picture of the total extent of anticipated impacts, has not changed the conclusions drawn in the EIS concerning potential impacts on wetlands and terrestrial habitats.*

Comment: There are instances in the DEIS where the impacts are characterized as affecting an entire transmission or pipeline corridor, when in reality, only a small percentage of the corridor will be impacted. Instances in the DEIS include (emphasis added): a. DEIS Subsection 2.4.1.2, Page 2-79, Lines 10-13: The DEIS states: "Access near the L-31 Canal **would occur** over or through dikes, levees, and canals as **well as 5 ac of wetlands**. An access road near NW 88th Street **would occupy**...." Acreages presented in the ER, along with the corresponding

documents, are on a corridor basis; the actual area disturbed will be less than the total within the corridor. b. DEIS Subsection 4.3.1.2, Page 4-45, Lines 3-4: The DEIS states: "Land cover that **would be** affected by installation of the pipeline totals approximately 326 ac (Table 4-3)..." All acreage within potable water pipeline corridor is identified as "affected area", when actually only a small percentage of the corridor will be used to install the pipeline. c. DEIS Subsection 4.3.1.2, Page 4-45, Lines 15-17: The DEIS states: "Approximately **1,886 ac** of upland, forested, and wetland habitats... **would be affected** by installation of the reclaimed water pipeline (Table 4-3)." Only a small percentage of total will actually be temporarily impacted during pipeline installation. d. DEIS Subsection 4.3.1.2, Page 4-50, Lines 7-16: The DEIS states: "Combined, the two new access roads for the West Preferred corridor **would affect 365 ac** (Table 4-6). The Krome Avenue access road **would result in** habitat loss or alteration...The four access roads necessary for the West Consensus corridor **would affect** a combined **110 ac**...A variety of wetlands **would be lost**..." Corridors are wider than necessary to allow for impact avoidance during final roadway alignment design. Only a small percentage of habitats within the corridor would be affected. e. DEIS Subsection 4.3.1.3, Page 4-68, Lines 21-23: The DEIS states: "The proposed reclaimed water pipeline **would affect** almost **450 ac** of wetlands, including..." The DEIS is presenting all acreage within a corridor (from DEIS Table 4-3) as impact area, when only a small percentage of the corridor would be affected. For comparison, from DEIS reference (FPL2011-TN1012)—Turkey Point Units 6 & 7 Mitigation Plan, the total acreage of temporary wetland impact associated with reclaimed water pipeline is **43.6 ac.** f. DEIS Subsection 4.3.1.7, Page 4-72, Lines 29-31: The DEIS states: "Pipelines that would be built...would **affect an additional area of approximately 2,211 ac**..." Corridors are wider than necessary to allow for impact avoidance during final design. Only a small percentage of habitats within the corridor would be affected. (**0619-1-19** [Maher, William])

Response: *The review team understands corridors were designated to be wider than what would be necessary to contain a linear feature (road, pipeline, transmission line) for planning purposes. Lacking more precise design data, the review team had originally conservatively assumed that all acreage contained within a corridor could be affected by the proposed action. Use of newer more precise data allows the review team to present a less conservative, more realistic evaluation in the final EIS. The review team has verified the information contained in the comment and expanded Section 4.3.1 of the EIS accordingly. This updated information has not changed the conclusions drawn in the EIS concerning potential impacts on wetlands and terrestrial habitats.*

Comment: There are instances in the DEIS with respect to the presented land use values in their respective tables, which are inconsistent with the cited source or not current with the most recent documentation/reference. Instances in the DEIS include (emphasis added):...DEIS Subsection 4.3.1.1, Page 4-40, Table 4-7: DEIS Table 4-7 contains acreage values for the Turkey Point Site by cover types and FLUCFCS code. The following inconsistencies with the source cited for DEIS Table 4-7, (FPL 2014-TN4058) are noted: i. DEIS Table 4-7 lists FLUCFCS code 617 "Mixed Wetland Hardwoods" with a permanent impact acreage of 1.2. However, ER Table 4.3-1 does not list FLUCFCS code 617 or a corresponding acreage and percent total but rather list FLUCFCS code 619 "Exotic Hardwoods" with a corresponding disturbed acreage of 0.61. ii. DEIS Table 4-7 characterizes all of the disturbed acreage as "permanent". (**0619-2-5** [Maher, William])

Response: *The review team used the most current design data available to them. The review team has revised EIS Sections 4.1 and 4.3.1 so that the analyses in the final EIS account for design information received subsequent to publication of the draft EIS. The review team has independently verified the information contained in the comment and expanded the EIS*

accordingly. This updated information has not changed the conclusions drawn in the EIS concerning potential impacts on wetlands and terrestrial habitats.

Comment: DEIS Subsection 4.3.1.1, Page 4-43/4-44, Lines 21/5: The DEIS states: "FPL has accounted for **secondary impacts on wetlands** at all proposed wetland fill locations associated with temporary road improvement for construction access as well as other non-linear facilities by calculating the acreage of a 25 ft buffer of those proposed fill locations. Secondary impacts on wetlands would also be mitigated per State of Florida regulations (State of Florida 2014-TN3637), but FPL has proposed to do so **at a reduced level equal to 60 percent of direct impacts** (FPL 2011-TN1012)." There is no specific FDEP guidance on mitigation for secondary impacts, which are potential impacts to wetlands adjacent to where the facilities will be located (direct impacts). FPL has proposed a very conservative mitigation approach by providing 60 percent of the mitigation required had the wetlands impacts been direct impacts. This is consistent with the mitigation approach approved by FDEP for previous FPL projects. (emphasis added) (**0619-4-4** [Maher, William])

Response: *The statement "Secondary impacts on wetlands would also be mitigated per State of Florida regulations (State of Florida 2014-TN3637)" has been removed from the EIS. Removal of this statement does not alter the overall assessment of wetland impacts in the EIS.*

Comment: DEIS Subsection 4.3.1.1, Page 4-44, Lines 21-23: The DEIS states: "Spoils would be deposited mostly on previously filled areas but would also **fill in additional canal acreage classed as streams and waterways**." ER Section 2.4 states: "Spoils from the Units 6 & 7 plant area, FPL reclaimed water treatment facility, and other construction locations would be deposited on three areas (total approximately 211 acres) within the industrial wastewater facility. Two of these areas would be located on wide berms on either side of Grand Canal, the primary north-south canal in the center of the facility. The third would be along a strip of land below the southern end of the industrial wastewater facility. **All three areas have been used historically for spoil deposition** and contain scattered patches of early succession vegetation (grasses, low shrubs, etc.)." (emphasis added) (**0619-4-5** [Maher, William])

Response: *Table 4.3-1 in FPL's ER entitled Turkey Point Property Disturbed Area FLUCFCS Summary states that Spoils Area A contains 1.06 ac of land classified as FLUCFCS Level 3 code 510 – Streams and Waterways/Canals, Spoils Area B has less than 0.01 ac of FLUCFCS Level 3 code 510 – Streams and Waterways/Canals, and Spoils Area C has 4.39 ac of FLUCFCS Level 3 code 510 Streams and Waterways/Canals. ER Section 4.3.1.1 states the three spoils areas would lie along designated sections of banks within the IWF. Therefore, the review team concluded that approximately 5.45 ac of streams and waterways along banks of the IWF would be filled during spoil deposition. No changes were made to the EIS as a result of this comment.*

Comment: DEIS Subsection 4.3.1.2, Page 4-49, Lines 14-15: The DEIS states: "Adjacent wetlands **would also be affected** by siltation and runoff." FPL has committed to utilizing BMPs to prevent erosion/sedimentation impacts. (emphasis added) (**0619-4-6** [Maher, William])

Response: *FPL's ER Revision 6 (on pg 4.2-2) states that BMPs would be employed "to minimize" discharge of pollutants during storm events during construction as part of an NPDES (National Pollutant Discharge Elimination System) permit. The ER also states that the NPDES permit (and its protections) is subject to a Notice of Termination following construction and stabilization of disturbed areas. The review team therefore concluded that minimization of*

runoff as part of an NPDES permit does not equate to complete prevention of erosion or sedimentation along transmission line access roads for the life of the project. No changes were made to the EIS as a result of this comment.

Comment: DEIS Subsection 4.3.1.6, Page 4-70, Lines 17-21: The DEIS states: "FPL proposes to remove or control exotic vegetation...FPL also proposes to maintain and monitor vegetation **for 3 years after mitigation activities**..." The DEIS reference, (FPL 2011-TN1012), "Turkey Point Units 6 & 7 Mitigation Plan", states: "Success criteria, to be negotiated in consultation with the FDEP, USACE, and DERM, will likely...include 5% or less cover by exotic species...**for a period of at least 3 years following** initiation of mitigation activities." (emphasis added) (**0619-4-7** [Maher, William])

Response: *Section 4.3.1.6 of the EIS has been expanded to provide more detail on proposed mitigation for terrestrial ecology impacts, including clarifying mitigation success criteria.*

Comment: DEIS Subsection 4.3.1.6, Page 4-71, Table 4-11: DEIS Table 4-11 contains the following inconsistencies with DEIS reference, (FPL 2011-TN1012), "Turkey Point Units 6 & 7 Mitigation Plan": a. In the "W.A.T.E.R. Debits" category, the "Reclaimed Water-Treatment Facility (W.A.T.E.R.)" site should list the currently proposed values rather than the originally proposed. The current proposed values are as follows: "Impact (ac)" = 39.5, and "Wetland Functional Change (Mitigation Units)" = -33 b. The "West Preferred Transmission Line" site should be included under "UMAM Debits", not "W.A.T.E.R. Debits". c. In the "UMAM Debits" category, the "Reclaimed Water Pipeline (UMAM)" site is referencing values associated with the Treated Reclaimed Water Pipeline from the originally-proposed location. The revised values for the "Reclaimed Water Pipeline (UMAM)" are as follows: "Impact (ac)" = 43.6 ac, and "Wetland Functional Change (Mitigation Units)" = -4.8 Mitigation Units. d. In the "UMAM Debits" category, the "Construction Access Road (UMAM)" "Impact (ac)" should be 81.6 ac., not 45.0 ac. e. After reconciliation, the "Subtotals" should be revised as follows: "W.A.T.E.R. Debits"; "Impact (ac)" = 315.86, "Wetland Functional Change (Mitigation Units)" = 201.35; "UMAM Debits"; "Impact (ac)" = 433.4, "Wetland Functional Change (Mitigation Units)" = 326.24; and "UMAM Credits"; "Wetland Functional Change (Mitigation Units)" = 333.5. f. After reconciliation, the "Net difference in Wetland Function (Credits)" = 7.21. g. The "Overall Net Mitigation Ratio (credit basis)" should be presented on an acreage basis rather than credit basis. h. Temporary wetland impacts (pipelines) should be separated from permanent wetland impacts. (**0619-4-8** [Maher, William])

Response: *This comment provides edits to update design information used in the wetland mitigation discussion in Section 4.3.1.6 of the EIS. The review team has independently verified the supplied information and updated Section 4.3.1.6 where appropriate. The updated information about that facility's proposed location has not changed the conclusions drawn in the EIS concerning potential impacts on wetlands and terrestrial habitats.*

Comment: DEIS Subsection 5.3.1.1, Page 5-36, Lines 38-39: The DEIS states: "The extent of the effects of road improvement on wildlife **is contingent upon the decision to restore roads to the preexisting condition** and traffic levels." FPL has **committed to remove construction access roads within 2 years following construction of Units 6 & 7** as documented in the Conditions of Certification issued by the State of Florida Department of Environmental Protection, Section B, Subsection VII-B-2-a and condition number 4 of the "Standard Amendments to the Comprehensive Development Master Plan for Miami-Dade County" issued by the Board of County Commissioners on April 28, 2010, which states "Within 2 years following the construction of Turkey Point Units 6 & 7 (a) all temporary roadway improvements on publicly

owned rights-of-way will be returned to the status of the roadway(s) prior to the commencement of construction of the temporary roadways and roadway improvements, and, (b) any privately owned roadway will be returned to the minimum roadway width required to provide maintenance to FPL facilities and shall not be more than two lanes;" (emphasis added) (**0619-4-17** [Maher, William])

Response: *This comment contains suggested edits provided by the applicant to update text in Section 5.3.1 of the EIS regarding their commitment to remove access roads once they are no longer needed. The review team used the most current design data available to them, including the data for the access roads. The review team has revised the EIS so that the analyses in the final EIS account for design information received subsequent to publication of the draft EIS. The review team has independently verified the information contained in the comment and expanded the EIS accordingly. This updated information has not changed the conclusions drawn in the EIS concerning potential impacts on wetlands and terrestrial habitats.*

Comment: DEIS Subsection 5.3.1.4, Page 5-50, Lines 17-20: The DEIS states: "FPL would monitor for the possible loss of wood stork foraging habitat within the designated wood stork core foraging areas in accordance with a methodology approved by the FWS (FPL 2011-TN1283)." **No monitoring** of wood stork foraging habitat is proposed in the cited reference (FPL 2011-TN1283), but the possible loss **will be quantified and mitigated in accordance with USFWS guidelines**. (emphasis added) (**0619-4-18** [Maher, William])

Response: *The statement about monitoring for lost wood stork foraging habitat was removed from the EIS. The review team did however add more information to Sections 4.3 and 5.3 of the EIS discussing mitigation of impacts on the wood stork.*

Comment: DEIS Appendix F-2, Section 2.2, Page 2-7, Lines 6-9: USFWS BA states: "Field reconnaissance surveys for threatened or endangered wildlife within existing and proposed new transmission-line corridors as well as a proposed reclaimed water pipeline corridor **consisted of a single vehicular driving survey during 2008 along the corridors** (FPL 2011-TN94)." ER Table 2.4-1 lists results of wildlife surveys and observations along the proposed transmission corridors from **1972 to 2011**. (emphasis added) (**0619-6-4** [Maher, William])

Response: *This comment consists of the applicant's suggested text edits to the BA. The indicated edits are too minor to influence the accuracy of the BA. The edits will not be made to the BA, because they are minor edits that would not affect the accuracy of the information provided in the BA and would have no material effect on the findings FWS must make.*

Comment: DEIS Appendix F-2, Subsection 3.1.3, Pages 3-6, Line 30: USFWS BA states, "The reclaimed water pipeline **corridor would be 75 ft wide** by 9 mi long." DEIS reference (FPL2012-TN1618), "Turkey Point Units 6 & 7 Federal Biological Assessment for Six Listed Species", Section 2.3 states, "Pipeline installation will require **temporary disturbance of an approximately 75-ft-wide** right-of-way within of the pipeline corridor to facilitate trench excavation. Areas of temporary impact will be restored following pipeline construction." (**0619-6-9** [Maher, William])

Response: *This comment provides edits reflecting the design of pipeline elements under the project. Data on acreages of terrestrial habitat affected by pipeline installation have been updated throughout the EIS, except in distributed correspondence to FWS in Appendix F-2. Additionally, the review team has added information about in situ restoration activities planned for the reclaimed-water pipeline to Section 4.3 of the EIS to describe why some impacts*

from this pipeline can be considered temporary. However, the review team expects forested wetlands (i.e., mangroves) to be converted to herbaceous wetlands and remain so for the operational life of the pipelines because standard practice dictates exclusion of woody vegetation from pipeline corridors due to root intrusion and subsequent maintenance issues. Although no net loss of wetlands would occur within the reclaimed-water pipeline corridors, the conversion of forested wetlands to herbaceous wetlands within the corridors must be regarded as a permanent impact (at least for the operational life of the pipelines). The updated data do not alter any conclusions presented in the EIS.

Comment: *Page 5-51, Section 5.3.1.6, Summary of Impacts to Terrestrial Resources*

Lines 2-5: The DEIS states, "Salinity within the IWF or other area wetlands would not change enough to alter prey populations consumed by wading birds. Deposition of emerging pollutants ... would also be below levels expected to affect the terrestrial ecosystem." There is insufficient information provided in the DEIS to be able to make such a conclusion. While salinity may not have an effect on prey populations consumed by wading birds such as the Wood Stork, reclaimed water put back into the IWF, as well as the addition from the drift, may have an effect. Some of these contaminants are endocrine disruptors, which cause effects such as immune suppression and developmental and reproductive effects at very low concentrations. The DEIS should include additional discussion about contaminants in the reclaimed water that not only exceed toxicological benchmarks and EPA water quality criteria, but also those that bioaccumulate. These contaminants have the potential to not only impact the wood stork and crocodile, but other species foraging in the project area as well. (**0622-1-6** [Austin, Stan])

Response: *The commenter is concerned about the potential for adverse effects on terrestrial and aquatic resources from the presence of CECs (chemicals of emerging concern) that may be present in the cooling-tower drift. Sections 5.2.1 and 5.3.2 of the EIS provide an assessment of the region of potential effect for CECs, and Section 5.3.1 provides an overview pertaining to the terrestrial ecosystem. Section 5.3.2 of the EIS has an extensive discussion of the EPA criteria used to assess the potential toxicity or adverse effects of CECs on aquatic species known to be sensitive to chemical compounds and at critical life stages. Because it is not possible to assess every potential chemical or chemical byproduct that may be present in the reclaimed-water source, the representative and most abundant chemical compounds were provided for different functional chemical classes, including endocrine disrupting compounds. The use of no observed effects concentrations (NOECs) for assessing toxicity thresholds is a widely used criterion in aquatic toxicology, and represents the highest concentration threshold acceptable in these toxicity tests for the correlated exposures. Section 5.3.1 of the EIS has been expanded to include discussion of recent environmental conditions within the IWF and actions taken and proposed to address these conditions that would also affect the transport of CECs from cooling-tower drift through the food chain to terrestrial organisms.*

Comment: *Page 5-136,* Table 5-23 (under the Terrestrial Ecosystems) states, "Herbicide use would be in accordance with manufacturer specifications and carried out by licensed applicators." Additionally under the Aquatic Ecosystems heading, the DEIS states "... procedures would include adherence to strict guidelines established by Federal, State, and local resource agencies regarding the use of herbicides." However, the document does not identify which herbicides would be used, when would they be used, how often would they be used, how they would be applied, if more than one herbicide would be used at a time or in conjunction with other chemicals, or whether any of the herbicides proposed for use have aquatic labels and will be applied over water, including any wetland. Revisions to the DEIS should address these

questions and discuss known potential interactive effects of these chemicals. (**0622-1-8** [Austin, Stan])

Response: *Sections 5.3.1 and 5.3.2 of the EIS address possible ecological impacts resulting from herbicide use. Because herbicide use would adhere to manufacturer specifications and Federal/State/local guidelines, for appropriate use, the review team concludes that the risk to terrestrial and aquatic ecosystems would be minimized to the extent practicable. As long as the herbicides are used in accordance with their labels and Federal and State regulations, the impacts of herbicide use on terrestrial ecology would be minimal. No changes were made to the EIS as a result of this comment.*

Comment: The DEIS provides only limited information related to potential impacts of construction of Units 6 and 7, associated power lines, and other related infrastructure on avian populations and other fauna. (**0622-1-17** [Austin, Stan])

Response: *Possible impacts on birds and other wildlife from all elements of the Units 6 and 7 project, including building and operating transmission lines, have been analyzed in detail and included in Sections 4.3.1 and 5.3.1 of the EIS. No change was made to the EIS as a result of this comment.*

Comment: The NPS recommends that the EIS also consider impacts on the piping plover and red knot. Both species would be expected to use the project site and vicinity for migratory habitat. (**0622-1-22** [Austin, Stan])

Response: *Potential impacts on the piping plover and rufa red knot have been considered and are individually discussed in Sections 4.3.1.3 and 5.3.1.3 of the EIS. Mitigation measures addressing shorebirds such as the rufa red knot are provided in Section 4.3.1.6. Cumulative impacts on wildlife habitats, including those used by the piping plover and rufa red knot, are discussed in Section 7.3.1.1. No change was made to the EIS as a result of this comment.*

Comment: Although birds from a wide range of taxa and feeding guilds are exposed to these direct risks, wading birds (such as herons, egrets, storks, and cranes) are of particular concern because they make up such a large and important component of the birds found in Everglades region of South Florida. Wading birds are behaviorally predisposed to collision due to their large size, which makes it difficult for them to take evasive action when confronted with flight obstacles. Collision with powerlines was identified as the most significant source of wood stork mortality in an evaluation of causes of death. [Footnote 4: Forrester, D.J. and Spalding, M.G. 2003. Ibises, Spoonbills, Flamingos, and Storks: Trauma. Pp. 227-228 *In:* Parasites and diseases of wild birds in Florida. Univ. Press of Florida, Gainesville. 1132 pp.] During nesting season when foraging conditions are good east of Everglades NP, the thousands of pairs of these nesting wading birds will fly past the powerlines, often two or more times daily, for periods of weeks to months. Use of flight diverters and line markers may reduce, but not eliminate, collision mortality for wading birds. The resulting expectation is that considering the elevated collision risk of wood storks and wading birds, the fact that thousands of these species are nesting within the normal foraging distances of these wading birds, the presence of powerlines will cause a sustained level of mortality for these species for the life of the powerlines. This sustained mortality may be punctuated by more significant mortality events when weather conditions or other factors cause increased risk of collision. Over time, this mortality may result in measurable population declines. (**0622-1-23** [Austin, Stan])

Response: *The review team has identified wading birds as a biological indicator of the South Florida ecosystem in Section 2.4.1.3 of the EIS, and many wading bird species are noted in Table 2-15, State-Listed Wildlife in the Turkey Point Vicinity. Impacts on wading birds, including the wood stork, are discussed in Section 4.3.1.3. Avian Mortality Impacts from Power Transmission is a subheading within Section 5.3.1.3 that contains a discussion of strike and electrocution mortality of wood storks and other wading birds. Mitigation measures addressing wood storks are discussed in Sections 4.3.1.6 and 5.3.1.5. Cumulative impacts on wildlife habitats, including those used by the wood stork and wading birds, are discussed in Section 7.3.1.1. The State of Florida COCs require pre- and post-construction ground surveys of all wading bird colonies that occur within a half mile of any new transmission line. No change was made to the EIS as a result of this comment.*

Comment: In the NPS DEIS regarding land exchange and the subsequent construction of powerlines within the west preferred corridor, the impacts of powerlines on wildlife and wood storks was determined to be moderate to major. (**0622-1-24** [Austin, Stan])

Response: *Consistent with the referenced NPS conclusion regarding impacts to wood storks from transmission lines in this area, the EIS acknowledges the potential for adverse impacts on wood storks and other wildlife from transmission lines built in the Western Preferred and Western Consensus transmission corridors. However, the review team also acknowledges that differences are possible among subjectively determined impact levels such as those used in its EIS and the referenced NPS EIS. No change was made to the EIS as a result of this comment.*

Comment: The NPS is also concerned that bird surveys conducted at the mud flats where Units 6 and 7 would be built are inadequate. Avian surveys referenced in the DEIS were conducted over a two-day span during June 2009. The use of this limited period of time for avian surveys is wholly inadequate to analyze annual or migratory use and the potential for avian impacts due to the plant construction or operations. This limited review did not include spring migration, fall migration, or wintering use birds. June is traditionally the least likely month to observe the diversity of birds in south Florida, and a mere two days could have been heavily impacted by weather and light conditions. Spring, fall, and winter surveys should be performed, not just on the proposed site for Units 6 and 7 itself, but also in the pipeline corridors, the transmission line corridors, the road areas, the fill source location, as well as other impacted sites. In an analysis of the potential for avian impacts, the more broadly available data for migration and winter or summer habitat use is available from the NPS, Tropical Audubon Society, or university researchers and should be consulted. (**0622-1-25** [Austin, Stan])

Response: *The review team acknowledges that comprehensive bird surveys were not conducted in all seasons at all proposed project locations. However, the baseline data underlying the wildlife impact analyses and subsequent conclusions within the EIS did not depend solely on the results of faunal surveys specifically conducted on the project site. Potentially affected fauna lists were generated using information from Federal, State, and local agencies, published literature, and online sources in addition to the limited onsite field survey data. To be conservative, the review team assumed that any bird or wildlife species potentially occurring in South Florida was present in all potentially suitable habitats. The discussion of baseline wildlife conditions on the Turkey Point site in Section 2.4.1.1 of the EIS was expanded to provide increased specificity and to more clearly identify the data sources used.*

Comment: The Florida panther utilizes habitat in the project area, illustrated by sightings, mortality, and behavior of radio-collared animals. Although there may be no confirmed

observations on FPL land, the panthers have been seen on nearby lands and FPL lands can reasonably be considered natural and active range for panthers. Lack of sightings does not necessarily indicate a lack of use of habitat. Increased road traffic and construction activity can reasonably be considered to affect current use of the area by this highly endangered species. Furthermore, access can increase threats to the endangered cats from poachers. For instance, a 5-year-old male panther was shot to death and found discovered alongside Immokalee Road in the Naples area on March 22, 2015. Lastly, new research relating to how wildlife see and are impacted by ultra-violet flashes emitted from powerlines should be analyzed as it is pertinent to the discussion on the Florida panther, as well as other wildlife and avian species. (**0622-2-2** [Austin, Stan])

Response: *Florida panthers were observed near the Turkey Point site within the west transmission corridors (SFWMD 2013-TN2917), and the review team assumes that Florida panthers are present throughout the region. Impacts on the Florida panther are addressed in Sections 4.3.1.3, 5.3.1.3, and 7.3.1.1 of the EIS. These discussions have been expanded to consider in greater detail how increased human access could affect the movement and behavior of Florida panthers in the region. The expanded discussions include consideration of the possible effects from ultraviolet flash. They do not alter the review team's general conclusions regarding impacts on the Florida panther.*

Comment: The NPS continues to be concerned with potential impacts to the Eastern indigo snake. Increased traffic during construction and operation of Units 6 and 7 would almost certainly impact Eastern indigo snake vehicle-related mortality near and on the site. Furthermore, power block construction and muck disposal, which could bury snakes, could affect eastern indigo snake populations as well. Short hydration periods for wetlands on site could also play an important role. Out of concern that increased traffic would lead to more vehicle-related wildlife mortality, the NPS has previously recommended to the State of Florida that herpetological surveys be conducted along the public roads leading to the site for at least a year prior to and during construction activities. These surveys would inform the placement of snake and reptile underpasses, as appropriate. (**0622-2-4** [Austin, Stan])

Response: *Impacts on the eastern indigo snake are discussed in Sections 4.3.1.3 and 5.3.1.3 of the EIS. Increased vehicle strike mortality is identified as a potential impact. The discussion addressing the potential for live burial during earth-moving activities has been expanded. FPL is required by the State of Florida to conduct pre-clearing surveys for listed species, including the eastern indigo snake in accordance with the State of Florida COCs issued by the Siting Board on 5/19/14. The expanded discussion includes information about this requirement and how the data ultimately collected could be used to reduce impacts. The expanded discussion does not alter the review team's general conclusions regarding impacts on the eastern indigo snake.*

Comment: *Pre-treatment building - associated with the reclaimed and potable water pipelines[.]* Location of the reclaimed water treatment facility is on 43 acres of wetlands. The DEIS states that there would be 328.12 acres of wetlands (not verified by the USACE as jurisdictional wetlands) that would be filled to prepare the site. A proposed restoration project would be to scrape down the Florida City Canal. Eradicating invasive species and restoring mangrove would benefit the ecological value of the area. (**0622-2-15** [Austin, Stan])

Response: *FPL's wetlands mitigation plan included in the State of Florida COCs issued on 5/19/14 would mitigate for all functional loss of wetlands through regional wetland restoration, enhancement, and preservation combined with purchase of credits from regional mitigation*

banks. The discussion of the Wetland Mitigation Plan in Section 4.3.1.6 of the EIS has been expanded to better explain how the proposed mitigation would offset the unavoidable losses and degradation of specific wetland habitats, including the coastal mangrove forests. Although the review team considers the possible benefits of the applicant's proposed wetland mitigation in its assessment of terrestrial and wetland impacts in the EIS, the details of the plan are developed by the applicant and approved by the Federal and State agencies that have regulatory oversight.

Comment: The NPS asserts that the DEIS impact analysis associated with construction and operation of proposed Units 6 and 7 does not sufficiently address issues related to the environmental impacts of the proposed action on resources managed by the NPS. Based on our review of the DEIS, we have strong concerns that impact analysis described in the DEIS does not:...describe the importance of the fragile and threatened nature of Biscayne and Everglades NPs, Biscayne Bay, and the broader Everglades ecosystem in the context of ongoing federal and state efforts to restore the Everglades; and, as a result[.] (**0623-9** [Austin, Stan])

Comment: Included in the project application are three new sets of power lines, some 15 stories tall, that will cut across the Everglades National Park. Expected impacts include: increased electrocutions and collisions for birds; the spread of invasive plant species along a new, drivable access corridor; changes to the hydrology of the Shark River Slough due to tower pads and road construction; and a new, unsightly, industrial landscape, visible for miles, in the heart of the Everglades, one of Floridas most profitable and popular wilderness areas. (**0674-6** [Dwyer, Karen])

Comment: I believe it will bring some benefits but we also have to make sure that we have the -- have a greater discussion about how it will impact the national parks because it's right there on the bay and it's right there near the Everglades. (**0723-8-4** [McDuffie, Stephen])

Response: *The review team has added an expanded discussion to Sections 4.3.1 and 5.3.1 of the potential effects of the project on the terrestrial and wetland resources of the South Florida ecosystem as they pertain to both Biscayne and Everglades National Parks and the experience of visiting these parks. This expanded discussion integrates the direct and indirect effects on specific resources in the parks and addresses how those effects could influence the resource management objectives for each park and the broader Everglades ecosystem, including the objectives of the CERP. The assessment of potential cumulative impacts on the unique terrestrial and wetland resources of both parks and the Everglades ecosystem has likewise been expanded. The expanded discussion does not alter the NRC staff's general conclusions regarding impacts on terrestrial ecology resources.*

Comment: We have to start to look more completely at possible long term consequences involving the expansion of Power plants. There are so many creatures and plants that call this area home. (**0689-1** [Miller, Nena])

Response: *Cumulative impacts on terrestrial plants and animals, discussed in Section 7.3.1 of the draft EIS, are considered for the proposed life of the project and include the actions that would occur in the reasonably foreseeable future. No changes were made to the EIS as a result of this comment.*

Comment: You've got the spread of invasive plant species into the area[.] (**0721-22-4** [Schwartz, Matthew])

Comment: It's going to spread invasive plant species throughout the east Everglades expansion area. (**0723-9-10** [Schwartz, Matthew])

Comment: Invasive plant species throughout the access road, the pads, changes in the hydrology. (**0723-9-12** [Schwartz, Matthew])

Response: *The possible inadvertent introduction of terrestrial plant and animal invasive species is discussed under the Disease Vector and Pest Species heading of Sections 2.4.1.2 and 2.4.1.3 of the EIS. Non-indigenous fish are discussed in Section 2.4.2.3 and listed in Table 2.26. The impacts of additional inadvertent introduction of non-native species by the proposed actions are included in appropriate sections of Chapters 4, 5, and 7.*

Comment: The National Parks Service did an avian and bird study. Lots of impacts, lots of collisions, lots of electrocutions. Three colonies have now threatened Wood Storks in the area. They're going to be impacted. We need to look at those. (**0721-22-7** [Schwartz, Matthew])

Comment: Electrocutions, National Park Service already evaluated it. Electrocutions and collisions with birds. Three colonies of threatened wood storks in the area. (**0723-9-13** [Schwartz, Matthew])

Response: *Collision and electrocution mortality as well as other impacts on wading birds, including the wood stork, are discussed in Sections 4.3.1.3 and 5.3.1.3 of the EIS, and associated mitigation measures are discussed in Sections 4.3.1.6 and 5.3.1.5. No changes were made to the EIS as a result of this comment.*

Comment: And what will happen then to the wildlife that remains? They can't leave. (**0721-32-9** [Schlackman, Mara])

Response: *Impacts on wildlife are discussed in Sections 4.3.1.1 and 5.3.1.1. The assessment of possible impacts on wildlife considers the relative mobility of various species.*

Comment: I also have read your impact, your ecological impact that clearly says, when required, permanent disturbance to approximately 573 acres of habitat. It would affect wetlands, it would create mud. It will create a lot of killing of lifestyle, of life, of wildlife in our areas. You clearly say some habitat will be permanently lost, some wildlife will be killed and other wildlife will be temporarily displaced. And you consider this small to moderate?

We talked about the butterflies, we talk about the bobcats, we talk about the marsh rabbits. We talk about the tarpin, we talk about the porpoises. We're talking about -- I'm looking at my notes because I really haven't prepared anything. We're talking about the voice of the water, the voice of the environment, the voice of the wildlife. (**0722-17-1** [Swenson, Cyndee])

Response: *The terrestrial and aquatic ecology sections of Chapters 4 and 5 of the EIS (Sections 4.3.1 and 5.3.1 for terrestrial and Sections 4.3.2 and 5.3.2 for aquatic) acknowledge that impacts from the proposed units on terrestrial ecological resources, including wetlands, would be MODERATE. MODERATE impact is defined by the NRC as being sufficient to noticeably alter, but not destabilize important attributes of the resource. The EIS provides specific details about the acreage of specific terrestrial habitats affected by the project and an in-depth evaluation of the adverse effects on wildlife using those habitats and adjoining areas. The review team used a conservative approach when analyzing impacts, leaning on the side of caution when considering terrestrial resources and wetlands resources.*

Comment: ...the significance of these rare and disappearing birds and animals. (**0723-11-3** [Berendsohn, Catherine])

Response: *Impacts on birds and other terrestrial wildlife are discussed in Sections 4.3.1.1 and 5.3.1.1. Impacts on specific rare species that are Federally or State-listed as threatened or endangered are presented individually in Sections 4.3.1.3 and 5.3.1.3.*

Comment: The FEIS should include a wetland jurisdictional determination, so that a complete review of wetland impacts can be determined. During the wetland jurisdictional determination review, the EPA is willing to participate with that review, prior to publishing in the FEIS. Also, the FEIS should include Uniform Mitigation Assessment Method scores (Parts 1 and 2), for the proposed impact and mitigation sites. Technical rationale for each score should also be included.

Overall, the FEIS should include updated information regarding the CWA Section 404 permitting process, and include information responsive to the concerns stated in EPA's letters to the USACE, as well as the specific concerns listed here. Impacts should be avoided to the maximum extent feasible, and unavoidable impacts should be effectively mitigated. (**0617-1-30** [Mueller, Heinz J.])

Comment: Sequential Mitigation of Impacts to Essential Fish Habitat[.] Under the Clean Water Act, its implementing regulations, and EPA guidelines, wetland impact avoidance and minimization are the first two steps in sequential mitigation, and the third step is compensatory mitigation for unavoidable impacts. The public notice does not describe any measures to avoid or minimize impacts to mangroves or seagrass from the project. Based on the drawings provided with the notice, it appears 100 percent of the wetlands on the site are proposed for impact. The public notice states the applicant submitted a mitigation plan that includes debiting of mitigation credits from the FPL Everglades Mitigation Bank, purchasing of mitigation credits from the Hole-in-the-Donut in-lieu-fee program, and constructing permittee-responsible mitigation. The public notice, draft EIS, and EFH assessment neither describe the permittee-responsible mitigation, how well the credits from these mitigation banks match the impacts, nor the number of credits required. In letters to the USACE dated April 9, 2015, and May 4, 2015, the EPA provides additional detail on concerns about how the sequential mitigation process has been implemented for this project. (**0724-15** [Fay, Virginia M.])

Comment: Wetland Fill[.] In order to construct Units 6 and 7 and related infrastructure, including pipelines and the RCWs, the NRC and FPL propose to fill approximately 1,000 acres of wetlands. The public notice does not identify the impacts to mangroves from this work; however, the draft EIS indicates approximately 105 acres of mangroves would be filled, permanently or temporarily to facilitate construction (Table 2). The NRC expects about half of the mangrove impacts to be construction related and temporary. Project plans in the final EIS and EFH assessment should reflect all practicable avoidance and minimization of impacts to mangroves. In addition, a compensatory mitigation plan should be provided demonstrating, through a functional assessment comparing impact and mitigation areas, that sufficient mitigation is proposed. The mitigation plan should describe how mangrove temporary impact areas would be re-graded to appropriate elevations and monitored to ensure mangrove vegetation returns to the impacted sites at locally appropriate densities. Performance measures, monitoring criteria, schedule, and frequency should also be identified in the plan (see the Federal Compensatory Mitigation Rule dated April 2008).

[Table 2 included in original correspondence]

Table 2: FPL proposed land disturbance on the Turkey Point site and Florida land use, cover, and forms classification system (FLUCFCS) summary for the different categories of mangrove impacts (modified from Table 4-1 in the draft EIS) (**0724-4** [Fay, Virginia M.])

Response: *Section 4.3.1.6 of the EIS discusses FPL's proposed Wetland Mitigation Plan that was adopted within the State of Florida COCs. Regarding the wetland jurisdictional determination, FPL would have to obtain a jurisdictional determination from the USACE prior to receiving its Section 404 permit authorizing impacts on wetlands and other waters of the United States. The mitigation discussion addresses opportunities for avoidance or minimization of wetland impacts, and it outlines concepts for compensatory mitigation. Table 4-10 of the EIS summarizes wetland functional loss debits and mitigation credits, using the Uniform Mitigation Assessment Method. As required by the USACE Mitigation Rule dated April 2008, the Wetland Mitigation Plan is based on estimating the functional credits that must be provided in the compensatory wetland mitigation needed to offset the losses of functional values in wetlands affected by the project. The review team has updated the text of Section 4.3.1.6 to reflect new information about wetland mitigation available since the draft EIS. The review team has also updated Table 4-10 to reflect the latest mitigation information available from the applicant and interactions between the applicant and the USACE and FWS subsequent to the draft EIS. The expanded text in Section 4.3.1.6 provides more information about specific elements of the applicant's proposed wetland mitigation and how each element of that mitigation addresses wetland impacts from individual parts of the Units 6 and 7 project.*

Comment: DEIS Subsection 7.3.1.1, Page 7-19, Lines 10-12: The DEIS states: "The **West Preferred Corridor within the eastern boundary of Everglades National Park** could be counterproductive to future CERP goals..." ER Subsection 2.2.2.2 states that the **West Preferred Corridor (preferred option) "runs along" the eastern boundary of Everglades National Park**, while the West Secondary Corridor (secondary option) runs through the Park. Further, ER Figure 2.2-5 shows both routes in relation to the Park boundary. Therefore, the West Preferred Corridor/preferred option does not present a barrier to surficial flow to eastern Everglades National Park as it is associated with the eastern boundary of the Park. (emphasis added) (**0619-5-9** [Maher, William])

Response: *The location of the West Preferred transmission corridor was corrected in Section 7.3.1.1 of the EIS, and its potential effects on the CERP was also edited accordingly. These changes did not alter the conclusions presented in the EIS.*

Comment: DEIS Appendix F-2, Section 2.1, Page 2-4, Lines 3-4: USFWS BA states: "**Each unit** would have **a mechanical draft cooling tower** for the circulating-water system..." ER Subsection 3.1.2 states: "**For each unit**, the closed-cycle circulating water system (CWS) would consist of **three mechanical draft cooling towers**..." (emphasis added) (**0619-6-1** [Maher, William])

Comment: DEIS Appendix F-2, Subsection 3.2.1, Page 3-8, Lines 5-6: USFWS BA states: "The circulating-water system flow and heat rejection rates compared to the service-water system would be about **44 times larger** respectively." ER Table 3.4-1 lists the service water flow rate for normal operation as 10,500 gpm and the heat transferred as 103 x 10^6 Btu/hr. ER Subsection 3.4.1.1.1 lists the circulating water pumps flow rate at 660,100 gpm and the heat load as 7628 x 10^6 BTU/hr. Using these values, the circulating-water system flow and heat rejection rates compared to the service-water system are **62.9 and 74.1, respectively**. (Note all the values listed are on a per unit basis.) (**0619-6-11** [Maher, William])

Comment: DEIS Appendix F-2, Section 4.18, Page 4-15, Lines 27-29: USFWS BA states: "Pineland habitat a the **Gold Coast Railroad Museum Park that borders the proposed East transmission-line corridor** for approximately 700 m is also designated critical habitat for the Florida brickell-bush." The **East Corridor does not border the Gold Coast Railroad Museum Park**. The location of the Gulf Coast railroad Museum is adjacent to Zoo Miami on the north side. The address is 12450 SW 152nd St, Miami, FL 33177, http://www.gcrm.org/ (emphasis added) (**0619-6-15** [Maher, William])

Comment: DEIS Appendix F-2, Section 5.2, Page 5-2, Lines 10-12: USFWS BA states: "Mitigation has also been **proposed** for 1,030 habitat units after applying the FWS mitigation ratio of 2.5:1 for panther habitat." The reference provided in the USFWS BA is (FPL 2011-TN1283). However, Attachment D of this document "Estimated Impacts to Florida Panther Habitats (BDA, 2009)", Page 3 states: "The number of PHUs that the USFWS may require for mitigation for the direct and temporary losses of panther habitat due to improvements to roads accessing the Site was **estimated**. FPL will work with the USFWS, ACOE, and other appropriate agencies to determine mitigation recommendations for the loss of panther habitats after a final design for project features has been achieved consistent with the conditions of site certification." (**0619-6-16** [Maher, William])

Comment: DEIS Appendix F-2, Section 5.7, Page 5-5: This section refers to FPL 2011-TN1283 "FPL Turkey Point Units 6 & 7 Threatened and Endangered Species Evaluation and Management Plan, Rev 1" when describing several wood stork requirements imposed by FFWCC on FPL. The correct reference is (FPL2014-TN3637), "Final Order on Certification, In Re: Florida Power and Light Company Turkey Point Units 6 & 7 Power Plant Siting Application No. PA 03-45A3," which contains the FFWCC Conditions of Certification. The Threatened and Endangered Species Plan does not include Conditions of Certification. (**0619-6-17** [Maher, William])

Comment: DEIS Appendix F-2, Section 5.7, Page 5-5, Lines 8-11: USFWS BA states: "Offsite activities would also affect storks, because the installation of a portion of the proposed transmission lines would occur within **1 mi of two active wood stork colonies and within 3 mi of two other colonies**. The transmission lines would also bisect the 18.6 mi CFA of nine wood stork colonies." The language is correct for the West Preferred Corridor; however, it **does not reflect the location of the West Consensus Corridor (MDLPA 2 Corridor)** which is located outside the recommended management zones. DEIS reference, (FPL2013-TN2941), Section "Threatened and Endangered Species", page 9 states: "However, use of the MDLPA 2 Corridor reduces the probability of potential impacts to the federally endangered wood stork (*Mycteria americana*) and Everglade snail kite (*Rostrhamus sociabilis plumbeus*). The wood stork is known to nest in four colonies both south and north of Tamiami Trail and west of the West Preferred Corridor. These colonies have been well documented for years and are known as the Tamiami East 1 and 2, Tamiami West, and 3B Mud East colonies [South Florida Water Management District (SFWMD), 2013]. The **MDLPA 2 Corridor is located east of all these known colonies, and the closest colony (Tamiami East 1) is 0.86 mile away**. This distance falls outside the recommended primary (500-1500') and secondary (2500') management zones..." (emphasis added) (**0619-6-18** [Maher, William])

Comment: DEIS Appendix F-2, Section 5.7, Page 5-5, Lines 14-16: USFWS BA states: "The FFWCC requires FPL to conduct flight surveys of the two known wood stork nesting colonies to determine the flight corridors of fledging wood storks before and after transmission-line installation (**FPL 2011-TN1283**)." The reference is incorrect in this section. FPL 2011-TN1283 references the "FPL Turkey Point Units 6 & 7 Threatened and Endangered Species Evaluation

and Management Plan". The correct reference is the Conditions of Certification (**State of Florida 2014-TN3637**). (emphasis added) (**0619-6-19** [Maher, William])

Comment: DEIS Appendix F-2, Section 2.2, Page 2-6, Lines 21-24: USFWS BA states: "Freshwater marsh is the predominant natural land cover on the site; it occupies almost 18 percent of the entire property and almost 40 percent of the undeveloped land area. **An additional 9 percent is mixed wetland hardwoods**." The following language can be used for clarification: "**An additional 9 percent of the undeveloped land** is mixed wetland hardwoods." (emphasis added) (**0619-6-3** [Maher, William])

Comment: DEIS Appendix F-2, Section 2.2, Page 2-7, Lines 12-13: USFWS BA states, "Avian surveys were also conducted at selected locations on the Turkey Point site over a 2-day span during **June 2009**." In addition to the survey conducted on **June 23-24, 2009**, another survey was conducted on **March 24-25, 2009**. The survey report is included in the DEIS reference (FPL2009-TN1334), however, it is not referred to in the USFWS BA. (emphasis added) (**0619-6-5** [Maher, William])

Comment: DEIS Appendix F-2, Subsection 3.1.1, Page 3-3, Lines 5-10: USFWS BA states: "Land clearing, grubbing, grading, and placement of fill would occur on approximately 591 ac of the Turkey Point site (FPL 2014-TN4058). Excluding cover classes supporting existing development, approximately 577 ac of intact terrestrial habitat would be lost. Approximately 328 ac of wetlands on the Turkey Point site would be permanently altered by filling and grading, clearing of vegetation, dewatering, erosion, sedimentation, and other alterations of the existing hydrology such as road construction and culvert installation." The cited source in the text is FPL's ER Revision 6. ER Table 4.3-1, Revision 6, includes revised acreage values that will result in different acreage values—this includes the removal of the treated reclaimed water supply line as this line is now fully within the heavy haul road disturbed area and is no longer separately considered. Additionally, the 577 ac value number includes the spoils area and, as described in ER Section 2.4, the spoils area is not "intact terrestrial habitat." ER Section 2.4 states: "**All three areas have been used historically for spoil deposition** and contain scattered patches of early succession vegetation (grasses, low shrubs, etc.)." (emphasis added) (**0619-6-6** [Maher, William])

Comment: DEIS Appendix F-2, Subsection 3.1.1, Page 3-3, Lines 23-25: USFWS BA states: "Almost **40 percent** of the affected land area has been filled during previous land-development activities. Another **30 percent** of the affected land, including the entire Units 6 and 7 plant area, is classified as non-vegetated wetland (FPL 2014-TN4058)." ER Section 2.4: Total property acreage is approximately 9400 ac; cooling canals acreage = 5900 ac (open water = 4400 ac); and Units 1-5 = 340 ac. Total filled areas is [(5900 ac-4400 ac) + 340 ac] =1840 ac or 20%. (emphasis added) (**0619-6-7** [Maher, William])

Comment: DEIS Appendix F-2, Section 5.7, Page 5-5, Lines 14 -25: USFWS BA states, "The FFWCC requires FPL to conduct flight surveys of the two known wood stork nesting colonies to determine the flight corridors of fledging wood storks before and after transmission-line installation (FPL 2011-TN1283)." Line 23 states: "FPL would also have to conduct post-building monitoring during the breeding season after transmission-line installation near wood stork colonies." FFWCC Conditions of Certification states: "The FFWCC requires FPL to conduct flight surveys of the two known wood stork nesting colonies to determine the flight corridors of fledging wood storks before transmission-line installation. **For the West Preferred Corridor**, FFWCC also requires FPL to conduct flight surveys of the two known wood stork nesting colonies **after** transmission-line installation." In addition, "FPL would also have to conduct post-

building monitoring during the breeding season after transmission-line installation **within 0.5 mi of wood stork colonies**. (FPL 2011-TN1283)." (emphasis added) (**0619-7-1** [Maher, William])

Comment: DEIS Appendix F-2, Section 5.14, Page 5-13, Lines 23-25: USFWS BA states: "Almost 62 ac of land were classified as Brazilian pepper within the second leg of the preferred route of the West transmission-line corridor that would span between the Clear Sky and Levee substations." For consistency in this section, also include the **Brazilian pepper acreage** in the 2nd leg of Clear Sky to levee for the West Consensus Corridor. From the Proposed Turkey Point, Units 6 & 7 "Supplemental Transmission Corridor Information for the Combined License Application Part 3 - Environmental Report", DEIS reference (FPL2013-TN2941), Section "Land Use", Table 2 "Major Land Use Acreages Along the Entire West Consensus Corridor", page 6 shows: **44.82 acres (approximately 45 acres)**. (emphasis added) (**0619-7-2** [Maher, William])

Comment: DEIS Appendix F-2, Section 6.1, Page 6-2, Lines 40-41: USFWS BA states: "Unit 5 also uses **freshwater** mechanical draft cooling towers to dissipate heat." ER Rev. 6, Subsection 2.3.1.2.2.4 "Hydrogeochemical Characteristics", page 2.3-35 states: "Although the Upper Floridan aquifer is a major source of potable groundwater in much of Florida, water withdrawn from the unit in southeastern Florida, including Miami-Dade County, **is brackish and variable with chloride and dissolved solid concentrations greater than 1000 mg/L**. Groundwater samples from the Upper Floridan aquifer production wells at Unit 5 (Table 2.3-22) show an average chloride concentration of **2900 mg/L**." (emphasis added) (**0619-7-5** [Maher, William])

Response: *These comments offer specific suggested edits based on new information available since publication of the draft EIS. They are specifically directed to the BA submitted to the FWS as part of ESA Section 7 consultation between the NRC, the USACE, and the FWS. Since the draft EIS, the review team has held multiple discussions with the FWS, resulting in a table of updated analysis of project effects on Federally listed species. The review team has not, however, updated the text of the BA. The FWS did not request the review team to update the BA text beyond simply providing the updated table. EIS Sections 4.3.1 and 5.3.1 were revised to reflect the updated consultation status.*

Comment: DEIS Subsection 2.4.1.1, Page 2-77, Lines 6-14: The DEIS states: "During April 2009, surveys were also conducted to determine...reptile presence and relative abundance...(FPL 2009-TN1444)...**Reptiles were observed, including the American alligator (*Alligator mississippiensis*)**..." The cited DEIS reference, (FPL 2009-TN1444), is the "Mammal Trapping and Herpetology Report Turkey Point Property Associated with Units 6 & 7, April 13-16, 2009". The referenced report does not indicate that the American alligator was observed during April 2009 surveys. Nor is this species listed in ER Table 2.4-2 which presents results of April 2009 (and earlier) surveys. (emphasis added) (**0619-3-10** [Maher, William])

Response: *The American alligator was removed from the list of reptiles noted as having been observed during the April, 2009 surveys in Section 2.4.1.1 of the EIS.*

Comment: **Reclaimed water treatment facility**. The project will require the construction of a facility to treat reclaimed water used in cooling of Units 6 and 7. The proposed site for the facility is located immediately north of the northern border of the cooling canal system and west of the test canal system. The proposed treatment facility will result in the loss of 42.82 acres of dwarf mangroves and 0.78 acres of mixed wetland hardwoods. Wetlands provide important habitat for fish and wildlife, aid in flood control, and perform a number of other vital ecosystem functions. Consequently, the location of the water treatment facility, as proposed, will result in a significant loss of valuable wetland resources. To minimize the loss of wetlands resulting from the project,

we recommend that FPL relocate the reclaimed water treatment facility to a site with minimal or no impacts to wetlands or to a disturbed uplands closer to the Miami-Dade Water and Sewer Department's South District Wastewater Treatment Plant. We understand that FPL has stated security concerns as a reason to site this facility in its current location. However, the Department asserts that those concerns can be addressed with adequate fencing and other safeguards, and that these concerns do not warrant the destruction of wetlands within the current preferred site. We recommend that the NRC require the reclaimed water treatment facility to be moved from the currently proposed location. (**0227-12** [Stanley, Joyce])

Response: *This comment relates to how the site layout and design for Units 6 and 7 developed by FPL would result in impacts on terrestrial ecology. The site layout and design proposed by FPL is discussed in Chapter 3 of the EIS. It is outside of the review team's regulatory authority to require FPL to change the planned layout of the site. The impact on terrestrial ecology resulting from construction of the proposed units is described in Section 4.3.1. No changes were made to the EIS in response to this comment.*

Comment: **Transmission lines**. Moreover, active nesting colonies of the wood stork are located near both the Preferred Corridor and the Consensus Corridor. Locating new transmission lines near these colonies will increase the potential for injuries and deaths of wood storks from collisions with power lines and transmission towers. The Department has had discussions with FPL about moving this segment of the west corridor eastward in order to abut existing development to the greatest extent practicable. FPL may be amenable to this approach. We recommend that the NRC require the location of the west corridor to be relocated eastward along existing developed areas. Information provided in the Biological Assessment and DEIS indicate that parcels of the rare pine-rockland habitat type are located within or near the west corridor. Pine rocklands are a globally imperiled ecosystem, which has been reduced by 95 percent of its historical range in Miami-Dade County, and is home to sixteen candidate and listed species. We recommend that these habitat parcels be avoided when siting the west corridor transmission line. The transmission towers and wires of the proposed transmission lines will be greatly elevated above the ground (80 to 150 feet). Consequently, they represent a hazard to migratory birds flying through the area, especially at night. Migratory birds may have difficulty avoiding these structures, and may be injured or killed due to collisions with these structures. These trust resources are protected under the MBTA. Therefore, FPL should develop a Department approved avian protection plan to avoid, minimize impacts to bird species and compensate for the loss of their habitat. (**0227-13** [Stanley, Joyce])

Response: *Transmission corridors and specific routes evaluated in the EIS include those proposed by FPL. Expected impacts are discussed in numerous subsections in Sections 4.3.1 and 5.3.1 of the EIS. FPL's Avian Protection Plan is briefly discussed and referenced in Section 4.3.1.6 of the EIS. Requiring FPL to use any particular transmission corridor or route or to obtain approval from the FWS of its Avian Protection Plan is outside the scope of the review team's authority. No changes were made to the EIS in response to this comment.*

Comment: **Western laydown area**. A storage or laydown area for the stockpiling of construction materials and equipment will be established just east of the northeast portion of the cooling canal system and immediately east of the footprint for Units 6 and 7. This area is largely disturbed but is located immediately east of canal and berm habitat inhabited by the crocodile in the cooling canal system. To reduce the likelihood that crocodiles and other wildlife are hit by motor vehicles or crushed during movement and storage of materials, we recommend FPL install continuous barrier fencing along both sides of SW 359 Street where it borders the reclaimed water treatment facility, cooling canal system, and test canal system. The continuous

fencing should also extend southward along the western edge of the heavy haul road and along the western boundary of the laydown area to a point about 500 feet south of the land utilization building. The fence should be constructed of at least 6-foot tall galvanized chain-link type material (or a similar material that will exclude crocodiles). If needed, a barrier material of some type should be installed along the bottom two to three feet of the fence to prevent small crocodiles and other small species of wildlife from passing through the fence. The proposed fence will connect with the barrier fencing the FPL has agreed to install along both sides of SW 359th Street from SW 137th Avenue/Tallahassee Road to the L-31E Canal, SW 137th Avenue from SW 344th Street/Palm Drive to SW 359th Street, and SW 117th Avenue from SW 344th Street/Palm Drive to SW 359th Street to protect wildlife in the area. (**0227-14** [Stanley, Joyce])

Response: *Impacts on the American crocodile are discussed as part of Sections 4.3.2.3 and 5.3.2.3. A Biological Assessment (BA) was submitted to the FWS to address effects on protected species, such as the American crocodile, through consultation under ESA Section 7. The FWS may determine, as part of their ongoing formal consultation with the review team under ESA Section 7, that additional fencing requirements are necessary for crocodile protection. No changes were made to the BA as a result of this comment. Updates to ESA Section 7 consultation were made to Sections 4.3.1, 4.3.2, 5.3.1, and 5.3.2 of the EIS.*

Comment: The new reactors are planned to be built on nearby mined limestone further destroying the critical wetlands surrounding them, not only important for the health of Biscayne National Park, but crucial to the community's first line of defense against hurricane impacts. Mined pits also increase the likelihood of contamination of the Biscayne aquifer. (**0288-7** [Cleland, Noel] [Jackalone, Frank] [Mahoney, Stephen] [Matthews, Debbie] [Roff, Rhonda] [Scott, John] [Teas, Jim] [Ullman, Jonathan])

Response: *Although FPL had discussed acquiring fill material from an FPL-owned fill source for the construction of Turkey Point Units 6 and 7 in their ER, FPL subsequently stated in a letter to the NRC that they removed the FPL-owned fill source from the application. As noted in Section 4.3.1.4 of the EIS, FPL would acquire all of the fill from regional commercial mines. None of the available commercial mines are located near Biscayne National Park or directly on the coast, and all of them are permitted by the USACE to operate as such. Impacts on wetlands from the operation of commercial mines is regulated as a separate action under the existing permits held by the mine owners. No changes were made to the EIS as a result of this comment.*

Comment: According to the CWA Section 404(b)(l) Guidelines, 40 CFR § 230.91(c), and the February 6, 1990, Memorandum of Agreement between the U.S. Anny Corps of Engineers and the EPA regarding the Determination of Mitigation under the Clean Water Act Section 404{b)(l) Guidelines, an applicant must demonstrate avoidance and minimization of wetland impacts before compensatory mitigation can be considered. Subpart H of the CWA Section 404(b)(1) Guidelines describes several (but not all) means of minimizing impacts of an activity. Section 4.3.1.6, Wetland Mitigation Plan (pg.70): The DEIS states that, as part of the compensatory mitigation offset projects impacts, FPL proposes to restore two parcels totaling 812 acres. (**0617-1-13** [Mueller, Heinz J.])

Response: *The commenter identified an issue related to the Clean Water Act Section 404 permitting process. This comment is acknowledged. The USACE has not concluded its review and permitting process for wetlands impacts. Mitigation that would address impact avoidance and minimization is discussed in Section 4.3.1.6. Section 4.3.1.6 has been updated to reflect progress in the Section 404 permit review process and the development of wetland mitigation.*

Comment: The proposed powerlines could also harm snail kites, which forage by flying over suitable marsh habitat at an elevation of 10-16 feet above vegetation. Like wood storks, they may be vulnerable to collisions with guy wires. Forage flights at this elevation would occur well below the expected transmission-line heights of 80-90 feet (230 kV) and 140-160 feet (500 kV). Because the snail kite population is severely depressed, even the loss of a few individuals may have population-level impacts. We suggest the NRC include a discussion in section 5.3.1 regarding the value of not using guy wires for portions of the western corridor near sensitive bird habitat, which could significantly limit collision risks for wood storks and snail kites. (**0622-1-21** [Austin, Stan])

Response: *The comment suggests that the use of non-guyed transmission poles near sensitive areas could decrease environmental impacts from the proposed action. The discussion in Section 5.3.1 of the EIS identifies collision with guy wires as a risk to snail kites. Although no information exists that would quantify this risk, the review team acknowledges that use of non-guyed transmission poles near snail kite nests and foraging areas would likely reduce risk to snail kites. Although the review team added a discussion to Section 5.3.1 about the possible benefits of reducing the number of transmission line guy wires, the review team cannot require the applicant to change its design unless it falls within its regulatory jurisdiction.*

Comment: Biscayne Bay Coastal Wetlands Projects -Phase 1 and Phase 2[.] As set forth above, implementation of the BBCW Project is crucial to realizing the suite of direct restoration benefits provided by the project. Although Phase 1 of this project has been previously described, Phase 2 includes the critical component of locating and providing a source of much needed additional freshwater to Biscayne NP and Biscayne Bay. To implement BBCW Phase 2, additional lands will be needed, as well as planning, design, and construction funding. Some project lands needed to complete Phase 2 are in FPL ownership. The NPS urges the action agencies to consider requiring mitigation that would move Phase 2 of this crucial project forward. Mitigation could be donation of project lands or funding components of the project. The NPS wishes to begin a dialogue with the action agencies regarding these mitigation possibilities. (**0622-2-7** [Austin, Stan])

Response: *This comment contains a specific suggestion regarding possible mitigation for wetland impacts resulting from the project. The review team appreciates suggestions regarding possible mitigation measures but can only consider mitigation proposed by the applicant or required by agencies specifically authorized to enforce the mitigation. No changes were made to the EIS as a result of this comment.*

Comment: Numerical value inconsistencies within the draft EIS: Appendix F-2, Section 2.1, Page 2-4, Lines 40-43 "Two potential routes were proposed for the West corridor--the preferred and consensus routes. Each route would eventually be about **89 mi** long..." (Reference for statement was corrupt.) DEIS Table 2-4 ER Subsection 3.7.2 DEIS Table 2-4 indicates that this length is **52 miles**. In the first paragraph of ER Subsection 3.7.2, the length of the West corridor "Clear Sky -- Pennsuco (230 kV)" is characterized as **52 miles**. (**0619-2-37** [Maher, William])

Comment: Numerical value inconsistencies within the draft EIS: Appendix F-2, Section 2.3.2, Page 2-9, Lines 16-18 "Approximately 89 mi of corridors are being proposed; approximately 52 mi of the corridor would be associated with either of the two West corridor routes, and approximately **36 mi** would be associated with the East corridor." DEIS Table 2-4 ER Subsection 3.7.2 DEIS Table 2-4 indicates that this length is **37 miles**. In the first paragraph of

ER Subsection 3.7.2, the length of the East Corridor comprised of Clear Sky to Davis (19 miles) plus Davis to Miami (18 miles) results in a total of **37 miles**. (**0619-2-38** [Maher, William])

Comment: Numerical value inconsistencies within the draft EIS: Appendix F-2, Section 5.6, Page 5-4, Lines 35-36 "The construction of Units 6 and 7 could permanently eliminate **182 ac** of mudflat suitable as piping plover (Charadrius melodus) wintering habitat." DEIS Subsection 4.3.2.1, Page 4-77, Lines 33-35 DEIS Appendix F-2, Subsection 3.1.1, Page 3-3, Lines 14-17 ER Section 2.4 "As described in ER Revision 6 (FPL 2014-TN4058) wetland and aquatic habitats within the proposed Units 6 and 7 plant area and adjacent laydown areas include the following: *187.5 ac of mudflats..." Similarly, Appendix F-2: "Wetland and aquatic habitats within the proposed Units 6 and 7 plant area and adjacent laydown areas total approximately 270 ac and include the following land-cover classes: * 187.5 ac of mudflats..." ER Section 2.4: "Wetland habitats within the Units 6 & 7 plant area and the adjacent laydown area include mudflats (**187.5 acres**)..." (**0619-2-39** [Maher, William])

Comment: DEIS Appendix F-2, Subsection 3.2.1.1, Pages 3-13/3-14, Lines 18-26/1-2: USFWS BA states: "NRC EIS, NUREG-2176 Section 3.2.2.1 discusses stormwater drainage for the plant area...According to Table 2-10 of the NRC EIS, NUREG-2176, the average annual runoff for the plant area prior to building for the period from 2000 to 2010 is...annual average precipitation depth of 56.10 in...The annual average runoff after building decreases largely due to the removal of the makeup-water reservoir as a contributing area. The maximum annual precipitation during the period was 71.53 in. during 2005, which produces 1,428 ac-ft of runoff after building compared to 1,646 ac-ft (NRC EIS, NUREG-2176 Table 2-10) prior to building." There are some inconsistencies with the DEIS (emphasis added): a. DEIS Subsection 2.3.1.1 states "The review team estimated an average annual precipitation of **57.10** in. and maximum annual precipitation of 71.53 in. during the period from 2001 through 2010." b. DEIS Table 2-10 reports the maximum total annual runoff for the plant area prior to building for the period from 2000 to 2010 (2001 to 2010) as **1,715 ac-ft**. (**0619-6-13** [Maher, William])

Comment: DEIS Appendix F-2, Section 2.1, Page 2-4, Lines 34-36 and DEIS Appendix F-2 Subsection 3.1.1, Page 3-4, Lines 6-8: USFWS BA (Section 2.1) states: "The review staff assumes water contained in the muck would drain primarily into the IWF; **the spoil pile at the southern end of the site may dewater into Card Sound**." Similarly the USFWS BA (Subsection 3.1.1) states: "There is also concern that the disturbance and relocation of the muck from the plant site to the cooling-canal berms **may adversely affect the water quality of the IWF and possibly Card Sound as the muck dewaters**." Condition of Certification, Section B "Specific Conditions - Power Plant and Associated Facilities (Excluding Transmission Lines)", Subsection VII "Miami-Dade County", Item C.2, page 78 states: "To the greatest extent practicable FPL shall use proposed Spoil Areas A and C, located along the east and west berms of the Grand Canal. If spoils are placed on Area B, FPL shall implement Best Management Practices to limit **to the extent practicable, runoff from the spoils entering the wetlands areas to the south of the Industrial Wastewater Facility**." (emphasis added) (**0619-6-2** [Maher, William])

Response: *These comments contain specific suggested edits to the text of the BA that the review team submitted to FWS as part of its consultation under ESA Section 7. The BA was a final product of the FWS formal consultation process and hence has not been edited. The information is acknowledged. The information does not alter the conclusions in the BA or substantially alter the presentation of information in the BA. If the information did substantially alter the content of the BA, the NRC would have notified the FWS.*

Comment: Synergistic effects of aerosols. I'm a bee farmer. You combine certain pesticides you have bee colony collapse. If we're killing bees, humans are not going to be around much longer either. So these things need to be looked at. (**0721-24-4** [Eastman, John])

Response: *Colony Collapse Disorder (CCD) is a recognized phenomenon affecting honey bees worldwide. Extensive research indicates no single causative agent. Although pesticides have not been ruled out as a contributing factor, insecticides and possibly fungicides currently appear to be the group of pesticides that may contribute to CCD. Pesticides likely used by FPL related to the construction and operation of Units 6 and 7 would be herbicides to control invasive plant species (discussed in Section 5.3.1.2). Herbicides have not been implicated as a causative agent of CCD. Specific herbicides used to control vegetation have not been identified by FPL, but as noted in Section 5.3.1.2, any herbicide or pesticide use would be conducted in compliance with applicable Federal, state, and local laws, regulations, and permit requirements. No changes were made to the EIS as a result of this comment.*

Comment: The NMFS believes the proposed mangrove fill is not consistent with EPA' s Guidelines for Specification of Disposal Sites for Dredged or Fill Material. The fundamental precept stated in 40 CFR 230.1(c) that *dredged or fill material should not be discharged into the aquatic ecosystem unless it can be demonstrated that such a discharge will not have an unacceptable adverse impact either individually or in combination with known and/or probable impacts of other activities affecting the ecosystems of concern" would not be met by this project. The basic purpose of the project, as stated in the public notice is to meet the public's need for electric energy. Based on guidance provided by 40 CFR 230.10(a)(3), energy development does not require access or proximity to or siting within wetlands to achieve the basic purpose (i.e., energy production is not water dependent). In discussing the water dependency requirement, the guidelines state that for non-water dependent projects, practicable alternatives that do not involve special aquatic sites (e.g., wetlands adjacent to and within the Biscayne Bay Aquatic Preserve) are presumed to be available. (**0724-16** [Fay, Virginia M.])

Response: *Placement of fill material within waterways of the U.S. would be regulated by the USACE under a Department of the Army permit. As part of its review of FPL's application for a Department of the Army permit to perform work in waters of the United States, the USACE would determine whether the proposed action was the LEDPA (least environmentally damaging practicable alternative) in accordance with the Section 404(b)(1) guidelines (40 CFR 230). No changes were made to the EIS as a result of this comment.*

Comment: [W]e also handle and capture and monitor the indigo snakes where their habitat is threatened. And we monitor their population and their growth. We also monitor terns, the nesting terns. They love our berms to nest on, and the wading birds that are populating our canals. But not just the native species but also there are a mix of exotics. We now have permits to eradicate the pythons. So we're giving back to the community in so many different ways and these are small examples of our environmental stewardship. (**0723-15-3** [Bertelson, Bob])

Response: *The comment expresses support for environmental stewardship at the Turkey Point site. The comment does not provide specific information related to the environmental effects of the proposed action, and no changes were made to the EIS.*

Comment: Finally, the South Florida Water Management District plans to construct culverts on the east side of the L-31 E right-of-way for the BBCW project. FPL is also considering using the same right-of-way to accommodate the reclaimed water pipeline. The DEIS does not adequately discuss this potential conflict and how plans for reclaimed wastewater pipelines may negatively

impact plans to proceed with Everglades restoration. [Footnote 31: South Florida Water Management District, Third Completeness Comments, FPL Turkey Point Units 6 & 7, Site Certification Application Power Plant & Associated Facilities, June 4, 2010, 14.] Considering the extensive loss of ecologically valuable wetlands in and around Turkey Point and Biscayne Bay that has already occurred and the commitment of the federal government and the state of Florida to restore and replenish wetland resources in these areas, the DEIS must include an adequate discussion of how the construction and operation of around nine miles of pipeline will further impact wetland resources and if reasonable alternatives exist. (**0113-2-17** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Response: *Impacts on terrestrial resources from the proposed reclaimed-water pipeline are described in Sections 4.3.1 and 5.3.1 of the EIS and include consideration of direct, indirect, and cumulative impacts from building and operating those pipelines on wetlands and wildlife. No changes to the EIS were made as a result of this comment.*

Comment: **New paved roads**. The project will result in the construction of new paved roadways to provide the main construction access to the project site and allow the delivery of fill, equipment, and construction materials. New paved roadways will be constructed within the footprint of existing dirt roadway at: SW 137th Avenue from SW 344th Street/Palm Drive to SW 359th Street (three lanes); SW 117th Avenue from SW 344th Street/Palm Drive to SW 359th Street (three lanes); and SW 359th Street from SW 137th Avenue/Tallahassee Road to the Turkey Point Power Plant site (three lanes from SW 137th Avenue to SW 117th Avenue and four lanes from SW 117th Avenue to the Turkey Point Power Point site, including a new bridge over the L-31E Canal). Consequently, the project will introduce significant motor vehicle traffic (consisting largely of trucks) within an area that seldom experiences motor vehicle traffic and increase the likelihood of injuries and deaths to the panther and other wildlife resulting from collisions with vehicles. We note the proposed paved roadways described above will result in a significant loss of wetlands and fish and wildlife habitat and the impacts to the environment will be great. We recommend that the NRC require FPL to use a less environmentally damaging route to access the project site, such as the use of Palm Drive. We understand that this will increase motor vehicle traffic on this roadway but we believe that this problem could be overcome through road widening, the use of a shuttle bus system for FPL employees, and the judicious construction of new access roads near the project site. In the event that the proposed new paved roadways are implemented. FPL has agreed to several protective measures to reduce the potential for vehicle collisions, including installing continuous barrier fencing on both sides of the new roadways (*i.e.*, SW 137th Avenue from SW 344th Street/Palm Drive to SW 359th Street, SW 117th Avenue from SW 344th Street/Palm Drive to SW 359th Street, and SW 359th Street from SW 137th Avenue/Tallahassee Road to the Turkey Point Power Plant site), and installation of a large underpass structure and several smaller culvert structures along SW 359th Street that will allow Florida panthers and other wildlife to pass safely under the roadway. In addition, FPL has agreed to remove these paved roadways following construction and return the area to its original condition (*i.e.*, lime dirt road and wetlands). (**0227-10** [Stanley, Joyce])

Response: *The review team appreciates suggestions such as this that could reduce impacts to terrestrial ecology resources, but the NRC does not have the regulatory authority to require FPL build its roads or other project facilities in specific locations. No changes were made to the EIS specifically as a result of this comment.*

E.2.10 Comments Concerning Ecology - Aquatic

Comment: The algae bloom was never controlled. (**0008-5** [Finver, Jody])

Comment: When power output was increased, algae bloom followed. Now FPL is pumping toxins in to control it. (**0252-4** [Van Leer, Sam])

Comment: Environmental and technical problems have taken its toll on the machines built more than 40 years ago. The most recent problems threaten the continued viability of the reactors as well as the prospects for more. Rising temperatures and a boost of power have caused algae to fill the canals, and threaten to clog the system unless even more water can be brought in from the Everglades. In 2014, summer temperatures routinely climbed above 100 degrees Fahrenheit. (**0288-2** [Cleland, Noel] [Jackalone, Frank] [Mahoney, Stephen] [Matthews, Debbie] [Roff, Rhonda] [Scott, John] [Teas, Jim] [Ullman, Jonathan])

Response: *The commenters are concerned about the algae bloom in the IWF cooling canals. These cooling canals are used for the operation of Turkey Point Units 3 and 4, and would not be used for cooling Units 6 and 7. These comments offer no new information relative to the construction and operation of Units 6 and 7. However, a more detailed description of the changes in the cooling canals since 2013 has been added to Sections 2.3.1 and 2.4.2.*

Comment: Please do NOT approve additional Nuclear reactors at Turkey Point in South Florida. There are already problems with the water surrounding the current reactor, too warm for the sea life and causing unnecessary algae to bloom. More reactors will mean more warm water flowing into the canals that feed into Biscayne Bay. This is disastrous for the sea life of all types. (**0048-1** [Wegner, Geri])

Comment: Regarding the FPL request to enlarge Turkey Point, I am sure you are aware that it is located on the border of Biscayne National Park. The existing cooling canals drain into the Card Sound National Lobster Sanctuary. Our marine life has been severely compromised over the last few decades with the population explosion that has happened in and around the Miami area. I have been here since 1966 and have personally experienced the decline of our natural habitat and marine life. The heated water that already runs into this precious area along with sewage infiltration from Miami Dade County has resulted in a marked decline of our local wildlife since my arrival. The stress that this project will have on what natural splendor we still have left will be devastating. As you know, even a slight increase in water temperature can be fatal to living corals and sea grass. (**0081-3** [Benson, Mary] [Skove, Ellen H.] [Tompkins, Constance])

Comment: It is a serious matter to chance raising the water temperature and negatively affecting the wildlife of the Florida Keys. (**0084-1** [Phillips, Monica D.])

Comment: Discharged hot water from cooling systems is known to affect fish reproduction and development. (**0214-5** [Zerulla, Tanja])

Comment: The water is not deep enough in the area and it would cause it to heat up, thus killing all the fish etc. (**0368-2** [Casey, Sr., Robert J.])

Comment: Please consider the impacts of dumping additional hot water directly into Biscayne Bay. (**0537-5** [Anonymous, Judi])

Comment: Once those towers are built we can't go back. If the temperature in our water in Biscayne Bay rises and we continue to get algae blooms and we continue to get fish killing because of the rise in salt, salinity and we have rise in temperatures we are doomed. We need to also represent the voice of the ocean, the water and the wildlife. (**0722-17-4** [Swenson, Cyndee])

Response: *The commenters are concerned about the potential for warm water discharge from proposed Units 6 and 7 to the IWF cooling canals and Biscayne Bay, and the potential for algae blooms and adverse effects on marine organisms. As described in Section 5.3.2, the operation of two new reactors would result in discharge of station blowdown from Units 6 and 7 to deep injection wells. There would be no thermally enriched water discharges to surface waters, including Biscayne Bay or the IWF, from operation of units 6 and 7. There would be no surface water discharge of treated or untreated reclaimed water to any surface waters. No changes were made to the EIS as a result of these comments.*

Comment: I am strongly in favor of the addition of 2 more nuclear reactors to the current Turkey Point facility for the following reasons:...If the additional reactors generate more water water then more Manatees can benefit from that further increasing their numbers. The addition of the 2 reactors thus can point to positive environmental benefits to a threatened species. (**0015-13** [Goldmeier, Barry])

Response: *The commenter supports the construction and operation of two new nuclear units for the possible benefit additional warm water might provide to endangered manatees. The effects of operation on protected aquatic species is described in Section 5.3.2, and in the staff's BA for the FWS mentioned in Appendix F2 of this final EIS. Due to the proposed deep-well injection of blowdown water, no warm water would be discharged to the nearshore waters of Biscayne Bay. No changes were made to the EIS as a result of this comment.*

Comment: [The vented hot steam will likely contain household chemicals, pharmaceuticals, bacteria and viruses that end up in the county's wastewater. Even in small amounts, these can affect] terrestrial and marine environments like mangroves, seagrass beds and coral reefs. The aerosol mist can be dispersed widely by wind and water. (**0078-7** [Wilansky, Laura Sue])

Comment: The vented hot steam will likely contain household chemicals, pharmaceuticals, bacterial and viruses that end up in the countys wastewater. Even in small amounts these can effect] terrestrial and marine environments like mangroves, seagrass beds and coral reefs. The aerosol mist can be dispersed widely by wind and water currents. Did I mention this is a hurricane prone state? (**0353-5** [Royce, M.])

Comment: [The vented hot steam will likely contain household chemicals, pharmaceuticals, bacteria and viruses that end up in the county's wastewater. Even in small amounts, these can affect] terrestrial and marine environments like mangroves, seagrass beds and coral reefs. The aerosol mist can be dispersed widely by wind and water currents. (**0356-11** [Shlackman, Jed])

Comment: [The vented hot steam will likely contain household chemicals, pharmaceuticals, bacterial and viruses that end up in the countys wastewater. Even in small amounts these can effect] terrestrial and marine environments like mangroves, seagrass beds and coral reefs. I do NOT want to CHANCE that the aerosol mist may be (likely) dispersed widely by wind and water currents. (**0362-3** [Hurley, Paula])

Comment: [The vented hot steam will likely contain household chemicals, pharmaceuticals, bacterial and viruses that end up in the county's wastewater. Even in small amounts these can effect] terrestrial and marine environments like mangroves, seagrass beds and coral reefs. The aerosol mist can be dispersed widely by wind and water currents. (**0366-5** [Griffith, Ed and Harriet])

Comment: Even in small amounts, these can affect human health and terrestrial and marine environments like mangroves, seagrass beds and coral reefs. The aerosol mist can be dispersed widely by wind and water currents. (**0370-10** [Vayu, Satya])

Comment: [The vented hot steam will likely contain household chemicals, pharmaceuticals, bacteria and viruses that end up in the county's wastewater. Even in small amounts, these can affect] terrestrial and marine environments like mangroves, seagrass beds and coral reefs. The aerosol mist can be dispersed widely by wind and water currents. (**0676-7** [Kassel, Kerul])

Comment: When it comes out as gaseous H2O, as water vapor, there's gases mixed in with it that contain some of these chemicals. When the water droplets, where people call "drift," come out, those little tiny particles, they contain the exact same constituents of the wastewater, drifting over Biscayne Bay, over the terrestrial ecosystem. (**0721-22-13** [Schwartz, Matthew])

Comment: [What are the impacts of drift] on the terrestrial landscape, on Biscayne Bay, on mangroves, on sea grass beds, on coral reefs? (**0721-22-15** [Schwartz, Matthew])

Comment: How many places in the United States, Continental United States have a coral reef? We're blessed with a coral reef in South Florida. We're going to build a nuclear power plant right next to them, throw the wastewater up into the air as vapor and droplets and disburse it over this entire area. (**0721-22-16** [Schwartz, Matthew])

Response: *The commenters are concerned that aerosolized components from the cooling towers would be harmful to human and ecological resources. Sections 5.3.1 and 5.3.2 discuss the relative deposition of a number of contaminants of concern that may be present in reclaimed wastewater and concluded that the expected trace amounts would have negligible effects due to the extremely low concentration and dilution in receiving water bodies. No changes were made to the EIS as a result of these comments.*

Comment: The expansion of Turkey Point could have serious environmental impacts on sensitive ecological habitat and the health and sustainability of limited freshwater resources. (**0102-3** [Commenters, Multiple])

Comment: And an expansion of Turkey Point could jeopardize the area's limited freshwater resources as well as sensitive habitat for a wide range of federally protected endangered species. (**0103-3** [Commenters, Multiple])

Comment: Furthermore, changes to the salinity, quality and temperature of water in Biscayne may result in impacts to the seasonal behaviors of threatened and endangered species, such as the West Indian manatee and American crocodile. [Footnote 7: Lewis, M. and D. B. Kimball, United States Department of Interior, National Park Service Letter to U. S. Nuclear Regulatory Commission, April 16, 2010, L 67, 16.] (**0113-1-13** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: As fresh water is withdrawn from either the aquifer and/or the bay, there may be less freshwater to replenish the system, affecting salinity levels within Biscayne Bay. The withdrawal of freshwater from either of these sources has the potential to permanently disrupt the system's saltwater regime and could have substantial impacts to local ecosystems, which are extremely sensitive to changes in salinity. Disruption in nearshore habitats and overall ecological stability may occur as a result of hydrologic impacts that change water quality and

volume with the bay. (**0113-1-16** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: Given the sensitivity of our coastal waters, including the only living coral reef in the US, I am shocked that we are considering the addition to the environmental burden. (**0130-2** [Jones, Diane])

Comment: So many of our waters have already been ruined by development, drilling, pollution, and humans. Enough is enough! Our waters are supposed to be a place of peace and quiet for us, and the fish and wildlife which live in them! The animals are running out of places to live and be safe. Our fish and wildlife are under threat from so many angles. They desperately need to be protected, mainly from humans. Life is hard enough for people, let alone the animals. Can't we please offer them some much needed help?! PLEASE save the waters Biscayne National Park for all future generations before they are permanently ruined. Some damage cannot be undone! (**0191-1** [Hodie, Jake])

Comment: Expanding this nuclear plant would endanger the precious coral reefs. (**0193-2** [Shipe, Kathleen])

Comment: We are concerned that withdrawing massive amounts of freshwater from underneath Biscayne Bay could increase salinity levels within Biscayne National Park and hasten saltwater intrusion into freshwater resources. (**0210-4** [Sharp, Andrea Heuson])

Comment: Expanding Turkey Point would have serious environmental impacts on sensitive ecological habitat and the health and sustainability of limited freshwater resources. (**0228-3** [Yeager, Jerry])

Comment: The waters of Biscayne Bay are also home to incredible coral reef habitat and numerous threatened and endangered animals, including the West Indian manatee, American crocodile, and five species of sea turtles. (**0258-3** [Field, Fran])

Comment: The waters of Biscayne Bay are also home to incredible coral reef habitat and numerous threatened and endangered animals, including the West Indian manatee, American crocodile, and five species of sea turtles. (**0284-3** [Lopez, Josie])

Comment: The expansion of the power plant would only intensify and expand these negative impacts, posing significant threats to sensitive ecological areas and critical freshwater supplies. (**0284-5** [Lopez, Josie])

Comment: In addition, the expansion could have serious environmental impacts on sensitive ecological habitat and the health and sustainability of limited freshwater resources. (**0295-4** [Dietrich, Chris OMeara])

Comment: The expansion of Turkey Point could have serious environmental impacts on sensitive ecological habitat and the health and sustainability of limited freshwater resources. (**0299-2** [Salatino, Freda])

Comment: It would threaten other sensitive marine resources, including dozens of federally protected species such as the American crocodile, Florida manatee and five species of sea turtle. (**0356-2** [Shlackman, Jed])

Comment: These two new nuclear plants would also threaten other sensitive marine resources such as dozens of federally protected species to include the American crocodile, Florida manatee and five species of sea turtle. (**0366-7** [Griffith, Ed and Harriet])

Comment: It would threaten other sensitive marine resources, including dozens of federally protected species such as the American crocodile, Florida manatee and five species of sea turtle. (**0370-3** [Vayu, Satya])

Comment: Important natural resources would be in serious jeopardy. (**0370-7** [Vayu, Satya])

Comment: The expansion of Turkey Point will have serious environmental impacts on sensitive ecological habitat and the health and sustainability of limited freshwater resources. (**0413-2** [Cobb, Tanya])

Comment: Expansion of Turkey Point could have serious environmental impacts on sensitive ecological habitat and the health and sustainability of limited freshwater resources. (**0415-1** [Hazard, Evan])

Comment: If approved, the project will also destroy mangrove and seagrass populations that perform vital ecosystem services, including maintaining our water quality and protecting our shoreline. (**0515-3** [Regalado, Tomas])

Comment: The expansion of Turkey Point could have serious environmental impacts on sensitive ecological habitat and the health and sustainability of limited freshwater resources. "Our duty to the whole, including to the unborn generations, bids us to restrain an unprincipled present-day minority from wasting the heritage of these unborn generations. The movement for the conservation of wildlife and the larger movement for the conservation of all our natural resources are essentially democratic in spirit, purpose and method." --Theodore Roosevelt (**0555-1** [Lish, Christopher])

Comment: Other than the disposition of nuclear waste, the use of water by the plant that is located in a fragile ecological area, is something that should take priority in considering the licensing of the plant. (**0613-1** [Icaza, Alejo])

Comment: FP&L has stated that their two proposed nuclear reactors will use 90 million gallons of water daily for cooling. This will naturally have a negative impact on the plants, animals, birds, and marine life in the Everglades, Biscayne National Park, and the Atlantic Ocean which border the nuclear facility. (**0671-1-1** [Post, Patrick])

Comment: It would threaten other sensitive marine resources, including dozens of federally protected species such as the American crocodile, Florida manatee and five species of sea turtle. (**0676-2** [Kassel, Kerul])

Comment: The design (engineering tech exist today) must not effect/should not have any serious environmental impacts on sensitive ecological habitat and the health and sustainability of limited freshwater resources. (**0694-6** [Carpenter, Rory])

Comment: [Building 6 and 7 will foul the water supply], threatening the sea life and aquatic sanctuaries in the area. (**0721-12-10** [White, Barry J.])

Comment: Increased salinity will reduce fresh water which hatchling and juvenile sea life in Biscayne National Park and Biscayne Bay Aquatic Preserve, next door to Turkey Point, need to survive. (**0721-12-4** [White, Barry J.])

Comment: Also Biscayne National Park is the country's largest marine park and is home to incredible life diversity, important habitats, watersheds and ecosystems. The expansion of Turkey Point puts these natural resources at risk. (**0722-14-4** [Kaul, Devika])

Response: *The commenters express general concern about the potential for adverse effects on ecological resources, protected species, and freshwater supplies as a result of the construction and operation of Units 6 and 7. The effects of construction and site preparation on the water use and quality of surface water and groundwater resources are described in Section 4.2, and the effects of operation in Section 5.2, and were determined to be SMALL. The effects of construction and site preparation on terrestrial and aquatic ecological resources and protected species are described in Sections 4.3.1 and 4.3.2, respectively, and were found to be MODERATE for Terrestrial resources and SMALL for Aquatic resources except to the American crocodile, which would sustain a MODERATE impact. Operational effects on terrestrial ecological resources (including wetlands and listed species) and aquatic resources and protected species were found to be MODERATE and are described in Section 5.3.1. Operational effects on Aquatic resources were found to be SMALL and are described in Section 5.3.2. Because the new units would use reclaimed water as a source of cooling water with RCWs as a backup water source, employ closed-cycle cooling, and dispose of station blowdown through deep-well injection, adverse effects on aquatic resources would be avoided. No changes were made to the EIS as a result of these comments.*

Comment: Our residents enjoy recreating in this very area and have already seen a decrease in fish and bird populations that local experts tell us is related to the hypersalinity in the area. (**0208-3** [Ritz, David])

Comment: Stop disrupting already traumatized bio-systems, National Parks, endangered species by disregarding what The People want. (**0532-2** [Raab, Frances])

Comment: This power plant has been sited in the past for environmental damages such as pumping too WARM of water out in to the Gulf thereby destroying coral and changing the entire marine life in that area. (**0604-1** [Courliss, William])

Comment: Costs to the ecosystem, which I think was the last question that came up. (**0721-1-8** [Rodriguez, Jose Javier])

Comment: [We need to look at the salt water plume], the impact it's had on crocodiles[.] (**0721-13-7** [Martin, Drew])

Comment: Biscayne National Park is one of our country's largest marine national parks and it's home to important marine biodiversity and wetland and marine habitats and countless opportunity for education and recreation. (**0723-4-3** [McLaughlin, Caroline])

Comment: The waters of Biscayne Bay are also home to incredible coral reef habitat and numerous threatened and endangered animals, including the West Indian manatee, American crocodile, and five species of sea turtles. Turkey Point's operations are already impacting Biscayne Bay's habitat, water quality, and salinity, which are vital for the health and productivity of the bay. The expansion of the power plant would only intensify and expand these negative

impacts, posing significant threats to sensitive ecological areas and critical freshwater supplies. (**0728-2** [Gregory, Gregory B.])

Response: *The commenters express general concern about the current status of ecological resources in the area. The staff agree that Biscayne National Park is an important resource for marine biodiversity. However, the staff is unaware of any studies showing destruction of corals or significant changes to marine life in Biscayne Bay as a result of current Turkey Point operations. Except for site runoff, there would be no discharges to surface waters from operation of Units 6 and 7. No new information is provided, therefore, no changes were made to the EIS as a result of these comments.*

Comment: When nuclear plants draw water from natural water sources, fish and other wildlife get caught in the cooling system water intake structures. A study done in California investigated impacts from 11 coastal power plants and estimated that a single nuclear plant can kill millions of fish! (**0340-2** [Tweeton, Tanya])

Comment: The proposed new nuclear reactors would also imperil fish larvae and other forms of aquatic life, which are strained from the water as it travels through thousands of metal tubes to become steam that turns the turbines to make electricity. A 2005 study found that one coastal power plant in Southern California destroyed nearly 3-and-a-half million fish in just one year. (**0592-9** [Brexel, Sr., Charles])

Response: *The commenters express general concern about the current status of ecological resources in the area as well as the current water quality of Biscayne Bay. The staff agree that Biscayne National Park is an important resource for marine biodiversity. However, the staff is unaware of any studies showing destruction of corals or significant changes to marine life in Biscayne Bay as a result of current Turkey Point operations. Except for site runoff, there would be no discharges to surface waters from operation of Units 6 and 7. There would be no heated discharge to Biscayne Bay from the construction and operation of Units 6 and 7 and no degradation of water quality. No new information is provided; therefore, no changes were made to the EIS as a result of these comments.*

Comment: DEIS Subsection 2.4.2.1, Page 2-119, Lines 2-4 and DEIS Subsection 2.4.2.1, Page 2-121, Table 2-18: The DEIS (Page 2-119) states: "onsite surface-water habitats **exclusive of the IWF** include hypersaline mudflats, remnant canals...and areas of open water". The onsite surface-water habitats listed are **inclusive of the IWF**. Further, the sentences that follow describe data taken from sampling locations that are located **within the permitted IWF**. Similarly, DEIS Table 2-18, "Fish Species Present in Surface-Water Habitats Exclusive of the IWF on Turkey Point Site in Summer 2009", includes observations from locations **within the permitted IWF**; all listed observation points in this table are located within the IWF as described in DEIS reference FPL 2009-TN201. The statement and Title of Table 2-18 should reflect that the onsite surface-water habitats and surface water sampling are "inclusive of the IWF". (emphasis added) (**0619-3-12** [Maher, William])

Comment: DEIS Subsection 2.4.2.4, Page 2-154, Lines 38-40: The DEIS states: "Because modifications to the existing equipment barge-unloading area were expected...a survey of seagrass presence in that area was conducted during the summer of 2008 (**EAI 2009-TN153**)." The correct reference for the seagrass survey of the equipment barge unloading area is: (**FPL 2010-TN272**).) (emphasis added) (**0619-3-13** [Maher, William])

Comment: DEIS Subsection 4.3.2.1, Page 4-78, Lines 31-32: The DEIS states: "The RWTF would be built on approximately 44 ac of land immediately north and **east** of the IWF near SW 360th Streets (Figure 3-1)." The RWTF is located north and **west**, as illustrated on DEIS Figure 3-1. (emphasis added) (**0619-4-9** [Maher, William])

Response: *The commenter is correct. Text and references in Sections 2.4.2 and 4.3.2 were revised to reflect these clarifying comments describing the location of the reclaimed water treatment facility.*

Comment: Their construction will improve the environment and ensure the future of the manatee habitat, this helping preserve the manatees. (**0707-2** [Pheil, Edward])

Comment: They reduce C02 emmissions reducing ocean acidification damage to the ocean environment. (**0707-4** [Pheil, Edward])

Response: *These comments express general support for the construction and operation of Units 6 and 7 at the Turkey Point site. No changes were made to the EIS as a result of these comments.*

Comment: Climate Change and Drought impacts: As noted by NRC, climate-related changes include increased frequency and intensity of extreme weather, e.g., heavy downpours, floods, and droughts (Section 2.9.2, p. 2-208). For example, the drought of 2006 lowered the level of Lake Okeechobee to an all-time record of 8.82 foot mean sea level (Section 9.3.2.4, p. 9-70). Droughts and water shortages have the potential to increase in severity and frequency as the water demand increases in south Florida, independent of climate change effects. A minimum of one severe drought every decade can be expected. [Footnote 6: Droughts and Water Shortages in Central and South Florida (September 2001) SFWMD Technical Paper EMA #396 available at http://www.sfwmd.gov/portal/page/portal/pg_grp_tech__pubs/portlet_tech__pubs/ema-396.pdf]. Ninety percent of South Florida has been designated as a water resource caution area. [Footnote 7: Florida Water Management and Adaptation in the Face of Climate Change: A White Paper On Climate Change And Florida's Water Resources November 2011, available at http://floridaclimate.org/docslwater_managment.pdf] These are areas that have critical water supply problems, or are projected to have these problems in the next 20 years. Chapter 62-40, F.A.C. requires reuse within these designated areas. Florida currently uses more reclaimed water (43 percent of wastewater) than any other state. ***Recommendations:*** EPA has concerns regarding estuary and habitat impacts related to lengthy periods of droughts. In particular, the potential for increased salinity in existing brackish water habitats should be evaluated. Due to the proximity of saline, hypersaline and seawater in the area, measures to prevent increasing salinity should be addressed; in particular, brackish water species and habitat protection measures should be fully evaluated with regard to the project's impacts and potential future climate conditions. (**0617-4-7** [Mueller, Heinz J.])

Response: *The commenter expresses concern regarding the effects of climate change and the potential for subsequent effects on aquatic species and habitats in the context of these changes during operation of Units 6 and 7. Appendix I of the EIS describes the potential for climate changes, to include drought, sea-level rise, temperature increases, and changes in precipitation intensity and frequency. Section I.3.2 in Appendix I assesses the potential for adverse effects to water quality and on other water uses in the area during operation from climate changes. Section I.3.4 in Appendix I assesses the potential for adverse effects to aquatic species and habitats during operation from climate change. The staff found that operation of*

Units 6 and 7 would have a minimal influence on the effects of climate change on Biscayne Bay. No changes were made to the EIS as a result of this comment.

Comment: *Threatened and Endangered Species.* The DEIS summarizes the NRC's coordination with the U.S. Fish and Wildlife Service (FWS) and state wildlife agencies in Florida. Mitigation measures include protocols and requirements for protecting the American crocodile, Smalltooth Sawfish, Nassau Grouper, manatees and sea turtles. However, unavoidable adverse impacts would include permanent loss of some onsite aquatic environments, and some disturbance of aquatic environments and potential disturbance of species. Also, there would be habitat loss and land adversely affected for resident American crocodiles (page 2-122 and Table 4-10). ***Recommendations:*** The EPA defers to the FWS and the State wildlife agencies on these issues and agrees that the FEIS should provide updated information. Impacts should be avoided to the maximum extent feasible, and unavoidable impacts should be mitigated. (**0617-1-27** [Mueller, Heinz J.])

Comment: This plant will have negative impacts on endangered species. A number of endangered species live near the Turkey Point Nuclear Power Plant. These include a number of endangered wading birds, the American Alligator and the American Crocodile. The surrounding canals have been found to be overheated and on one occasion an American Crocodile was found dead. (**0641-7** [Martin, Drew])

Response: *The staff agree that impacts on threatened and endangered species should be avoided or minimized to the maximum extent feasible, and unavoidable impacts should be mitigated. Evaluation of effects on protected species such as the Smalltooth Sawfish, Nassau Grouper, and sea turtles are presented in a BA as part of ESA Section 7 consultation with the NMFS, and with the FWS for the American crocodile, birds, and manatees. Updated information about the status of the consultations, anticipated impacts, and mitigation related to the results of consultation is presented in Sections 4.3.2 and 5.3.2 of the EIS.*

Comment: Risks to Threatened and Endangered Species in Biscayne Bay[.] An additional area of concern is how project-related changes to water quality might affect threatened and endangered species that are found within Biscayne NP. Because there is much uncertainty about exactly what environmental changes could occur as a result of the proposed project, further investigation is needed to better elucidate potential negative impacts to imperiled species. For example, it is currently unknown if the proposed expansion will result in substantial changes to the water quality and/or temperature of water in Biscayne Bay in the vicinity of the cooling canals. It is possible that alterations to water quality and/or temperature could affect the relative incident and prevalence of Fibropapillomatosis (FP), a tumor-forming disease linked to a herpesvirus that is often lethal for juvenile sea turtles, particularly green sea turtles (*Chelonia mydas*). Eutrophication and increased temperatures have been implicated in triggering the emergence of FP tumors. Similarly, the endangered smalltooth sawfish (*Pristis pecinata*) is a benthic-dwelling species that could feasibly be affected by groundwater seepage from the plant. Comparable concerns also exist for manatees (*Trichechus manatus*), which are known to populate the southwest part of the bay (southeast cooling canals and associated external canals) during the winter. The potential impacts of activities at the plant need to be considered as part of a bigger picture, as there is concern that project-related effects could exacerbate the effects of other stressors present in the system and not related to Turkey Point. (**0622-1-26** [Austin, Stan])

Response: *Water quality effects on protected sea turtles, Smalltooth Sawfish, and manatees, including known diseases such as fibropapillomatosis, from construction and operation were*

assessed in a BA as part of ESA Section 7 consultation with the NMFS and FWS. Updated information about the result of consultation is presented in Sections 4.3.2 and 5.3.2 of the EIS. Section 7.3.2 of the EIS describes the cumulative effects of stressors on aquatic resources within the described region. In Sections 4.2 and 5.2, the staff has determined that construction and operation of Units 6 and 7 at Turkey Point would not noticeably alter water quality or temperature in Biscayne Bay, and therefore the staff determined that no adverse effects on protected aquatic species would occur due to changes in water quality and temperature. No changes were made to the EIS with regard to cumulative effects as a result of this comment.

Comment: Draft EIS also does not take in to account the Miami-Dade County Manatee Protection Plan and it could very well be in conflict. (**0721-5-7** [Mendez, Victoria])

Response: *Sections 4.3.2 and 5.3.2 of the EIS describe the applicant's manatee protection plan, which is consistent with FFWCC requirements. The effects of construction and operation on the Florida manatee were assessed in a BA as part of ESA Section 7 consultation with the FWS. Updated information about the result of consultation is presented in Sections 4.3.3 and 5.3.2 of the EIS, which includes conditions for monitoring manatees under FDEP manatee conditions for in-water work.*

Comment: In Revision 1 of the "FPL Turkey Point Units 6 & 7 Threatened and Endangered Species Evaluation and Management Plan", DEIS reference, (FPL 2011-TN1283), FPL updated the plan to incorporate the final location of the Reclaimed Wastewater-Treatment Facility (RWTF), **revising the number of wildlife underpasses from 4 to 3**. There remain instances in the DEIS where the wildlife underpasses were not updated. Instances in the DEIS include (emphasis added): a. DEIS Subsection 4.3.2.1, Page 4-82, Lines 17-22: The DEIS states: "To mitigate the hazards associated with the increased traffic...FPL is proposing to install a system of **wildlife underpasses** to allow crocodiles to move safely under the primary access road...and associated freshwater ponds on the berms to the north, including the area known as the moat." As illustrated in DEIS Section 3.1, page 3-3, Figure 3-1, **the moat is the location of the RWTF**, underpasses are no longer proposed at that location. b. DEIS Subsection 4.3.2.3, Page 4-94, Lines 13-16 and DEIS Subsection 4.3.2.5, Page 4-98, Lines 23-26: The DEIS (Subsection 4.3.2.3) states: "As described in its **2009** Threatened and Endangered Species Evaluation and Management Plan, FPL has proposed to install **three wildlife** underpasses on the road between the northern end of the IWF and **test canals to the west of the IWF** to mitigate collision hazards (FPL 2010-TN170)." Similarly, the DEIS states (4.3.2.5): "To mitigate hazards related to vehicle collision, FPL...proposed a series of wildlife underpasses on the road between the northern end of the IWF and **test canals to the west of the IWF** (FPL 2014-TN4058; FPL 2010-TN170)." Additionally, with respect to the location of the test canals, ER Subsection 4.3.1.1.4 states: "The FPL reclaimed water treatment facility would be built on a parcel by the test canals...(**immediately north of the industrial wastewater facility**)." (**0619-1-16** [Maher, William])

Comment: DEIS Subsection 4.3.2.3, Page 4-93, Lines 39-41: The DEIS states: "The **American crocodile** is currently **listed as Federally endangered** and **State threatened**..." As of 2007, the **American crocodile is Federally threatened**. As of 2010, all Federally listed species that occur in Florida are now included on Florida's list as Federally-designated Endangered or Federally-designated Threatened species. (emphasis added) (**0619-4-10** [Maher, William])

Comment: DEIS Subsection 4.3.2.3, Page 4-95, Lines 5-7 and DEIS Subsection 4.3.2.5, Page 4-98, Lines 16-17: The DEIS (Subsection 4.3.2.3) states: "As shown in **Figures 2-30 and 2-31**,

surveys conducted by FPL from 1978 to 2013 have shown that only **a few nests have been observed in areas where muck disposal would occur**." Additionally, the DEIS (Subsection 4.3.2.5) states: "Nests have also been documented **along the IWF Grand Canal where muck disposal is planned**." Reference should be to DEIS **Figure 2-31**, "Locations of Crocodile Nests in the Turkey Point IWF, 1978-2010", and DEIS **Figure 2-31**, "Locations of Crocodile Nests in the Turkey Point IWF, 2011-2013." Additionally, **neither figure shows nests located upon the spoils disposal areas**. (emphasis added) (**0619-4-11** [Maher, William])

Response: *The commenters suggested changes are correct. Text in Section 4.3.2 was revised to reflect these comments. The new and corrected information does not alter the staff's conclusions of impact.*

Comment: Inconsistencies identified in draft EIS and ER, Rev 6: Appendix F-4, Section 2.0, Page 2-1, Lines 30-33 "FPL's application states that **preconstruction activities**, which include activities the USACE denotes as "construction," are **expected to occur for 60 months** and construction activities, as defined by the NRC...to occur for 66 months (FPL 2014-TN4058)." ER Subsection 1.1.2.7 ER Section 3.9 ER Table 3.9-1 "No site preparation activities would occur...and the required U.S. Army Corps of Engineers permits are obtained. The project schedule assumes **a 69-month duration for preconstruction activities**." (ER Section 3.9 and Table 3.9-1 also indicate a 69-month duration for preconstruction activities.) (**0619-2-29** [Maher, William])

Comment: DEIS Appendix F-2, Subsection 3.2.1, Page 3-11, Table 3-1 and Appendix F-3, Subsection 4.2.1, Page 4-7, Table 4-1: The following inconsistencies were identified in comparing USFWS BA Table 3-1 and DEIS Table 5-1 on page 5-11. a. The listed concentration for "Triclosan" in USFWS BA Table 3-1 and NMFS BA Table 4-1 differs from the concentration for the same chemical; in the referenced DEIS Subsection 5.2.1.1, Table 5-1, page 5-11. b. "Ciprofloxacin" in USFWS BA Table 3-1 and NMFS BA Table 4-1 is not listed in the referenced DEIS table, Subsection 5.2.1.1, Table 5-1, page 5-11. c. The header for the values reads "**Annual** Average Drift - Deposition Rates"; however, the units are shown as (g/m^2-**month**) in USFWS BA Table 3-1 and NMFS BA Table 4-1. (emphasis added) d. Estimated values in USFWS BA Table 3-1 and NMFS BA Table 4-1 for "HHCB" and "Phenanthrene" differs from the values in the referenced DEIS Subsection 5.2.1.1, Table 5-1, page 5-11. (**0619-6-12** [Maher, William])

Comment: DEIS Appendix F-2, Section 4.10, Pages 4-9 through 4-12, Lines 17-20 (for text inconsistencies): USFWS BA states: "Recent crocodile monitoring data provided by FPL from 2000 to **2012** are summarized in Table 4-1. The number of successful nests observed from 2000 to **2012** has ranged from a low of 14 in 2001 to a high of 28 in 2008; the number of hatchlings captured has ranged from 134 in 2004 to 548 in 2009." Table 4-1 also includes **2013** data. Also, Figure 4-4 is entitled "Crocodile Nests Observed in 2011 and 2012: The nests shown in this figure do not match the nests shown for the same time period in the FPL Annual American Crocodile Report for 2011 and for 2012. Figure 4-4 also includes 2013 data. USFWS BA Figure 4.4 is consistent with the DEIS Figure 2-32. (emphasis added) (**0619-6-14** [Maher, William])

Comment: DEIS Appendix F-4, Subsection 2.3.1, Page 2-8, Lines 28-29 and Appendix F-4, Subsection 5.1.1, Page 5-2, Line 15-16: NMFS EFH (Subsection 2.3.1) states, "The RWTF would be located **west of the proposed units**..." Similar language is found in Appendix F-4 (Subsection 5.1.1). However, NMFS EFH Figure 2-2 shows the RWTF will be located **northwest of the proposed units**. (emphasis added) (**0619-7-10** [Maher, William])

Comment: DEIS Appendix F-4, Subsection 2.3.2, Page 2-9, Line 5: NMFS EFH states, "The maximum saltwater makeup-water rate under normal operating conditions would be approximately 43,200 gpm, assuming 1.5 cycles of concentration in the cooling towers." ER Subsection 3.4.1.1.1 states, "The maximum saltwater makeup rate to the circulating water system would be approximately **43,200 gpm** per unit." (emphasis added) (**0619-7-11** [Maher, William])

Comment: DEIS Appendix F-2, Section 6.1, Page 6-2, Lines 20-22: USFWS BA states: "As previously noted, this sanctuary would be located **south and west** of the existing IWF in an area adjacent to the Sea Dade Canal (FPL 2012-TN1618)." Turkey Point Units 6 & 7, Transmittal of Federal Biological Assessment for Six Listed Species dated November 2012, DEIS reference (FPL 2012-TN1618), Subsection 6.2.1.5 "Units 6 & 7 Crocodile Conservation and Monitoring Plan", page 77 states: "...and construction of an additional crocodile nesting and foraging sanctuary (Sea Dade Canal Crocodile Sanctuary) **south** of the industrial wastewater facility within the EMB." (emphasis added) (**0619-7-3** [Maher, William])

Comment: DEIS Appendix F-2, Section 6.1, Page 6-2, Lines 26-28, 31: USFWS BA states: "FPL predicted that the increase in capacity derived from the NRC-approved uprate of Units 3 and 4 (77 FR 20059) (TN1001) would increase water temperatures within the cooling canals by **2°F** and increase salinity by **2-3 ppt** (FPL 2014-TN4058)." ER Section 5.11.2.1, states: "The uprated Units 3 & 4 would have an increased thermal discharge into the cooling canals of a **maximum of 2.5°F** and would increase salinity by **6 percent**." Two different temperatures are referred to—one within the cooling canals and one for the discharge into the cooling canals. (emphasis added) (**0619-7-4** [Maher, William])

Comment: DEIS Appendix F-3, Subsection 3.1.1.2, Page 3-6, Line 14-16: NMFS BA states, "These pipelines would be routed from the Turkey Point peninsula along the existing berm east of the plant area, **and be situated above ground** (Figure 3-3)." ER Subsection 3.9.1.7 states: "The pipelines from the radial collector wells would require excavation on the Turkey Point peninsula and the existing berm east of the plant area, **but would be above ground on the plant area**." (emphasis added) (**0619-7-6** [Maher, William])

Comment: DEIS Appendix F-3, Subsection 4.1.2.2, Page 4-4, Lines 15-19 and Appendix F-4, Section 5.3, Page 5-6, Lines 24-26: NFMS BA states, "the current deliveries will likely decrease significantly, but during the 6-year construction period, **approximately 80 additional deliveries of construction equipment and modules would occur** (FPL 2014-TN4058)." Similar language is found in Appendix F-4. ER Subsection 4.3.2.2.1 states: "The number of weekly shipments of fuel oil would not be expected to change; however, during the 6-year construction period, there would be approximately 80 additional barge trips for delivery of construction equipment and modules **per unit**." (emphasis added) (**0619-7-7** [Maher, William])

Comment: DEIS Appendix F-3, Subsection 4.2.1, Page 4-6, Lines 31-33: NMFS BA states "With the exception of TDS, calculated depositional rates were very low, ranging from 7**.5 x 10^{-10} to 2 x 10-7** g/m^2-month." NMFS BA calculated depositional rates in Table 4-1 range from **3.5 x 10^{-10} to 8.4 x 10^{-7}** g/m^2-month. (emphasis added) (**0619-7-8** [Maher, William])

Comment: There are instances in DEIS Appendix F-3 that describe the possible impacts to aquatic species through impingement and entrainment if flow pathways occur through fracturing. For example DEIS Appendix F-3, Page 4-87, Line 5 states: "Operation of the RCW system to supply cooling water to proposed Units 6 and 7 could affect aquatic T&E species or their prey through impingement or entrainment if preferential flow pathways through the limestone above

the well lateral occur through fracturing (i.e., frac-out)..." However, Conditions of Certification **require a reverse-flow scenario that will maintain control of the drilling water within the drill bore and within the caisson minimizing the potential for frac-outs**. "Should fracturing occur...FPL shall mitigate for adverse impacts to Biscayne Bay Aquatic Preserve and its aquatic resources that have been caused by the fracturing event." (emphasis added) Instances in the DEIS include: a. DEIS Appendix F-3, Subsection 4.2.2, Page 4-7, Lines 5-9 b. DEIS Appendix F-3, Subsection 4.2.2, Page 4-8, Lines 17-20 c. DEIS Appendix F-3, Subsection 4.2.2, Page 4-9, Lines 29-32 (**0619-7-9** [Maher, William])

Response: *The commenter is correct; the described inaccuracies occur in the BAs submitted to the FWS and NMFS as part of ESA Section 7 consultation and the EFH assessment submitted to NMFS as part of ESA consultation between the NRC, USACE, and the FWS and NMFS. No changes were made to submitted consultation as result of these comments. Discussions and correspondence with the services since issuance of the BAs have kept them informed of changes, new analyses, and inaccuracies associated with the consultations. The new and corrected information does not alter the staff's conclusions of impact. Sections 4.3.2 and 5.3.2 were revised to reflect updated consultation status.*

Comment: The current status of American Crocodiles within Biscayne Bay and nearby areas of South Florida is well below restoration targets set by CERP. The overall crocodilian indicator status for American crocodiles within Biscayne Bay dropped from "yellow" in 2012 to "red" in 2014. Given recent information on the declining trends of crocodilians within Biscayne Bay and other areas of South Florida (see Brandt et al. 2014), potential impacts to American crocodiles of the proposed project need to be better assessed, and NPS recommends that local populations be monitored either through establishment of a new program or through funding continuation of existing work. Potential impacts of the proposed activity on population sizes, growth rates, hatchling survival rates, and body condition for American crocodiles within Biscayne Bay must be better understood. [Footnote 5: Brandt, L.A., J. Beauchamp, M. Cherkiss, A. Clark, R.F. Doren, P. Frederick, E. Gaiser, D. Gawlik, S. Geiger, L. Glenn, E. Hardy, A. Huebner, R. Johnson, K. Hart, C. Kelble, S. Kelly, K. Kotun, J. Lorenz, C. Madden, F. J. Mazzotti, L. Rodgers, A. Rodusky, D. Rudnick, B. Sharfstein, R. Sobszak, J. Trexler, A. Volety, 2014. System-wide Indicators for Everglades Restoration. 2014 Report. Unpublished Technical Report.]

The NPS encourages the NRC to clarify in revisions to the DEIS that crocodiles utilize Biscayne Bay and thus move in and out of Biscayne NP. Section 5.3.2 discusses variations in salinity from the pumping of the RCW and mentions there was a transient increase near two practical salinity units (psu). The EIS should clarify whether those areas included critical habitat for the American crocodile. Additionally, the 2014 report for the System-wide Ecological Indicators for Everglades Restoration states that Biscayne Bay has moved into the red (highest concern) ranking (down from yellow in previous years), and system-wide survival of hatchlings beyond 6 months old is less than 3%. This downward trend is disturbing and should be considered when analyzing direct and cumulative impacts on crocodiles from this project. (**0622-2-3** [Austin, Stan])

Response: *The NRC Staff acknowledges the concern about habitat requirements for the protected American crocodile. Direct and cumulative effects from construction and operation of new Units 6 and 7 on the American crocodile were assessed in a BA as part of ESA Section 7 consultation with the FWS. Updated information regarding anticipated impacts and mitigation related to protected species was communicated with the Services and is presented in Sections 4.3.2 and 5.3.2 of the EIS. Updated information about the status of consultations is presented in Sections 4.3.2, 5.3.2, and 7.3.2 of the EIS.*

Comment: **AMERICAN CROCODILES AND DESIGNATED CRITICAL HABITAT.** Appendix F Section 5.10 describes 270 acres of permanent loss of federally designated critical habitat for the American crocodile as a result of wetlands and surface waters that would be directly destroyed by the project and 211 acres of additional critical habitat that would be adversely affected for resident crocodiles. These impacts are being characterized in the DEIS as "unavoidable". In addition, at least one crocodile has already been killed by the project during construction of the first deep injection well for the Units 6 and 7 project according to the DEIS. Please clarify whether the USFWS has considered the cumulative impacts of this project in addition to the continuing degradation of adjacent critical habitat in and adjacent to the cooling canal system as temperatures and pollutant loads increase due to operation of Units 3 and 4. Please be advised that MDC has issued land use approvals (Z-56-07) for this project that include consultation conditions between FPL, the USFWS and Miami-Dade County for this issue and this informal consultation was initiated. At the time, FPL agreed to the establishment of development setbacks to prevent both direct and indirect impacts to crocodile habitat and these requirements are included within the land use approval. Has the NRC's analysis indicated any development setbacks that could reduce the acreage of impact to designated critical habitat for the crocodile? Have any other mitigation measures (beyond that proposed by the applicant) been identified through this review process, either by the NRC or USFWS to reduce these "unavoidable impacts"? An analysis of the cumulative impacts of the proposed project combined with the continuing degradation of adjacent critical habitat in and adjacent to the cooling canal system as temperatures and pollutant loads increase due to Units 3 and 4 is needed as part of this effort. MDC also requests information and clarification on the following issues: As part of the review for the American crocodile, have the cumulative impacts to areas adjacent to the cooling canals been considered including the continuing degradation of water quality throughout the cooling canals? For example, we understand that the USFWS has concurred with FPL that the water quality in the CCS surface water has become inappropriate for release of crocodile hatchlings due to increased salinity and temperature, and therefore all hatchlings last year were relocated to areas outside the cooling canals. Please confirm if our understanding is correct. Has the ongoing monitoring data on the adult crocodiles within this area been examined to determine whether there is any indication that the overall health of the adults may be decreasing or if their numbers are decreasing? Has the NRC or FWS considered the indirect as well as cumulative impacts to the crocodile mitigation area that was required by the Army Corps for the unit 5 project? Should the degradation or loss of this habitat require mitigation since it was previously required as a regulatory action? Pursuant to Condition 2 of Z-56-07, Miami-Dade County's Unusual Use Zoning approval for this project, MDC requests continued coordination with USFWS on the issue of the American crocodile and any required management actions or mitigation that may be required prior to finalization of the EIS. (**0110-1-6** [Hefty, Lee N.])

Response: *An assessment of the cumulative effects of building and operating Turkey Point Units 6 and 7 and all other past, present, and reasonably foreseeable future projects on aquatic resources, including the American crocodile, is discussed in Section 7.3.2 of the EIS. Sections 2.3.1 and 2.4.2 of the EIS have been revised to discuss the changes in the cooling canal system that have affected American crocodile habitat. The review was performed in consultation with the FWS as described in the BA and in accordance with Section 7 consultation requirements. If the FWS determines that environmental setbacks are necessary to reduce the permanent loss of designated critical habitat, they could be required as part of Section 7 consultation and be incorporated in the terms and conditions of a Biological Opinion. Such requirements would be determined by the FWS and are not determined by the NRC. FPL continues to work with the FWS on surface water quality in the cooling canals that are necessary for Turkey Point Units 3 and 4. Improved water quality in the IWF would be beneficial to the resident crocodile population. Section 7.3.2 of the EIS has been updated to reflect the 2015 status of crocodile*

populations near the cooling canals and coordination between FWS and FPL with regard to water quality. The information in the comment does not alter the staff's conclusion of impact.

Comment: ***Recommendations:*** The FEIS should specifically and holistically describe impacts to the ENP, BNP and BBAP. Because these are vitally important national and regional resources, the NRC should individually and robustly address potential impacts, both construction and operational, to these public lands.

These specific impacts for the ENP, BNP and BBAP should be separately described in the Affected Environment (Chapter 2), Construction Impacts at the Turkey Point Site (Chapter 4), Operational Impacts at the Turkey Point Site (Chapter 5), and Cumulative Impacts (Chapter 7), sections of the FEIS. (**0617-1-32** [Mueller, Heinz J.])

Response: *The commenter is concerned that impacts on Everglades National Park, Biscayne National Park, and the Biscayne Bay Aquatic Preserve are not described in specific subsections for all affected resources. The direct and indirect effects of construction and operation of Units 6 and 7 on the National Parks and the Preserve are described in the context of the affected resources in Sections 4.2.2, 4.2.3, 4.3.1, 4.3.2, 5.2.2, 5.2.3, 5.3.1, 5.3.2, 7.2.1, 7.2.2, 7.3.1, and 7.3.2 of the EIS. No changes were made to the EIS as a result of this comment.*

Comment: EPA recommends NRC and USACE develop a robust monitoring and adaptive management plan (in collaboration with resource agencies) to address any unforeseen future impacts to ENP, BNP and BBAP especially related to the potential operational impacts associated with the RCW. EPA recommends these commitments be reflected in the ROD. (**0617-1-33** [Mueller, Heinz J.])

Comment: FKNMS concurs with National Marine Fisheries Service comments (submitted May 22, 2015) requesting development of a biological monitoring and adaptive management plan to assess ecological impacts of the project at construction, implementation, and operation phase to continue throughout the life of the project. FKNMS welcomes the opportunity to contribute to development of this plan and requests that results and outputs from any biological monitoring be shared with FKNMS. (**0618-2** [Morton, Sean])

Comment: FKNMS conducts water quality monitoring and special studies through its long-standing Water Quality Protection Program (WQPP). Administered by the Florida Department of Environmental Protection and U.S. Environmental Protection Agency, the WQPP is a collaborative effort dedicated to protecting and improving water quality, coral reefs, seagrasses, fisheries and recreational opportunities within the FKNMS. The WQPP has supported and funded long-term research and monitoring programs that track water quality, coral reef and seagrass communities; results from monitoring and research studies have been instrumental in decision-making and in determining what actions are needed to sustain a healthy ecosystem. As such the WQPP could help inform the design of a water quality and biological monitoring program for this project that includes potential impacts to downstream aquatic ecosystems. (**0618-3** [Morton, Sean])

Comment: Need for a Biological Monitoring and Adaptive Management Plan[.] A biological monitoring and adaptive management plan based on ecologically relevant impacts should be developed, and the NMFS offers to assist development of the plan. The plan should be developed to measure impacts predicted from a reliable impact assessment that considers ecologically relevant water quality conditions and interactions between the cooling canals and Biscayne Bay waters. The plan should be implemented in perpetuity for the life of the RCWs

and include no less than three years of baseline monitoring (pre-operation) during dry years to characterize the ambient conditions at the site. (**0724-11** [Fay, Virginia M.])

Comment: Seagrass monitoring should also be a component of this plan. The NMFS reviewed the FDEP Certificate of Conditions (May 2014) containing recommendations for monitoring changes to the seagrass communities near the Turkey Point Nuclear Plant resulting from RCW operation. The NMFS believes the monitoring effort would be more efficient by incorporating relatively new approaches, for example using geo-spatial video-based survey techniques described in Lirman et al. (2008). The monitoring plan should demonstrate capability in detecting the level of biological change that constitutes an adverse effect to seagrass and fishery resources in Biscayne Bay. The sampling plan should be supported by a power analysis to demonstrate the sampling proposed is sufficient to detect the expected impacts. (**0724-13** [Fay, Virginia M.])

Comment: One way to efficiently accomplish developing the biological monitoring and adaptive management plan would be to establish and interagency team to contribute to the development of the plan. Ideally, the team should be composed of staff from the NMFS, NPS, NRC, USACE, U.S. Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service, FDEP, Florida Fish and Wildlife Commission, Miami-Dade Department of Environmental Resources Management, South Florida Water Management District, and FPL. The final plan implemented should reflect substantial input from this team. The NMFS, National Park Service, and others are currently planning to meet May 29, 2015, in Homestead to discuss this monitoring need (please contact Jocelyn Karazsia for additional information about this meeting, her contact information is at the end of this letter) (**0724-14** [Fay, Virginia M.])

Response: *The commenters are requesting a biological monitoring and adaptive management plan for aquatic resources that may be affected by construction and operation of Units 6 and 7. The staff agree that an interagency team would be valuable to coordinate monitoring efforts and share data. The FDEP provides detailed monitoring requirements for assessing potential adverse effects on ecological resources and water quality during the construction and operation of the RCW system, which include a 2-year period of pre-construction monitoring (State of Florida 2014-TN3637). The USACE would also provide special conditions regarding any monitoring and mitigation for USACE authorized activities in accordance with 33 CFR 320.4 for compliance with Federal and state wildlife provisions and for water quality standards under the Clean Water Act if Department of the Army permit is issued. Additional clarifying text has been added to Sections 4.3.2 and 5.3.2 of the EIS to provide more detail concerning surface water and biological monitoring and mitigation requirements as provided in the FDEP COCs.*

Comment: The DEIS also fails to provide sufficient information about current species diversity, abundance, and habitat utilization in the vicinity of proposed radial collector wells and therefore fails to complete a full and adequate analysis of the impacts of the wells to the Biscayne Bay ecosystem. This data is necessary to determine the ways in which disruptions to the salinity regime caused by the radial collector wells will impact Biscayne National Park, wildlife species, and their habitats. The DEIS does not contain comprehensive biological studies on wildlife utilization, plant cover, and species in the area adjacent to the radial collector wells. (**0113-1-18** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: Furthermore, a baseline survey of benthic fauna and seagrass cover has not been conducted near the location of the radial collector wells. Seagrasses can be particularly sensitive to changes in salinity and water quality and benthic habitat could be impacted by the radial collector wells. [Footnote 20: South Florida Water Management District, Second

Completeness Review, FPL Turkey Point Units 6 & 7, Site Certification Application, Power Plant & Associated Facilities, January 2, 2010, 3.] The DEIS cannot fully consider the potential impacts of the wells on wildlife resulting from the disruption of salinity regimes without providing comprehensive surveys and studies of the flora and fauna within the bay, particularly in areas near the radial collector wells. Without providing this data, the DEIS fails to establish an environmental baseline by which to evaluate impacts and alternatives. (**0113-1-19** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: **Barge unloading facility**. To support construction activities, the equipment barge unloading area, located at the northeastern portion of the Turkey Point Power Plant site, will be enlarged by 0.75 acres. This activity will require the dredging of approximately 0.1 acre of marine bottoms in the turning basin, and the installation of sheet piling to support building activities. Surveys conducted in 2008 indicate that at least some seagrasses occur in the area to be affected. We recommend that FPL resurvey the area to be affected to determine the extent of seagrasses and provide mitigation for the loss of these valuable marine resources. (**0227-11** [Stanley, Joyce])

Comment: Further, the proposed project would impact submerged aquatic vegetation (SAV), which includes *Ruppia maritima, Thalassia testudinum*, and *Halodule wrightii*. Fin and shell fish commonly associated with this species include Florida crawfish, stone crab, blue crab, penaeid shrimp, sea trout, gray snapper, red drum, pinfish, mullet, and flounder. Moreover, SAV provides attachment sites for periphyton which in turn increases food value for the base of marine and estuarine food webs. SAV aids in stabilizing the shallow water submerged land which promotes water quality. SAV also performs important nutrient uptake functions, which assist in the maintenance of water quality. For these reasons, the EPA also considers SAV to be ARNI. (**0617-1-11** [Mueller, Heinz J.])

Comment: EPA understands that a benthic survey has not been completed at the FPL Turkey Point site for some years. In order to evaluate the proposed project, the FEIS should include a colored copy benthic survey of the boat basin, radial collector well locations, and the Units 6 & 7 site. The benthic survey should extend a radius of 50 feet around submerged lands of these locations. The benthic survey should include a description of the protocol used to complete the survey, sampling dates, and a map that illustrates the density and location of each SAV found at the site. The seagrass survey should be conducted between the months of June and September to ensure the survey is conducted during the active growing season. The benthic survey is necessary for the EPA to determine extent of SAV impacts that will occur by the proposed project. (**0617-1-12** [Mueller, Heinz J.])

Comment: *Equipment Barge Unloading Area[.]* The existing barge-unloading facility would be enlarged to accommodate the larger barges used to deliver components for the proposed units. According to the DEIS, "approximately 90 ft. by 150 ft. would be excavated on the northwest edge of the existing barge-turning basin resulting in a total disturbed area of 130 ft. by 250 ft. or 0.75 ac ... The expansion of the barge-unloading facility would require dredging a 4,356 ft2 (0.1 ac) area in the turning basin." A survey from 2008 indicated that some seagrasses are found in the project area. The NPS recommends that the area be resurveyed to enable more accurate estimation of potential impacts to submerged aquatic vegetation. The NPS suggests that USACE consider supporting NPS restoration of "orphan" vessel grounding injuries in Biscayne NP sea grass habitat to offset dredging impacts. Some progress has been made, but much more work remains. We contend that orphan site restoration will help support the integrity of the seagrass ecosystem, which in tum supports manatees, sea turtles, critical habitat, economically important fisheries, and other marine life. (**0622-2-11** [Austin, Stan])

Comment: Equipment Barge Canal Expansion

The equipment-barge uploading area at the northeastern portion of the Turkey Point Nuclear Facility would be expanded by dredging 0.75 acres of estuarine bottom, including 0.10 acres of seagrass habitat, to support construction activities. The NRC and FPL propose use of turbidity curtains to limit water quality degradation caused by dredging. The EFH assessment states the basin contains sparse growth of seagrass and macroalgae. The NMFS requests the final EIS and EFH assessment include a more detailed habitat characterization and compensatory mitigation to offset the seagrass impacts. (**0724-3** [Fay, Virginia M.])

Response: *The commenters are requesting additional ecological characterization of nearshore aquatic resources associated with the barge unloading and the RCW areas. Section 2.4.2 of the EIS has been modified to provide additional ecological baseline information for the barge unloading area and the nearshore area surrounding the RCW location, and include seagrass locations and density. Sections 4.3.2 and 5.3.2 of the EIS have been revised to provide additional context for the construction and operation impacts at the barge unloading area, and include experimental results to support assessment of RCW effects on seagrass and other aquatic resources. State of Florida required monitoring and surveys for seagrass and marine organisms are also included in Sections 4.3.2 and 5.3.2. The additional information does not change the impact determination that the effects to aquatic resources in these locations from dredging and RCW installation and operation are minor.*

Comment: Comment 2. The DEIS is incomplete because it does not evaluate possible harm to the ecosystem of Biscayne Bay if the hypersaline plume under the cooling canals is forced into the bay by pumping from the radial collector wells - The DEIS indicates that intermittent pumping, as proposed in the DEIS, could displace the hypersaline plume into the path of fresh water flowing eastward: *"Intermittent operation could result in an increase of hypersaline flow into the aquifer beneath the bay that could migrate into the bay when the RCW is not operating." [DEIS p. G-29]* Emergence of hypersaline water into Biscayne Bay could result in localized hypersalinity that would kill sea grass beds in Biscayne National Park, as happened during periods of hypersalinity in Florida Bay in the early 1990s (e.g., Zieman et al. 1999); those areas of Everglades National Park have not fully recovered. ***The final EIS must note possible harm to Biscayne National Park ecosystem if hypersaline plume is relocated into Biscayne Bay. (*****0106-5** [Stoddard, Philip K.])

Comment: *Everglades National Park. Biscayne National Park and Biscayne Bay Aquatic Preserve.* The EPA is concerned about the proposed project's potential impacts to the Everglades National Park (ENP), Biscayne National Park (BNP) and Biscayne Bay Aquatic Preserve (BBAP). Turkey Point is in close proximity to both the BNP and BBAP. In the Affected Environment section of the DEIS (pages 2-10 -2-13), the NRC recognizes the unique characteristics of the ENP, BNP and BBAP, and that many of these waters are listed as Outstanding Florida Waters. Although the DEIS generally addresses some of the issues facing these national and state protected lands, the DEIS does not specifically address potential impacts facing these fragile and vital resources. EPA is concerned that the radial collector wells (RCWs) could impact the hydrology of BNP, and potentially impact tidal cycles and inflow of freshwater towards the national parks and the aquatic preserve. The FEIS should clarify whether there will be pre and/or post construction monitoring to ensure that the RCWs are not impacting the ENP, BNP and BBAP. EPA is concerned that the proposed projects' additional wastewater discharges to the IWF could contribute to increased salinity in the underlying Biscayne Aquifer, and increase the salinity and nutrient loading to BNP and BBAP. (**0617-1-24** [Mueller, Heinz J.])

Comment: If the proposed action needed to rely on the radial wells as the primary source of cooling water for extended periods during the project's projected life, the impacts to the near shore aquatic ecosystems should be assessed. Impacts of concern include how the volume of water required for cooling purposes and drawn from Biscayne Bay may potentially affect the salinity levels of the near shore Biscayne Bay, and the associated aquatic ecosystem. (**0617-4-8** [Mueller, Heinz J.])

Comment: Overall, the NRC provided an initial determination that construction and operation of the RCWs, 105 acres of mangrove impact, and 0.10 acres of seagrass impact, located within or adjacent to the Biscayne Bay Aquatic Preserve and designated Habitat Areas of Particular Concern (HAPCs) by the South Atlantic Fishery Management Council, would not result in an adverse impact on EFH or federally managed fishery species. The NRC provides individual determinations on the effects of six actions or activities on mangrove, seagrass, and unconsolidated bottom habitats in the EFH assessment (Table 1). As described further below, the NMFS disagrees with these determinations and concludes the proposed dredging and operation of the RCWs would result in adverse impacts to seagrass or mangroves. In particular, the RCW operation could alter nearshore water quality resulting in hypersalinity and hyperthermal conditions impacting additional seagrass and fishery resources in the Biscayne Bay Aquatic Preserve. Due to the potential severity of these impacts, a biological monitoring and adaptive management plan is recommended to evaluate the predicted impacts of RCW operation relative to the actual impacts and to implement corrective actions or mitigation measures if environmental thresholds are reached. (**0724-1** [Fay, Virginia M.])

Comment: FPL and the National Park Service, Biscayne National Park (NPS), are currently conducting water quality monitoring, and the NMFS recommends installing an additional four or five continuous water quality monitoring sites with similar equipment to assess the frequency duration, and intensity of hyperthermal and hypersaline events. The NMFS can assist in determining the location of the sites (spatially with respect to other sites and the work proposed and location in the water column). The water quality monitoring component of the plan should clearly identify the environmental thresholds requiring adaptive management and options to manage the operation. Because this type of monitoring generates a lot of data, an efficient plan to manage, analyze, and share data is also recommended. (**0724-12** [Fay, Virginia M.])

Comment: Operation of the RCWs would result in hypersaline conditions and thermal events within estuarine habitats in Biscayne Bay known to support federally managed species. The severity of these effects would depend on annual rainfall levels (i.e., more severe effects are expected during dry years than wet years). This is of concern because hypersaline conditions and thermal events can be bio-energetically expensive and reduce capacity for reproduction or growth. Impacts to seagrass habitats and fishery resources from the RCW operation are not quantified in the public notice. However, the draft EIS attempts to quantify these effects based the modelling FPL has completed to predict the influence RCWs will have on local salinity regimes in Biscayne Bay (provided in the draft EIS Appendix G). The draft EIS also briefly describes how the recent upgrades of Turkey Point Units 3 and 4 have led to increased discharge temperatures within the cooling canals contributing to an extensive algal bloom (draft EIS, Section 7.2.2.1). Based on maps provided with the public notice, it appears the RCWs would collect water in the vicinity of elevated temperature discharge plumes from the cooling canals. (**0724-9** [Fay, Virginia M.])

Response: *Section 5.2.1 and Appendix G were revised to provide an updated assessment of groundwater and surface water connectivity and salinity changes caused by RCW operation. Additional information about the RCW inflow volume under State of Florida permitted*

conditions compared to the total tidal volume of Biscayne Bay is provided in Section 5.3.2 of the EIS. Additional information has been included in Section 5.3.2 of the EIS to clarify the predicted changes in salinity to nearshore areas and Biscayne Bay (Biscayne National Park and Biscayne Bay Aquatic Preserve) based on modeling from RCW operation, and support the NRC Staff's conclusion that no adverse effects on aquatic resources are anticipated from RCW operation. The State of Florida COCs require water quality and biological pre-construction monitoring for 2 years prior to RCW installation activities, monitoring during construction, and at least 2 years of operational monitoring to include the first two RCW operational events, which are limited by the State of Florida to not exceed 60 days per year. Monitoring would take place in Biscayne Bay waters surrounding the RCW location and at reference sites in accordance with an FDEP approved RCW System Monitoring Plan.

Comment: American crocodile. The proposed project will result in the loss of approximately 270 acres of designated critical habitat for the crocodile associated with the construction of Units 6 and 7. The project also has the potential to affect water quality in the cooling canal system at the Turkey Point site. The cooling canal system provides important habitat to crocodiles. Drift from the cooling towers from the use of reclaimed water is expected to deposit a small amount of chemical contaminants (*e.g.*, 1,4-dichlorobenzene, phenanthrene, copper *etc*.) into waters of the cooling canal system, although information provided in the DEIS indicate that the deposition rates of these contaminants is extremely low. Additional water quality testing in the canal system should be considered to address these contaminants. (**0227-4** [Stanley, Joyce])

Response: *Section 5.3.2 discusses operational effects from cooling-tower drift including those on nearby water bodies and effects on aquatic species. A BA was submitted to the FWS to address effects to protected species, such as the American crocodile, through ESA Section 7 consultation. The NRC staff agrees that additional water quality testing in the canal system should be considered by the State of Florida, the applicant, and FWS. No changes to the EIS were made as a result of this comment.*

Comment: FPL intends to store the muck removed from the project footprint on the berms within the cooling canal system. This practice has the potential to introduce organic matter and nutrients (*e.g.*, nitrogen, phosphorus *etc*.), and decrease the quality of the water in the cooling canal system. This will undoubtedly further exacerbate the poor water quality currently experienced in the cooling canal system and further adversely affect the crocodile that inhabit the system. (**0227-5** [Stanley, Joyce])

Response: *Section 5.3.2 discusses the applicant's plan to place the muck on the cooling canal berms. The staff does not expect the placement of muck on the canal berms to significantly affect water quality in the IWF or Biscayne Bay. See Section 3.2.2.3 and 4.3.2.1 for a detailed explanation of muck disposal. Additional information has been added to Section 5.3.2 regarding the placement of muck on these cooling canal berms and the potential for its effects on aquatic species, including the American crocodile. The information in the comment does not alter the staff's conclusion of impact.*

Comment: Comment 9. The DEIS is incomplete (a) in failing to consider a complete list of bioactive chemicals found in the wastewater stream, (b) in failing to identify the bioactivity class of all chemicals listed, and (c) in failing to address additive and synergistic effects of those chemicals on aquatic organisms in the adjacent Biscayne National Park - Ecotoxicology studies show that some pollutants act in tandem to produce greater effects than any single chemical does at is particular concentration. Compound action

can be additive or synergistic (Crews et al. 2000). Chemicals in the same class of bioactivity often act in an additive manner, with effects proportional to the sum of the concentrations of multiple chemicals (Kortenkamp 2007). For other bioactive waste products, especially chemicals acting on different endocrine or biochemical pathways, the combined activity of multiple chemicals can be synergistic, with actions greater than the sum of the constituents (e.g., Vonier et al. 1996; Arukwe et al. 2001). Because of additive and synergistic effects, environmental consequences of exposure can only be estimated by knowing the entire constituency of chemicals released in treated wastewater, upon what body systems they act, and how they interact in the organism. The DEIS does not consider or present an exhaustive list of bioactive chemicals in the local wastewater stream, only those quantified by one prior study (Lietz and Meyer 2006). One example of a chemical missing from the DEIS is triclocarban (TCC), a chemical common to personal hygiene products, and likewise common in municipal wastewater (Lozanoa et al. 2013). While TCC has no endocrine action on its own, it acts synergistically to enhance action of androgens (Chen et al. 2008). Projected levels of TCC are not stated in DEIS. Triclosan is listed in the DEIS, but methyltriclosan, also common in wastewater, is omitted. Since triclosan and methyltriclosan will have additive effects, the omission of one of these necessarily results in underestimation of the likely effects of that chemical class on aquatic organisms. Lietz and Meyer (2006) did not pretend to be exhaustive in their analysis of wastewater chemicals, however the EIS must be exhaustive in order to give us an accurate picture of the possible hazards to the sensitive ecosystem surrounding the nuclear plant. ***The final EIS must consider additive and synergistic bioactivity of toxins and endocrine disrupters released as aerosols.*** (**0106-12** [Stoddard, Philip K.])

Comment: EPA is concerned that drift deposition could impact ENP, BNP and BBAP. The NRC should provide additional details regarding these impacts, and any other project impacts to ENP, BNP and BBAP. (**0617-1-31** [Mueller, Heinz J.])

Comment: *Page 5-60*

Lines 14-18: The DEIS states, "When toxicological benchmarks were used, no-observed effect concentration (NOEC) levels were chosen for sensitive, representative aquatic species to provide a conservative assessment." How is sensitive defined here and how were the most representative aquatic species determined? For what endpoints (e.g., growth, reproductive success, mortality, etc.) were the NOECs selected and for what period of time (e.g., 96-h, 7d, etc.)? Depending on the answers to these questions, the NOECs selected may NOT provide the most conservative assessment. Revisions to the DEIS should include a discussion regarding this topic.

Lines 21-24: The DEIS states, "For chemicals without established water-quality criteria, including most CECs, those present at >1/10 of a toxicological benchmark chosen by the review team to be protective of aquatic resources were included in the fate and effects evaluations (Table 5-1)." How were these toxicological benchmarks selected and what criteria were they based on? How were selected benchmarks determined to be protective of aquatic resources? Specifically, what aquatic resources were included in the above benchmark selection process? Revisions to the DEIS should include a discussion regarding this topic.

This section does not discuss the impacts of contaminants on species present in the mangrove wetlands. This type of habitat is known to be a nursery for a multitude of fish species and two, if not three, of the contaminants mentioned in Table 5-1 are endocrine disruptors (EDCs). Only very small concentrations of EDCs are needed to cause developmental effects and potentially reproductive effects. (**0622-1-7** [Austin, Stan])

Comment: *Page 5-140,* Table 5-24 (under Aquatic Ecosystems) states, "The use of reclaimed water from Miami-Dade County to operate the cooling system would not result in noticeable impacts on onsite and offsite aquatic resources." How was this determined? The revised DEIS should discuss known potential interactive effects of these chemicals not only with other pesticides, but also with other chemicals expected to be present from drift or other means. (See comments above regarding EDCs and their effects.) Revisions should include a discussion of the contaminants present in the reclaimed water, their environmental fate and transport and their potential environmental effects. (**0622-1-9** [Austin, Stan])

Response: *The commenters are concerned about the potential for adverse effects on aquatic resources from the presence of chemicals of emerging concern (CECs) that may be present in the cooling-tower drift. Sections 5.2.1 and 5.3.2 of the EIS provides an assessment of the region of potential effect for CECs. Section 5.3.2 of the EIS has an extensive discussion of the EPA criteria used to assess the potential toxicity or adverse effects of CECs on aquatic species known to be sensitive to chemical compounds and at critical life stages. Because it is not possible to assess every potential chemical or chemical byproduct that may be present in the reclaimed water source, representative and most abundant chemical compounds were provided for different functional chemical classes, including endocrine disrupting compounds. The use of No Observed Effects Concentrations (NOEC) for assessing toxicity thresholds is a widely used criterion in aquatic toxicology, and represents the highest concentration threshold acceptable in these toxicity tests for the correlated exposures. Section 5.3.2 has been expanded to demonstrate the overall sensitivity differences between freshwater and marine or estuarine species to further validate the described endpoints and species used in the assessment. One commenter suggests further analysis of synergistic interactions between compounds. The NRC staff agrees that synergistic or additive interactions may occur, but antagonist interactions are just as likely to occur and are supported by as many studies. Section 5.3.2 has been expanded to discuss environmentally relevant complex mixture interactions. The proposed high level disinfection and filtration of reclaimed water to be provided to the FPL water treatment plant is consistent with State of Florida regulations and water reuse management practices (FAC 62-610.688). FPL would further treat the reclaimed water prior to cooling water system use, which would further reduce any CECs in the water, and represents additional water treatment not provided for other reclaimed water uses such as direct irrigation for food crops and pastures for livestock, recharge of groundwater, and restoration enhancement efforts. Section 5.3.2 has been expanded to provide context for reclaimed water use in Florida.*

Comment: Construction and Operation of RCWs[.] *Construction of RCW*: The draft EIS and EFH assessment note frac-outs may occur during the drilling needed for the RCWs; however, the discussion focuses only on one aspect of what constitutes a frac-out. The NRC describes a frac-out as one or more significant fractures of the limestone above the RCW lateral pipelines altering fine-scale water flows during RCW system operation potentially resulting in impingement or entrainment of early life stages of fishery species. It is not clear to the NMFS how the NRC views this impact. While the NRC notes monitoring and detecting this type of frac-out and its impacts would be difficult, it goes on to conclude no adverse impacts would result from the entrainment or impingement of aquatic resources but later states there would be small, localized adverse effects. The NMFS requests the final EIS and EFH assessment clarify this issue. (**0724-5** [Fay, Virginia M.])

Response: *The commenter is concerned about the potential for adverse effects from installation and operation of the RCWs. Sections 4.3.2 and 5.3.2 of the EIS have been revised to include additional context and clarity concerning the potential for adverse effects on aquatic resources during installation and operation of the RCWs; the RCWs include specific installation*

requirements of the State of Florida (2014-TN3637) and do not use high-pressure water injection, thus negating any potential for a pressure induced frac-out. The information in the comment does not alter the staff's conclusion of impact.

Comment: You know, we did accidentally unearth a nest in 1977 with a backhoe, and part of our environmental stewardship we adopted a conservation effort from the University of Florida folks, Dr. Mozzotti in the International Park, and never took any money, he did it all in-house to monitor the crocodile population. And it steadily increased year after year. We did some evolving with the animals and the civil engineer and the biologists. You know, the canal system is an engineered supporting system for a fossil/nuclear plant. Sometimes those berms got to be cleared off. But also the biologists, we need to have the mangroves, we need to have some preservation for these to hatch some babies. And the ideas came together where we created a habitat. We dug out freshwater ponds when the babies were hatching so now the females, the nesting females won't take those babies to freshwater refugia away from these sanctuaries which, then, they became impregnated. So many predators, raptors, terrapins, raccoons, snakes, you couldn't count them. Now they're staying in the same place. And the best news about that, from '96 to 2006, that ten-year swath, the population went up tenfold in ten years. And then the State, U.S. Fish and Wildlife looked at that information and in 2007 the State of Florida downlisted the species from endangered to threatened. And all of us at Turkey Point take great pride in that accomplishment. It is the crocodiles. (**0723-15-2** [Bertelson, Bob])

Response: *The commenter expresses general support for the enhancement of crocodile habitat on FPL property. No changes were made to the EIS as a result of this comment.*

Comment: There are instances in the DEIS where, due to the timing of events with respect to drafting the DEIS, specified dates, or future actions, indicated in the DEIS have passed. Instances in the DEIS include (emphasis added):...DEIS Appendix F-2, Section 1.0, Page 1-1, Lines 22-25: Appendix F-2 states: "**A proposed** Conditions of Certification dated **May 24, 2013**, was issued to FPL authorizing construction, operation, and maintenance of Turkey Point Units 6 and 7 and associated facilities subject to the requirements listed (FDEP 2013-TN2629)." On **May 19, 2014**, the Governor and Cabinet issued the Site Certification Order with the **final** Conditions of Certification (State of Florida 2014-TN3637). d. DEIS Appendix F-2, Section 2.1, Page 2-4, Lines 11-12 and DEIS Appendix F-2 Subsection 3.1.3, Page 3-6, Lines 26-30: Appendix F-2 (Section 2.1) states: "FPL has proposed **an original location and an alternative location for the RWTF** and both are on the Turkey Point site." Similarly, USFWS (Section 3.1.3) states: "Land cover **at the alternate location** is mostly Australian pine established on upland spoil, canals, and ditches with some sawgrass marsh, dwarf mangroves, and Australian pine wetlands (FPL 2014-TN4058)." ER Section 3.9 "Preconstruction and Construction Activities", Figure 3.9-1 "Construction Utilization Plan", does not include the original location, only what used to be the called the "alternate" location. e. DEIS Appendix F-2, Subsection 3.1.1, Page 3-4, Lines 29-31: Appendix F-2 states with regards to dredging in the turning basin for the equipment barge unloading area improvement: "**FPL would submit an application to USACE for a permit to dredge under the CWA, Section 404(b)(1)** "Guidelines for Specification of Disposal Sites for Dredged or Fill Material" (40 CFR 230) (TN427), as described in ER Revision 6 (FPL 2014-TN4058)." The 404 **permit application submitted to ACOE on June 30, 2009 includes dredging in the turning basin**. f. DEIS Appendix F-2, Section 6.1, Page 6-2, Lines 10-11: Appendix F-2 states: "**Conversion of Units 1 and 2 to synchronous condenser mode would** reduce onsite vehicular traffic attributable to these two existing units." Unit 2 already operates in synchronous condenser mode as stated on Page 6-1, lines 19-20 of this document, which states: "In January 2013, **Unit 2 was converted to operate in synchronous condenser mode..."** (**0619-1-12** [Maher, William])

Response: *The commenter describes updates to referenced documents and processes described in the BA submitted to the FWS as part of ESA Section 7 consultation between the NRC, the USACE, and the FWS. No changes were made to submitted consultation as result of this comment.*

Comment: The USACE did not make an initial determination in its public notice on whether the impacts to 1,000 acres of wetlands, including over 100 acres of mangroves, would result in an adverse impact on EFH or federally managed fishery species noting the NRC is the lead federal agency for the EIS and is responsible for the EFH consultation. (**0724-2** [Fay, Virginia M.])

Response: *The commenter is correct that NRC is the lead federal agency responsible for EFH consultation, but the USACE is a cooperating agency. Sections 4.3.1 and 4.3.2 of the EIS have been revised to further describe the type of wetlands and mangroves that would be adversely affected by installation activities. Section 4.3.2 of the EIS has been further revised to describe the potential for adverse effects on aquatic habitats and species, including EFH and federally managed species from impacts on mangrove habitats. This additional information does not change the assessment of an overall SMALL impact to aquatic resources from installation activities.*

Comment: DEIS Section 4.11, Page 4-146, Table 4-18: In DEIS Table 4-18, in the "Aquatic Ecosystems" impact category, the DEIS states: "FPL would follow the guidance provided by the National Marine Fisheries Service (NMFS) to protect sea turtles and Smalltooth Sawfish during nearshore construction activities." The reference is a December 19, 2006 letter from Shelley Norton (NMFS) to Harriet Nash (NRC). The "Reasonable and Prudent Measures" outlined by NMFS represent a significant commitment for FPL. Among the documents reviewed (ER, SCA, RAIs), there is no record that FPL has committed to these actions. In-water work is limited to 0.1 acres of dredging within the existing turning basin; this area will be isolated from adjacent waters and manatee observers will be utilized in accordance with the FWC Standard Manatee Conditions for In-Water Work. These protective measures would also minimize the potential for impact to smalltooth sawfish or sea turtles if they were to occur within the project area. (**0619-4-16** [Maher, William])

Response: *The commenter is correct. Text in Table 4-17 was revised to reflect this comment.*

Comment: There are instances in DEIS Appendix F-2 that describe potential impacts to the American crocodile due to the location of the spoils piles. For example, the USFWS BA (Subsection 3.1.1) states: "Potential impacts on American crocodile include the permanent loss of approximately 270 ac of designated critical habitat to accommodate proposed Units 6 and 7 and the associated infrastructure, and **adverse effects to approximately 211 ac of habitat related to the relocation of material not suitable for reuse**..." Whereas, DEIS reference, (FPL2012-TN1618), Section 5.1, page 5-2 states: "Areas designated for placement of spoil materials excavated from the Units 6 & 7 Site were specifically selected due to their lack of suitable nesting substrate for the American crocodile and lack of recorded crocodile nesting in these areas." Also, DEIS reference (FPL2011-TN1283), Section 7.2.1 "American Crocodile", page 59 states: "These spoils areas do not contain suitable nesting habitat, nor do they contain any freshwater refugia for juvenile crocodiles; therefore, **no adverse impacts to the breeding population are anticipated**." (emphasis added) Instances in the DEIS Appendix F-2 include: a. DEIS Appendix F-2, Subsection 3.1.1, Page 3-4, Lines 1-6. b. DEIS Appendix F-2, Section 5.10, Page 5-6, Lines 29-32. c. DEIS Appendix F-2, Subsection 5.10.2, Page 5-7, Lines 42-43. d. DEIS Appendix F-2, Section 6.6, Page 6-7, Lines 20-23. e. DEIS Appendix F-2, Section 7.0, Page 7-1 Lines 15-17. (**0619-6-8** [Maher, William])

Response: *The NRC Staff acknowledges the analysis prepared by FPL for habitat effects for the protected American crocodile. The NRC Staff did an independent analysis of the FPL references, other scientific literature, and discussions with crocodile researchers and prepared a BA as part of ESA Section 7 consultation with the FWS. The effect of spoils pile placement did not only consider direct effects associated with reproduction, but indirect effects on crocodile habitats and individuals, such as changes in water quality and restriction of migration across the IWF. Updated information about the result of consultation is presented in Sections 4.3.2, 5.3.2, and 7.3.2 of the EIS.*

Comment: The NMFS believes applying the results of the modelling conducted by FPL to predict impacts to seagrass and federally managed species is problematic because it focuses on mean conditions as opposed to ecologically relevant conditions. In addition, the modelling performed was based on an inaccurate assumption that the cooling canals are a closed system (i.e., no exchange between the canals and Biscayne Bay). A more reliable way to analyze the impacts would be to examine ecologically relevant scenarios, such as the frequency, duration, and intensity of the salinity and temperature disturbance (i.e., extreme) events. In addition, the impact analysis should be updated to characterize and quantify the level of exchange between the cooling canals and Biscayne Bay and then incorporate that working understanding of the level of exchange into the analysis of impacts and the development of monitoring to verify those impacts. (**0724-10** [Fay, Virginia M.])

Response: *The review team performed additional groundwater modeling of the interaction between the planned RCWs, the existing hypersaline plume, and the cooling canals using a two-dimensional cross-section model and a limited-extent three-dimensional model. These simulations were performed to better understand the effects of RCW pumping on salinity in the aquifer beneath the bay combined with the existing hypersaline plume from the Units 3 and 4 cooling canals and planned remediation actions, and the analysis has been added to Appendix G. This model was useful in showing salinity changes that occur in the aquifer near the RCWs when the wells are operated. The results showed that when the wells are not operating hypersaline water from the cooling canals is present in the high permeability zone where the well laterals are installed. This saline water is drawn into the wells during the first few days of RCW pumping, resulting in increasing, then decreasing, salinity at the well. The salinity of the water produced by the operating RCW eventually dropped to about the concentration of the bay water. Water flowing down through the bed of the bay and into the RCWs is therefore expected to have about the same salinity as bay water. When RCW pumping ceases, water in the high permeability zone again increases in salinity because of the migration of water from the hypersaline plume. This migration of hypersaline water into the high permeability zone would occur regardless of the presence of the RCWs. Predicted future change in sea level and its effect on interactions between the RCWs and the hypersaline plume were also simulated. The additional modeling confirmed that pumping of the RCWs would move hypersaline water toward the RCWs and would remove some groundwater captured by the RCWs from the hypersaline plume region of the Biscayne aquifer. The model also indicated that RCWs operation is not likely to reduce the effectiveness of hypersaline plume remediation actions specified in the consent order between FPL and Miami Dade County. Reclaimed wastewater would be the primary source of cooling water for the proposed reactors. Saline water from the RCWs beneath Biscayne Bay would only be used when reclaimed treated wastewater is not available in sufficient quantity or quality, and for a maximum of 60 days per year that is permitted under the Florida State COCs. The review team determined that the primary reclaimed water source is reliable because of the need for Miami-Dade County to dispose of large volumes of treated wastewater that now go to the ocean. Therefore, it is likely that the RCWs would be used less than the 60 days per year permitted under the COCs. Sections 5.2.1 and 5.3.2 were revised to*

include the results of the additional modeling and effects to aquatic resources in Biscayne Bay such as seagrass and aquatic species, however the new information did not change the SMALL effect characterization on aquatic resources for operation of Units 6 and 7.

Comment: *Operation of RCWs*: The primary source of cooling water for the proposed Turkey Point Units 6 and 7 would be reclaimed wastewater from the Miami-Dade Wastewater and Sewer Department. Because the availability of the reclaimed wastewater supply will vary, FPL plans to install four RCWs on the Turkey Point peninsula to provide a secondary source of cooling water. Each RCW would consist of a central reinforced concrete caisson with 8 to 12 lateral pipelines (horizontal collector lines) extending out from the caisson. The horizontal extent of the RCW lateral pipelines would be up to 900 feet beneath Biscayne Bay and would be approximately 25 to 40 feet below the bay bottom. In order to maintain the RCW system, the RCWs would be used up to 60 days per year with a maximum saltwater makeup-water rate under normal operating conditions being 43,200 gpm. The EFH assessment does not address use of the RCW system outside this maintenance; i.e., when it becomes the main water supply when the primary supply is inadequate. The NMFS recommends the final EIS and EFH assessment analyze the effects of operating the RCW as the main water supply when the reclaimed wastewater becomes unavailable for longer periods than expected. Alternatively, the NRC or the USACE may need to reinitiate EFH consultation prior use of RCWs for time periods exceeding those evaluated in the draft EIS and EFH assessment. (**0724-8** [Fay, Virginia M.])

Response: *Reclaimed wastewater would be the primary source of cooling water for the proposed reactors. Saline water from the RCWs beneath Biscayne Bay would only be used when reclaimed treated wastewater is not available in sufficient quantity or quality, and for a maximum of 60 days per year that is permitted under the Florida State COCs. The review team determined that there is a very large volume of treated municipal wastewater that can be used for cooling the proposed plants without impacting other demands for fresh water. MDWASD staff have stated that they must find ways to dispose of large volumes of treated wastewater that currently go into the ocean. Therefore, the review team concluded that the reclaimed water supply is reliable. Therefore, it is likely that the RCWs would be used less than the 60 days per year permitted under the COCs. The commenter is incorrect that the 60 day RCW annual maximum operation is required for maintenance.*

E.2.11 Comments Concerning Socioeconomics

Comment: I am strongly in favor of the addition of 2 more nuclear reactors to the current Turkey Point facility for the following reasons:...I see the potential of economies of scale boosting FLP's ability to provide safety and efficiency over what it is today. (**0015-4** [Goldmeier, Barry])

Response: *The NRC acknowledges the commenter's support for new nuclear power. Economies of scale to the applicant are not part of the scope of the socioeconomics analysis. No change was made to the EIS as a result of this comment.*

Comment: Plus putting such large ugly power poles along a roadway which goes thru many residential and low rise commercial establishments and neighborhoods of high end homes are unacceptable choices. Just because you can build it does not mean it should be built. The human needs and emotional needs are great in this area, and we should all be very cautious when locating such extreme projects in this Miami area. (**0050-2** [Simon, Gary P.])

Comment: Tourists and residents do not come to National Parks to see huge power lines. (**0159-5** [Bazzone, Barbara])

Comment: Electricity produced by the proposed Units 6 and 7 will be distributed to the existing power grid through two new transmission line corridors: the east corridor and the west corridor. The northern segment of west corridor will be located either in the Preferred Corridor or the Consensus Corridor. The Department notes that the Preferred Corridor will be located immediately adjacent to the (ENP). As such the installation of this new transmission line will adversely affect the aesthetic experience of visitors to the ENP. (**0227-15** [Stanley, Joyce])

Response: *The comments express opposition to the visual impact of the transmission lines to serve FPL's proposed Turkey Point Units 6 and 7. Although electrical transmission is outside the regulatory authority of the NRC, the review team considered the visual impacts of transmission lines in Sections 4.4.1.6 and 5.4.1.6 (aesthetics) and the cumulative impacts of transmission lines with past, present, and foreseeable future actions in Chapter 7, Cumulative Impacts. No new information was provided by these comments that was not already considered in the analysis. No changes were made to the EIS as a result of these comments.*

Comment: I encourage you all to rethink this "let's make quick money and let the next generation deal" mentality and discontinue support for this dangerous and frankly lazy attempt on FP&L's part to keep up with the market or grow their business a par 15% per annum or whatever is motivating this plan to expand the Turkey Point facility rather than pursue what they already have in the can, ready to go, the motivation is obviously not hospitable or even aware that there is a population south of spaghetti junction as long as they keep paying the bills. (**0056-3** [McCall, Eric])

Comment: Investing in dirty, dangerous nuclear plants that may never even be built is very profitable for FPL and its shareholders. That's why they want to do it. But it' a financial and environmental disaster for our local area, our state and all who live here. (**0078-12** [Wilansky, Laura Sue])

Comment: Investing in dirty, dangerous nuclear plants that many never even be built, is very profitable for FPL and its shareholders. That's why they want to do it. But it's a financial and environmental disaster for our local area, our State, and all who live here. (**0721-28-13** [Wilansky, Laura Sue])

Response: *Environmental and socioeconomic impacts from construction and operation of the proposed nuclear reactors are analyzed in Chapters 4 and 5 of the EIS. Financial considerations are outside the scope of the EIS. The comment did not provide new information relevant to this EIS and will not be evaluated further. No change was made to the EIS as a result of this comment.*

Comment: The State should be for people and wildlife. Tourism is a very sustainable industry but will fall by the wayside if our environment is wantonly destroyed. (**0060-5** [Beckman, Yvonne and Douglas])

Comment: I am told that expansion of the power plant will result in 800 new jobs. Any destruction to Biscayne National Park, will negatively impact the hundred of thousands visitors that we have annually to our area and the businesses that rely on them. I am also greatly concerned that any environmental change could potentially effect the only living coral reef we have in United States waters, The John Pennekamp National Coral Preserve. These resources

are far to unique, valuable and delicate to jeopardize. Undoubtedly, the negative economic impact of lost eco visitors will far out weigh the positive economics of the Turkey Point project for south Florida. (**0081-4** [Benson, Mary] [Skove, Ellen H.] [Tompkins, Constance])

Comment: Turkey Point is located within six miles of two biologically rich natural parks, a state aquatic preserve, a national wildlife refuge, and a wetland habitat preserve. Everglades National Park is recognized as an endangered UNESCO World Heritage Site, an International Biosphere Reserve and supports a unique array of ecosystems and wildlife. Biscayne National Park, located directly adjacent to Turkey Point, is one of our largest marine national parks, and home to incredible biodiversity and important marine and wetland habitat that has now enacted no-take zones to save its dwindling fish stocks. Expansion of these reactors will adversely impact these national treasures and severely curtail the public's use and enjoyment of them. (**0288-11** [Cleland, Noel] [Jackalone, Frank] [Mahoney, Stephen] [Matthews, Debbie] [Roff, Rhonda] [Scott, John] [Teas, Jim] [Ullman, Jonathan])

Comment: We also feel that Miami's economy relies heavily on its tourism industry and it's in the best interest of the tourism economy to keep Biscayne National Park pristine, safe and clean for the people who come here to see its beauty every year. (**0722-14-5** [Kaul, Devika])

Comment: Because you guys, you own those national parks, people come here from all over the world to see them. It's a huge part of our economy. Everybody wants to see Everglades National Park and thousands and hundreds of thousands want to see Biscayne National Park. (**0723-9-7** [Schwartz, Matthew])

Response: *These comments express concern about impacts on tourism through impacts on the environment. The review team analyzed environmental impacts from construction and preconstruction (Chapter 4) and from operations (Chapter 5) of the proposed nuclear reactors. Summaries of these impacts can be found in Section 4.12 (Summary of Construction and Preconstruction Impacts) and Section 5.12 (Summary of Operational Impacts). Because the site is already heavily industrialized and there is no indication industrialization has significantly affected current tourism the review team determined an incremental addition to the site should not have a noticeable effect. Impacts on recreational infrastructure are discussed in Sections 4.4.4.2 and 5.4.4.2 (recreation). No changes were made to the EIS in response to these comments.*

Comment: As a South Florida resident I am deeply concerned about the potential environmental impacts of the proposed Turkey Point expansion (reactor units 6&7). But as the founder of the future Underline, it will be tragic to erect massive powerlines along a park and trail that is will bring so much good and much-needed alternative transportation infrastructure to our community. (**0076-2** [Daly, Meg])

Response: *The commenter expresses opposition to the transmission lines to serve FPL's proposed Turkey Point Units 6 and 7, because of their location along a proposed park and trail. Although electrical transmission is outside the regulatory authority of the NRC, the review team considered the visual impacts of transmission lines in Sections 4.4.1.6 and 5.4.1.6 (aesthetics) and the cumulative impacts of transmission lines with past, present, and foreseeable future actions in Chapter 7, Cumulative Impacts. The potential for adverse cumulative impacts along the proposed transmission line routes with proposed land uses is discussed in Section 7.1 (Land-Use Impacts), which recognizes potential moderate and adverse impacts. No changes were made to the EIS as a result of this comment.*

Comment: The Biscayne National Park has been trying for years to put new management regulations into place that will hopefully give what little marine life we have left a chance to regenerate. I am shocked that they are not pursuing every legal avenue available to prevent the FPL expansion from occurring. Over the next decade, millions of people will visit this area. That is unless, god forbid, an accident happens. Then, the resource could be lost forever and the visitors simply won't come. (**0081-5** [Benson, Mary] [Skove, Ellen H.] [Tompkins, Constance])

Comment: I am a Florida native; growing up in Miami, I have seen the unfortunate change to this unique subtropical environment as it is. This proposal subjects our delicate environs to the horrable and - INEVITABLE - hurricane impact that would be devastating on many levels; not the least of which is to Floridas' survival as a tourist destination. Our beautiful beaches are an intricate part of our survival as a state. This will devistate our fishing,our swimming, our Everglades, the intrinsic beauty, life style and safety of our unique and beloved state. (**0580-2** [Lawrence, Theresa])

Response: *The comments express concern about impacts on tourism if the environment is destroyed due to a natural disaster. The review team assessed the potential for environmental impacts from postulated accidents (design basis accidents and severe accidents) in Section 5.11 (Environmental Impacts of Postulated Accidents). The review team found the potential environmental impacts (risks) to be small. No changes were made to the EIS as a result of these comments.*

Comment: The proposed expansion of Turkey Point could also have significant impacts on the diverse ecosystems and valuable recreational experiences protected by our national parks. Biscayne National Park is particularly vulnerable to the impacts of the proposed project due to its location directly adjacent to Turkey Point. The park visitor center and entrance are located only two miles north of the site proposed for Units 6 & 7 and water areas of the park are just 2000 feet east of the proposed new units. Viewsheds from the waters of Biscayne will be significantly impacted above current levels due to the construction and presence of the new units and ancillary facilities, impacting visitor use and experience. (**0113-1-12** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: This infrastructure will also mar the view for visitors who come from all over the world to this UNESCO World Heritage site. (**0246-6** [Shlackman, Mara])

Comment: It's going to create an industrial landscape for the hundreds of thousands of people who go visiting that area on airboats, on canoes and kayaks, people who paddle to Shark River Slough. And you know that observation tower up there when you get up to the top of it; you're going to see power lines. That's a human impact. (**0721-22-6** [Schwartz, Matthew])

Response: *These comments express concern about impacts on recreational experiences or tourism via visual impacts in the vicinity of the proposed nuclear reactors. The review team considered the visual impacts of construction and operation of the proposed nuclear reactors in Sections 4.4.1.6 and 5.4.1.6 (aesthetics). The analysis conducted in those sections concludes that there would be minor or temporary aesthetic impacts from building and operating the proposed new units. The comment does not introduce any new information not already considered in the analysis. No changes were made to the EIS as a result of these comments.*

Comment: People come from all corners of the world to visit South Florida. They don't come to visit FPL or nuclear power plants. They come to swim in the ocean, enjoy the clean air, soak up

some sunshine, visit the Everglades, and a host of other activities that give them reasons to come back. I invite you to come and enjoy our beautiful peninsula. (**0207-6** [Cleland, Noel])

Comment: People come from all corners of the world to visit South Florida. They don't come to visit FPL or nuclear power plants. They come to swim in the ocean, enjoy the clean air, soak up some sunshine, visit the Everglades, the Keys, Biscayne National Park, and a host of other activities that give them reasons to come back. (**0677-6** [Chiszar, Benjamin J.] [Jacobs, Lee] [Klopfer, Carol])

Response: *These comments express general opposition to new power plants and appreciation for environment-based tourism. No new information was provided regarding the environmental or socioeconomic impacts of the proposed plants. Therefore, no changes were made to the EIS as a result of these comments.*

Comment: Also, removing the negative externalities of pollution will free up investment. Businesses will invest more when the oft-hidden costs of pollution are removed. More investment means more jobs. Lastly, new ventures and industries that are too energy-intensive under our nuclear-deficient energy system--venture like indoor vertical farming--will be possible with increased nuclear energy generation. (**0378-4** [Macher, Nathan])

Response: *The NRC acknowledges the commenter's support for new nuclear power. The impacts of the proposed nuclear reactors relative to alternative energy sources is discussed in Section 9.2 (Energy Alternatives). No change was made to the EIS as a result of this comment.*

Comment: Socioeconomics. We note the distinction in the DEIS between temporary construction impacts and longer-term operation impacts. However, since the facility's construction is likely to be underway for seven years, these impacts may be considered significant for the local communities. Issues regarding traffic congestion, socioeconomic impacts, Environmental Justice, and other issues that directly concern the local communities, as well as operational impacts related to these matters, should be fully clarified in the FEIS, pursuant to our comments. We understand that the NRC cannot include mitigation measures in the licenses that do not pertain to safety and security. However, the EPA encourages the project team and the applicant to continue coordinating with the communities that will be impacted by the proposed project, and to continue a comprehensive public outreach strategy to inform residents of the risks and impacts as a result of the proposed project. In particular, potential traffic impacts and emergency preparedness measures should be coordinated with local communities. ***Recommendations:*** The EPA encourages a comprehensive public outreach strategy. This should include, but is not limited to, targeted outreach campaigns to neighbors, informational literature, and updated websites. Traffic impacts and emergency preparedness measures are particular topics that should be addressed and coordinated with local communities. (**0617-3-1** [Mueller, Heinz J.])

Response: *This comment recommends a comprehensive public outreach strategy to address traffic impacts, emergency preparedness measures, and other impacts in coordination with local communities. These actions are outside the scope of NRC's NEPA requirements and outside the scope of NRC's Atomic Energy Act mission. No change was made to the EIS as a result of this comment.*

Comment: Having said that, Cyndee, please relax. "Gigantic 26 foot high cooling towers" are not going to drive tourists away from Florida. As a matter of fact, nothing they are going to do at

Turkey Point is going to drive anybody away from Florida. No, we have no problem looking at the Turkey Point Plant. (**0680-3** [Hubbard, Stanley S.])

Response: *The NRC acknowledges the commenter's view that the proposed nuclear reactors would have no impact on tourism. The comment does not raise any new information not already considered in the analysis. No changes were made to the EIS as a result of this comment.*

Comment: And that is the breeding ground for the entire Florida Keys, so salinity there threatens the $7.6 billion fishing and tourist industries. (**0721-12-5** [White, Barry J.])

Comment: [past and current Boulder Zone discharges to the Atlantic] It's destroying our fishing. Everybody who fishes in Biscayne Bay knows what happened to the fishing. It's not even worth doing it anymore for most people. (**0723-9-19** [Schwartz, Matthew])

Response: *Impacts on aquatic resources from operations are assessed in Section 5.3.2 (Aquatic Impacts Related to Operation). The review team concluded that impacts would be small. No changes were made to the EIS as a result of these comments.*

Comment: I am strongly in favor of the addition of 2 more nuclear reactors to the current Turkey Point facility for the following reasons:...[w]hy sould Miami-Dade residents pay of power generated as far away as Canada when we can be employing local people to whom our payments go who in turn support the economy. (**0015-11** [Goldmeier, Barry])

Comment: I am strongly in favor of the addition of 2 more nuclear reactors to the current Turkey Point facility for the following reasons:...[t]he relatively high paid construction and ongoing jobs in operation will serve as an economic boost for Homestead...FPL has been collecting the funds for this expansion for years. from Miami-Dade County. It should be reinvested here. (**0015-7** [Goldmeier, Barry])

Comment: This construction is going to generate 800 permanent jobs, highly technical permanent jobs, and an additional 3,500 job just for the construction, not to mention the added benefits that the local economy is going to see just from the large influx of money. (**0721-15-9** [Kuraza, Devon])

Comment: Reports indicate that Turkey Point Units 6 and 7 will create 3,500 jobs over a multitude of year's construction period, and 800 good paying --good paying, jobs once the facility is completed and becomes operational. The construction of these units will represent one of the largest projects in this State's history, and the jobs it creates will benefit thousands, thousands of South Florida families while protecting all environmental issues. In addition to the construction of the project these units will need to be maintained and refueled on a reoccurring basis, just like the current units require. These periods are also known as outages, resulting in hundreds of temporary jobs for area workers, which help local businesses keep the customers that they already have and generate a large ripple effect throughout the economy. (**0721-19-3** [Riley, Bill])

Comment: The south Florida community has benefited immensely from the FPL's investments for the last 40 years. The Turkey Point Plant, not only has generated clean energy, but also has helped our local economy. The reports indicate that Turkey Point Units 6&7 will generate 3,500 jobs that will last for many years, in addition to more than 800 maintenance jobs once the plant starts functioning. The construction of these units will be one of the largest projects in the history of the state of Florida, and will generate jobs that will benefit thousands of families in south

Florida. Furthermore, the new units will require maintenance work. The maintenance work known as "Outages" will result in the creation of hundreds of additional jobs in the area, which in turn will benefit local business. We are convinced that this important project will be positive and beneficial for the entire state. (**0721-20-2** [Garcia, Javier])

Comment: Additionally, the nuclear energy facilities in Florida are heavyweights when it comes to economic growth in the State, as you've heard from several others here today. These facilities employ more than 2,270 highly skilled workers with an annual payroll of $191 million. They also pay more than $32 million in State and local taxes. This support of local communities through jobs and tax revenue is tangible and would be sorely missed if a plant were to be taken offline. (**0721-21-2** [Martin, Patrick])

Comment: The Hurricane Andrew wiped out Homestead, pretty much all the businesses dropped, our population dropped dramatically and we're rebuilding now but we're not there yet. Unlike other cities north of us who have rebounded economically, Homestead is still struggling.

We are coming around the corner, we're making some major progress but we definitely need more jobs and we're looking at a potential of greater jobs and higher paying jobs with this expansion. So we really --I can't speak to the science, I'm not a scientist, there's much smarter people in this room than I. But I do know that the impact of our downtown and the partnerships we've had over the last few years with FPL has greatly helped us[.] (**0722-11-1** [Knowles, Yvonne])

Comment: We [Redland Market Village] are in full support of this application and the reason that we have, the main reason is that we are part of a very low-income persons that are part of our business. And every penny counts. (**0722-12-1** [Infante, Jose Renee])

Comment: There will be a huge -- as many other people have mentioned earlier -- huge economic, continued economic impact to deep South Dade and not only deep South Dade but the communities going up the north and south U.S. 1 corridor as well. (**0722-13-3** [Duquette, Bill])

Comment: [T]here's 700 employees at Turkey Point with an additional industry of indirect jobs related to that which brings in, it nets us $500 million annually toward local economies. So for every dollar spent at Turkey Point the local economies produce about 43 which is a huge impact.

And as Yvonne did mention, post Hurricane Andrew, we're finally getting back to the previous level we were so this would be a huge boom to our local community.

The additional units will, of course, provide additional -- a number of additional jobs. After all is said and done comparatively, plus construction of about ten years, that will be an additional 800 full-time higher paying jobs not only again in deep South Dade, Homestead and Florida City and up the road. (**0722-13-4** [Duquette, Bill])

Comment: We have to be realistic. I say with the impact of jobs, of good growth community, I think we need the reactors. (**0722-19-2** [Hudak, Jill])

Comment: [T]he building of these Units 6 and 7 presents us with employment opportunity. And to be more specific on that, it's going to produce about 3,500 jobs during construction and 800 stable jobs upon completion. And these are jobs that I can take as well as many other students, many of my other colleagues.

It's important to note that these jobs will be available not just to myself but generations to come due to the longevity and reliability that comes from running nuclear reactors. (**0722-5-1** [Silva, Nicolas])

Comment: Reports indicate that Turkey Point Units 6 and 7 will create 3,500 jobs during the course of construction and 800 permanent, good-quality paying jobs for our local residents once the plant has become operational. The construction of these units will represent one of the largest projects in the State's history and the jobs it creates will benefit thousands of South Florida families while protecting the environmental issues. (**0722-9-3** [Riley, Bill])

Comment: In addition to the construction projects these units will need maintenance and refueling on a regular basis just like the existing nuclear units. These periods are known as outages resulting in hundreds of additional temporary jobs for area workers which helps local businesses keep their customers that they already have and generate a large ripple effect through the economy. (**0722-9-4** [Riley, Bill])

Comment: a supporter of the environment. I want my kids to have fresh air, clean water, abundant wildlife, flora and fauna. But you know, as we are the city, there's another element to our environment that sometimes gets overlooked. It's the working men and women of our community. They're part of the environment, too. A project like this, the building construction stage will generate 3,500 construction jobs followed by approximately 800 permanent jobs. These are not retail jobs, these are real, real important substantial salaries that people will make and then reuse in the community. So when you talk about the environment, never forget people, that they're part of it, too. And I've seen that happen too many times in presentations where that element of need is often left out. (**0723-1-5** [Wallace, Otis])

Comment: As a mayor, got to talk taxes as a reality. This project will generate $100 million in taxes for our community. Rich folks don't care about stuff like that, or they whine about paying taxes. They do whine more than anybody else. But when it comes to making money, I think it's important that people be allowed living wages to make money, but the 100 million in taxes generated would be significant running our community, a community within Dade County. (**0723-1-7** [Wallace, Otis])

Comment: ...we do see that study shows benefits on day-to-day operations when we see the huge economic impact in our community. (**0723-10-1** [Brito, Rosa])

Comment: We see Turkey Point supports over $540 million of annual economic activity locally which is really important for small businesses in our area which are dependent on plant business and employees spending to stay afloat. For every dollar FPL's Turkey Point plant spends locally the economy produces $1.43. When you do the math, this is a huge amount of money for a small town of 60,000 citizens. (**0723-10-4** [Brito, Rosa])

Comment: We also heard some folks talk about the actual monitoring of the project after it's built and some of the experience that goes in, and the knowledge that goes into doing that. But also in the construction of this we have skilled trades people that are going to be working on these projects. It's going to develop just good jobs. Not just jobs but good jobs, good paying jobs for professional people. (**0723-13-2** [Simpson, Chris])

Comment: But just to move along here real quick, reports indicate that Turkey Point Units 6 and 7 would create 3,500 jobs, as you've heard tonight, over a multitude of years of construction period, and 800 good, qualified paying jobs for multiple local residents once the plant has

become operational. The construction of these units will represent one of the largest projects in the State of Florida's history and the jobs it creates will benefit thousands of South Florida families while protecting environmental issues. In addition to the construction projects, these units will need maintenance and refueling on a recurring basis just like the existing nuclear unit are now at Turkey Point. These periodic shut-downs are known as outages, the results of hundreds, hundreds of additional temporary jobs for area workers, area workers in Homestead, Miami, Broward, Conyer County, Naples, wherever. There are hundreds of jobs on each one of these shutdowns. It keeps the customers they have and businesses active and also generates a large ripple effect throughout the economy when they shut down. People, local people and a lot of other people participate in those activities. (**0723-14-4** [Riley, Bill])

Comment: And whereas the project, during its construction and completion will bring economic stimulus via jobs both during construction and permanent as well as high technology employment to Miami Dade County. (**0723-2-7** [Trowbridge, Mark])

Comment: I do consider the fact that this proposed plants, the two separate sites, 6 and 7 will bring to -- in jobs... (**0723-8-2** [McDuffie, Stephen])

Response: *These comments express support for the proposed nuclear reactors due to their impacts on the economy and specific aspects of it such as jobs, earning, output, and fiscal impacts but do not introduce any new information to inform the assessment of impacts. The NRC acknowledges these comments. Impacts on employment, earnings and fiscal revenues are assessed in Sections 4.4.3 and 5.4.3 (Economic Impacts on the Community). No changes were made to the EIS as a result of these comments.*

Comment: And then the last thing I would mention too, is, that I just want to speak directly to my Union brothers and sisters here in the audience, the ones who are working for FPL. I understand that you all -- that this is your livelihood, and I know what it's like. Believe me. I know what it's like to be in a situation where I have to advocate on behalf of my employer. But I would mention, too, that before I taught here at FIU, before I was a member of the United Faculty of Florida, I was a member of the United Auto Workers, and I was a very proud Union member, except for the point where my Union, I thought, sold us all out by going before Congress and advocating against the CAFÉ standards, the minimum standards for fuel efficiency on automobiles. They went to Washington arguing the same thing that the automakers were arguing, was that the CAFÉ standards were going to cost jobs. They said it was an economic argument, much like the one that you guys are making now. And I can you tell you, they were wrong. It didn't keep American -- it didn't keep auto working jobs here in America. It did nothing to help the Union, and the Union suffered. We all suffered. Don't let FPL, which is beholding not to you, but to its shareholders, try to make an artificial argument between economic growth in your jobs versus, I don't know what the other alternative is, that we all live in darkness. It's a false choice. (**0721-16-5** [Rifkind, David])

Comment: Now, I want everybody in this room to understand, there will be jobs. There will be a future, there will be power. (**0721-30-11** [Ullman, John])

Response: *These comments express opposition to the proposed nuclear reactors suggesting that claims of forgone jobs under the No Action Alternative are overstated. Impacts on employment, earnings and fiscal revenues are assessed in Sections 4.4.3 and 5.4.3 (Economic Impacts on the Community). These comments do not provide new information to inform the assessment of impacts. No changes were made to the EIS as a result of these comments.*

Comment: I am a realtor and I strongly believe that all the property value in Miami is at extreme risk with turkey point. (**0055-10** [Roedel, Kitty])

Comment: More nuclear electric generating plants would not only be a danger, but will also severely impact billions of dollars in value of the business, homes, and infrastructure of Miami-Dade county and beyond. (**0091-3** [Boyce, Sheila])

Comment: And 6 and 7 would cost every FPL homeowner about $5,200 or 2 percent of the value of their own home. (**0721-12-11** [White, Barry J.])

Response: *These comments suggest that construction of the proposed nuclear reactors would have a negative effect on property values. In response to these comments, the review team assessed the current literature on the effects of nuclear reactors on property values. The review team concluded that the current literature is inconclusive and that any potential adverse or beneficial impacts would be expected to be small. Section 4.4.4.3 (Housing) was edited to include this review.*

Comment: Comment 10. The DEIS is incomplete in that its analysis of alternate sites did not consider the economic impacts of transmission infrastructure necessitated by a new nuclear plant and it did not consider the disparate economic impact of that infrastructure on a county with a disproportionately minority and low income population - Miami-Dade County has a predominantly minority population and a higher number of people living in poverty (25.6%) than the statewide average (20.8%) (U.S. Census & American Community Survey). Economic effects of the entire TPN 6&7 project include not just the plant itself, but also the attendant infrastructure, including new transmission lines. All components that can affect the County's tax base must be taken into economic consideration within the DEIS because they will affect the ability of the County to provide needed services countywide. The DEIS does consider the economic benefits to the County during construction, but not the countywide costs caused by infrastructure necessitated by the plant. Most of the economic benefits reported in the DEIS will accrue only during construction, but the economic costs will be permanent and recurring. Economic analysis by Dr. Richard Weisskoff, Chairman of the Economics Dept. at the University of Miami (2011) has projected that the transmission line infrastructure will cost the county's tax base by $35 million annually (adjusted for change in real estate values since the study was done in 2010). FPL's analysis shows approximately 6500 temporary jobs will be added countywide during construction. However, Dr. Weisskoff's analysis, not mentioned in the DEIS, shows that 4000-8000 permanent jobs will be lost by routing supporting infrastructure (transmission lines) through areas of high economic activity. It should be noted that FPL engaged the property appraiser from Leon County, Florida to critique Dr. Weisskoff's analysis. That individual concluded that Dr. Weisskoff's valuation data were erroneous, however it appears the property appraiser did not understand that the Miami-Dade County Property Appraiser's valuation listings treat condominiums differently than other property types, combining values of land and structure in a single column of numbers rather than breaking them out separately. Thus the valuation discrepancy reported by the Leon County property appraiser appears to stem from his own misunderstanding of local property appraiser listings and not from any error in Dr. Weisskoff's data collection or analysis. ***The final EIS must evaluate disparate countywide impacts of site selection and attendant infrastructure on minorities and low-income residents of Miami-Dade County.*** (**0106-13** [Stoddard, Philip K.])

Comment: In addition we find likely adverse consequences for the Miami-Dade County economy as a whole that are overlooked in the DEIS. (**0106-3** [Stoddard, Philip K.])

Comment: The lines traverse well-populated areas with unsightly towers, impacting property values. (**0117-3** [Robertson, Alyce])

Comment: We will lose property value due to these poles and we are in the prime real-estate area in South Florida. (**0149-9** [Nelson, Joyce E.])

Comment: As for the residents on both sides of US Hwy 1: Coral Gables, Cutler Bay, Florida City, Homestead, Miami, Palmetto Bay, Pinecrest, Princeton and un-incorporated Miami Dade property values will see an immediate, tangible drop upon completion of FPL's would-be power line. A rudimentary economic-impact study will bear out this fact. This, in turn, will lower tax revenues for all municipalities and taxing units; further impoverishing the public sector so private interests may benefit. (**0408-7** [Sifko, Basilio])

Comment: And also, another thing also is that, you know, what someone else mentioned earlier about the lady from Roads saying, oh, it's going to reduce the property values to the Roads neighborhood. And, yeah, that's true. I mean, who wants to live next to those ugly power lines that nobody wants. (**0721-31-9** [Almirola, Alejandro])

Response: *These comments refer to potential adverse effects on property values of the construction of transmission lines associated with the proposed project. The review team assessed the current literature on the effects of nuclear reactors and transmission lines on property values and concluded that the current literature is inconclusive and that any potential adverse or beneficial impacts would be expected to be small. Section 4.4.4.3 (Housing) was edited to include this review.*

Comment: Overall, the expansion of Turkey Point will end up costing our communities jobs and our taxpayers, money. Despite the addition of temporary jobs during construction, research from the University of Miami indicates that more jobs will be lost due to the routing of transmission lines through areas of high economic activity. Furthermore, Florida Power & Light customers have been footing the bill for the expansion up front, regardless of whether the new reactors are ever built. The expansion of Turkey Point does not make economic sense for the people of South Florida. (**0254-6** [Dudley, Dwight] [Lerner, Cindy] [Regalado, Tomas] [Stoddard, Philip K.])

Response: *This comment expresses opposition to the proposed nuclear reactors because of potential adverse effects on local economies, as well as the cost to electricity consumers. The economic impacts of construction and operations of the proposed project are discussed sections 4.4.3 and 5.4.3, respectively. Changes in the cost of electricity are outside the scope of the NRC's authority and were not addressed in the EIS.*

Comment: [The Turkey Point Nuclear Plant Units 6 & 7 application should be viewed in context of a region facing the enormous water quality and land use related challenges imposed by climate change.] Therefore, the final Environmental Impact Statement ought to consider not only the direct impact of this project to a region currently under threat, but also how the project's operations will constrain investments made to manage future challenges and correct a history of destabilizing influences. In sum, the region is confronted with a deteriorating baseline and will need to adapt. (**0456-2** [Miami, City])

Response: *Section 2.3 (Water) describes the current water use in the affected area. Appendix I of the EIS documents the review team's consideration of the potential changes in impacts that may occur as a result of the changes to the environment resulting from global climate change,*

including sea-level rise. The changes that were considered include potential changes in temperature, rainfall, and the occurrence of severe weather events. The effects of sea-level rise were also considered. No changes were made to the EIS in response to this comment.

Comment: In early 2015, FPL announced the change of the commercial operation dates (CODs) for Units 6 & 7 from 2022 and 2023 to 2027 and 2028, respectively. A new and significant information review was conducted by FPL where it was concluded that there would not be an impact to any significance level or conclusion drawn in the ER with respect to the change in CODs. There are instances in the DEIS, however, where references to CODs differ from the newly announced CODs. Instances in the DEIS include: a. DEIS Subsection 4.4.3.1, Page 4-107, Lines 2-5: In DEIS Subsection 4.4.3.1, the commercial operations dates are mentioned in relation to economic analysis: "The impacts of building the proposed units on the local and regional economy ...For this analysis, FPL assumed site preparation activities would begin in 2016 and commercial operation dates would be 2025 for Unit 6 and 2026 for Unit 7." b. DEIS Subsection 5.4.2, Page 5-66, Line 22: In DEIS Subsection 5.4.2, the commercial operations dates are mentioned in relation to demographic analysis: "For analytical purposes, Unit 6 is scheduled to start operation by 2025 and Unit 7 by 2026." (**0619-1-6** [Maher, William])

Response: *The NRC includes clarification in Sections 4.4 and 5.4 regarding FPLs modification of the expected commercial operation dates.*

Comment: DEIS Subsection 9.3.6.2, Page 9-247, Lines 12-19: The DEIS states, "The **impacts of traffic** at the Martin site are MODERATE to LARGE (depending on the timing of other projects in the area), while the impacts at the Turkey Point site are MODERATE **because of visual impacts along the eastern corridor**, while the impacts at the Martin site are SMALL **because the new transmission lines** are expected to follow the path of existing lines. Finally, impacts on **cultural and historic resources** at the Turkey Point site are MODERATE because of **visual impacts along the eastern corridor**, while the impacts at the Martin site are SMALL **because the new transmission lines** are expected to follow the path of existing lines." These sentences appear to conflate the discussion of traffic, transmission, visual, and cultural/historic impacts. (emphasis added) (**0619-5-19** [Maher, William])

Response: *Section 9.3.6 (Comparison of the Impacts of the Proposed Action and the Alternative Sites) offers socioeconomic assessments of four different sites, each of which has different characteristics of importance. These differences are the source of the concerns in the comment. After review of each analysis, the staff determined the analyses are not incorrect. No changes were made to the EIS in response to this comment.*

Comment: There were some comments by the Mayor about people paying taxes. None of us like paying all of our electric bill, right? But it's basically a fixed cost that we all have to do. And anything that we can do to help drive that cost down helps all of us in the long run. (**0723-6-2** [Murphy, Mike])

Response: *The comment suggests the proposed nuclear reactors could help decrease electrical bills. The impact of the proposed nuclear reactors on electricity prices is beyond the scope of this EIS. No changes were made to the EIS in response to this comment.*

Comment: ...our Chamber hereby supports the proposed Turkey Point Units 6 and 7 which will result in the creation of additional jobs, reliability and significant infrastructure improvements. (**0723-2-9** [Trowbridge, Mark])

Response: *This comment expresses support for the proposed nuclear reactors due to their impacts on the economy and infrastructure, but does not introduce any new information to inform the assessment of impacts. Impacts on the economy are assessed in Sections 4.4.3 and 5.4.3 (Economic Impacts on the Community) and impacts on the infrastructure are assessed in Sections 4.4.1 and 5.4.1 (Physical Impacts). No changes were made to the EIS as a result of this comment.*

Comment: So if you want to give FPL credit for employing people you ought to also on the other hand look at all the jobs they've been destroying. (**0723-12-8** [Henry, Jim])

Response: *This comment refers to jobs that would be created if solar power were developed instead of the proposed nuclear reactors. The consideration of jobs created by alternative generating technologies is outside the scope of the EIS. No changes were made in the EIS in response to this comment.*

Comment: They pay very little tax in the way of after-tax profits, their actual corporate tax rate in 2005 to 2009 averaged 1.3 percent. They're one of the lowest taxpayers in the United States because they take advantage of unaccelerated appreciation and being able to write off a lot of that expenditure. (**0723-12-2** [Henry, Jim])

Response: *The tax impacts of the proposed nuclear reactors area assessed in Sections 4.4.3 and 5.4.3 of this EIS. The taxes paid by a licensee are outside the scope of the NRC's authority. No information is provided in the comment that would alter the analysis done in those sections. No change was made in the EIS in response to this comment.*

Comment: And I want to echo the sentiments of the lady from the Roads neighborhood who's against this plan as well, because I personally will be affected. I'm a lifelong resident of the Roads neighborhood and I echo the sentiments of the City Attorney and the City, in saying it's a bad idea to make our neighborhood look ugly with those ugly power lines that nobody wants. Nobody from the Roads wants those power lines. And so it's going to be the ugly thing to see on top of those banyan trees on Coral Way, and it's just going to kill the historic value of the, you know, the historic nature of the neighborhood. (**0721-31-2** [Almirola, Alejandro])

Response: *The commenter expresses opposition to the visual impact of the transmission lines to serve FPL's proposed Turkey Point Units 6 and 7, as well as the impact of transmission lines on the historic character of the neighborhood. Although electrical transmission is outside the regulatory authority of the NRC, the review team considered the visual impacts of transmission lines in Sections 4.4.1.6 and 5.4.1.6 (aesthetics), and concluded the aesthetic impacts of transmission lines would be minor. Historic and cultural impacts are assessed in Sections 4.6 and 5.6. No new information was provided by the commenter that was not already considered in the analysis. No changes were made to the EIS as a result of this comment.*

Comment: The construction industry is the second larger employer in Miami-Dade County. And there have been talk before about the minorities on this project, the impact of this project on the minorities. The majority of the workers in the construction industry are minority, members of the minority community, and we need -- we need the additional power in order to keep this construction boom going. (**0721-27-2** [Rodriguez, Manuel J.])

Response: *Impacts on minority and low-income populations are discussed in Sections 4.5 and 5.5. No new information was provided in the comment that was not already considered in the analysis. No changes were made to the EIS in response to this comment.*

Comment: Finally, there's an economic issue. The Impact Statement talks about benefits to the County, economic benefits. It was modeled by FPL. They talk about creating jobs. They talk about other benefits to the economy. But those are temporary jobs that are created. Those are temporary benefits during construction only. (**0721-2-13** [Stoddard, Philip K.])

Response: *The EIS discussed both temporary and long-term impacts of the proposed nuclear reactors during construction and operations. This analysis was included in Sections 4.4 and 5.4 of the EIS. No changes in the EIS were made in response to this comment.*

Comment: 5) <u>Analysis of Visual, Lighting, and Noise Impacts</u>

The DEIS does not sufficiently analyze impacts to NPS scenery, night skies, nocturnal habitat, acoustic environment and wildlife health to determine impacts to these resources and values. Effects to these resources are of particular importance to the NPS because they affect wildlife movement and habitat use, and the visitor experience within both NPs. NPS recommends NRC update its analysis of impacts to these resources and values, as well as, develop photo simulations.

As discussed, the DEIS virtually dismisses the visual impacts of the plant construction, plant profile, powerline corridor and other powerline infrastructure on Biscayne and Everglades NPs. Moreover, we contend that the computer illustration of the facility found in the DEIS is inadequate and that a full visual analysis that include photo simulations is warranted. As a result, the NPS and the public have not been able to assess how this major energy project will impact the viewscape at Biscayne and Everglades NPs. Photo simulations are routinely completed for environmental reviews relating to energy infrastructure and are a critical component that informs the NEPA process as to the relationship of people with the natural and physical environment. [Footnote 1: 40 CFR part 1508.14] The NPS requests that a visual analysis be included in a revised DEIS that includes development of photo simulations of the proposed project and examines the visibility of project components and the level of change in the existing landscape.

The NPS is happy to collaborate with the NRC to identify important vantage points from within Biscayne and Everglades NPs for these simulations. Based on our experience working with other agencies, we can also share with you our suggested guidelines on site photography, simulations, and output. Furthermore, the NRC can utilize photo simulations included in the NPS's Acquisition of FPL land in the East Everglades Expansion Area DEIS. (**0622-1-11** [Austin, Stan])

Comment: The NPS also encourages the NRC to further analyze potential increases in light pollution and resultant impacts related to construction and operation of Turkey Point Units 6 and 7. As construction would likely be ongoing throughout the night, construction lighting under standard practices can adversely affect night sky quality by contributing to glare and atmospheric scattering (light domes). Glare can directly affect nearby wildlife and visitors while light domes can affect wildlife habitat quality, overall photic environmental conditions, and scenic and scientific views of the night sky. The reflective nature of water can exacerbate the scattering of construction lighting more so than an equivalent project on land. Impact from artificial light can be reduced by limiting where lighting will occur, limiting hours of operation, limiting nighttime operation during seasonally sensitive periods (e.g., bird migration), limiting total lumen output of artificial lighting (either per fixture or by calculating lumens per acre), and directing lighting downward and shielding the fixtures.

In addition to the lighting design criteria discussed in section 5.3.1, the NRC should consider other lighting areas and lighting color. Warmer lighting colors typically have less ecological impact and adequate lighting can be achieved with less amount of lighting than is often used. We also encourage the NRC to consider whether illumination of Units 6 and 7, which would be sited within a key area within the Atlantic Flyway, would impact migratory birds. This evaluation should address whether new lighting may also increase illumination of existing structures, thereby increasing risk to migratory birds. The NPS requests that lighting plans, analysis of lighting impacts, and mitigation techniques be included in revisions to the DEIS.

NPS recommends that section 5.3.1 be updated to include information related to the effects of noise on NPS resources and acoustic environment in Biscayne NP. Currently, only a day-care facility and Homestead Bayfront Park are categorized as "sensitive receptors," however we maintain that NPS resources should also be considered sensitive to noise. Changes in overall decibel levels, maximum decibel levels, and audibility can have effects on the acoustic environment, wildlife interactions, and park visitors. The DEIS does not appear to analyze noise impacts on Biscayne NP. We encourage the NRC to consider the relationship between increased noise generated at the facility compared with the natural ambient baseline sound levels for Biscayne NP. The NPS recommends that further documentation and environmental analysis include:

Determination of the natural ambient acoustic condition that exists in Biscayne NP;

Assessment of the cumulative noise output of all noise sources on site during construction and under full operating conditions;

Determination of the distance at which noise will attenuate to natural ambient levels. The inclusion of a noise map with contours would be helpful;

Calculation of noise levels at the park boundary and comparison with natural ambient levels;

Assessment of the effects that these increased noise levels would have on park wildlife and visitors; and

The use of an analytical framework for evaluating impacts that is appropriate for a national park setting (e.g., not a community noise framework).

The NPS's "Baseline Ambient Sound Levels in Biscayne National Park" report from November 2011, which has already been shared with the NRC, should prove helpful in gathering this information. (**0622-1-13** [Austin, Stan])

Response: *These comments suggest that further analysis is needed regarding the impacts of light and noise at the Turkey Point site. As explained in Sections 4.4.1 and 5.4.1, the review team assessed the potential impacts from construction- and operations-related light at the Turkey Point site and concluded that the visual impact of the building of proposed Units 6 and 7 would be noticeable but temporary and the visual impacts of operations would be minor. Noise impacts on the general public would be minimal given the use of the mitigation actions included in applicable regulations and because noise attenuates rapidly with distance, intervening vegetation, and variations in topography. NEPA guidance states the depth and detail of an analysis must be proportional to the expected severity of the impacts. Because the staff determined small impacts from light and noise, no changes were made in the EIS in response to these comments.*

Comment: Contrary to the assertion of the NRC (EIS) that the "socioeconomic "effects of building and operating the proposed reactors #6 and #7, are "small and beneficial" I believe the actual risk to the population of South Florida is astronomical and potentially devastating. (**0358-2** [Norman, Ronald])

Response: *This comment expresses the view that the risks to the population of South Florida are very high. The review team analyzed impacts on people from construction and preconstruction (Chapter 4) and from operations (Chapter 5) of the proposed nuclear reactors. Summaries of these impacts can be found in Section 4.12 (Summary of Construction and Preconstruction Impacts) and Section 5.12 (Summary of Operational Impacts). The analysis does not support the view that the "risk to the population of South Florida is astronomical and potentially devastating," and the comment does not introduce any new information not already considered in the analysis. No changes were made to the EIS in response to this comment.*

Comment: Florida law allows FPL to charge its customers for the licensing and construction costs for this project. In the past three years, FPL has charged us $209 million. Even if FPL never completes the new reactors, it keeps our money. These charges include new transmission lines in Everglades National Park and the heart of Miami-Dades dense commercial and residential neighborhoods. Massive 105-foot tall towers along Dixie Highway would cut through Pinecrest, South Miami, Coral Gables, Coconut Grove, and then Brickell, on their way into downtown Miami, carving tens of millions annually from the countys tax base and killing thousands of jobs in the process. (**0675-4** [Rodriguez, Jose Javier])

Response: *This comment expresses opposition to the proposed nuclear reactors because of adverse effects on consumer rates as well as the adverse effects of the associated transmission lines on the county's tax base and jobs. The NRC does not assess impacts on electricity rates and electrical transmission is outside the regulatory authority of the NRC. In addition, the comment did not provide evidence to support the claim that transmission lines would have an adverse impact on the tax base and jobs. Although the review team recognizes the potential for land use conflicts in Chapter 7, Cumulative Impacts, the impact of the transmission line on property values (and consequences for the tax base) is not possible to determine based on the existing literature (see Section 4.4.4.3 for a discussion). No change was made to this EIS as a result of this comment.*

Comment: Inconsistencies identified in draft EIS and ER, Rev 6: Subsection 2.5.2.6, Page 2-179, Lines 27-29 "There are 35 colleges or universities that are accredited.... that offer professional and paraprofessional training (FPL 2014-TN4058)." ER Subsection 2.5.2.8.3 ER Table 2.5-43 "There are **12 colleges** or universities that are accredited...that offer professional and paraprofessional training within 50 miles..." ER Table 2.5-43 also identifies **12.colleges**. (**0619-2-21** [Maher, William])

Comment: Inconsistencies identified in draft EIS and ER, Rev 6: Subsection 4.4.2, Page 4-104, Lines 8-11 Subsection 4.4.2, Page 4-105, Lines 37-38 On page 4-104: "...assessment of population impacts is based on FPL's estimated peak project workforce analysis (FPL 2014-TN4058). The proposed project schedule assumes 10 years-- **36 months for preconstruction activities** and 84 months for NRC-authorized construction--to build both units....." On page 4-105: "Also shown is the **36 months of preconstruction activities**." ER Subsection 3.10.1.1 ER Table 3.9-1 ER Table 3.10-2 DEIS Figure 4-6 ER Figure 3.10-1 ER Figure 3.10-3 "As described in Section 3.9, preconstruction activities could occur **39 months (start of 2nd quarter 2013 through end of 2nd quarter 2016)**... before the start of safety-related construction for Units 6 &

7." ER Tables 3.9-1 and 3.10-2 project **39 months for preconstruction** activities prior to safety related construction. (Note DEIS Figure 4-6 and ER Figures 3.10-1 and 3.10-3 also illustrate 39 months for preconstruction activities.) (**0619-2-24** [Maher, William])

Comment: Inconsistencies identified in draft EIS and ER, Rev 6: Subsection 4.4.4.5 Page 4-118 through 4-119 Lines 39 through 3 Subsection 5.4.4.5, Page 5-77, Lines 9-10 On page 4-118 and 4-119: "...**15.4 percent** of students in Miami-Dade County...attend private schools (FPL 2014-TN4058)...**Fifteen point four percent** of in-migrating students..." Similarly, on page 5-77 "...**15.4 percent** of students County...attend private schools (FPL 2014-TN4058)." ER Subsection 4.4.2.2.8.3 ER Subsection 5.8.2.2.8.3 "...assumption...percentage of in-migrating...private school... **(15 percent)**...The assumption...percentage of in-migrating...private schools...attending private schools in Miami-Dade County **(15 percent)**. (This percentage, **15 percent**, is also consistent with ER Subsection 5.8.2.2.8.3) (**0619-2-25** [Maher, William])

Response: *The text in Sections 2.5, 4.4, and 5.4 was revised to be consistent with Revision 6 of the ER.*

Comment: In some portions of the document, there are descriptions of the area within the 50 mile radius as highly developed, densely populated, with some of the highest incomes in the county. However, language in other sections of the document identifies the proposed plant site location as if it were located within a completely undeveloped area. Turkey Point lies within 12 miles from the Cities of Homestead and Florida City, within 8 miles from the developed area Ocean Reef on North Key Largo, 16 miles from the city of South Miami, and 20 miles from downtown Miami. The 50 mile radius, the Gateway to both National Parks, includes Miami-Dade County with the highest and densest (by land area) population in the State of Florida. That population is in large part concentrated along the coast and along U.S. Highway One north of the parks. The DEIS does not sufficiently evaluate this population and its location particularly with respect to use and economic contribution of their travel to the NPs (**0622-1-30** [Austin, Stan])

Response: *The EIS acknowledges both the significant population centers near Turkey Point and the large areas of undeveloped land in the vicinity included in the nearby National Parks, aquatic preserves, and mitigation banks. Section 2.5 of the EIS addresses the Socioeconomic setting of the Turkey Point site and describes the population and significant communities in the counties surrounding the site. Section 2.2 describes the various land uses in the surrounding region. The impacts of building and operating the proposed new units at Turkey Point on local populations and on undeveloped regions are described in Chapters 4 and 5 of the EIS. No changes were made to the EIS as a result of this comment.*

Comment: There are over a dozen threatened and endangered species in Biscayne Bay and nearly half a million visitors visited Biscayne National Park in 2013. And there are -- there's an active community of fishermen, boaters, divers, snorklers and recreational and commercial fishing area that is important. And you know, those jobs and those livelihoods and that culture and heritage should be considered in this process as well. Even if you've never visited the Coral Reef you're never going to catch lobster, you're never going to go fishing for permit. (**0722-7-7** [Silverstein, Rachel])

Response: *The comment expresses concerns about the potential impacts to tourism, recreation, and ecological impacts to the nearby Biscayne Bay including the Biscayne National Park. The review teams agree that Biscayne National Park is an important resource for marine biodiversity and has added an expanded discussion to Sections 4.3.1 and 5.3.1 of the potential effects of the project on ecological resources of the South Florida ecosystem as they pertain to*

both Biscayne and Everglades National Parks and the experience of visiting these parks. Furthermore, Sections 4.4 and 5.4. provide the review teams analysis of the potential socioeconomic impacts from construction and operation of the proposed Turkey Point Units 6 and 7.

E.2.12 Comments Concerning Environmental Justice

Comment: *Environmental Justice (EJ)*. Pursuant to Executive Order 12898, the DEIS (Section 2.6) includes demographic and impact data, including minority and low-income populations. The project team assessed the potential for disproportionately high and adverse health and environmental impacts, and concluded that there are no environmental pathways where the identified EJ populations in the 50-mile region would be likely to suffer disproportionately high and adverse environmental or health impacts as a result of the proposed project (page 10-7). Communities may experience both benefits and burdens associated with this project, and should be involved in meaningful discussions with the project team throughout the decision-making process. We encourage the project team to continue coordinating with the communities that will be impacted by the licensing and permitting actions. Community involvement and discussion of project issues should take place throughout project planning. In particular, local communities have voiced their concerns regarding transmission line routing and potential economic impacts resulting from the location of these lines. *Demographics*: The NRC includes demographic information related to minority and low income populations. The project area contains minority and low-income populations within the 50 mile project area that includes Miami-Dade County and portions of Broward, Collier, and Monroe Counties. U.S. Census data from the American Community Survey was used to evaluate minority and low-income populations prior to the identification of disproportionate impacts. Thresholds that include the 50% Criterion and the Meaningfully Greater Criterion were used to compare race and income data from the block group level to the reference population at the State. The use of these thresholds are consistent with the Council for Environmental Quality EJ Guidance. *Analyses*: Based on our review, EPA has concerns regarding how the Meaningfully Greater Criteria was applied. The DEIS used a 20% threshold, however, the manner in which it is applied or calculated can mean that minority or low-income populations may not be appropriately identified. In the DEIS, 20% is simply added to the reference population (i.e., 20% threshold +42.2% minority population = 62.2% minority threshold). However, the way the threshold should be used to yield consistent benchmarks involves taking 20% of 42.2% minority population, which is 8.44, and adding that to 42.2, resulting in a benchmark of 50.64%. Using this mathematical calculation will yield consistent benchmarks that will be 20% higher than the reference population, regardless of the initial percent population value. *Meaningful engagement*: Communication with minority and low-income populations and other interested individuals, community, community and organizations should consider (as appropriate) encompassing adaptive and innovative approaches to both public outreach, (i.e. disseminating relevant information),and participation (receiving community input), since minority populations and low-income population often experience barriers to engagement. NRC indicates that there was active phone and field consultations with various organizations and study of applicant's Environmental Report (ER) to identify affected populations and unique exposure pathways. ***Recommendations:*** The FEIS EJ sections should include information about the outreach and participation methods to minority and low-income populations that may have limited English proficiency, particularly since migrant workers that are primarily Hispanic are located approximately 3 miles from the proposed site. In addition, the FEIS should also include a summary of any EJ comments or concerns, and the NRC's response to those comments. (**0617-3-2** [Mueller, Heinz J.])

Response: *Application of the meaningfully greater criteria is consistent with NRC regulations. Information about the outreach and participation methods, including comments received and responses, is provided in Appendices B through F of this EIS. No modifications to the document were made in response to this comment.*

Comment: *EJ Impacts*: The NRC's EJ analysis includes a summary of noise, air quality, water resource and traffic impacts on affected minority and low-income populations, including Native American tribes and populations that are dependent on subsistence resources. According to the DEIS, there are no disproportionate high and adverse impact to EJ populations.

Recommendations: Based on our review of the EJ section of the DEIS, it was difficult to identify the impacts to minority and low-income populations. Most of the impacts are marginalized for various reasons, including proximity. While the DEIS summarizes the impacts associated with the construction of the reactors and traffic, it is unclear whether there are other impacts that should be considered, such as impacts associated with transmission lines constructed through minority and low-income communities. The FEIS should clarify whether these and other impacts will primarily be borne by EJ communities.

Local residents should be involved in meaningful discussions with the project team throughout the decision-making process. Efforts should be made to meaningfully involve and outreach to residents near the site and with increased visibility to the facility's structures and its emissions. The project team should take community concerns regarding transmission line routing and impacts into consideration, and these concerns should be fully addressed to the extent feasible. Dialog between the project team and the communities should continue. (**0617-3-3** [Mueller, Heinz J.])

Response: *Section 2.6.1 (Methodology) explains the NRC's approach to the environmental justice (EJ) analysis. The review team investigated special pathways by which EJ populations of interest could be disproportionally affected by adverse impacts. No impacts considered small could lead to disproportionately high and adverse human health or environmental effects without special pathways through which EJ populations of interest could be disproportionately affected. Sections 4.5 and 5.5 summarize the results of the analysis. No special pathways were identified through which EJ populations of interest could be disproportionately affected by adverse impacts. Although electrical transmission is outside the regulatory authority of the NRC, the analysis includes the potential impacts of transmission lines associated with the proposed nuclear reactors. Recommendations for meaningful outreach and involvement of the local communities is outside the NRC's NEPA and Executive Order 12898 requirements. No changes were made to the EIS in response to this comment.*

Comment: Let me make a mention in terms of environmental justice. Under Federal guidelines it's critical that Federal agencies review environmental justice impacts. Miami-Dade County is a very diverse county, as many as 80 to 85 percent minority. I think I've not seen a proper analysis in terms of that. The impact of this on low income people, on minorities, and I think that needs to be reviewed as well. (**0721-7-6** [Edmond, Gabriel])

Response: *The comment suggests no proper EJ analysis was done but no supporting details are provided in the comment. The review team followed its guidance under NUREG-1555, the Environmental Standard Review Plan, in its assessment of EJ impacts. The EJ analysis is presented in Sections 4.5 and 5.5. No changes were made to the EIS in response to this comment.*

Comment: And Miami-Dade County, as everybody around here knows, is -- has a disproportionally high population of minority members and poor. And so the damage to the County's economy and the tax base and the job loss is going to be greater in this disproportionally poor and minority community than elsewhere. And I think that's a flaw in the site selection process that needs to be addressed. (**0721-2-15** [Stoddard, Philip K.])

Response: *The comment requests that impacts on disproportionally poor and minority communities be addressed. Sections 4.5 and 5.5 address impacts on minority and low-income populations in the study area. No changes were made to the EIS in response to this comment.*

E.2.13 Comments Concerning Historic and Cultural Resources

Comment: I agree with the DEIS review team's conclusion that the impacts from the construction and preconstruction activities of Units 6 and 7 will be small (and therefore unlikely to impact cultural resources listed on or eligible for listing on the National Register of Historic Places, or NRHP). I also agree that the impacts from the construction and preconstruction activities for the proposed transmission lines and other offsite activities have the potential to adversely affect eligible NRHP resources. (**0139-2** [Parsons, Timothy A.])

Response: *The comment from the Florida SHPO express agreement with the findings of the historic and cultural resources analysis in the draft EIS. No changes were made to the EIS as a result of the comment.*

Comment: In a letter to the Corps' Miami Permits Section dated April 2, 2015 (DHR #: 2015-1221), our office requested that all previously unsurveyed portions of the offsite APE be subjected to professional archaeological survey and that the resultant report be submitted to us in order to facilitate Section 106 review. I look forward to continuing Section 106 consultation with the Corps of Engineers to assess effects to the resources within the area of potential effects, and to consult on any necessary avoidance, minimization, or mitigation strategies that might be necessary. (**0139-3** [Parsons, Timothy A.])

Response: *The comment from the Florida SHPO states that future Section 106 procedures will be required of the USACE. These procedures include professional surveys of previously unsurveyed portions of the offsite APE (primarily along the transmission line corridors), and submission of the resulting report to the SHPO. These requirements are described in the EIS. No changes were made to the EIS as a result of these comments.*

Comment: Tribal Coordination. *Consultation*. The EPA encourages government to government consultation with the Seminole Tribe of Florida and Miccosukee Tribe of Indians of Florida at all levels of decision-making. The EPA works closely with both Tribes on Everglades-related matters, and is committed to working with other federal partners to prioritize the Tribes' water quality and water management concerns. (**0617-3-4** [Mueller, Heinz J.])

Response: *The NRC and the USACE have engaged in government-to-government consultation with the Seminole Tribe of Florida and Miccosukee Tribe of Indians of Florida as described in Section 2.7 of the EIS. The NRC appreciates that the EPA also works closely with both Tribes. No changes were made to the EIS as a result of this comment.*

Comment: National Historic Preservation Act (NHPA). *Historic Preservation*. NRC's evaluation anticipates that indirect visual impacts on National Register-eligible buildings will occur in the transmission line corridor. Specific impacts are to be determined based on USACE

impact evaluation related to transmission lines on cultural resources. FPL agreed to develop a work plan for additional cultural resources studies related to requirements for the transmission line corridors and offsite facilities. The DEIS (Section 2.7) describes the project team's coordination with the Florida State Historic Preservation Office (SHPO) and tribes. The document concludes that the potential impact of license renewal on cultural and historic resources is minimal. The USACE is the lead federal agency for Section 106 of the National Historic Preservation Act (NHPA), and the consultation for this project is in progress. ***Recommendations:*** Compliance with Section 106 of the National Historic Preservation Act (NHP A) should be documented as the project progresses. The FEIS should include an update regarding the mitigation measures developed in consultation with the Florida State Historic Preservation Officer (SHPO). The FEIS should also include an update of coordination activities with the SHPOs and tribes, along with the finalized decision documents pursuant to Section 106 of the NHPA, if available. The EPA defers to the SHPOs and tribes on these issues. EPA encourages government-to-government consultation with the Seminole Tribe of Florida and Miccosukee Tribe of Indians of Florida at all levels of decision-making. (**0617-3-5** [Mueller, Heinz J.])

Response: *The NRC and the USACE agree with the EPA recommendations. Section 2.7 was modified to include government-to-government consultation meetings with the Tribes that took place subsequent to the publication of the draft EIS. Section 106 consultation between the USACE, the Seminole Tribe of Florida, and Miccosukee Tribe of Indians of Florida is ongoing. Section 2.7 of the EIS was updated to include the current status of National Historic Preservation Act (NHPA) Section 106 consultation. Special conditions that the USACE typically uses for permitting actions dictate that all work and ground-disturbing activities shall halt within a 100-meter radius of any unanticipated discovery of cultural materials or human remains, and that the USACE shall notify the Florida State Historic Preservation Office(r) (SHPO) and appropriate Tribal Historic Preservation Officers (THPOs) of the finds. Sections 4.6 and 5.6 of the EIS were modified to clarify the USACE's special conditions regarding work stoppage.*

Comment: There are instances in the DEIS where, due to the timing of events with respect to drafting the DEIS, specified dates, or future actions, indicated in the DEIS have passed. Instances in the DEIS include (emphasis added): a. DEIS Section 4.6, Page 4-124, Lines 31-33 and DEIS Section 5.6, Page 5-82, Lines 2-3: The DEIS (Section 4.6) states: "(3) **if** consultation with the Florida SHPO concluded with a finding of no historic properties affected... (FDHR 2010-TN1455; FPL 2014-TN4058, Appendix 2.5A)..." Similarly, The DEIS (Section 5.6) states: "(4) **if consultation with the Florida SHPO concluded** with a finding of no historic properties affected..." However, as indicated in DEIS Section 4.6, ER Subsection 4.1.3.1, and ER Subsection 5.1.3, the work plan was submitted and Florida SHPO concurred. DEIS Section 4.6, page 4-123, lines 34-36 states: "The Florida SHPO concurred with FPL's informal determination of "no historic properties affected" (Appendix 2.5A in FPL 2014-TN4058)." ER Subsection 4.1.3.1, states: "The survey identified no newly or previously recorded archaeological sites or historic resources...The Work Plan was submitted to **SHPO and concurrence** with the recommendation was received by FPL (FDOS Jul. 2009a)." And, ER Subsection 5.1.3, states: "Based on the findings contained in these two reports...no further surveys or investigations are warranted at the plant or associated non-linear facilities due to the lack of any cultural resources in these areas. The **SHPO has concurred** with these recommendations (FDOS Jul 2009a)." (**0619-1-10** [Maher, William])

Response: *This comment pertains to a discrepancy in the draft EIS where similar wording in Sections 4.6 and 5.6, describing a SHPO finding of no historic properties affected for the Units 6 and 7 onsite APE, conflicts with subsequent wording in the same sections. The NRC agrees*

with the comment. Sections 4.6 and 5.6 were revised to clarify that consultation with the Florida SHPO did reach a finding of no historic properties affected for the Units 6 and 7 onsite APE.

Comment: There are instances in the DEIS where there are inconsistencies and/or discrepancies relating to authorizations, permitting and certifications. Instances in the DEIS include (emphasis added):...DEIS Section 4.6, Page 4-124, Lines 12-16: The DEIS states: "In addition, the **USACE**, the Florida SHPO (FPL 2014-TN4058, Appendix 2.5A), and the Miami-Dade County Office of Historic and Archaeological Resources (NRC 2010-TN1458) **have required FPL to conduct surveys and other studies of offsite areas** and, if practicable, avoid National Register-eligible sites or mitigate effects in an acceptable manner, as determined through consultation with these agencies." The USACE permit has not been issued and there are no USACE requirements in the Conditions of Certification. (**0619-2-10** [Maher, William])

Response: *This comment pertains to a statement in the draft EIS where the wording implies that USACE has already issued requirements concerning archaeological survey and other required studies of the offsite APE. The commenter correctly notes that the USACE has not yet issued any specific conditions concerning these requirements. The NRC agrees with the comment. Section 4.6 was modified to remove reference to the USACE in the State-level review.*

Comment: There are instances in the DEIS where there are inconsistencies and/or discrepancies relating to authorizations, permitting and certifications. Instances in the DEIS include (emphasis added):...DEIS Section 5.6, Page 5-81, Lines 33-40: The DEIS states: "All work within a **100-meter radius would be halted** while the appropriate specialist consults with the Florida SHPO and USACE Project Manager, **per the Special Conditions of the DA permit, if one is issued**...Any ground-disturbing activity that impacts a historic property that is potentially eligible, eligible to the NRHP, or contains human remains, all **ground disturbing activities shall halt within 100-meter radius buffer** of the site, and the USACE Project Manager and SHPO notified. Work shall not commence without written notice from both the USACE and SHPO." FPL has not included nor has SHPO required a specific "work halting radius" in the work plans. (**0619-2-13** [Maher, William])

Response: *This comment pertains to statements in the draft EIS that describe a 100-meter radius within which work would halt should there be an unanticipated discovery of a cultural resource during operations. The special conditions that the USACE typically uses for permitting actions dictate that all work and ground-disturbing activities shall halt within a 100-meter radius of any unanticipated discovery of cultural materials or human remains, and that the USACE shall notify the Florida SHPO and appropriate THPOs of the finds. Sections 4.6 and 5.6 of the EIS were modified to clarify the USACE's special conditions regarding work stoppage.*

Comment: DEIS Subsection 2.7.3, Page 2-198, Lines 30-36: The DEIS states, "The indirect-effects APE...**has been set at 500 ft on either side** of the centerline of the alignment...(FPL 2009-TN1513; FPL 2009-TN1515; FPL 2011-TN95; FPL 2013-TN2941)." One of the cited references, (FPL 2009-TN1515), "Cultural Resource Assessment Survey Work Plan for the Turkey Point Units 6 & 7 Associated Linear Facilities", states: "For the purposes of this preliminary analysis, Janus Research defined the areas of potential effects (APE) as **100 feet from each side** of the East Preferred Corridor ...In addition, a review of previously recorded historic resources within 500 feet of each side of corridors, pipelines, roads, and bridges was conducted." The final APE **will be established in consultation** with the Florida Department of State, Division of Historical Resources and State Historic Preservation Office (DHR/SHPO)." (emphasis added) (**0619-3-15** [Maher, William])

Response: *This comment concerns the definition of the Area of Potential Effect (APE) for Section 106 of the NHPA, which, as stated in the comment, will be defined by the USACE in consultation with the SHPO. The EIS text in Section 2.7 was modified to clarify that, for purposes of the review team's analysis, a preliminary APE of 500 ft on either side of the centerline for linear facilities was used to guide the data collection. This preliminary APE may or may not correspond to the final APE adopted by the USACE and SHPO because consultation is not completed for the transmission line route.*

Comment: DEIS Subsection 2.7.3, Page 2-199, Lines 25-28: The DEIS states: "In addition to the desktop research for the transmission line APE, FPL also conducted a search of the National Register and Florida SHPO site files for a distance of 1.2 mi from the eastern and western transmission line corridors. The research for the offsite linear facilities identified 359 resources and 16 resource groups located with 1.2 mi of these facilities." The cited reference (FPL 2009-TN1513) "Cultural Resource Assessment Survey Work Plan for the Turkey Point Units 6 & 7 Site and Associated Non-Linear Facilities" did not contain information regarding a search of the National Register and Florida SHPO site files for a distance of 1.2 mi., nor did FPL conduct a search of the National Register and Florida SHPO site files for a distance of 1.2 mi from the eastern and western transmission line corridors. (**0619-3-16** [Maher, William])

Response: *This comment refers to a statement in the EIS that refers to a background records search conducted by FPL of the area encompassing 1.2 mi around the offsite linear facilities, including transmission lines. The comment indicates that the cited reference in the draft EIS, prepared by FPL's consultant, does not report on this records search, and also states that FPL did not conduct a search of the National Register of Historic Places and Florida SHPO site files. The NRC agrees that FPL's consultant did not conduct the records search, and that the draft EIS should not have cited the consultant's report (FPL 2009-TN1513). Rather, reference should have been made to the Turkey Point Nuclear Plant COL ER (FPL 2014-TN4058), which does contain the information. The NRC therefore disagrees with the comment that FPL has not conducted a records search within 1.2 mi of the transmission line corridors. As stated in the COL ER in Section 2.5.3.6 (FPL 2014-TN40). "A search of records maintained by the National Park Service, Florida Division of Historical Resources, Miami-Dade County, and city of Homestead was conducted to identify significant cultural resources located within 1.2 miles of the transmission lines, substations, and reclaimed water pipelines." Section 2.7 was revised to include the correct citation and to clarify the source of the information for the records search.*

Comment: A large number of archaeological sites have been recorded throughout southeast Florida and as noted in the draft EIS, numerous sites are known to occur near the proposed transmission line corridors. We are concerned with the possible impacts of any undertaking on cultural resources which may be present within the area of potential effect. Since it does not appear that either of the possible transmission line corridors have been subjected to a systematic Phase I cultural resources assessment survey, we request that such a survey be conducted at the appropriate time and that the results of such survey be provided to the STOF-THPO for review and comments. If any preliminary or desktop/archival investigations have already been completed we would like to be provided copies of those reports. (**0727-1** [Mueller, Bradley M.])

Response: *Preliminary desktop surveys have been completed for the proposed transmission line corridors and are summarized in Section 2.7 of the EIS. The USACE would provide the Seminole Tribe of Florida with these reports and any other reports as they are developed. Phase I cultural resources surveys would be conducted at the appropriate time and the results of such surveys would be provided to the Seminole Tribe of Florida through*

continued consultation between the USACE and the Seminole Tribe of Florida. No changes were made to the EIS as a result of this comment.

Comment: Our experience has shown that archaeological sites in the Everglades have a high likelihood of containing burial resources (human skeletal remains, etc.). This is especially relevant with regards to the West Consensus Corridor. It is the Tribes position that the remains of ancestors should be left undisturbed and every effort should be made to identify sites in advance of any ground disturbance, and those sites avoided whenever feasible. We also request that at the appropriate time, prior to any ground disturbing activities, the USACE, the STOF-THPO, and other appropriate parties develop protocols to follow in the event of the unanticipated discovery of human remains during any phase of the proposed undertaking. (**0727-2** [Mueller, Bradley M.])

Response: *These comments from the Seminole Tribe of Florida provide information about the likely presence of sensitive cultural resources, including those containing human remains, within the transmission line corridors, and especially the western corridors, and that the Tribe's preferred treatment for human remains is preservation in place. They also state that efforts should be made to identify such resources prior to disturbance, and that appropriate procedures for unanticipated finds should be in place prior to construction. The EIS in Section 2.7 indicates that both pre-construction surveys and unanticipated finds procedures would be required by the USACE and other agencies prior to construction. Regarding unanticipated finds procedures, the special conditions that the USACE typically uses for permitting actions dictate that all work and ground-disturbing activities shall halt within a 100-meter radius of any unanticipated discovery of cultural materials or human remains, and that the USACE shall notify the Florida SHPO and appropriate THPOs of the finds. Work cannot resume until an appropriate treatment has been determined. In response, Sections 2.7, 4.6, and 5.6 of the EIS have been modified to include information about sensitive cultural resources provided by the Tribe.*

Comment: At least one area considered sacred to the Seminole, a natural spring, is located near a portion of the East Preferred Corridor. We are concerned with the possible effects of transmission line construction on the hydrology of that area and request that sufficient technical analysis be conducted to assess if water flowing to the spring would be interrupted or adversely affected. We would also ask that the USACE make available an appropriate, knowledgeable individual to discuss the results of such investigations with members of the Tribal community if needed. (**0727-3** [Mueller, Bradley M.])

Response: *Regarding the sacred area near the eastern transmission line corridor, Sections 2.7, 4.6, and 5.6 of the EIS have been modified to include information about cultural resources provided by the tribe. Regarding the effects of transmission line construction on the hydrology of the spring, FPL's ER indicates that local dewatering might be required at some of the transmission tower bases. This would result in a temporary drop in the groundwater levels near the excavation of that particular transmission tower, but the groundwater levels are expected to return to normal after the tower base is in place and backfilled. BMP's and requirements of the construction permits would assure no introduction of contaminants that could affect the quality of the groundwater that may eventually reach springs or wells near the transmission tower construction site. If necessary, the USACE would perform analyses to determine the effects of transmission line construction on water flowing to the spring, and can provide an appropriate knowledgeable individual to discuss the results of the investigation with members of the tribal community.*

Comment: [I]n the USACE's April 4th, 2015 public notice announcing the release and availability of the Turkey Point draft EIS, it is stated that a short section of the transmission line, presumably the East Preferred Corridor, will cross beneath the Miami River as an underground cable system. The area proposed for this crossing, east of Interstate I-95, is rich in aboriginal archaeological sites including sites that have been shown to contain numerous burials. We caution that any ground disturbing activities in these areas has a heightened potential for encountering cultural and/or burial resources and we would like to be consulted further when details of such a river crossing are being developed. We again recommend that protocols be developed in consultation with the STOF-THPO to deal with the unanticipated discovery of human remains. (**0727-4** [Mueller, Bradley M.])

Response: *This comment from the Seminole Tribe of Florida provides information about the likely presence of subsurface cultural resources, including those containing burials within the Miami River crossing for the eastern transmission corridor. The tribe requests that they be consulted as details of the crossing are developed. Sections 2.7, 4.6 and 5.6 of the EIS have been modified to include information about cultural resources provided by the tribe. Details of the crossing would be discussed during ongoing consultation between the USACE and the Seminole Tribe of Florida. Ongoing consultation would also ensure that the Seminole Tribe of Florida is involved in the development of treatment protocols for the unanticipated discovery of human remains.*

Comment: Please continue to consult with us on this project since it is occurring within an area that is especially important to the Tribe. (**0727-5** [Mueller, Bradley M.])

Response: *This comment from the Seminole Tribe of Florida reiterates the request for further government-to-government consultation regarding the project. In response, Section 2.7 of the EIS has been modified to include meetings held among the NRC, USACE, and the Tribe in June 2015, and to clarify that consultation with the Tribe is ongoing.*

Comment: Thank you for providing the Florida State Historic Preservation Officer with the opportunity to comment on the Draft Environmental Impact Statement (DEIS) for the Turkey Point Units 6 and 7 combined license application. Pursuant to a letter from NRC dated October 23, 2014, I note that the U.S. Army Corps of Engineers is now the lead federal agency for compliance with Section 106 of the National Historic Preservation Act of 1966, and that the Section 106 process will not be completed through the completion of this NEPA document. (**0139-1** [Parsons, Timothy A.])

Response: *This comment acknowledges that the USACE would serve as the lead Federal agency for NHPA Section 106, and that the Section 106 process would not be completed through the NEPA document. These decisions are described in Section 2.7 of the EIS and no changes were made as a result of this comment.*

Comment: DEIS Subsection 2.7.1, Page 2-195, Lines 1-2: The DEIS states: "Lake Okeechobee and Everglades regions, and **Fort Davis**...became a base of operations." The name should be **Fort Dallas** as indicated in Cultural Resource Assessment Survey for the Turkey Point Units 6 & 7 Site, Associated Non-Linear Facilities, and Spoils Areas on Plant Property [Enclosure 1 of FPL's response to NRC RAI No. 2.7-1 (eRAI 5480), DEIS reference (FPL2011-TN1512)]. (emphasis added) (**0619-3-14** [Maher, William])

Response: *Section 2.7 was revised to read Fort Dallas.*

E.2.14 Comments Concerning Meteorology and Air Quality

Comment: *Greenhouse Gases (GHGs).* EPA appreciates the thorough GHG analysis in the DEIS, which evaluated the carbon dioxide (CO_2) equivalent emissions of the proposed two new nuclear power plants in context of building, operating, and decommissioning (Sections 4.7, 5.7.1, 6.1.3, and 6.3). NRC made conservative GHG-emission estimates by basing them on the most GHG-emission intensive nuclear technology (i.e., the uranium fuel cycle). Consequently, NRC estimated the total nuclear power plant lifecycle footprint to be 10,500,000 MT CO_2e, with a 7-year preconstruction and construction phase, 40 years of operation, and 10 years of decommissioning. NRC concluded the cumulative impacts from other past, present, and reasonably foreseeable future actions on air quality resources in the geographic areas of interest would be moderate for GHGs. Additionally, NRC concluded the fossil fuel impacts, including GHG emissions, from the direct and indirect consumption of electric energy for fuel-cycle operations would be small (page 6-9). ***Recommendations:*** EPA recommends that the NRC address the following in its FEIS: •The GHG emissions analysis used a 40-year (Section 7.6.2, p. 7-33) operation period while the Climate Change Effect analysis (Appendix J) incorporated the license renewal which could extend operation of the two reactors another 20 years. EPA recommends NRC's GHG emissions analysis use the 60-year operation period similar to that used in Appendix J. •Clarify what the uranium fuel cycle is, i.e., identify the activities associated with the production of electricity from nuclear reactions. This could be done effectively with a simple diagram. • Whether the GHG emissions analysis in the DEIS addresses the GHG emissions associated with decommissioning the existing 2 nuclear power plants (Units 3 and 4), in addition to the new ones (Units 6 and 7). EPA recommends the decommissioning of units 3 and 4 also be included as part of the GHG cumulative-effects analysis. (**0617-4-9** [Mueller, Heinz J.])

Response: *The greenhouse gas (GHG) appendix and the climate change appendix both used a 40-year period for the proposed action. The EIS has been revised to delete the sentence "If applied for and if granted, license renewal could extend operation of the reactors until 2082 and 2083" (draft EIS pages I-2, lines 37-38), because it could be interpreted as including a license renewal period in the analysis. The uranium fuel cycle is defined in Section 6.1, and a diagram of the fuel cycle appears in Figure 6-1. The GHG appendix does not include the emissions from decommissioning of the existing Units 3 and 4. As stated in EIS Section 1.2, the proposed NRC Federal action is issuance, under the provisions of 10 CFR Part 52, of COLs for authorizing the construction and operation of two new Westinghouse AP1000 reactors at the Turkey Point site while the proposed USACE Federal action is the decision about whether to issue, issue with modification, or deny a Department of the Army permit pursuant to the requirements in Clean Water Act Section 404 (40 CFR 230) and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403 et seq.) to authorize certain activities potentially affecting Waters of the United States. Decommissioning of existing Units 3 and 4 is not part of the proposed Federal actions. Additionally, the decommissioning of power facilities is subject to a separate environmental review that must be conducted prior to the start of decommissioning activities in order to satisfy the requirements of 10 CFR 50.82(a)(6)(ii), which states that a licensee must not perform any decommissioning activity that causes significant environmental impacts not previously reviewed. Assessment of GHG emissions associated with decommissioning existing Units 3 and 4 will be addressed in the decommissioning environmental review, which will be conducted by the NRC when FPL decides to terminate their NRC license for Units 3 and 4. Additional information about the NRC's decommissioning environmental review process can be found on the NRC's website at: http://www.nrc.gov/waste/decommissioning/process.html#rea.*

Comment: All the endangered wildlife and sea mammals help us so much in our lives without us, the people, really knowing it. This breaks my heart that you people are willing to just destroy their lives and our lives by putting toxins into our air that we breath from. (**0188-1** [Frederickson, Kelly])

Response: *The comment concerns the release of air pollutants into the environment. Air-quality impacts from operation of the power plant are discussed in Section 5.7.1 and Section 5.7.2 addresses the cooling-tower impacts. Emissions from the cooling towers would be the largest source of air emissions and the air pollutant of most concern. The cooling-tower emissions would be required to adhere to the New Source Performance Standards (40 CFR 60.40Da) and the applicant would need to demonstrate compliance with national ambient air-quality standards by acquiring a Prevention of Significant Deterioration (PSD) Permit before operating. In Section 5.7.2 it was concluded that air-quality impacts from operating the cooling towers would have minimal impacts. No change was made to the EIS as a result of this comment.*

Comment: The reactors also threaten to degrade our air quality with excessive chlorides and industrial contaminants, creating more health problems for our population. (**0340-3** [Tweeton, Tanya])

Response: *Section 5.7.2 discusses the potential impacts from the cooling-tower salt-drift deposition when using saltwater in the cooling system. Impacts were examined both within the Turkey Point site and in maximum impact locations near the site. No significant increases were found in the salinity levels in the canals or in the nearby environment. Section 5.2.1.3 discuss the potential impacts to the environment from the cooling-tower salt-drift deposition when using treated reclaimed water in the cooling system. The review team considered Florida requirements for reclaimed wastewater and concluded that compliance with Florida requirements for the treatment and use of reclaimed wastewater by FPL would be protective of public health. No change was made to the EIS as a result of this comment.*

Comment: Turkey Point is located on a coastline in an area that is susceptible to hurricanes, flooding, storm surges, and even the possibility of a tsunami. (**0710-3** [Platt, George Seth])

Comment: Hurricane Andrew. This agency, the Nuclear Regulatory Commission, did a complete study on the impacts of Hurricane Andrew, which basically it was a direct impact, August 1992, Cat. 4 hurricane hit, Hurricane Andrew. This is what they identified happened: Loss of all offsite power for more than five days. No offsite power. The plant ran off the generators. Complete loss of communications systems. Closure of the access road. One access road was closed. The high water tank collapsed onto the fire water system rendering the fire protection system inoperable. This is the NRC's report. The potential collapse of the damaged Unit 1 chimney onto the diesel generator buildings. (**0721-22-9** [Schwartz, Matthew])

Comment: What we have here is a problem that really needs to be recognized for what it is. We are on the verge of a possible calamity. Had Hurricane Andrew been ten miles further to the south we wouldn't even be sitting here. They would've had a 17 foot tidal surge instead of just a 5 foot one because of the rotation. (**0721-6-2** [Harris, Walter])

Response: *EIS Section 2.9.1.4 discusses the potential for severe weather events, including hurricanes, at the Turkey Point site. The historical record observed that three hurricanes make landfall per decade within 100 mi of the Turkey Point site. As part of the NRC's site safety review, the staff will consider whether the site is suitable based on the potential for flooding,*

storm surge, and the potential for tsunami. The results of this review will be found in the site Safety Evaluation Report. This issue is not within the scope of the environmental review. No change was made to the EIS as a result of these comments.

Comment: Now, this brings me to the subject of the aerosols. So the new technology brings down most of the aerosols back into the towers, but there is still going to be about 4.2 million gallons a year of this stuff strewn out across the site. We don't know the spatial distribution. The modelers do know; they didn't put it in the Impact Statement. (**0721-2-11** [Stoddard, Philip K.])

Response: *Section 5.7.2 of the EIS discusses the spatial distribution of the salt-deposition analysis from cooling-tower drift using saltwater from the RCWs as the primary cooling-water source. Maximum deposition rates as high as 105 kg/ha/mo were found near the makeup-water reservoir, decreasing to 1 to 70 kg/ha/mo in the cooling canals. Salt-deposition rates greater than 10 kg/ha/mo were generally confined to the Turkey Point site except for areas adjacent to the southeastern portion of the site. No change was made to the EIS as a result of this comment.*

Comment: What's going to be coming out of those cooling towers? What are people going to be breathing in, (**0723-9-17** [Schwartz, Matthew])

Response: *In Section 5.2.1.3, the NRC discusses what is emitted from the cooling towers. Small droplets of water (drift) and salt particles would be emitted from the cooling towers during operation of the power plant. As a result, salt along with any potential contaminants in the cooling water would be deposited on the area surrounding the cooling towers. When using treated reclaimed wastewater for makeup water in addition to salt, priority pollutants (metals and organic compounds) and emerging pollutants of concern (EPOCs) could be contained in the drift. No changes was made to the EIS as a result of this comment.*

Comment: And then she goes on to say, "regarding nuclear energy it is especially important as provided about 12 percent of the State's electricity but accounts for a full 98 percent of the emissions-free electricity." So emission-free electricity. (**0722-9-10** [Riley, Bill])

Comment: I have two articles that I'd like to leave with you. I won't go into them too much other than to say one is in the -- one was in the "Sun Sentinel" by the ex-governor of New Jersey. And just a quick comment quote, "moreover, nuclear energy provides 98 percent of Florida's carbon-free electricity. Because nuclear plants produce no greenhouse gases, Florida has -- reactors have effectively offset 15 billion tons of carbon emissions each year. That equivalence of removing three million cars from the roadways." And that was by Christine Whitman. (**0722-9-8** [Riley, Bill])

Comment: And whereas additional nuclear power generation will provide reliable and cost effective electricity to maintain our standard of living and economic vitality without additional gas emissions. (**0723-2-5** [Trowbridge, Mark])

Response: *These comments provide general information in support of nuclear power. They do not provide any specific information related to the environmental effects of the proposed action. No changes were made to the EIS as a result of this comment.*

Comment: And then I see that it says here that: Additional plan treatment of the reclaimed wastewater prior to use also is expected. Therefore, the actual concentration of these constituents in drift could be either higher or lower. (**0721-11-7** [Roff, Rhonda])

Response: *This statement is in regard to the inhalation screening risk in drift from reclaimed water discussed in Section 5.8.5, Footnote (a) in Table 5-8, indicating "higher or lower" has been revised to indicate "lower" concentration only. Treatment of the reclaimed water should only lower concentration and the conservative estimates used in the air-dispersion modeling (Section 5.2.1.3) also support the conclusion that the estimated concentrations in Table 5-8 are maximum concentrations. Table 5-8 has been revised in response to this comment.*

Comment: My background is as an environmental chemist, so I stress out a lot about things that Mayor Stoddard was talking about, about the aerosol drift and the accumulation. And it is kind of surprising to look at the uncertainties in the EIS regarding that. (**0721-11-1** [Roff, Rhonda])

Response: *Section 5.3.1.1 discusses the impacts of accumulation from aerosol drift. The section broadly discusses the possible impact from salt deposition onto leaves, surface water, and accumulation in soil on vegetation found within and near the facility as well as possible impacts on fish and other wildlife. No changes were made to the EIS as a result of this comment.*

Comment: Air Quality. *Air Quality Criteria Pollutants*. Section 5.7.1 discusses the potential impacts of criteria pollutants associated with operation of Units 6 and 7. The analysis indicates that the principal emissions associated with the new units are emissions of particulate matter with an aerodynamic diameter of 10 microns or less (PM10). Table 5-7 includes estimates of anticipated emissions of criteria pollutants associated with the operation of proposed units 6 and 7. Emission factors from PM10 are cited for the maximum mechanical drift from all six cooling towers. However, it is unclear what assumptions were used to estimate emissions of PM2.5. Section 7.6. l discusses the cumulative impacts of criteria air pollutants and indicates that the operation of Units 6 and 7 cooling towers would result in plumes and salt deposition, including "significant salt deposits" when using make-up water, with the highest concentrations occurring within the Turkey Point site, specifically including deposition on the current industrial cooling canals. Hence, the impacts of salinity of the cooling canals cannot be separated from impacts of the new units. Potential impacts related to interactions of the Unit 6 and 7 cooling towers with the emissions from the stack of the combined-cycle generating Unit 5 were not discussed in the impacts or cumulative impacts sections. The analysis indicates that CALPUFF modelling was performed to determine the impact area, however, this analysis was not included in the appendices. Hence, it is not possible to determine if interactions between these stacks may occur. Of particular concern is the formation of PM2.5 from nitrates, ammonium, or other salts. Table 5-1, which addresses the constituent salts, does not address whether ammonium salts are present. It is not clear from the discussion whether ammonia was not present in samples from the reclaimed water facility, or whether no tests were conducted for this constituent. ***Recommendations:*** EPA recommends that a report documenting the findings of the plume modelling be included in the FEIS appendices, including information on stack height and interaction between the emissions plumes from Units 5, 6, and 7. In addition, EPA recommends clarification of Tables 5-1 and 5-7 or related text to include assumptions used to estimate emissions of PM2.5 from the cooling towers, and the presence of ammonia or ammonium salts related to the use of reclaimed water from the sewage treatment facility. (**0617-2-3** [Mueller, Heinz J.])

Response: *In Section 5.7, Table 5-7 reports particulate matter with an aerodynamic diameter of 10 microns or less (PM_{-10}) and particulate matter with an aerodynamic diameter of 2.5 microns or less ($PM_{-2.5}$) emission rates from cooling towers. The basis for the PM_{10} and the $PM_{2.5}$ emissions for the escape of the dissolved salts that could be emitted from cooling-tower outflow as drift is the peak in PM_{10} and $PM_{2.5}$ emission rate, which occurs at 4,000 ppm total*

dissolved salts for PM_{10} and 5,000 ppm for $PM_{2.5}$ based on the methodology of Reisman and Frisbie (2002-TN1022). The staff identified from the FPL Response to NRC RAI No. 4.2-2 (RAI 5765; FPL 2012-TN263) that based on measurements in reclaimed water ammonia (as N) concentrations ranged from 19.1 to 29.0 mg/L from 5 yearly samples. The maximum ammonia found in the reclaimed water along with the ammonia emissions from Unit 5 was then used as input to the CALPUFF dispersion model to determine the maximum ammonia concentrations in the ambient air that would be available to interact with Unit 5's emissions of oxides of sulfur (SO_x) and nitrogen oxides (NO_x). The maximum 24-hour and annual average ammonia concentrations were 14.7 and 0.60 ppb, respectively. A background concentration of 0.35 ppb was added to these modeled concentrations to estimate maximum ammonia concentration levels. The background concentrations were based on monitoring data for a suburban Florida location (Saylor et al. 2015-TN4605). These ammonia concentrations were then used as the background ammonia level in the CALPUFF model. The conservative MESOPUFF II chemical scheme option in the model was applied to predict nitrate and sulfate particulate matter concentrations. In response to RAI 8508 FPL provided the location of the Unit 5 exhaust stacks, ammonia, SO_x and NO_x emission rates for the annual average and maximum short-term period (FPL 2016-TN4501). These emissions were then modeled with CALPUFF to determine the maximum annual average and 24-hour sulfate and nitrate aerosol concentration. Results from these simulations showed that the maximum increase in total particulate matter concentration (sulfate plus nitrate) for 24-hour average was less than 0.05 $\mu g/m^3$ and long-term was less than 0.0003 $\mu g/m^3$. These changes would be difficult to measure and are less than 0.2 percent of the national ambient air quality standard. On this basis, the review team concludes that the impacts of Unit 5 operating concurrently with the cooling towers of Units 6 and 7 on air quality would be SMALL and warrant no further mitigation.

Comment: Inconsistencies identified in draft EIS and ER, Rev 6: Subsection 2.9.4, Page 2-210, Lines 8-9 "... backup meteorological tower is located about **0.4 mi northwest** of...proposed Units 6 and 7." ER Subsection 6.4.2.2 "...the LU tower is currently approximately **0.30 miles northwest** of Units 6 & 7...." (**0619-2-22** [Maher, William])

Response: *The text in Section 2.9 was revised to be consistent with Revision 6 of the ER.*

E.2.15 Comments Concerning Health - Nonradiological

Comment: I am concerned as well about the health and well being of individuals, including children who live close to the lines as I believe that there is the potential of cancer from these high voltage power lines. Whether you believe that there is or is not such danger, it has not yet been sufficiently negated by any study that I have read, and you should err towards caution as opposed to err towards risk. Also, the people who traverse the area regularly (as there is a bike path/walking path adjacent to SW 151 Avenue) would also be placed at risk. (**0073-5** [Commenters, Multiple])

Comment: 5. The health and well being of individuals, as well as the people who traverse the area regularly on bikes or on foot, including children who live close to these proposed lines, is a real cancer concern. Whether or not you choose to acknowledge this danger, keep in mind that such has not been negated by any study I have read and it is always better to err towards caution. Should these lines be placed in the neighborhood, they should be buried underground to a level that will not pies a threat to those traversing the area or to the neighborhood. (**0077-4** [de Armas, Maria Cristina])

Comment: We all know that High voltage transmission towers produce an unhealthy environment even making sick to people who live under these towers. (**0088-7** [Lange, Alexandra])

Comment: The lines that will carry this high voltage for miles to its ultimate use will be going through populated areas that cannot be protected adequately from the electro-magnetic radiation. (**0337-3** [Philips, Sally B.])

Comment: I am concerned as well about the health and well being of individuals, including children who live close to the lines. Whether you believe that there is or is not such danger, it has not yet been sufficiently negated by any study that I have read, and you should err towards caution as opposed to err towards risk. Also, the people who traverse the area regularly (as there is a bike path/walking path adjacent to SW I st A venue) would also be placed at risk. (?) (**0685-2** [Batista, Carlos])

Comment: [W]e're going to have hundred plus lines on poles running down on street on First Avenue from U.S. 1, through our neighborhood, I'd say 150 feet from my home. Homes around me, including homes where kids are, there are babies, there are toddlers, they are teenagers, and there are us, and we don't want it. I don't care whether you believe in that radiation or not. Wouldn't you want to err on the side of caution? (**0721-26-1** [Koenigsberg, Linda])

Comment: Also, I mean, you know, I'm concerned for the health and safety of everyone in the Roads. My neighbors and myself included, especially children who live close to the lines that because, you know, there could be cancer risks with those high voltage lines right there to everyone. And so, you know, I don't know why we need to put ourselves at risk of cancer and other problems with those things there that nobody wants. (**0721-31-8** [Almirola, Alejandro])

Response: *These comments relate to the impacts of the electromagnetic fields (EMFs) associated with the transmission lines and the applicable regulatory standards. As discussed in Sections 3.2.2.3 and 5.8.3 of the EIS, all transmission lines would comply with National Electric Safety Code (NESC) provisions, which are protective of human health. No change was made in the EIS as a result of these comments.*

Comment: DEIS Section 4.8, Page 4-129, Lines 14-16: The DEIS states: "Extrapolating from data in the ER (FPL 2014-TN4058), in 2010 approximately **87,000 people** lived within 10 mi of the site and approximately **50,000 others** are estimated to have worked or visited within this radius..." The DEIS references the ER for this data; however, ER Table 2.5-1 and FSAR Subsection 2.1.3.1 show **192,594 combined residents and transients** within 10 miles of Turkey Point. FSAR Subsection 2.1.3.3 indicates that 53,547 of these people are transients. Subtracting yields **139,047 residents, not 87,000**. (emphasis added) (**0619-4-13** [Maher, William])

Response: *The text in EIS Section 4.8, Nonradiological Human Health, regarding population numbers within 10 mi of the site was updated to be consistent with data provided in the FSAR (Final Safety Analysis Report), Subsection 2.1.3.3.*

Comment: Numerical value inconsistencies within the draft EIS: Subsection 2.10.1.2, Page 2-212, Lines 36-39 "As seen in Table 2-57, rates of injuries and illnesses per 100 full-time workers for years 2003-2010 in the **heavy and civil engineering construction sector**-- an important sector baseline for assessing building impacts (Chapter 4) -- ranged from 3.8 to 5.9 for the United States and **2.4** to 7.0 for Florida." DEIS Subsection 4.8.1.2, Page 4-130, Lines 21-23 DEIS Table 2-57 "As noted in Section 2.10, the total recordable cases rate published by the BLS for 2010 for **heavy and civil engineering construction** was 3.8 per 100 full-time workers

in the United States overall and **3.4** per 100 full-time workers in Florida." DEIS Table 2-57 indicates, for the heavy and civil engineering construction sector for Florida, the range is **3.4** to 7.0 per 100 full-time workers in Florida. (**0619-2-32** [Maher, William])

Comment: Numerical value inconsistencies within the draft EIS: Subsection 2.10.1.2, Page 2-214, Lines 15-16 "As seen in Table 2-58, fatal injury rates for utility operations ranged from 3.6 to **6.1** per 100,000 workers." DEIS Table 2-58 DEIS Table 2-58 indicates the range is 3.6 to **6.3**. (**0619-2-33** [Maher, William])

Comment: DEIS Subsection 4.8.2, Page 4-132, Lines 21-32: The DEIS states: "Similarly, the nearest residences at Homestead Bayfront Park (2.7 mi from the proposed units)...which would be close to the measured **background** noise levels of 49.4 dBA for the daytime and **47.3 dBA for the nighttime**...The day-care facility (2 mi from the proposed units), would experience a maximum noise level during the site preparation and construction phase of about 49**.6 dBA during the daytime** and **51.1 dBA during the nighttime**..." The data in this paragraph references the noise study in the Site Certification Application (SCA). However, Table 5.7.4-3 (and Table 5.7.4-5) of the SCA reports the **background nighttime** sound pressure level for site S7 (Homestead Bayfront Park) value to be **47.2 dBA**. Additionally, the maximum sound pressure level for site S6 (day-care facility) during pre-construction and construction as reported from the noise study in the Site Certification Application (SCA), Table 5.7.4-4 of the SCA, are **50.2 dBA for daytime** and **50.4 dBA for nighttime for preconstruction**. And, Table 5.7.4-6 on construction reports **49.2 dBA for daytime** and **49.5 dBA for nighttime**. The DEIS is reporting values for site S5 (the northern FPL boundary). (emphasis added) (**0619-4-14** [Maher, William])

Response: *The text in the Nonradiological Human Health Sections 2.10 and 4.8 of the EIS was revised to be consistent with the referenced material.*

Comment: The vented hot steam will likely contain household chemicals, pharmaceuticals, bacteria and viruses that end up in the county's wastewater. Even in small amounts, these can affect human health[.] (**0078-6** [Wilansky, Laura Sue])

Comment: Aerosol droplets known as "drift" can travel far and contain pharmaceuticals, cleaners, and detergents and other household chemicals as well as bacteria which can grow inside the cooling towers themselves as bacterial slime. This all impacts the human environment as well as dozens of threatened species in the vicinity. (**0153-2** [Goldman, Emanuel])

Comment: Aerosol droplets known as "drift" can travel far and contain pharmaceuticals, cleaners, detergents and other household chemicals, as well as viruses and bacteria (which can grow inside the cooling towers themselves as bacterial slime). Impacts on the human environment as well as on dozens of endangered and threatened species in the vicinity are largely unknown. (**0240-4** [Commenters, Multiple])

Comment: The vented hot steam will likely contain household chemicals, pharmaceuticals, bacteria and viruses that end up in the countys wastewater. Even in small amounts, these can affect human health. (**0353-4** [Royce, M.])

Comment: The vented hot steam will likely contain household chemicals, pharmaceuticals, bacteria and viruses that end up in the countys wastewater. Even in small amounts, these can affect human health[.] (**0356-10** [Shlackman, Jed])

Comment: I do NOT want a CHANCE of the vented hot steam which likely contains household chemicals, pharmaceuticals, bacteria and viruses ending up in the countys wastewater. Even in small amounts, these can affect human health. (**0362-2** [Hurley, Paula])

Comment: The vented hot steam will likely contain household chemicals, pharmaceuticals, bacteria and viruses that end up in the county's wastewater. Even in small amounts, these can affect human health[.] (**0366-4** [Griffith, Ed and Harriet])

Comment: The vented hot steam will likely contain household chemicals, pharmaceuticals, bacteria and viruses that end up in the countys wastewater. (**0370-9** [Vayu, Satya])

Comment: The primary source of cooling water for the proposed Turkey Point 6 and 7 reactors is waste water from Miami. Some of this water will be turned into steam and released into the surrounding environment, along with its constituent pesticides, inorganic solvents, industrial wastes, household chemicals, and dissolved pharmaceuticals. This waste water turned into steam will spread out into clouds over the entire population of Miami-Dade and Broward counties and rain down on the population with its chemical, waste, and pharmaceutical components, creating polluted air vapors and polluted rainfall. (**0615-2-19** [Bethune, David])

Comment: It seems that the ingredients for a 'Perfect Storm' are being assembled as I read that you will also be adding 'wastewater' to the mix with its intendant biohazards. (**0639-3** [Haselhurst, Richard])

Comment: There is nothing safe about two new 1,117 megawatt nuclear reactors being built on Floridas east coast, especially because they will be cooled by 90 million gallon per day of recycled Miami-Dade County sewage and wastewater. This water will not be pure water and some will be released over Biscayne Bay and surrounding wetlands along with steam in the planned cooling towers. Aerosol droplets known as "drift" can travel far and contain pharmaceuticals, cleaners, detergents and other household chemicals, as well as viruses and bacteria (which can grow inside the cooling towers themselves as bacterial slime). Impacts on the human environment as well as on dozens of endangered and threatened species in the vicinity are largely unknown. (**0674-2** [Dwyer, Karen])

Comment: The vented hot steam will likely contain household chemicals, pharmaceuticals, bacteria and viruses that end up in the countys wastewater. Even in small amounts, these can affect human health[.] (**0676-6** [Kassel, Kerul])

Comment: [W]e have all kinds of contaminants through drift; we have waste products to manage. I look at the list of chemicals including the metals, including the anti-scaling, including the things that we know are toxic, including the things that are considered endocrine disruptors. We don't know what safe level they are. We don't know their synergistic effects. (**0721-11-6** [Roff, Rhonda])

Comment: [F]or the rest of the year chemically laden reclaimed water with descaling chemicals added to the water by FPL will fall within a 1 mile radius. This will fall on workers there, and on already salinity challenged cooling canals for Turkey Point 3 and 4. (**0721-12-3** [White, Barry J.])

Comment: There's a whole panoply of chemicals that are listed, many of them are endocrine disruptors. The amounts are small, but endocrine disruptors work in small amounts. There is nothing in the Environmental Impact Statement that lets a scientist, such as myself, determine what safe levels actually are relative to the levels that are going to be produced. Furthermore, at

the National Pesticide Forum this weekend, everybody was talking about synergistic effects, all the major eco-toxicologists who study endocrine disruptors, talk about synergistic effects. There's no indicator of synergistic effects in the Environmental Impact Statement. (**0721-2-12** [Stoddard, Philip K.])

Comment: Let's look at the cooling towers a little bit and these 90 million gallons a day of wastewater that they're going to be putting in there. What's in that wastewater? I want to know everything that's in that wastewater. We, as people, need to know what's going into --excuse me, we just had a meltdown --what's going in to this wastewater that they're pouring through this nuclear power plant? Is it going to be pure H2O? No. I started reading the research from people who deal with wastewater experts, engineers. It ain't pure. There's thousands --think of everything you buy at a CVS. Think about all the things we put down our toilet bowls; the cleaning fluids, the pharmaceuticals, the bacteria, the viruses. All of that's going into that wastewater. How clean could they get it? It ain't pure. (**0721-22-12** [Schwartz, Matthew])

Comment: We've heard about the 90 million gallons of wastewater, the chemicals and the pollutants that would be in that water, how that water is going to be disbursed, aerosolized[.] (**0721-28-6** [Wilansky, Laura Sue])

Response: *These comments express concern that the use of reclaimed wastewater for cooling of Turkey Point Units 6 and 7 could result in the release of additional etiological and chemical agents in the cooling-tower drift. Sections 5.3.1 and 5.3.2 discuss the relative deposition of a number of contaminants of concern that may be present in reclaimed wastewater and concluded that the expected trace amounts would have negligible effects due to the extremely low concentration and dilution in receiving water bodies. The review team considered Florida requirements for reclaimed wastewater and concluded that compliance with Florida requirements for the treatment and use of reclaimed wastewater by FPL would be protective of public health. No changes were made to the EIS as a result of these comments.*

Comment: Nuclear expansion is not going to be good for public health or environment at Biscayne National Park. Why don't you really admit this? One more dollar profit is really not everything to you, is it? (**0726-1** [Poolos, Hazel])

Response: *The EIS was developed to disclose the environmental and health impacts of building and operating the proposed Turkey Point Units 6 and 7. The impacts of building the units are described in Chapter 4 and the impacts of operating the units are described in Chapter 5. Nonradiological health impacts are described in Sections 4.8 and 5.8 of the EIS. Section 5.9 of the EIS describes the radiological impacts of operating the proposed units. No changes were made to the EIS in response to this comment.*

Comment: Inconsistencies identified in draft EIS and ER, Rev 6: Subsection 4.8.1.2, Page 4-130, Lines 31-33 "The resulting estimates are an annual average of **89** (based on U.S. data) and **96** (based on Florida data) recordable cases and a peak 12-month amount (months 34 to 45) of **162** (U.S.) and **174** (Florida) recordable cases." ER Table 4.8-1 ER Table 4.8-1 indicates: the Incidence at US Rate annual average as **86**; TRC Incidence at FL Rate annual average as **93**; TRC Incidence at US Rate Peak 12-month period as **161**; and TRC Incidence at FL Rate 12-month period as **173**. (DEIS values are consistent with an earlier revision for the source.) (**0619-2-26** [Maher, William])

Comment: DEIS Section 4.8, Page 4-129, Lines 12-13: The DEIS states: "The area south and southwest of the site consists primarily of marshland and glades, and contains no resident

human population." However, ER Table 2.5-1 shows 2,249 people living to the south (ranging from 5 to 30 miles) and 15 people living to the southwest (ranging from 40 to 50 miles). (**0619-4-12** [Maher, William])

Response: *The text in Section 4.8 was revised to be consistent with Revision 6 of the ER.*

Comment: The FEIS should include detailed information regarding impacts associated with potential exceedances of the NNC. The Florida Department of Environmental Protection (FDEP) approved NNC water quality standards for estuaries including Biscayne Bay. However, there is no discussion in the DEIS regarding the project's potential impacts regarding the NNC and Biscayne Bay. (**0617-1-35** [Mueller, Heinz J.])

Comment: EPA acknowledges that there are no current exceedances of the NNC. However, the DEIS should evaluate the future project in the context of potential NNC impacts and possible related algal blooms beyond the IWF. EPA requests that the NRC better describe the existing condition of the current operations of Units 3 and 4 and related water quality impacts in the FEIS and, if available, disclose the results of the FPL studies discussed in the DEIS. The EPA is concerned that the combined and additional wastewater discharges into the IWF could potentially lead to exceedances of the NNC.

Recommendations: The EPA is concerned that the proposed project could cause NNC exceedances within Biscayne Bay, and requests that more detailed information be provided in the FEIS. Specifically, EPA requests that the NRC consider the additive effects of all the wastewater being placed into the IWF. The FEIS should describe how the additional wastewater discharges to the IWF could potentially impact the Biscayne Aquifer, potentially increase NNC levels within Biscayne Bay and the potential for the algal bloom to expand beyond the IWF. (**0617-1-36** [Mueller, Heinz J.])

Response: *Compliance with Numerical Nutrient Criteria (NNC) is a regulatory responsibility of the FDEP, not the NRC or USACE. The NNC is only of interest in this review inasmuch as it helps inform the aquatic ecologists about the thresholds of potential impacts to the aquatic ecosystems. Nonetheless, the review team did consider the incremental increase in nutrients in Biscayne Bay from drift, which is the only new source of nutrients associated with the proposed units. The staff also considered drainage and leakage from muck as a source of nutrients to the canals. While these nutrients are not new to the local environment, they would likely become more mobile and available for movement outside the boundaries of the IWF. The review team has acknowledged the subsurface migration of hypersaline water, but as discussed in Appendix G, determined that upward migration into the affected environment would be minor. Therefore, the minor incremental increase in nutrient concentration and minor potential for entering the surface of the Bay itself would be minor impact. No changes to the EIS were made based on these comments.*

E.2.16 Comments Concerning Health - Radiological

Comment: ESE breezes prevail, any mishap and where do you think that takes the contamination, directly over the largest concentration of human beings south of. Hello is anybody thinking?? (**0065-1** [Wilson, J. D. Bruce])

Comment: As previously mentioned, there is no way to guarantee that some, or many of these substances will not find their way into the local environment. Some of these substances have a

halflife of 80 million to over 700 million years! Can FPL, or the NRC guarantee they will be contained for all of that time? None of us know how to do that. (**0078-9** [Wilansky, Laura Sue])

Comment: Nuclear advocates frequently state that both xenon and krypton decay and disappear in a matter of seconds or minutes. What they don't tell us is that these isotopes decay into daughter isotopes that are extremely deadly emitters. Many credible physicians, scientists and other nuclear experts -- free of the self-interests of nuclear profits, academic sponsorship or career advancement -- have outlined the absence of epidemiological studies of certain radionuclides emitted or flushed at nuclear reactors. Dr. Helen Caldicott has elaborated the detrimental health effects of the noble gases xenon (Xe) and krypton (Kr), and she notes that these have appearance hundreds of miles from reactors believed to have emitted them. --Xenon 137, with a half-life of 3.9 minutes, converts almost immediately to the notoriously dangerous cesium 137 with a half-life of thirty years. --Krypton 90, half-life of 33 seconds, decays to rubidium 90, half-life of 2.9 minutes, then to the medically toxic strontium 90, half-life of twenty-eight years. --Xenon 135 decays to cesium 135 with an incredibly long half-life of 3 million years. --Large amounts of xenon 133 are released at operating reactors, and although it has a relatively short half-life of 5.3 days, it remains radioactive for 106 days. --Krypton 85, which has a half-life of 10.4 years, is a powerful gamma radiation emitter. --Argon 39 has a 265-year half-life (**0264-4** [Dwyer, John P.])

Comment: All reactors as part of normal operations regularly emit radioactive material into both the air and the cooling water used [to] manage the heat produced by the reactors. Radioactivity generated by the mining of uranium, the ore refining and enriching facilities, the fission process in reactors and the toxic radioactive waste all pose a danger to human life. Radioactive emissions that are a necessary product of nuclear power generation are linked to cancer, birth defects, developmental delays in children, reproductive problems and other chronic health issues such as heart disease. (**0511-3** [Draper, Lonnie M.])

Comment: This is simply very dangerous to our health! (**0524-1** [Garcia, Alda S.])

Comment: The NRC cannot persist in a shell game that pretends radiation isn't both a safety and environmental concern. (**0615-1-11** [Bethune, David])

Comment: The most serious shortcomings in the draft EIS relate to radiation releases and accident mitigation. Although the staff present at last night's meeting tried to shift questions about radiation off to a closed-door safety review which does not allow public participation, the truth of the matter is that safety and environmental impact cannot be separated when it comes to the manufacture and release of fission products, whether intentional or unintended. Every radioactive isotope created at the proposed plants is both a safety hazard and an environmental hazard. (**0615-1-8** [Bethune, David])

Comment: Even precluding their release, the mere creation of radioactive isotopes such as plutonium with its 24,000 year half life poses unavoidable risks to health and the environment. (**0615-1-9** [Bethune, David])

Comment: I have family in Florida,and am very aware of the high radiation levels they are being exposed to daily! Miami has had rad levels above 450 counts per minute almost daily! anything above 50 cpm is shelter in place! (**0624-2** [Galles, Camilla])

Comment: People need to check netc.com to know what we are all being poisoned with at present, and go to enenews.com to find out just what is coming your way from the nuclear power plants already spreading their poison every time they refuel! (**0624-3** [Galles, Camilla])

Comment: There is no safe dose and we're risking the human genome. It's madness. It's cruel to the people in the area and everyone downwind, not to mention downstream. To extend this is random premeditated murder in my opinion. It is a crime against humanity and our unborn children as well. (**0644-3** [Anonymous, Anonymous])

Comment: As previously mentioned, there's no way to guarantee that some or many of these substances will not find their way into the local environment. Some of them have a half-life of 80 million to over 700 million years. Can FP&L or the NRC or any of us guarantee that they'll be contained for all that time? We can't do that. (**0721-28-9** [Wilansky, Laura Sue])

Response: *The NRC's primary mission is to license and regulate the Nation's civilian use of radioactive materials to protect public health and safety, promote the common defense and security, and protect the environment. The NRC's regulatory limits for radiological protection are set to protect workers and the public from the harmful health effects of ionizing radiation on humans. The limits are based on the recommendations of standards-setting organizations. The NRC radiation standards reflect extensive scientific study by national and international organizations and incorporate conservative assumptions and models to account for differences in gender and age so as to ensure that workers and all members of the public are adequately protected from radiation.*

The NRC disagrees with the comments that "[t]here is no safe dose" or that the existing population in the area of the Turkey Point site is exposed to high levels of radiation. The dose standards are set conservatively by NRC based on the conclusions and recommendations of numerous national and international expert panels in part to account for the potential uncertainties. These dose standards are based on the linear, no-threshold dose-response model described in the Biological Effects of Ionizing Radiation (BEIR) VII report. The report states "Lower doses would produce proportionally lower risks." It does continue to support the conclusion that there is some amount of cancer risk associated with any amount of radiation exposure and the risk increases with exposure and exposure rate. It also concludes that the risk of cancer induction at the dose levels in the NRC's and EPA's radiation standards is very small.

As reported to the Commission in SECY-05-0202 (Staff Review of the National Academies Study of the Health Risks From Exposure to Low Levels of Ionizing Radiation (BEIR VII) - October 29, 2005), the staff stated "that the findings presented in the National Academies BEIR VII report contribute to our understanding of the health risks from exposure to ionizing radiation. The major conclusion is that current scientific evidence is consistent with the hypothesis that there is a linear, no-threshold dose response relationship between exposure to ionizing radiation and the development of cancer in humans. This conclusion is consistent with the system of radiological protection that the NRC uses to develop its regulations. Therefore, the NRC regulations continue to be adequately protective of the public health and safety and the environment."

As discussed in Sections 2.11 and 5.9.6 of this EIS, the amount of radioactive material released from nuclear power facilities is well measured, well monitored, and known to be very small. The doses of radiation received by members of the public as a result of exposure due to nuclear power facilities are very low (i.e., less than a few millirem). To put this in perspective, the

average dose per individual in this country is approximately 360 millirems from natural sources of radiation (NRCP Report # 160 (NRCP 2009-TN420)). Radiation from natural and man-made sources is not different in its properties or effects. To ensure that the nuclear power plants are operated safely within radiation protection requirements, the NRC licenses the plants to operate, licenses the plant operators, and establishes license conditions for the safe operation of each plant. The NRC provides continual oversight of plants through its Reactor Oversight Process to verify that they are being operated in accordance with NRC rules and regulations.

The comments do not provide any information that was not already considered in the evaluation in the draft EIS, and no changes were made to the EIS as a result of these comments.

Comment: The municipalities of Homestead and Florida City have allowed extensive residential development east of U.S. and within a few miles of the Turkey Point plant. Moreover, most of the most populous areas of Miami-Dade County are downwind of the plant and within a few dozen miles of it. Please note the following: The RPHP "Tooth Fairy Project-" grew out of the work of Dr. Jay Gould, Director of the Radiation and Public Health Project (RPHP) and author of The Enemy Within: The High Cost of Living Near Nuclear Reactors. By analyzing 50 years of US National Cancer Institute data, Dr. Gould proved that.....of the 3,000-odd counties in the United States, women living in about 1,300 nuclear counties (located within 100 miles of a reactor) are at the greatest risk of dying of breast cancer. Dr. Gould found even higher risks for prostate cancer among men living in nuclear counties. (**0093-4** [DuPriest, William Robert])

Response: *As presented in the public summary introduction of the BEIR VII report (National Research Council 2006-TN296), the health risks from exposure to radiation are related to the dose one receives:*

"Specifically, substantial evidence exists that exposure to high levels of ionizing radiation can cause illness or death. Further, scientists have long known that in addition to cancer, ionizing radiation at high doses causes mental retardation in the children of mothers exposed to radiation during pregnancy. Recently, data from atomic bomb survivors suggest that high doses are also connected to other health effects such as heart disease and stroke."

And,

"This report, BEIR VII, focuses on the health effects of low levels of low linear energy transfer (LET) ionizing radiation. Low-LET radiation deposits less energy in the cell along the radiation path and is considered less destructive per radiation track than high-LET radiation. Examples of low-LET radiation, the subject of this report, include X-rays and γ-rays (gamma rays). Health effects of concern include cancer, hereditary diseases, and other effects, such as heart disease."

The occurrence of cancers is known to be related to a number of factors, including age, sex, time, and ethnicity, as well as exposure to environmental agents such as ionizing radiation. Understanding the role of exposure in the occurrence of cancer in the presence of modifying effects is a difficult problem. Contributing to the difficulty are the stochastic nature of cancer occurrence, both background and exposure related, and the fact that radiogenic cancers are indistinguishable from nonradiogenic cancers. Therefore, the BEIR committees have judged that the linear no-threshold model (LNT) provided the most reasonable description of the relation between low-dose exposures to ionizing radiation and the incidence of solid cancers that are induced by ionizing radiation.. Simply stated, the NRC currently assumes that any increase in dose, no matter how small, results in an incremental increase in health risk.

The NRC accepts this theory as a conservative model for estimating health risks from radiation exposure and recognizes that the model probably overestimates those risks. On the basis of this theory, the NRC conservatively establishes limits for radioactive effluents and radiation exposures for workers and members of the public, as found in 10 CFR Part 20.

As discussed in Sections 2.11 and 5.9, the amount of radioactive material released from Turkey Point Units 3 and 4 is well measured, well monitored, and known to be very small. Based on this operational experience and the new facility design, the NRC believes that the amount of radioactive material to be released from the Turkey Point, Units 6 and 7 would also be well measured and well monitored, and the NRC also believes the release would be very small. The total whole body dose from both ingested radionuclides due to liquid and gaseous releases and direct radiation from the Turkey Point site is and would be negligible compared with the public's exposure from natural background radiation alone (approximately 360 mrem per year), and 620 millirem per year from the combination of natural background, medical irradiation, and radiation from consumer products (NRCP 2009-TN420).

Although a number of studies of cancer incidence in the vicinity of nuclear power facilities have been conducted, there are no studies to date that are accepted by the scientific community that show a correlation between radiation dose from nuclear power facilities and cancer incidence in the general public. Specific studies accepted as scientifically valid include:

- *In 1990, at the request of Congress, the National Cancer Institute conducted a study of cancer mortality rates around 52 nuclear power plants and 10 other nuclear facilities. The study covered the period from 1950 to 1984 and evaluated the change in mortality rates before and during facility operations. The study concluded that there was no evidence that nuclear facilities may be linked causally with excess deaths from leukemia or from other cancers in populations living nearby.*
- *In June 2000, investigators from the University of Pittsburgh found no link between radiation released during the 1979 accident at the Three Mile Island power plant and cancer deaths among nearby residents. Their study followed 32,000 people who lived within 5 mi of the plant at the time of the accident.*
- *In January 2001, the Connecticut Academy of Sciences and Engineering issued a report on a study around the Haddam Neck nuclear power plant in Connecticut and concluded that radiation emissions were so low as to be negligible.*
- *The American Cancer Society (ACS) in 2001 concluded that although reports about cancer clusters in some communities have raised public concern, studies show that clusters do not occur more often near nuclear plants than they do by chance elsewhere in the population.*

Likewise, the ACS report found no evidence that links strontium-90 with increases in breast cancer, prostate cancer, or childhood cancer rates. The ACS also found that radiation emissions from nuclear power plants are closely controlled and involve negligible levels of exposure for nearby communities.

Also in 2001, the Florida Bureau of Environmental Epidemiology reviewed claims that there are striking increases in cancer rates in southeastern Florida counties caused by increased radiation exposures from nuclear power plants. Using the same data to reconstruct the calculations on which the claims were based, Florida officials were not able to identify unusually

high rates of cancers in these counties compared with the rest of the state of Florida and the nation.

- *In 2000, the Illinois Public Health Department compared childhood cancer statistics for counties with nuclear power plants to similar counties without nuclear plants and found no statistically significant difference.*

The NRC has reviewed a number of studies by the Radiation Public Health Project (RPHP) that assert that levels of radioactive strontium-90 are rising in the environment and that these increased levels are responsible for increases in cancers, particularly cancers in children, and infant mortality. The group claims that radioactive effluents from nuclear power plants are directly responsible for the increases in strontium-90. In one study, researchers reported that strontium-90 concentrations in baby teeth are higher in areas around nuclear power plants than in other areas. This has sometimes been referred to as "The Tooth Fairy Project." However, as discussed in a background paper prepared by the NRC, (http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/tooth-fairy.pdf), numerous peer-reviewed, scientific studies do not substantiate the RPHP claims, and the NRC finds that there is little or no credibility in the RPHP's studies.

As presented in the above NRC backgrounder, approximately 99 percent of strontium-90 in the environment came from atmospheric testing of nuclear weapons. The second largest source of strontium-90 in the environment was the Chernobyl accident. The amount of strontium-90 from all commercial nuclear power plants is a tiny fraction of the amount from Chernobyl. The estimated radiation dose from all sources of strontium-90 in the environment is approximately 0.3 percent of the dose that the average person in the United States receives from natural background radiation. These dose levels are well below the levels that are known to cause any health effects. The NRC requires nuclear power plant licensees to monitor the releases of radioactivity from their facilities to the environment and to annually report these releases to the NRC. Additionally, these licensees are required to monitor the environment around their facilities and report results annually to the NRC. The NRC routinely inspects these aspects of nuclear power plant licensee performance.

Due to the concern about the issues regarding the increased cancer rates raised by the RPHP, the Florida Department of Health (FDOH) chose to also look at the cancer rates using the same data used by RPHP. Staff from the Bureau of Environmental Epidemiology interviewed the RPHP staff to determine the source of data and then performed their own calculations and graphed the results (FDOH 2001-TN4744). Overall the FDOH could not identify any unusually high rates of cancers in the area. While some county rates appear higher than state and national trends and some appear lower, this variation is within the expected, statistical variation, meaning the variation would be expected to occur by chance. These rates fluctuate from year to year and in some situations large fluctuations occur with a small number of cases in small underlying county populations. Therefore, the claim by the RPHP that there are elevated rates of cancer in the vicinity of the plant are unsubstantiated and refuted by the State of Florida study.

No changes were made to the EIS as a result of these comments.

Comment: Don't you know that the radiation monitors in Florida for EPA have been long since TURNED OFF to conceal form the people of Florida how they are already impacted from the wind currents coming in from Fukushima? (**0628-2** [Anonymous, Anonymous])

Response: *Given the great distances between Fukushima Dai-ichi and the United States and the large amount of dilution and dispersion that would occur over this distance, only a trace amount of radioactivity was detected in the United States from this event. Based on the environmental measurements made to date by government agencies and non-government organizations, the Fukushima Dai-ichi accident has had no detectable impact on human health in the United States. In particular, the EPA's air monitoring data have not shown any radioactive elements associated with the damaged Japanese reactors since late 2011, and even then, the levels found were very low—always well below any level of public health concern (EPA 2015-TN4217).*

No changes were made in the EIS as a result of this comment.

Comment: Nuclear power plants also release dangerous radiation into the air and water during their daily operations. This radiation is linked to all kinds of cancers, heart disease, diabetes, birth defects, miscarriages, thyroid problems, leukemia, the list goes on and on. (**0603-2** [Anonymous, Anonymous])

Comment: During refueling, nuclear power plants can release up to 1,000X the amount of radiation and Dr. Ian Fairlie believes this is what causes the increases in childhood leukemias around nuclear power plants. (**0603-3** [Anonymous, Anonymous])

Comment: Let's discuss the childhood leukemias and cancer deaths that researchers say arecaused by nuclear energy:

Quote from Dr. Ernest Sternglass ---> The official measurements carried out by the Office ofRadiological Health, and by the government, and the Public HealthService, they measured the radiation doses around the first bigreactors in Dresden near Chicago, and they found that indeed therewere doses almost as high as half of the normal background, andaccording to Dr. Stewarts finding, that would mean an increaseof 40-50% in childhood cancers and leukemias around the fence ofevery nuclear plant. SOURCE: youtube /watch?v=hN7rcjSnxZs. (**0603-4** [Anonymous, Anonymous])

Comment: Let's also not forget Dr. John Gofman's research which states that approximately 1,600 CANCER DEATHS PER YEARcan becaused by EACHnuclear power plant. (**0603-5** [Anonymous, Anonymous])

Comment: While the potential public health effects are much less significant than some of the other issues everyone has talked about tonight, I think they do bear mention. At least one study found increased thyroid problems in areas near nuclear plants in the Northeast, and there have been studies from the U.S. and abroad correlating some forms of leukemia with proximity to nuclear plants. Despite no family history of leukemia, I lost a parent to leukemia a couple years ago. (**0721-32-3** [Schlackman, Mara])

Response: *The NRC's primary mission is to protect the public health and safety and the environment from the effects of radiation from nuclear reactors, materials, and waste facilities. The NRC's regulatory limits for radiological protection are set to protect workers and the public from the harmful health effects of radiation on humans and can be found in 10 CFR Part 20 (Standards for Protection Against Radiation). The limits are based on the recommendations of standards-setting organizations. Radiation standards reflect extensive scientific study by national and international organizations (International Commission on Radiological Protection [ICRP], National Council on Radiation Protection and Measurements*

[NCRP], United Nations Scientific Committee on the Effects of Atomic Radiation [UNSCEAR], and the National Academy of Sciences [NAS]) and are conservative to ensure that the public and workers at nuclear power plants are protected.

Health effects from exposure to radiation are dose-dependent. At low doses, radiation can be responsible for inducing cancers such as leukemia, breast cancer, and lung cancer. At very high doses (several hundred rem or higher) and dose rates, radiation has been known to cause prompt (or early, also called acute) effects, such as vomiting and diarrhea, skin burns, cataracts, and even death.

Currently, there are no scientifically conclusive data that unequivocally establish the occurrence of cancer following exposure to low doses, below about 0.1 Sv (10 rem). However, radiation protection experts conservatively assume that any amount of radiation may pose some risk of causing cancer and that the risk is higher for higher radiation exposures. Therefore, a linear, no-threshold dose response relationship is used to describe the relationship between radiation dose and cancer induction. Simply stated, any increase in dose, no matter how small, results in an incremental increase in health risk. The NRC accepts this theory as a conservative model for estimating health risks from radiation exposure and recognizes that the model probably overestimates those risks. On the basis of this theory, the NRC conservatively establishes limits for radioactive effluents and radiation exposures for workers and members of the public, as found in 10 CFR Part 20.

The amount of radioactive material released from Turkey Point Units 3 and 4 is well measured, well monitored, and known to be very small. Based on this operational experience and the new facility design, the NRC believes that the amount of radioactive material to be released from the Turkey Point Units 6 and 7 would also be well measured and well monitored, and the NRC also believes the release would be very small. The total whole body dose from both ingested radionuclides due to liquid and gaseous releases and direct radiation from the Turkey Point site is and would be negligible compared with the public's exposure from natural background radiation, medical irradiation, and radiation from consumer products of more than 300 millirem per year.

Although a number of studies of cancer incidence in the vicinity of nuclear power facilities have been conducted, there are no studies to date that are accepted by the scientific community that show a correlation between radiation dose from nuclear power facilities and cancer incidence in the general public. Specific studies that have been conducted include:

- *In 1990, at the request of Congress, the National Cancer Institute conducted a study of cancer mortality rates around 52 nuclear power plants and 10 other nuclear facilities. The study covered the period from 1950 to 1984 and evaluated the change in mortality rates before and during facility operations. The study concluded that there was no evidence that nuclear facilities may be linked causally with excess deaths from leukemia or from other cancers in populations living nearby.*
- *In June 2000, investigators from the University of Pittsburgh found no link between radiation released during the 1979 accident at the Three Mile Island power plant and cancer deaths among nearby residents. Their study followed 32,000 people who lived within 5 miles of the plant at the time of the accident.*
- *In January 2001, the Connecticut Academy of Sciences and Engineering issued a report on a study around the Haddam Neck nuclear power plant in Connecticut and concluded that radiation emissions were so low as to be negligible.*

- *The American Cancer Society in 2001 concluded that although reports about cancer clusters in some communities have raised public concern, studies show that clusters do not occur more often near nuclear plants than they do by chance elsewhere in the population. Likewise, there is no evidence that links strontium-90 with increases in breast cancer, prostate cancer, or childhood cancer rates. Radiation emissions from nuclear power plants are closely controlled and involve negligible levels of exposure for nearby communities.*
- *Also in 2001, the Florida Bureau of Environmental Epidemiology reviewed claims that there are striking increases in cancer rates in southeastern Florida counties caused by increased radiation exposures from nuclear power plants. Using the same data to reconstruct the calculations on which the claims were based, Florida officials were not able to identify unusually high rates of cancers in these counties compared with the rest of the state of Florida and the nation.*
- *In 2000, the Illinois Public Health Department compared childhood cancer statistics for counties with nuclear power plants to similar counties without nuclear plants and found no statistically significant difference. No changes were made to the EIS as a result of these comments.*

Comment: DEIS Subsection 4.9.1, Page 4-137, Lines 18-20 and Appendix G, Section G.2.4.4, Page G-16, Line 27: The DEIS (Subsection 4.9.1) states: "...FPL calculated an annual dose to the construction worker of **0.009** mrem (FPL 2014-TN4058)" and references the ER. Similar language appears in Appendix G (Subsection G.2.4.4). The ISFSI dose was subsequently revised to **0.013** mrem in the response to RAI 12.4.1.9.3-1 (eRAI 5430), L-2014-322, dated October 22, 2014, ML14297A026. (emphasis added) (**0619-4-15** [Maher, William])

Response: *The typographical error was noted after publication of the draft EIS. The 0.009 mrem (mrem/yr) has been changed to 0.013 mrem (mrem/yr) in Sections 4.9.1 and G.2.4.3 in the final EIS.*

Comment: DEIS Subsection 5.9.1, Page 5-98, Lines 23-26: The DEIS states: "For the gaseous effluent release pathway, FPL considered the following exposure pathways in evaluating the dose to the maximally exposed individual (MEI): ...ingestion of goat milk..." ER Subsection 5.4.1.2 states: "The input parameters for the gaseous effluent exposure pathway are presented in Table 5.4-5", and Table 5.4-5 includes "**Milk cows**" and does not include "goat milk". (emphasis added) (**0619-4-19** [Maher, William])

Response: *This comment indicates that cow milk was a parameter for the population dose assessment and that goat milk was not considered as a parameter for the population dose assessment. Therefore, in Section 5.9.1, the phrase "ingestion of goat milk," has been deleted from the final EIS.*

Comment: DEIS Subsection 5.9.1, Page 5-98, Lines 27-28: The DEIS states: "For population doses from the gaseous effluents, FPL used the same exposure pathways as those used for the individual dose assessment." The FPL analysis included cow milk in population doses but not in MEI doses. (**0619-4-20** [Maher, William])

Response: *The sentence in Section 5.9.1 was amended in the final EIS to reads as follows: "For population doses from the gaseous effluents, FPL used the same exposure*

pathways as those used for the individual dose assessment, with the addition of a pathway for the ingestion of cow milk."

Comment: DEIS Appendix G, Subsection G.2.1.4, Page G-7, Table G-3: DEIS Appendix G Table G-3 incorrectly states that the driller doses in ER Table 5.4-3 are for an **adult**. They are for a **child**, as indicated in the last paragraph of ER Subsection 5.4.1.1. The lower doses calculated by the Staff are for an adult, leading to the differences noted in Table G-3.(emphasis added) (**0619-7-12** [Maher, William])

Response: *ER Table 5.4-3 (FSAR Table 11.2-209) gives no indication that the subsistence driller dose is based on a child rather than an adult for conservatism. This is only discussed in the last paragraph on ER page 5.4-5 (third paragraph on FSAR page 11.2-29).*

In Table G-3, the following changes were made in the final EIS for clarification:

In the FPL column, "(adult)" was changed to "(child)" and "(liver)" was changed to "(child's liver)"

In the NRC column, "(liver)" was changed to "(adult's liver)"

Note "a" now includes the following additional sentence: "ER Table 5.4-3 (FPL 2014-TN4058) and FSAR Table 11.2-209 (FPL 2015-TN4502). For conservatism, FPL used the parameters of a child for the driller's dose based on the radiological liquid effluent releases from two AP1000 units."

Comment: DEIS Appendix G, Subsection G.2.2.6, Page G-14, Table G-11: DEIS Table G-11, "Calculated Doses to the Population Within 50 mi of the Turkey Point Site from Gaseous and Liquid Pathways (Two AP1000 Units)", contains calculated whole body doses by various pathways and reports the "FPL Estimate" for each cited pathway. The "FPL Estimate" contains a footnote which cites (FPL 2014-TN4058), FPL's ER Revision 6. However, the listed doses by pathway in Table G-11 that are attributed to the ER do not appear in the ER. (**0619-7-14** [Maher, William])

Response: *Section G.2.2.6 and Table G-11 along with their references have been revised as appropriate.*

Comment: DEIS Appendix G, Subsection G.2.4.4, Page G-17, Table G-15: DEIS Table G-15, "Comparison of FPL and NRC Staff Estimated Gaseous Effluent Doses to Unit 7 Construction Workers," compares annual dose values by source. There are instances where the doses attributed to FPL are inconsistent with ER Table 4.5-4: a. For the "Units 3 and 4" source, the "Skin Dose" reported for FPL is **0.0022** mrem/yr. ER Table 4.5-4 reports this same dose as **0.0031** mrem/yr. b. For the "Units 3 and 4" source, the "TEDE" reported for FPL is **0.0022** mrem/yr. ER Table 4.5-4 reports this same dose as **0.0023** mrem/yr. (**0619-7-15** [Maher, William])

Response: *In the final EIS, Section G.2.4.4, Page G-17, Table G-15 dose values have been changed to the following FPL dose values:*

For row "Units 3 and 4" the FPL Skin Dose has been changed from 0.0022 To 0.0031.

For row "Units 3 and 4" the FPL TEDE Dose has been changed from 0.0022 To 0.0023.

Comment: DEIS Appendix G, Subsection G.2.5.3, Page G-19, Table G-18: DEIS Table G-18, "NRC Staff Estimate of Non-Human Biota Doses for Proposed Turkey Point Units 6 and 7 for One Unit", presents estimates of non-human biota doses expressed as annual absorbed dose. For consistency with DEIS Table G-19, these doses should be expressed as daily absorbed dose. (**0619-7-16** [Maher, William])

Response: *The dose values in Table G-18 are in mrad/yr because the GASPAR output is in annual doses. However, in Table G-19, the doses are being compared to International Atomic Energy Agency/NCRP guidelines, which necessitates providing doses in mrad/d. No changes to the EIS were made as a result of this comment.*

Comment: DEIS Appendix G, Subsection G.2.2.4, Tables G-8 and G-9, Page G-12: DEIS Table G-8 lists values for the "FPL and NRC Staff Skin Dose (mrem/yr)" for Inhalation, Vegetable, and Meat. ER Table 5.4-7 reports "**0**" for each of the corresponding doses. Additionally, the "Total MEI Dose" via the Skin pathway by Inhalation reported in the DEIS for an adult is **0.0622 mrem/year** and is **0 mrem/year in** ER Table 5.4-7. This discrepancy also appears in DEIS Table G-9 in the 5th row. **DEIS Table G-9 reports** a Skin dose of **0.04 mrem/year for a child** via the Inhalation pathway, whereas the **ER reports 0 mrem/year for a child.** (**0619-7-13** [Maher, William])

Response: *In the final EIS, for clarification, for each value in question in Tables G-8 and G-9, the following format is now used: [FPL]/[NRC] (where [FPL] is the FPL value and [NRC] is the NRC value). A note has been added to each table to discuss the revised format.*

Comment: There are a few instances in the DEIS text where the DEIS either states that Revision 6 of Florida Power & Light's (FPL) Environmental Report (ER) (FPL 2014-TN4058) incorporated Revision 19 of the Westinghouse AP1000 Design Control Document (DCD) or that the FPL application refers to Revision 17 of the AP1000 reactor certified design. Revision 19 of the AP1000 DCD was incorporated as early as Revision 3 of the Units 6 & 7 COLA, DEIS reference (FPL 2011-TN127). Instances in the DEIS include: a. DEIS Section 5.9, Page 5-97, Lines 36-41. (**0619-1-3** [Maher, William])

Comment: Inconsistencies identified in draft EIS and ER, Rev 6: Subsection 4.9.2, Page 4-138, Lines 5-7 "FPL estimated a **total body dose** from Unit 6 of...**5.5 mrem/yr** based on a worker occupancy...2,080 hours annually (FPL 2014-TN4058)." ER Table 4.5-4 ER Table 4.5-4 shows the **total body dose** of **5.2 mrem** from Unit 6 and the total effective dose equivalent **(TEDE) of 5.5 mrem** from Unit 6. (**0619-2-27** [Maher, William])

Response: *The text in Sections 4.9 and 5.9 was revised to be consistent with Revision 6 of the ER.*

Comment: Numerical value inconsistencies within the draft EIS: Subsection 5.9.3.2, Page 5-107, Lines 22-25 "...the estimated collective **whole body dose** to the population living within 50 mi of the Turkey Point Units 6 and 7 is **9.4 person-rem/yr**..." Subsection 5.9.3.2 Page 5-10 Lines 10-12 ER Table 5.4-10 DEIS Subsection 5.9.3.2: "In ER Table 5.4-10 (FPL 2014-TN4058), FPL estimated...collective **total body dose** within a 50 mi radius...**8.0 person-rem/yr**..." ER Table 5.4-10 reports **8.0 person-rem/yr** as the collective dose for Turkey Point Units 6 and 7. (**0619-2-36** [Maher, William])

Response: *Section 5.9 of the EIS was updated to correct the inconsistency related to whole body dose.*

Comment: Inconsistencies identified in draft EIS and ER, Rev 6: Appendix G Subsection G.2.4.3, Page G-16, Line 33-35 "For dose calculation purposes, the average location of the Unit 7 worker was assumed to be at the center of Unit 7 reactor. Table 3.10-2 from the ER (FPL 2014-TN4058) estimates the maximum workforce for Unit 7 during any month to be **3,950 people**." ER Table 3.10-2 ER Subsection 4.5.3.3 DEIS Table G-16. ER Table 3.10-2 reports the maximum construction workforce as **3,950 people**. (The maximum construction workforce after fuel load is **2800 people**.) Table G-16 defines footnote '(c)' and refers to a maximum Unit 7 worker population of **2800 people** (**0619-2-30** [Maher, William])

Response: *Table G-16 has been changed to be consistent with the expected workforce numbers reported in Revision 6 of the ER.*

Comment: The potential economic impacts of radioactively contaminating these ports and waterways is staggering. The draft EIS for Turkey Point 6 and 7 is incomplete because it fails to take into account the site's location alongside economically and biologically critical waterways of the United States. (**0615-2-22** [Bethune, David])

Response: *The EIS takes into account the areas around Turkey Point Units 6 and 7. The NRC reviews and assesses the impacts (both radiological and non-radiological) on land and water features, and includes (but not just limited to) biological, human, and economic impacts of the construction, operation, and decommissioning of Turkey Point Units 6 and 7.*

The NRC review and assessment looks at normal, off-normal, and postulated accident releases to the environment. As a result of this review and assessment, the NRC determined that the release of gaseous radioactive effluents enveloped the postulated releases from Units 6 and 7.

As presented in EIS Section 5.9, due to the applicant meeting the regulations of 10 CFR Part 20 for gaseous radioactive effluent releases, the health effects to members of the public and non-human biota from all radioactive effluent releases are SMALL. This includes nearby ports and waterways.

No change was made to the EIS as a result of this comment.

E.2.17 Comments Concerning Accidents - Severe

Comment: I don't want another Fukushima. (**0008-10** [Finver, Jody])

Comment: FPL should be denied a license for Turkey Point expansion for many reasons:...2. Too dangerous. We don't want Fukushima here in Miami. (**0022-2** [Read, Alice Gray])

Comment: I was born in the 1950's, and have been living with the threat of nuclear energy for my whole life, as long as I can remember. Although the dropping of atomic bombs on Hiroshima and Nagasaki was unspeakable, I believe the ongoing nuclear catastrophe at Fukushima poses the greatest threat to the future of life on Earth that we have ever seen. The people of Japan trusted the TEPCO power plant owners and developers who pooh-poohed the dangers of building multiple nuclear plants in that beautiful spot by the ocean. Their trust has proven to be woefully misplaced. (Added while speaking) So to Devin Caraza, the gentleman from FPL who spoke, you'll forgive me if I just can't take your word for it when you tell us everything is safe now. After Fukushima, it's clear that nuclear energy is way too dangerous, and it's impossible to either prevent or clean up nuclear accidents. (**0078-1** [Wilansky, Laura Sue])

Comment: HAVE WE NOT LEARNED FROM THE JAPAN DISASTER THAT PUTTING A NUCLEAR PLANT BY A WATER SOURCE IS STUPID!!!!! (**0108-1** [Jurin, Richard])

Comment: It is a bad place to build a nuclear plant as it is too close to the water as was Fukashima. (**0122-3** [Meyer, Paul])

Comment: We are totally opposed to the expansion of nuclear generated energy at Turkey Point - for the following reasons: 1) Too dangerous (as in the Fukushima disaster in Japan) (**0129-1** [Mayer, Doug])

Comment: Of course, beyond the daily addition of heated waters and waste, the potential disaster related to weather or other operational failure looms large. We might think we've engineered the plant properly, but as Fukishima showed us, Mother Nature has a way of overwhelming man made systems. (**0130-3** [Jones, Diane])

Comment: Often the NIMBY attitude is applied to perfectly reasonable plans. This is not one of those cases. By approving this proposal, and putting South Florida at Fukushima-like risk, the NRC could have blood on its hands in the future. (**0133-4** [Corral, Oscar])

Comment: Another disaster waiting to happen like in Japan. (**0149-8** [Nelson, Joyce E.])

Comment: BUT A MUCH LARGER DANGER LOOMS. ALL ONE HAS TO DO IS REMEMBER THE DEVASTATION THAT OCCURRED IN JAPAN NOT VERY LONG AGO TO KNOW THAT MOTHER NATURE WILL REEK HAVOC AT WILL IN SPITE OF ANY AND ALL HUMAN PRECAUTIONS. CLOSE PROXIMITY TO OPEN WATER AND RISING SEA LEVELS IS A DISASTER WAITING TO HAPPEN. (**0164-1** [Chrissos, H. L. Chris])

Comment: We should learn and apply some important lessons from the Fukushima Daiichi disaster. (**0174-1** [Swensen, Harry])

Comment: The tragedy of Fukushima should have been the last word on building nuclear plants in vulnerable coastal locations like this one. (**0240-8** [Commenters, Multiple])

Comment: Proponents of FPL's new nukes claim that expansion is safe, and that every eventuality has been considered and planned for. I must point out that the TEPCO must have made the same claims while seeking approval of Fukushima. (**0252-11** [Van Leer, Sam])

Comment: We could rethink this after Fukushima is no longer threatening to destroy the planet? (**0276-1** [Taylor, Kirk])

Comment: Look what has happened at Chernobyl and Fukushima. The risk is way too high[.] (**0329-3** [Baumwall, Douglas])

Comment: The ongoing disaster at Fukushima, Japan is precisely the sort of thing that might happen at Turkey Point. None of the experts can actually say for certain how high the dikes need to be in every possible event. (**0342-2** [Merleaux, Derek])

Comment: No more Fukishima's. (**0344-2** [Hull, Meagan])

Comment: Did we learn nothing from what happened in Japan? (**0359-2** [LoBiondo, Roana and Michael])

Comment: The era of nuclear power ended with the Fukushima melt down. (**0440-2** [Hoyle, Lester and Judy])

Comment: After Fukushima, we know that nuclear power plants are NOT safe, and we should never be expanding or building new ones. (**0441-1** [Bender, Kae])

Comment: ... and-as the world has seen from the Fukushima power plant debacle-a profound potential for incalculable damage to everything, people included, should the unthinkable happen and a disaster strike. (**0449-1** [Benton-Janetta, Lori])

Comment: The ongoing disaster at Fukushima should has shown convincingly that nuclear power is a dead-end, quite literally. (**0458-1** [Polk, James])

Comment: If you all need a hint look at how the Fukushima nuclear plant is faring. How many more of these time bombs are you all willing to place in our country? (**0459-2** [Smyke, Pete])

Comment: After Fukashima and the continuing radiation disaster, Are you Crazy????? (**0487-1** [Caswell, Susan])

Comment: You might remember Fukushima, as well. (**0492-3** [Mckee, Sarah])

Comment: We don't need to be reminded of the horror the Japanese suffered when their power plant was hit by a big wave. (**0495-3** [Mazzarella, Rebecca])

Comment: Do you want another Fukushima??? (**0540-1** [Burge, Laura])

Comment: We do not plan to have a catastrophe but it has happened with Japan's nuclear plants as well as oil spills that had disastrous results for the local areas and widespread areas in Japan. (**0541-2** [Zarsky, Terry])

Comment: There are so many reasons why this is a BAD decision. We can't afford to have a FUKUSHIMA incident off the South East Coast of Florida. It will be a matter of time before a hurricane will hit this area again. (**0548-2** [Scott, Ruth])

Comment: Look what happened in Japan you think that won't happen here? (**0549-2** [Allison, Noreen])

Comment: The tragedy of Fukushima should have been the last word on building nuclear plants in vulnerable coastal locations like this one. (**0551-3** [Anonymous, Anonymous])

Comment: Although I am not opposed to nuclear power generally (so long as waste can be properly dealt with), I believe this application is misguided. Clearly, the experience of Fukushima in Japan should be causing all regulators to seriously question the wisdom of siting ANY additional nuclear facilities adjacent to low-lying shorelines, nature preserves, and significant population centers. (**0573-2** [Trauner, Keith])

Comment: Hurricane damage to the fuel pool building or its cooling water supply equipment is of particular concern at Turkey Point, as without a constant supply of water, a meltdown of the fuel rods is assured. (**0615-2-26** [Bethune, David])

Comment: The tragedy of Fukushima should have been the last word on building nuclear plants in vulnerable coastal locations like this one. (**0625-3** [Felinski, Julee])

Comment: I will sum it up with one word Fukishama! (**0638-1** [Anonymous, Charity])

Comment: Think Fukushima!!! (**0651-4** [Young, Kim])

Comment: We have seen what can happen when nuclear plants are located near large bodies of water-witness Japan. (**0692-1** [Nickerson, Nancy])

Comment: We still have to deal with Fukushima, you know. (**0695-3** [Nappe, Judith])

Comment: Do we really want to set ourselves up for the problems Japan experienced with their nuclear reactors recently? (**0699-1** [Stocker, Nancy])

Comment: The tragedy of Fukushima should have been the last word on building nuclear plants in vulnerable coastal locations like this one. No amount of "profit" will ever replace the destruction and loss of life from having a nuclear fallout or leak from a facility such as this. (**0712-1** [Almer, Anessa])

Comment: One of the big lessons we learned from Fukushima is that when you lose the ability to run cooling water through the core reactor, through the thousands of pounds of waste nuclear material, that sits right now on the shores of Biscayne Bay, it melts down. It did melt down in Fukushima. It almost could have happened at Turkey Point. That was -- we dodged the bullet there. All these things happened. All these things happened. And this is safe? (**0721-22-10** [Schwartz, Matthew])

Comment: Another big concern of mine that's been raised here by some other people is the spent fuel storage. This is exactly the same setup as Fukushima, and this plant uses the same type of fuel. They use a zirconium coated fuel pellets. The zirconium interacts with steam and water, in the case of a meltdown, to produce hydrogen, and that hydrogen is explosive. It's exactly what exploded in Fukushima. (**0721-23-5** [Bethune, David])

Comment: So we're creating, if we license this plant here, another potential Fukushima situation with two fuel pools that are exposed and open to the air essentially, and in largely unprotected buildings. If those fuel pools lose water we will have a meltdown. And not only will we have a meltdown, but the site will be unapproachable to human beings until the end of time. Once that fuel pool is uncovered and there is no water in there, no human beings can go back to that site to perform any kind of work at all. So these design basis accidents, about it's all -- it's going to be over in three days and we'll just go back and make things right, are completely unrealistic. We already saw that with our own eyes that that's not what happens in a fuel pool meltdown situation. (**0721-23-7** [Bethune, David])

Comment: The last thing I want to bring up is the fact that we're creating another Fukushima situation here with multiple plants on the same site. (**0721-23-8** [Bethune, David])

Comment: So if you had an accident at one of the nuclear plants, whether it be here or anyplace else, we'd probably not be -- not the roof blowing off like in the Ukraine which can produce like 10 or 12,000 Roentgens blowing in the air. But you would have no problem here but you may have a problem if somebody accidentally or otherwise took the water out where the spent rods storage is. It would release probably 1,000, 1,500 Roentgens if that was released. So that would be the only thing. (**0722-15-2** [McColgan, Robert])

Comment: It perhaps borders on insanity to begin to even consider another one or two power plants, after seeing what has happened with Chernobyl, and Fukashima. (**0731-1** [Council, Barbara])

Response: *The first several pages of Section 5.11 of the EIS discusses the actions taken by NRC to enhance the safety of U.S. reactors based on specific lessons learned from the event at Japan's Fukushima Dai-ichi Nuclear Power Plant. On March 12, 2012, the Commission issued three Orders and a Request for Information (RFI) under 10 CFR 50.54(f) to holders of U.S. commercial nuclear reactor licenses and construction permits. The first Order (EA-12-049) requires a three-phase approach for mitigating beyond design-basis external events that employs installed structures, systems, and components (phase 1), onsite portable equipment (phase 2), and offsite support (phase 3). For the AP1000 passive design, passive means assure the cooling for the core, spent fuel pool, and containment are assured in the first 72 hours after an accident or external event. The AP1000 design includes ancillary diesel generators and features to provide make-up water after 72 hours and up to 7 days to the passive systems, such as the passive containment cooling water ancillary storage tank, and ancillary diesel generators. This equipment is protected from external hazards including the safe-shutdown earthquake (SSE). The third Order (EA-12-051) requires reliable spent fuel pool level instrumentation (77 FR 16082) (TN1424). The AP1000 containment design differs from those identified in the second Order; therefore, the actions addressed in the second Order are not applicable to Turkey Point Units 6 and 7. The NRC staff, with the Commission's approval, implemented a plan to address the requirements in the Orders and the RFI for pending COL applications.*

In regard to the Turkey Point COL application, the NRC staff issued RAIs to FPL requesting information to address the requirements of the first Order on mitigation strategies for beyond design basis accidents and the third Order on spent fuel pool instrumentation, respectively, and information sought in the first RFI for a seismic reevaluation and the fifth RFI in regard to emergency preparedness (NRC 2012-TN3239). FPL addressed the first and third Orders along with the fifth RFI by proposing license conditions that would require action before initial fuel loading for proposed Units 6 and 7 (FPL 2014-TN4058; FPL 2014-TN4103). The NRC's evaluation of FPL's responses are addressed in the NRC's advanced safety evaluation (ASE). In particular, ASE Section 2.4 documents the staff evaluation of the potential effects of hurricanes on the proposed new units (NRC 2016-TN4775), and ASE Section 9.1 documents the staff evaluation of the spent fuel pool design (NRC 2016-4803). As discussed in Section 5.11.2.4 of the EIS, the AP1000 reactor vendor considered extratropical cyclones, hurricanes up to Category 5 on the Saffir-Simpson scale, and tornadoes up to EF5 on the enhanced Fujita scale in the AP1000 design. The total contribution of high winds to core damage frequency (CDF) was reported to be 1.38×10^{-8} per year by the AP1000 reactor vendor (Westinghouse 2011-TN261), assuming that only safety systems are available. The more detailed analysis in the FSAR (FPL 2014-TN4069) specifically for Turkey Point site also estimated CDF probability from high wind on the order of 1.0×10^{-8} per year. The safety design features of the AP1000, lead warning time before the arrival of hurricane force winds, and NRC's oversight policies are all considered in the NRC evaluation of plant safety in case of hurricane events. The common concern raised by the comments is already considered in Section 5.11 of the EIS; therefore, there were no changes made to this EIS.

Comment: The lessons of Chernoble and the nuclear disaster at Fukushima Daiichi after the Earthquake & Tsunami of March, 2011 teach me that the balance of risk versus reward has not been properly considered with this proposal. Planning & Construction fail to be designed to meet the extremes of the unexpected. The unexpected occurs frequently enough that the

consequences need be considered. One consequence of the Fukushima nuclear disaster was the evacuation of everyone within a fifty-mile radius of those plants. A fifty-mile radius evacuation here, because of a possible disaster at Turkey Point, would extend from Islamorada in the Florida Keys all the way to Hollywood, Florida. See this link: http://www.nytimes.com/interactive/2011/03/16/world/asia/japan-nuclear-evaculation-zone.html. (**0213-2** [Hyams, Charles])

Comment: Haven't we learned anything from the devastation that resulted from the reckless planning that went into not only building the Nuclear plant in Fukushima but the clean up process for a accident/meltdown as well? As I type a steady flow of radioactive toxic water is released into the Pacific ocean and the world stands by helpless! We can build the best bombs and weapons in the world but we can NOT contain nor sufficiently clean up from a nuclear accident or a deep water well blow out! (**0259-1** [Lettieri, Tammy])

Comment: The idea that a nuclear plant will never have an accident that endangers the public health and safety defies both history and logic. All industries experience accidents of one kind or another sooner or later and the latest example in Japan shows how the manufacture of energy using nuclear power can result in a killing calamity that takes human life and destroys property. (**0332-1** [Ross, Sherwood])

Comment: You would think that Three Mile Island, Chernobyl, and Japan's Fukushima disasters would tell us all we need to know about the sudden, unexpected and long, long term dangers of nuclear energy. (**0339-1** [Provost, Allan])

Comment: History has shown that unanticipated "incidents" can occur at Nuclear Power generating facilities. History has also shown that the results of such an incident can be catastrophic and long lasting. (**0358-3** [Norman, Ronald])

Comment: No matter how safe those who profit say they are, a Fukushima type accident or terrorist attack could render most of South Florida uninhabitable. (**0371-2** [Haffmans, Edmund])

Comment: And I have been reading about Japan. They are finding radiation pretty far from the plants. (**0373-6** [Lee, Nancy])

Comment: I realize that the risk of a nuclear accident is very low. But the consequences are astronomical. Can you image a Fukushima-type accident here in Florida? Can you imaging evacuating everyone from the Palm Beaches to Key West? Do you want to be responsible for such a disaster? (**0643-1** [Joannou, Jr., Benjamin])

Comment: Until there is technology to cean up a meltdown, like in Fukushima and Chernobyl and God only knows what else. I say absolutely not. (**0644-2** [Anonymous, Anonymous])

Comment: I believe that the ongoing nuclear catastrophe at Fukushima poses the greatest threat to the future of life on earth that we've ever seen. The people of Japan trusted the TEPCO power plant owners and developers who poo-poo'd the dangers of building multiple nuclear plants in that beautiful spot by the ocean. Their trust has proven to be woefully misplaced, and I'm sorry, but I just can't take the assurances of Devon and the folks from FPL that they've got everything handled. I don't believe that. After Fukushima it's clear that nuclear energy is way too dangerous and it's impossible to either prevent or clean up nuclear accidents. (**0721-28-2** [Wilansky, Laura Sue])

Response: *The Great Tohoku earthquake of March 11, 2011, and the subsequent resulting tsunami produced widespread devastation across northeastern Japan, resulting in approximately 25,000 people dead or missing, displacing many tens of thousands of people, and significantly affecting the infrastructure and industry in the northeastern coastal areas of Japan. Nonetheless, the damage to the Fukushima Dai-ichi nuclear power plant from the tsunami, including the loss of ac power and almost all safety systems, has not resulted in any radiation exposure-related fatalities (UNSCEAR 2014-TN4762; UNSCEAR 2015-TN4763). The comments correctly refer to the evacuation of the population residing near the reactor site and the need for decontamination near the site. Evacuation and land decontamination are part of the input to the MACCS code for the severe accident analysis as described in Section 5.11.2 of this EIS. In the event of an actual accident, emergency response management authorities would consider whether evacuation is warranted, depending on the circumstances.*

The Turkey Point severe accident risk analyses in Table 5-18 of EIS Section 5.11 includes population dose risk, risks of fatalities, and costs associated with evacuation, resettlement, land decontamination, interdiction, and condemnation. Table 5-21 of the EIS provides the calculated costs of all severe accidents. These costs are part of the evaluation process for implementation of severe accident mitigation alternatives as discussed in Section 5.11.3 of the EIS. The comments do not provide any information that was not already considered in the evaluation in the draft EIS, and no changes were made to the EIS as a result of these comments.

Comment: Radiation from Fukushima is hitting US shores. Where do you think radiation and chemicals from Turkey Point will end up? (**0078-10** [Wilansky, Laura Sue])

Comment: BUILDING A NUCLEAR FACILITY NEAR A SENSITIVE ECOSYSTEM IS FOOLISH. JUST LOOK AT THE CONTINUING DAMAGE FROM THE FUKUSHIMA NUCLEAR DISASTER, WITH RADIATION POURING INTO THE PACIFIC OCEAN AND WAFTING OVER THE PACIFIC TO THE WESTERN U.S.A. RADIATION COUNTS NEAR OUR WESTERN COAST WERE STOPPED LONG AGO BECAUSE PEOPLE WERE UNWILLING TO REVEAL THE REAL THREAT TO THE AMERICAN & CANADIAN PUBLIC. (**0201-1** [Reid, Sarah])

Comment: Locating two new nuclear reactors at Turkey Point would seem to invite disaster if a severe weather event were to occur, similar to the one that devastated the nuclear plant in Japan. Radioactive waste from that disaster has spread by water across the seas to countries thousands of miles away. (**0280-1** [Betts, Cynthia])

Comment: The ongoing radioactive contaminatio horror emanating from the nuclear fission time-bomb plants in Fukushima will be poisoning the Northern Pacific Ocean for countless centuries. Fukushima is an extinction level event! (**0513-1** [Roehl, Richard Ralph])

Comment: We know that Fukushima has poisoned the whole Pacific. (**0673-3** [Dwyer, John P.])

Comment: Radiation from Fukushima is hitting U.S. shores. Where do you think radiation and chemicals from Turkey Point will end up? (**0721-28-10** [Wilansky, Laura Sue])

Response: *Only a trace amount of radioactivity has been detected in the United States from this event from airborne or waterborne pathways (Kratchman et al. 2015-TN4737). Based on these measurements, the Fukushima Dai-ichi accident resulted in no or negligible impact on human health in the United States. This result is unsurprising, since the great distances between Fukushima and the United States would result in large amounts of dilution and dispersion over those distances, which, in turn, would result in negligible doses in the United*

States from the Fukushima accident. The comments do not provide any information that was not already considered in the evaluation in the draft EIS, and no changes were made to the EIS as a result of these comments.

Comment: It's [the reactor] a prime target in the event of a hurricane. (**0008-6** [Finver, Jody])

Comment: I would like to express my concerns and opposition to this projects on environmental and quality-of-live grounds. First, we only need to look at the Fukushima incident in Japan, a country I lived for over 5 years, to understand the catastrophic potential of this project in Hurricane prone Florida. (**0024-1** [Roque, Julio])

Comment: I also, have great concerns about the condition of the existing facility. I remember that during Hurricane Andrew significant damage occurred at Turkey Point. I can't even imagine what will happen to this area if something like that happens again if a facility the size of what is proposed becomes reality. (**0081-2** [Benson, Mary] [Skove, Ellen H.] [Tompkins, Constance])

Comment: My understanding is that their proposal involves antiquated technology and would be highly vulnerable to modest storm surges. (**0093-2** [DuPriest, William Robert])

Comment: Nuclear power should not be placed in locations with high hurricane or tsunami risk. Fukushima is a lesson we should never forget. (**0109-2** [Platt, David])

Comment: The area is also very susceptible to the threats of hurricanes. Hurricane Andrew, which hit two decades ago, was a small intense storm. Its full force did not effect Turkey point. Its 200+ mph winds totally destroyed the area a few miles to the north. Had it hit Turkey Point directly, the consequences could have been devastating and irreversible to our entire community. (**0115-7** [Trencher, Ruth])

Comment: With Florida being proned to Hurricanes this could be detrimental to our communities and our environment. Don't you remember what happened to Japan in 2011? (**0128-2** [Bach, Lili])

Comment: Hurricanes may severely damage them and cause untold damage as was done in Japan. (**0159-4** [Bazzone, Barbara])

Comment: I need not remind you of the 1992 nuclear reactors at Turkey Point which took a direct hit from Hurricane Andrew. . . READ THE DATA. (**0250-4** [Fulks, Anna Louise])

Comment: Building the reactors in a hurricane flood zone was unsafe, and just plain stupid in the first place. This common sense has been confirmed by the NRC's own findings after Hurricane Andrew, which knocked out all or part of its safety, power, access, security and fire-fighting capacities... for 5 days. (**0252-2** [Van Leer, Sam])

Comment: DIDN'T WE LEARN ANYTHING FROM JAPAN'S DISASTER? WHAT HAPPENS IF IT GETS HIT WITH A HURRICANE????? (**0279-1** [Hall, Linnea M. Fronce Thomas])

Comment: Current safety approaches have been found to be inadequate for preventing melt down accidents according to the authors of a report submitted by a very prominent panel of scientists, physicists, and engineers, recently convened by Congress. (the best safety efforts were used by the Fukashima reactors,but the accident happened anyway, so what will happen during a potential huge future hurricane event ?) (**0340-9** [Tweeton, Tanya])

Comment: A strong hurricane would devastate South Florida. (**0360-4** [Palmer, Majorie])

Comment: These plants are especially vulnerable to hurricane impacts also. (**0647-1** [Burns, Terry])

Comment: If there is a hurricane nearby, it will be a huge disaster. (**0654-4** [Guy, Sharon])
Comment:

NRC's Draft EIS is Deficient Because it Mischaracterizes the Impact of Hurricane Andrew on the Turkey Point Site: Not only has NRC's DEIS failed to address the potential impacts upon the Turkey Point site of climate change but when NRC did address Hurricane Andrews impact on the site NRC mischaracterized and downplayed the risk posed by severe weather events. According to NRC's DEIS:

> Hurricane Andrew was historic because it was the first time that a hurricane significantly affected a commercial nuclear power plant. The eye of the storm, featuring sustained winds of up to 145 mph and gusts of 175 mph, passed over the Turkey Point site and caused extensive onsite and offsite damage. However, there was no damage to the safety-related systems of Units 3 and 4 except for minor water intrusion and some damage to insulation and paint (NRC 1993-TN542).

This is a significant mischaracterization of the impact of Hurricane Andrew on Turkey Point. In fact Hurricane Andrew resulted in a loss of offsite power at Turkey Point that lasted six and a half days according to the joint NRC/INPO review:

> A high priority was placed on restoring offsite power to Turkey Point. The Davis 1 line to the Turkey Point switchyard was energized 4V2 days after the storm, but suffered intermittent losses for several hours. Six and one-half days after the storm, the startup transformers for Units 3 and 4 were energized, and the EDGs were shut down. A second offsite line became available about a day later (see Appendix K for details). 25 Section 3

When offsite power was not available, the four EDGs ran continuously to supply plant safety-related loads. An EDG tripped on two instances during this period. Seven hours after the storm had passed, the "A" EDG for Unit 4 tripped during efforts to troubleshoot and isolate a ground on the dc control power supply. The crew immediately recognized that the troubleshooting procedure in use applied when the bus is energized from offsite power but not when the EDG is supplying loads. The EDG was restarted again after a few minutes, and the procedure revised. The "A" EDG for Unit 3 tripped 3!/? days after the storm. Troubleshooting to locate the cause of the trip was unsuccessful, and the EDG was successfully restarted in 2/4 hours. No further problems were encountered. (Effects of Hurricane Andrew on the Turkey Point Nuclear Generating Station from August 20-30, 1992, Jointly sponsored by Institute of Nuclear Power Operations and the U.S. Nuclear Regulatory Commission, March 1993, section 3, p. 25. (http://www.osti.gov/scitech/servlets/purl/10158520/)

The NRC seems to have merely cut and paste the Information Notice on Hurricane Andrew into its EIS but for some reason NRC decided to edit the following which contradict the blithe assurances in the DEIS. The NRC's Information Notice on the impact of the Category 5 hurricane on the site states that, "(t)he onsite damage included loss of all offsite power for more than 5 days, complete loss of communication systems, closing of the access road, and damage

to the fire protection and security systems and warehouse facilities. (http://www.nrc.gov/reading-rm/doc-collections/gen-comm/infonotices/1993/in93053.html)

Damage at the Turkey Point Site was not limited to the electrical infrastructure. As the Union of Concern Scientists has pointed out FPL, Turkey point and the people of Florida got lucky:

> "The fire protection system at the plant was disabled when winds knocked a high tower tank onto a 500,000 gallon tank containing water for the fire protection system .... If the damaged stack had fallen, it could have landed on the building housing the emergency diesel generators for the nuclear units. Considering that the diesel generators were the only source of ac power at the plant for several days, it was extremely fortunate that the leaning stack of Turkey Point did not fall." (http://allthingsnuclear.org/fission-stories-48-hurricane-andrew-vs-turkey-point/) [FIGURES-Water tower and Chimneys]

The extent to which NRC mischaracterized the impact of Hurricane Andrew in the DEIS is demonstrated by the fact that NRC's own risk analysts found the hurricane to be an important accident precursor. NRC's risk analysts counted both units as accident precursors and attributed a risk of 1.6E-4 or 1 in 10,000. (U.S. Nuclear Regulatory Commission, Precursors to Potential Severe Core Damage Accidents: 1992 A Status Report, NUREG/CR--4674 ORNL/NOAC-232 Vol. 17, December 1993, p. 31. (http://www.osti.gov/scitech/servlets/purl/10125322/) (**0716-9** [Riccio, Jim])

Response: *The NRC disagrees with the comments concerning Hurricane Andrew effects on Turkey Point Units 3 and 4. The NRC has years of experience with hurricanes and other severe storms. Nuclear facilities were affected by Hurricane Andrew in Florida in 1992, by Katrina in Louisiana in 2005, and by Sandy along the East Coast in 2012, among others. Lessons learned from each hurricane are examined and enhancements to safety are made if deemed necessary. Since hurricanes have long lead warning times (on the order of days), plant shutdowns are commenced long before a hurricane arrives along with other protective measures and actions. In response to lessons learned from previous weather events, emergency planning and evacuation notification systems have been enhanced (e.g., see NRC Information notices 93-53 and 97-05 for Hurricane Andrew). Additionally, as part of the NRC's Fukushima lessons learned actions and orders, Turkey Point Units 3 and 4 have undergone additional analyses, including for hurricane events (NRC 2014-TN4738). The site is also part of the industry's FLEX initiative to address mitigation strategies for beyond design basis external events.*

The comments cite the estimated risk of CDF calculated using probabilistic risk assessment (PRA) techniques for existing Turkey Point Units 3 and 4. The estimated risk for the existing units, however, does not apply to the proposed new units, nor do those numbers reflect how the Units 3 and 4 in fact performed in the face of Hurricane Andrew, which is discussed further below. As discussed in Section 5.11.2.4 of the EIS, the AP1000 reactor vendor considered extratropical cyclones, hurricanes up to Category 5 on the Saffir-Simpson scale, and tornadoes up to EF5 on the enhanced Fujita scale in the AP1000 design proposed for Turkey Point Units 6 and 7. In regard to the estimated risk for proposed Turkey Point Units 6 and 7, calculated with PRA techniques, the total contribution of high winds to CDF was reported to be 1.38×10^{-8} per year by the AP1000 reactor vendor (Westinghouse 2011-TN261), assuming that only safety systems are available. The more detailed analysis in the FSAR (FPL 2014-TN4069) specifically for Turkey Point site also estimated CDF probability from high wind on the order of 1.0×10^{-8} per year. The safety design features of AP1000, lead warning time before the arrival of

hurricane force winds, and NRC's oversight policies are all considered when assuring plant safety in case of hurricane events.

The comments provided no new information or challenges to the proposed new reactors not considered in the draft EIS; therefore, no changes were made to the EIS in response to these comments.

Comment: It's not cost effective for us and it poses a mayor catastrophic risk in the event a big hurricane hits us or with the rise in sea levels. (**0087-3** [Lange, Alexandra])

Comment: While I am normally not opposed to nuclear energy generation, I would like to know how the project's design engineers have addressed the concern of susceptibility to storm surge from a hurricane, so as to learn from and further prevent the existential threat posed by a repeat of the Fukushima Daiwa plant in our own back yard. (**0132-1** [Mauri, Tom])

Comment: I believe the purpose of these lines to maintain a fully depreciated facility ignores the risk of an outdated & highly dangerous technology (i.e. Japan's Fukushima disaster) in an area prone to powerful hurricanes, storm surge, and increasing sea levels which heightens the risk of water contamination & damage to the reactor or its cooling system. (**0134-1** [Lucero, Olga])

Comment: This area is subject to sea level rise and tropical storm impacts. It is inconceivable that this location could be used for a nuclear power plant. It is not possible to guarantee the safety of the operation. (**0151-1** [Stanko, Janet L.])

Comment: Tsunamis may not be as frequent as in the Pacific but they are possible in the Atlantic and storm surges can be as bad as many tsunamis. By not accounting for sea level rise along with tsunamis and storm surges we are risking another Fukushima on our own doorstep. (**0236-2** [Enfield, David])

Comment: This is an unsafe place for a nuclear plant being barely above sea level, in a hurricane zone & next to an ocean. (**0729-1** [Rader, D.L.])

Response: *As discussed in Section 5.11 of this EIS the AP1000 reactor vendor considered extratropical cyclones, hurricanes up to Category 5 on the Saffir-Simpson scale, and tornadoes up to EF5 on the enhanced Fujita scale. The total contribution of high winds to CDF was reported to be 1.38×10^{-8} per year by the AP1000 reactor vendor (Westinghouse 2011-TN261), assuming that only safety systems are available. The more detailed analysis in the FSAR (FPL 2014-TN4069) specifically for Turkey Point site also estimated CDF probability from high wind on the order of 1.0×10^{-8} per year. The safety design features of the AP1000, lead warning time before the arrival of hurricane force winds, and NRC's oversight policies are all considered when assuring plant safety in case of hurricane events.*

Similarly, for possible severe accidents due to external flooding, the EIS in Section 5.11 states that each new reactor application evaluates the natural phenomena that are pertinent to the site for the proposed reactor design by applying present-day regulatory guidance and methodologies. This includes a determination of the characteristics of flooding at the site. The plant design elevation accounts for high tides in Biscayne Bay, which, in combination with maximum storm surge plus sea-level rise, are controlling for external floods. ASE Section 2.4 assesses the maximum external flood as being within the design basis of the site (NRC 2016-TN4775). The associated severe accident risk due to external flooding is discussed in Section 5.11.2.4 of the EIS and also shown to be small.

The comments did not provide any information in addition to that already considered in the draft EIS. Therefore, no changes were made to the EIS as a result of these comments.

Comment: FPL has failed to adequately account for the intersecting impacts of sea level rise and storm surge. A study by John Perkins and Natalie Kopytko published in the journal Energy Policy in January 2011 concerning 9 coastal nuclear reactors in the US found that while currently operating nuclear plants were built high enough to withstand sea level rise alone for the next 50 years, which is beyond the operating lifetime of those plants, storm surges from Category 4 and 5 hurricanes will completely inundate those plants within their lifetimes--see http://www.climatecentral.org/news/sea-level-rise-brings-added-risks-to-coastal-nuclear-plants. (**0246-2** [Shlackman, Mara])

Comment: Some people consider Hurricane Andrew to be a Category 6 for its power (the conventional scale tops out at Cat 5). It spawned many tornadoes, with wind-speeds that were in addition to the Hurricane's. Many climate scientists to be growing in strength, and perhaps in frequency. Numerous records have been broken in the past decade. Hurricane Storm-Surge will be boosted to higher levels by SLR with each passing year. (**0252-10** [Van Leer, Sam])

Comment: Deeper Examination of Foreseeable Emergencies. As noted in the previous section, the DEIS acknowledges the potential that "[c]limatological changes might affect the average environmental risks of severe accidents," however it concludes that the core damage frequencies of the relevant reactor design are low enough that this is an unlikely problem. DEIS at I-13. This does not appear to be a thorough analysis. Simply stating, without further discussion or support, that the reactor design standards are sufficient to protect from future climate harm, does not satisfy NEPA. (**0456-18** [Miami, City])

Comment: Comment 12: The final Environmental Impact Statement should incorporate a full analysis of the potential for severe accidents related to climate change or cite to relevant research. Although the DEIS does acknowledge that there is the potential for a severe accident resulting from climatological changes, it does not discuss specific scenarios or estimated probabilities. The final Environmental Impact Statement should include a full analysis to better demonstrate the nature and likelihood of the risks acknowledged in the DEIS. (**0456-19** [Miami, City])

Comment: Comment 13: The final Environmental Impact Statement should incorporate a full analysis of the potential for severe accidents related to climate change or cite to relevant research. Although the DEIS does acknowledge that there is the potential for a severe accident resulting from climatological changes, it does not discuss specific scenarios or estimated probabilities. The final Environmental Impact Statement should include a full analysis to better demonstrate the nature and likelihood of the risks acknowledged in the DEIS. (**0611-14** [Haber, Matthew S.])

Comment: However, due to rising sea-levels and hurricanes the potential for this plant to become another Fukushima in its lifetime is very real. (**0639-2** [Haselhurst, Richard])

Comment: The site proposed for expansion is located directly on the shores of Biscayne National Park. If designed correctly there would be no concerns like Japan plant flooding do to weather related wind/huricane potential sea level rise. (**0694-5** [Carpenter, Rory])

Response: *As discussed in Section 5.11, the AP1000 reactor vendor considered extratropical cyclones, hurricanes up to Category 5 on the Saffir-Simpson scale, and tornadoes up to EF5 on*

the enhanced Fujita scale. The total contribution of high winds to CDF was reported to be 1.38 × 10^{-8} per year by the AP1000 reactor vendor (Westinghouse 2011-TN261), assuming that only safety systems are available. The more detailed analysis in the FSAR (FPL 2014-TN4069) specifically for Turkey Point site also estimated CDF probability from high winds on the order of 1.0 × 10^{-8} per year. The safety design features of the AP1000, lead warning time before the arrival of hurricane force winds, and NRC's oversight policies are all considered when assuring plant safety in case of hurricane events.

EIS Appendix I indicates that nuclear power plants must be designed to withstand natural events. General Design Criteria 2 of 10 CFR Part 50 Appendix A requires nuclear power plants to be designed to withstand the effects of natural phenomena without loss of capability to perform their safety functions. A plant's design must reflect appropriate consideration of the most severe natural phenomena events that have occurred at or near the proposed site, with margin to account for uncertainty. In addition, the EIS does recognize that the safety review assesses the plant's capability to withstand external flooding, which is part of the design basis for proposed Turkey Point Units 6 and 7. As discussed in the staff's ASE Section 2.4 (NRC 2016-TN4775), the plant design elevation accounts for high tides in Biscayne Bay, which, in combination with maximum storm surge plus sea-level rise, are controlling for external floods. Therefore, with the information in Section 5.11.2.4 of this EIS and the safety finding that the plant at this site would meet all necessary regulatory requirements, the associated severe accident risk due to external flooding is small.

Climate change in general and rising sea level are expected to be gradual. Under 10 CFR 50.54(f), the NRC could determine whether or not a license should be modified based on a review of the impact of climate change on plant operation and adaptation, emergency preparedness, and the availability of nearby structures used for plant operation and safety. If the NRC determines that additional safety enhancements are necessary based on information obtained in accordance with 10 CFR 50.54(f), the NRC can require that such enhancements be implemented in a timely manner to assure adequate protection of the public within the current NRC regulatory process.

In conclusion, the NRC staff published an Advanced Safety Evaluation that analyzes all aspects of reactor and operational safety including hurricane and flooding events. The primary purpose of the EIS is to evaluate the environmental impacts resulting from the construction and operation of the proposed plant. The comments express concern about the possibility of an event that might damage the proposed units, but do not raise any issue in regard to the substance of the severe accident evaluation in EIS Section 5.11. The staff clarified in Appendix I of the EIS the NRC process for ensuring plant safety over the licensing period with respect to sea level rise as a result of these comments.

Comment: History has shown that the potential exists for unplanned "incidents" to occur at or within Nuclear Power Plants. Fukushima, Three Mile Island and Chernobyl are just 3 examples of when the best intentions can go terribly wrong. The results of such an unplanned "incident" can be catastrophic and long lasting. (**0039-2** [Violich, Francesca])

Comment: Very recent history has demonstrated that the potential exists for unanticipated "incidents" to occur at or within Nuclear Power facilities. Fukushima, Three Mile Island and Chernobyl are just three examples of how the very best intentions can go terribly wrong. The results of these actual unanticipated "incidents" have proven both catastrophic and long-lasting. FP&I's recent problems with the reactor cooling water temperatures only reinforces the fact that

unanticipated problems and "incidents" remain a distinct possibility at Turkey Point. (**0044-2** [Commenters, Multiple])

Comment: History (Fukushima, Three Mile Island, and Chernobyl) provides solid evidence that nuclear incidents devastate large areas and destroy lives. (**0057-3** [Neway, Roberta])

Comment: I do not want to have the next "Fukushima" or "Chernobyl" on my doorsteps! As I stated in last month's NRC meeting in Miami at FIU, it's just a bad idea waiting to happen. (**0178-2** [Almirola, Alejandro])

Comment: Attached is a list of Nuclear power station accidents and incidents with the IAEA description for your information and before any approval is given for two new nuclear reactors. (**0250-1** [Fulks, Anna Louise])

Comment: Fukushima, Three Mile Island and Chernobyl are just three examples of how the very best intentions can go terribly wrong. The results of these actual unanticipated "incidents" have proven both catastrophic and long-lasting. FP&l's recent problems with the reactor cooling water temperatures only reinforces the fact that unanticipated problems and "incidents" remain a distinct possibility at Turkey Point. (**0263-1** [Orzechowicz, Holly])

Comment: An MIT team has estimated that give the expected growth of nurlear power over the 50 year span from 2005 to 2055, at least 4 serious nuclear accidents would be expected. (**0333-4** [Anonymous, Anonymous])

Comment: I remember 3 mile island. Learn from your mistakes. (**0373-9** [Lee, Nancy])

Comment: We should have learned from the errors of Chernobyl, Three Mile Island, and the ongoing disaster that is Fukashima that nuclear power is the wrong choice for our energy future. (**0382-2** [Mikowski, George])

Comment: Really think this doesn't need to happen especially since there have been nuclear reactors disasters already. (**0455-1** [Hardin, Lillian])

Comment: Let's not have another 3 mile island or Fukushima in the United States! (**0460-1** [Yarter, E. C.])

Comment: When the regular occurrence of nuclear accidents and meltdowns such as occurred at Chernobyl, Three Mile Island and the Fukushima disaster are factored in, the health risks of nuclear power rise exponentially and make this form of power generation totally unacceptable. (**0511-4** [Draper, Lonnie M.])

Comment: I wanted to mention, though, that before I came to South Florida I grew up in Philadelphia, which is 90 miles downwind from Three Mile Island, and I can tell you firsthand what it's like to live in a metropolis of 2 million people undergoing -- or in the midst of a nuclear reactor meltdown. And I know that you can reassure us that the same thing can't happen here. But remember, too, that NASA assured us that there was no way that a second shuttle could fail, right? And so things happen. (**0721-16-1** [Rifkind, David])

Comment: I want to talk to the Union guys for a second. When I was a young guy I was a Union member, Local 23, Mason Tenders Union. I worked real hard. We had a building in New York we were building that we were real proud of, the World Trade Center. We looked at those buildings go up, carried lumber, did concrete work. My best friend was Tom Consadine, an

electrician. We were so proud to be involved in that project. There was no way on this earth those buildings could go down. Nobody ever thought of that. Tommy's still my friend. You know what he did the last few years? He's been building the new World Trade Center. I'm going to leave everybody with one fact from this meeting they're never going to forget. April 26, 1986, a crew of workers goes in to Reactor Number 4 to do a safety check, and they botched it. Nothing was wrong with the reactor. They botched the safety check. Well, it's 29 years later and a thousand square miles -- this is no exaggeration -- over a thousand square miles around the Chernobyl Nuclear Plant are inhabitable from a safety check. So anybody in this room who believes it can't happen here, you're kidding yourself. That's all I have to say. (**0721-25-1** [Corda, Charles])

Comment: "You would think that Three Mile Island, Chernobyl, and Japan's Fukushima disasters would tell us all we need to know about the sudden, unexpected and long-term dangers of the nuclear energy. But apparently not. At least not when some large corporation like FP&L stands to make greater profits by putting Americans in danger and destroying the beauty and safety of Florida neighborhoods. (**0721-26-2** [Koenigsberg, Linda])

Response: *These comments indicate that severe reactor accidents such as those that occurred at Three-Mile Island Unit 2 (TMI-2), Chernobyl, and Fukushima Dai-ichi, and their consequences are unavoidable. The design of nuclear power plants in accordance with NRC requirements affords protection to public health and safety in two basic ways: (1) prevention of core damage events such that the likelihood of events that lead to core damage is very low, and (2) mitigation of consequences in the event of an accident. The NRC has determined that the combination of these two aspects of protection of public health and safety results in an acceptably low risk. In addition, enhancements to safety have been made based on the lessons learned from previous accidents to further reduce the acceptably low risk from severe accidents. The TMI-2 accident brought about regulatory changes for nuclear power plants and heightened oversight by NRC, as did the Fukushima accident. The Chernobyl accident did not result in regulatory changes for enhancing safety because the design, construction, and operation of U.S. reactors is fundamentally different than the Chernobyl reactor. As described above in this comment response section, the NRC has taken several actions regarding the lessons learned from the Fukushima accident specifically for the Turkey Point Units 6 and 7 COL application. Additionally, the AP1000 is a passive design and it provides core, containment, and spent fuel pool cooling for 72 hours with no operator action needed. These cooling functions can be sustained for an extended period beyond 72 hours during which the only operator actions are to refill the tank that is the source of water for the passive safety systems and distribute the water when needed. The enhanced safety of the AP1000 due to these passive features is clearly illustrated in Table 5-20 of the EIS, which compares the health risks from severe accidents for an AP1000 reactor at the Turkey Point site with the risks for current-generation reactors at various sites. The comments do not provide information other than what the review team has already considered in the EIS. Accordingly, no changes were made to the EIS as a result of these comments.*

Comment: Turkey Point is adjacent to fragile natural resources and a "stone's throw" from the densely populated areas of Miami-Dade County. Any "major" incident would destroy our ecosystem and wreck havoc on the lives of more than two million people. (**0057-4** [Neway, Roberta])

Comment: This area is highly populated. Any problem that arises would affect hundreds of thousands of people, not to mention multiple millions of dollars in property. It is clear from Three

Mile Island, and other "accidents" around the world, that nuclear plants and city and towns should not be mixed. (**0061-2** [Lague, Victoria])

Comment: Contrary to the assertion of the NRC (EIS) that the "socioeconomic" effects of building and operating the proposed reactors #6 and #7, are "small and beneficial" I believe the actual risk to the population of South Florida is astronomical and potentially devastating. History has shown that unanticipated "incidents" can occur at Nuclear Power generating facilities. History has also shown that the results of such an incident can be catastrophic and long lasting. (**0067-2** [Commenters, Multiple])

Comment: Locating a Nuclear Power Generating Facility in close proximity to a densely populated metropolitan area of more than 2,500,000 people, is an ill conceived notion at best. Although this decision may be a means to enrich the shareholders of FP&L, it places the entire population of South Florida in extreme jeopardy. (**0067-3** [Commenters, Multiple])

Comment: The expansion is a direct threat to our drinking water. An accident, a la Chernobyl or Fukushima would destroy one of the most beautiful places in America. (**0097-3** [Geary, Craig W.])

Comment: Contrary to the assertion of the NRC (EIS) that the "socioeconomic' effects of building and operating the proposed reactors# 6 and# 7, are "small and beneficial" I believe the actual risk to the population of South Florida can be devastating. History has shown that unanticipated "incidents" can occur at Nuclear Power generating facilities. History has also shown that the results of such an incident can be catastrophic and long-lasting. (**0206-2** [White, Holly])

Comment: There is no question if an accident will happen but when, maybe not in our lifetime but it WILL happen and the consequences for the earth and people leaving near there will be devastating! (**0222-1** [Glass, Rachel])

Comment: Obviously you have not considered the possible danger to the residents of South Florida. (**0331-2** [Anonymous, Anonymous])

Comment: We live in the the historic and beautiful Coconut Grove section of Miami, a short distance due north of Turkey Point. A southerly breeze would bring the tragic effects of a nuclear disaster at Turkey Point straight to our homes and our lives in Coconut Grove, adding our community to the names Fukushima, Three Mile Island, and Chernobyl. (**0338-1** [Kavanaugh, Daniel])

Comment: There are real safety concerns with this proposal for more reactors to be built so close to a huge metropolitan area. (**0340-8** [Tweeton, Tanya])

Comment: Please make sure any expansion of Turkey Point's reactors is accomplished in a manner that will assure that there is Zero possibility of any harm coming to South Florida's people or environment as a result of any expansion of the facilities. (**0554-1** [Denninger, Frank])

Comment: The cost of a nuclear meltdown is astronomical. One TRILLION dollars and counting for Fukushima and Chernobyl. (**0603-7** [Anonymous, Anonymous])

Comment: Operators of PWR reactors like the AP1000 often store the full core inventory in the spent fuel pool during maintenance operations, alongside the older fuel kept in long-term storage there. The larger the number of rods in the fuel pool at one time, the greater the risk of

criticality accidents, meltdown, hydrogen explosion, and the release of fission products. An extended station blackout, terrorist attack, or aircraft accident taking place when the fuel pool was full or nearly full presents a risk to human health and the environment of unprecedented proportions. Fission releases from fuel pool meltdowns at Fukushima were one of the principal sources of land and water contamination and human exposure to radiation. Spent fuel pools at Japanese reactors typically have far fewer fuel rods than their US counterparts owing to that country's use of spent fuel reprocessing. In the four years since the events at Fukushima, the NRC has allowed the start of construction of AP1000 plants in Georgia and South Carolina with spent fuel pools that are no different from pre-Fukushima designs. Those plants are situated at inland, rural locations. Turkey Point is located on the Atlantic Ocean near a major metropolitan area. A fuel pool accident or hydrogen explosion at Turkey Point 6 or 7 presents an unjustifiable risk to the large human population, Florida Everglades National Park, and to the marine environment along the coast including Biscayne Bay National Park. Fuel pool meltdowns were and continue to be the cause of the largest releases of radioactivity from Fukushima, where the surrounding land has become uninhabitable and the plant continues to pour dangerously radioactive water into the sea every day as the utility company attempts to prevent further criticalities. A catastrophic release of radiation into the waters around Turkey Point would have devastating consequences for tourism and shipping industries as the plant sits alongside one of the most heavily trafficked waterways of the United States and just south of important sea ports at Miami and Fort Lauderdale. (**0615-2-17** [Bethune, David])

Comment: Allowing a total of four nuclear reactors to Turkey Point would mean paradoxically siting of one of the country's largest nuclear reactor installations alongside an urban population of 4 million people. Siting at this location presents an extreme hazard to public health and safety in the event of an evacuation due to catastrophic environmental release of radiation. South Florida is laid out along the coast of the Atlantic Ocean and lacks evacuation routes to the west. (**0615-3-8** [Bethune, David])

Comment: And, of course, there's always accident scenarios. We don't even want to talk about an accident. We've seen them. I lived through --I'm old enough to have been through Three Mile Island and we - our jaws are still dropped open from Fukushima. I know it's not the same kind of power plant, but accidents can happen. So all bets are off. All those estimates about environmental impacts changes dramatically, in the event of a release in an accident scenario. (**0721-11-9** [Roff, Rhonda])

Comment: First, the population data right now is inaccurate. The models are not looking at this project effecting as many as 4 million people, all the way up to Fort Lauderdale, and they're not even taking into account the 2 million in Miami-Dade County. Right now the models are really looking at about 150,000 people that could be affected if there is a problem with the plant. (**0721-5-1** [Mendez, Victoria])

Response: *As discussed in Section 5.11 of the EIS, the severe accident risks listed in Table 5-18 include the population dose risk values. Specifically, the risk values include the risk to human health in terms of calculated cumulative doses to the general public residing within 50 mi of the site and estimated early fatalities and latent cancer fatalities in the exposed population; total economic costs from evacuation, rehabilitation, and land interdiction, condemnation and decontamination; estimated areas of surrounding farm lands requiring decontamination; and from water ingestion. The staff review applied the latest available census data of 2010, and accounted for the increasing population trend, and the property values for independently assessing the applicant's results as presented in the EIS. Thus, the staff considered the most recent information in evaluating severe accident risk for the proposed new reactors.*

As discussed in Section 5.11.2 of the EIS, the environmental risks from various classes of severe accidents for the Turkey Point site were considered for the purpose of severe accident analysis Site-specific information appears in Table 5-18 as population dose risk (person-rem/Ryr), offsite economic costs ($/Ryr), and population dose risk from water ingestion (person-rem/Ryr). The AP1000 design has several passive safety features to reduce the risk from severe accidents. For example, as described in the AP1000 DCD Appendix 19B, one of the key AP1000 severe accident design features is the capability to retain the core debris within the reactor vessel for a large number of severe accident sequences by flooding the reactor cavity and submerging the outer surface of the reactor vessel. The heat removal capability of the water on the external surface of the reactor vessel prevents the reactor vessel wall from reaching temperatures at which failure of the reactor vessel could occur. This has been termed in-vessel retention (IVR). The primary benefit of in-vessel retention of the core is that ex-vessel severe accident phenomena associated with relocation of core debris to the containment, which can be a dominant containment failure mechanism, are physically prevented. Thus, retention of the core within the reactor vessel results in a significant reduction in the potential for large fission product releases to the environment for core damage accidents.

In accordance with the Commission policy statement on severe reactor accidents (50 FR 32138) (TN4519), the severe accident risks of the proposed new reactors are presented in Table 5-18 of Section 5.11.2 of this EIS in terms of risk values per reactor-year, which are the product of the probability of a severe accident and its consequences. The NRC considers these risk values to represent the most meaningful way to place the risk in context and inform the environmental assessment process.

The NRC carries out its mission to protect public health and safety by specifying licensing and operational requirements that nuclear power plants must meet and by inspecting and enforcing compliance with these requirements. The NRC staff does not claim that the risk from a severe accident is zero or that a severe accident "cannot happen here," or that there would not be impacts to tourism or other economic activities. Rather, the NRC staff estimates the risk from a severe accident as described above and uses the estimates in the environmental analysis. The risk values include selected measures that are used for comparative analyses of societal risks and benefits. Specifically, the population dose and economic costs are used for assessing viable severe accident mitigation alternatives, or design alternatives, as explained in Section 5.11.3 of the EIS. The average individual fatality risk for the Turkey Point site, as shown in Table 5-19 and discussed in Section 5.11.2.1, are well below the Commission's safety goals (51 FR 30028) (TN594). The comments provided no information in addition to that considered in the draft EIS analysis, and no changes were made to the EIS as a result of these comments.

Comment: There are a few instances in the DEIS text where the DEIS either states that Revision 6 of Florida Power & Light's (FPL) Environmental Report (ER) (FPL 2014-TN4058) incorporated Revision 19 of the Westinghouse AP1000 Design Control Document (DCD) or that the FPL application refers to Revision 17 of the AP1000 reactor certified design. Revision 19 of the AP1000 DCD was incorporated as early as Revision 3 of the Units 6 & 7 COLA, DEIS reference (FPL 2011-TN127). Instances in the DEIS include:...DEIS Section 5.11, Page 5-131, Lines 10-11. (**0619-1-4** [Maher, William])

Response: *The text in Section 5.11 was revised to reflect FPL's application and Appendix D of 10 CFR Part 52 reference Revision 19 of the AP1000 Design Control Document.*

Comment: **NRC's Draft EIS is Flawed Because it Fails to Adequately Address the Impacts of Severe Accidents From Multiple Units and or Spent Fuel Pools.** According to

the NRC's DEIS: The NRC staff evaluated the environmental impacts from DBAs and severe accidents for an AP1000 at the Turkey Point site. Based on the information provided by FPL and NRC's own independent review, the NRC staff concludes that the potential environmental impacts (risks) from a postulated accident from the operation of the proposed Turkey Point Units 6 and 7 would be SMALL, and no further mitigation would be warranted. (See Appendix D, p. D-3. http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr2176/) NEPA provides for a detailed statement of, "the environmental impact of the proposed action, (and) any adverse environmental effects which cannot be avoided should the proposal be implemented." 42 U.S.C. § 4332(2)(C). However, the NRC characterizes impacts as "Small," "Moderate," or "Large." NRC's characterization of the postulated impacts as "small" is not supported by facts and instead relies upon claims of low probability of severe accidents. However as former Chairman MacFarlane acknowledged in one of her votes after Fukushima: While postulated frequencies of accidents at nuclear power facilities inte h U.S. are often expressed anywhere from one in 1,000 years to one in 1,000,000 years, it's important to recognize that the world has seen three severe accidents at nuclear facilities in the last 33 years -or essentiallyone every ten years, on average. Even though the circumstances, regulatory requirements, and plant designs differed from one accident to the next, these distinctions do not reassure most members of the public. To the contrary, this recurrence rate feeds much of the concern the public expresses about the safety of nuclear power. (U.S. Nuclear Regulatory Commission, Commission Voting Record, SECY-12-0157, Consideration of Additional Requirements for Containment Venting Systems for Boiling Water Reactors with Mark I and Mark II Containments, March 19, 2003, p. 3, http://www.nrc.gov/reading-rm/doc-collections/commission/cvr/2012/2012-0157vtr.pdf) Not only does NRC characterization of accidents as "small" violate NEPA but also the DC Circuits decision in New York v NRC, which found that, "(o)nly if the harm in question is so 'remote and speculative' as to reduce the effective probability to zero may the agency dispense with the consequences portion of the (NEPA) analysis." (New York v NRC, 68 F.3d 471, 482. (DC Cir. 2012) Given the commercial nuclear industry's track record of a meltdown per decade and the 2011 triple melt down of General Electric designed reactors in Japan, a severe nuclear accident at a U.S. nuclear plant involving multiple units is anything but speculative. (**0716-10** [Riccio, Jim])

Response: *The staff recognizes and appreciates the concern the public has about the safety of nuclear power. In recognition of this concern, the staff assesses the environmental impacts from postulated accidents in Section 5.11 of the EIS in accordance with Commission policy statements, the regulations of 10 CFR Part 51, and the guidance in Sections 7.2 and 7.3 of NUREG-1555. Nonetheless, the NRC disagrees with the comment that the draft EIS is flawed concerning the risks from severe accidents and that the NRC violates NEPA by assigning an environmental impact finding of "SMALL" to severe accidents.*

As for the comment's citation to the decision in New York v NRC, 681 F.3d 471, 482. (D.C. Cir. 2012), the Court of Appeals for the District of Columbia Circuit decision there invalidated an NRC rule. In that case, the NRC had not prepared an environmental impact statement, and the D.C. Circuit held that the challenged rule was not supported by an environmental assessment finding of no significant impact. The rule challenged in the New York v. NRC case differs from the application for COLs for Turkey Point Units 6 and 7 under consideration here because the NRC has prepared an EIS in connection with requested COLs, and the NRC staff has considered the plant-specific facts, including those raised in the comment."

Specifically, the NRC staff did consider severe accidents affecting more than one unit. As the EIS states in Section 5.11.2.4, "[t]he consequences of a severe accident would be the same regardless of whether one or two reactors were built at the site. If two reactors were built, the

risks would apply to each reactor, and the total risk for the site would be approximately double the risk for a single reactor." In the evaluation of severe accidents presented in Section 5.11.2 of the EIS, the staff has shown that the combination of probability and harm is sufficiently minimal in terms of the expected risks of a severe accident for the AP1000 reactor design to reach an environmental finding of SMALL.

Specifically regarding the Fukushima accident, the staff discusses in Section 5.11 the actions that have been taken during the safety review to address this concern and addresses the design features of the AP1000 that are specifically designed to counter the type of severe accidents that could affect multiple reactor units. Therefore, the staff concludes in Section 5.11 of the EIS that "none of the information the staff has identified about the Fukushima accident or the steps taken by the NRC to date to implement the task force recommendations suggests that the seismic and flooding hazards or the available mitigation capability assumed in the Turkey Point Units 6 and 7 EIS analysis of severe accidents would be affected. For these reasons, the NRC's analysis of the environmental impacts of design-basis and severe accidents presented herein remains valid." Additional information concerning the actions taken by the applicant to address actions for the mitigation of beyond-design-basis external events are presented in Chapter 20 of the ASE, Requirements from Fukushima Task Force Recommendations (NRC 2016-TN4806). For example, ASE Chapter 20 notes how passive cooling of the spent fuel is achieved using the water inventory of the SFP and safety-related makeup, and does not rely on active components or ac power (NRC 2016-TN4806).

The staff provided further clarification on the consideration of external events in Section 5.11.2.4 of the EIS in response to this comment.

E.2.18 Comments Concerning the Uranium Fuel Cycle

Comment: Finally, the high-level nuclear waste generated by Turkey Point Nuclear Units 6 &7 will end up and harm the environment for tens of thousands of years to come! (**0010-9** [Saporito, Thomas])

Comment: None of the chronic problems of nuclear power have been permanently solved. High-level nuclear waste continues to accumulate at reactor sites all across the U.S. We should not be building more reactors that create this deadly stuff, until we have a permanent repository for nuclear waste. (**0037-1** [Schoene, William])

Comment: Complicating all of this is that with no solution in sight for the long-term management of highly radioactive nuclear waste, there is no reason to support the licensing of these proposed reactors. (**0104-5** [Commenters, Multiple])

Comment: We are totally opposed to the expansion of nuclear generated energy at Turkey Point -- for the following reasons.....3) No long term solution for waste disposal (**0129-3** [Mayer, Doug])

Comment: Complicating all of this is that with no solution in sight for the long-term management of highly radioactive nuclear waste (**0141-4** [Lucas, Carmen])

Comment: We are still dealing with disposal issues. This waste lasts for centuries. Where will it be stored? (**0146-3** [Grant, Randy])

Comment: Thousands of pounds of spent fuel rods (nuclear waste) have already piled up on the shores of Biscayne Bay. There is no long term safe storage on the horizon. (**0158-1** [Carlson, John])

Comment: WE STILL DO NOT HAVE CONSENSUS ON THE DISPOSAL OF WASTE. IT IS WRONG OF US TO LEAVE THIS PROBLEM TO OUR DESCENDANTS TO LIVE OR DEAL WITH. (**0164-3** [Chrissos, H. L. Chris])

Comment: Complicating all of this is that with no solution in sight for the long-term management of highly radioactive nuclear waste, there is no reason to support the licensing of these proposed reactors. (**0192-6** [Lebatard, David])

Comment: AND, HOW TO SAFELY STORE SPENT FUEL??? (**0201-3** [Reid, Sarah])

Comment: Spent fuel storage [is unacceptable]. (**0245-4** [Lindsey, Jerrie])

Comment: One item that was heatedly argued by the commissioners present was the "safe" disposal of "spent" nuclear fuel rods which, some commissioners insisted could be converted into "glass logs" and thus neutralized. Depleted uranium doesn't deplete very much. Plutonium-239 only lasts 24,100 years. And Plutonium 244 only lasts 80 million years. (**0264-2** [Dwyer, John P.])

Comment: US spent-fuel storage sites are packed with no place to go. This is EXTRAORDINARILY RISKY AND DANGEROUS. Taxpayers are paying for storage for some utilities that have run out of storage space, and some have even sued the federal government for breach of contrac, because it failed to keep the 1998 deadline to establish long-term storage. (**0273-1** [Stewart, Berkeley])

Comment: And then there is the problem of nuclear waste disposal. We dont have a good long term solution for it and as we speak, it is being stored on site, too close for comfort! (**0340-5** [Tweeton, Tanya])

Comment: Another environmental issue that has not even been addressed by FPL or any government agencies is the huge accumulation of nuclear waste, with no place to dispose of it. The plan was to send it to Yucca Mountain, and now it has been determined that there are environmental problems with disposal at Yucca. What will be the environmental impact of keeping nuclear waste with no place for an environmentally safe place for disposal? (**0365-8** [Fischer, Antoinette])

Comment: The U.S. still has not settled upon a place to store radioactive waste materials. The Yucca Mountain reserve has proven to have to many problems for storage of dangerous materials for 50,000+ years. (**0382-1** [Mikowski, George])

Comment: If you cannot create a SAFE way to dispose, reverse, or eliminate nuclear waste in that the piles/deposits, etc. do not last thousands of years, THEN DON'T BUILD ANY MORE NUCLEAR PLANTS!!!!! DO YOU UNDERSTAND THIS BASIC FACT????? (**0406-1** [Ledbetter, Carolyn])

Comment: Furthermore, we have never devised a way to deal with nuclear waste, and at this point it seems unlikely we ever will. The kitty litter disaster at the WIPP is just one example of the insanity that plagues the nuclear waste industry. Here in California we're storing vast quantities of nuclear waste from the San Onofre plant (which had to be decommissioned

because the owners tried to skirt regulations and made "upgrades" which effectively destroyed it) right on active earthquake faults. What could possibly go wrong? (**0431-1** [Hicklin, Mary])

Comment: Where do you plan to store the nuclear waste? SDD (**0434-1** [Dahlgren, Shelley])

Comment: AND, where goes the waste, in whose backyard? (**0448-1** [Rush, Charlene])

Comment: And nobody has answers to the final question: What to do with spent fuel? Is this left for our children to take care of? (**0467-1** [Veijalainen, Pertti])

Comment: No one knows what to do with nuclear waste. It will be there forever. (**0469-1** [Weber, Zorina])

Comment: 2) after 30 years, the waste still has nowhere to go. Before expansions can be considered, the mounting spent nuclear waste problem has to be addressed. Suggest giving NASA a new mission - get the Nuc waste off the planet - shoot it into the sun or whatever. (**0502-2** [Brumleve, Charles])

Comment: To collect additional Nuclear waste material at that site, without a method of disposal, is irresponsible. (**0509-1** [Otto, Peter])

Comment: The waste created by these plants are a hazard to the planet and all like on it. (**0529-2** [Brandariz, Anita])

Comment: Uranium 238 is permanent since and has a half-life of 4.5 billion years, making contaminated areas uninhabitable for eternity. And where are you guys going to bury the nuclear waste? You have already run out of places to bury it. (**0561-2** [G., Ambriel])

Comment: Nuclear power has lethal by products, nuclear waste, that will be around for hundreds of years. Has FPL developed a viable plan to deal with this waste? I doubt it. I think they are being irresponsible and not protecting the public welfare if there is no workable plan to safely dispose of these highly toxic wastes. (**0579-3** [Schwab, Roy])

Comment: The proposed additional, new nuclear reactors at FPL's Turkey Point would produce even more radioactive waste that would not decay for the next 250,000 years or more. Solar and wind power do not produce any radioactive pollution. (**0592-10** [Brexel, Sr., Charles])

Comment: NO ONE has figured out how to make radioactive waste safe. (**0627-2** [Dolben, Hollis])

Comment: Nuclear power will ultimately destroy humanity-just think of the waste problem. (**0632-2** [Moll, Wolfgang])

Comment: And what about nuclear waster? No one has any idea what to do with the growing mountains of nuclear waster. (**0643-5** [Joannou, Jr., Benjamin])

Comment: Where are they going to store the waste?WIPP, in the open air, by the great lakes, in the ocean, on mars? (**0644-4** [Anonymous, Anonymous])

Comment: Our technology surpasses our ability to control, maintain, service, and dispose of wastes from nuclear plants, but we proceed, just as we continue to bum fossil fuels. (**0657-3** [Hartmann, Donald])

Comment: One item that was heatedly argued by the commissioners present was the safe disposal of spent nuclear fuel rods which, some commissioners insisted could be converted into glass logs and thus neutralized. Depleted uranium doesn't deplete very much. Plutonium-239 lasts 24,100 years. And Plutonium 244 lasts 80 million years. (**0673-2** [Dwyer, John P.])

Comment: But probably the number one thing that stuck out at me was the United States' approach to storing this hazmat and the nuclear waste, not only from power plants but from military. They come up with the Yucca Flats idea, initially it sounded great. Let's put all this stuff in one spot, put it underground, we can seal it off forever. And really, that's what we need as far as the long-term storage of these products is forever because some of the harmful effects can affect humans for 300,000 years, so that's basically forever. The country needs to come up with a national storage facility and get rid of all these onsite storage locations. It's just too hazardous having this stuff parked all over the country. Let's get it in one spot and not have any more nuclear plants put online until we have that policy in effect. And I think that this needs to be done, it needs to be a national priority and we all need to be letting our elected representatives know that we need a national plan for dealing with this waste. Until then there is no such thing as safe nuclear power. (**0721-24-1** [Eastman, John])

Comment: Will there be anyone here to oversee storage of these substances, keeping them from leaching into the environment? (**0721-32-8** [Schlackman, Mara])

Comment: So to get down to the point, Monroe County has a safety plan in case of a spill, and spill could see -- okay, they say our core of reactors may produce 10,000 Roetgens. You're loading up the Westinghouse, the rods to say three and a half percent uranium. When you get finished with them you bring down about one and a half percent uranium, it's called spent rods. Unfortunately we do not have a good repository in the United States to store them so they're stored onsite. (**0722-15-1** [McColgan, Robert])

Response: *These comments are concerned with Continued Storage and long term disposal of high-level waste. While a repository for final disposal of spent nuclear fuel has yet to be constructed, the Commission has, through rulemaking, considered the environmental impacts of spent fuel disposal in light of the current national policy regarding spent fuel. Specifically, on August 26, 2014, the Commission issued a revised rule at 10 CFR 51.23 and an associated Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel (NUREG-2157). Continued Storage is defined as the storage of spent fuel after the end of the licensed life for operations of a nuclear reactor and before final disposal in a permanent repository. The revised rule adopts the generic impact determinations made in NUREG-2157 and codifies the NRC's generic determinations regarding the environmental impacts of continued storage of spent nuclear fuel beyond a reactor's operating license. As directed by 10 CFR 51.23(b), the impacts assessed in NUREG-2157 are deemed incorporated into this EIS in Section 6.1.6. Section 6.1.6 also explains that current national policy mandates that high-level and transuranic wastes are to be buried at deep geologic repositories and that no release to the environment is expected to be associated with deep geologic disposal. The comments provided no information in addition to that considered in the draft EIS analysis and NUREG-2157. Accordingly, no change was made to the EIS as a result of these comments.*

Comment: More operating nuclear reactors at Turkey Point will produce more long-lived, highly radioactive nuclear waste in the form of spent nuclear fuel for which no safe storage and long-term management yet exists. Coupled with the high vulnerability of this area to sea level rise and severe storm surges from extreme weather events, which will increase from the effects of global climate change, the DEIS is deficient in assessing the impacts to the environment and

public health and safety of indefinite on-site, long-term, potentially permanent, storage of this nuclear waste. Having such a large amount of radioactivity clustered in a population-dense, hurricane-prone area could create significant safety and health concerns for Floridians. The NRC must address these cumulative impacts. (**0112-8** [Barczak, Sara])

Comment: With the two new reactors having a much larger power capacity than the existing ones, increasing amounts of spent nuclear fuel containing uranium-235, plutonium, and other dangerous radioactive materials will be accumulating in a flood and hurricane prone location for many years to come. (**0158-2** [Carlson, John])

Comment: Expanding a nuclear power plant in an area that is ground zero for sea level rise threatens our communities and the environment, especially if large amounts of spent nuclear fuel are stored on---site. (**0210-6** [Sharp, Andrea Heuson])

Comment: In addition to the highly dangerous nuclear fuel in the reactor cores - thousands of pounds of spent fuel rods (nuclear waste) have already piled up on the shores of Biscayne Bay. There is no long term safe storage on the horizon. With the two new reactors having a much larger power capacity than the existing ones, increasing amounts of spent nuclear fuel containing uranium-235, plutonium, and other dangerous radioactive materials will be accumulating in a flood and hurricane prone location for many years to come. (**0240-7** [Commenters, Multiple])

Comment: There are already thousands of pounds of spent nuclear fuel rods accumulating onsite at Turkey Point, and that accumulation will be compounded by the addition of two reactor units. Given the half-lives of Uranium 235 and plutonium, this waste will remain radioactive for thousands of years, and yet it is accumulating in a location vulnerable to sea level rise and storm surges, whose impacts FPL has underestimated. The spent fuel rods greatly multiply the risks from adding two reactors at this location, to the human population and even more so the wildlife in the nearby national parks. (**0246-4** [Shlackman, Mara])

Comment: Expanding a nuclear power plant in an area that is ground zero for sea level rise threatens our communities and the environment, especially if large amounts of spent nuclear fuel are stored on-site. (**0253-5** [Bloom, Justin] [Campbell, Cara] [Causey, Charlie] [Cavros, George] [Chenoweth, Mike] [Daly, Meg] [England, Margaret] [Fuller, Manley] [Jones, George L.] [Keller, Alan] [Martin, Drew] [McLaughlin, Caroline] [Reynolds, Laura] [Silverstein, Rachel] [White, Paton] [Williams, Elinor])

Comment: Expanding a nuclear power plant in an area that is ground zero for sea level rise poses a multitude of threats to our communities, especially if large amounts of spent nuclear fuel are stored on-site. (**0254-4** [Dudley, Dwight] [Lerner, Cindy] [Regalado, Tomas] [Stoddard, Philip K.])

Comment: The half-life of the main fuel, U-235, is 703.8 million years. Plutonium is also routinely created in the process of running a nuclear plant. It is highly toxic and its various isotopes have half-lives ranging from about 25,000 to 80 million years. These extremely dangerous substances will require secure storage and protection for a very long period of time in an area likely to be hard hit by increasing sea-level rise, storm surges and hurricanes. (**0356-14** [Shlackman, Jed])

Comment: The half-life of the main fuel, U-235, is 703.8 million years! Taking a CHANCE on the natural resources we HAVE REMAINING NOW is not a game. Plutonium often created in the process is highly toxic and its various isotopes have half-lives ranging from about 25,000 to

80 million years! Our wildlife and the eco-SYSTEMS that interacts dynamically have delicate balances, just like the human body. Securing storage and protection of dangerous substances I for a very long period of time in an area likely to be hard hit by increasing sea-level rise, storm surges and hurricanes does not seem logical. Once a resource is gone, it's not coming back! Risking throwing anything off in the slightest way can have effects that scientists haven't studied and I would like our next generation to be able to enjoy nature, just as I have today. (**0362-4** [Hurley, Paula])

Comment: The half-life of the main fuel, U-235, is 703.8 million years. Plutonium is also routinely created in the process of running a nuclear plant. It is highly toxic and its various isotopes have half-lives ranging from about 25,000 to 80 million years. These extremely dangerous substances will require secure storage and protection for a very long period of time and we do not have an agreed upon place to store or agreed way to transport nuclear waste. This is especially a problem for these two nuclear plants because they are in an area likely to be hard hit by increasing sea-level rise, storm surges and hurricanes. (**0366-11** [Griffith, Ed and Harriet])

Comment: The half-life of the main fuel, U-235, is 703.8 million years. Plutonium is also routinely created in the process of running a nuclear plant. It is highly toxic and its various isotopes have half-lives ranging from about 25,000 to 80 million years. These extremely dangerous substances will require secure storage and protection for a very long period of time in an area likely to be hard hit by increasing sea-level rise, storm surges and hurricanes. (**0370-13** [Vayu, Satya])

Comment: In addition to the highly dangerous nuclear fuel in the reactor cores -thousands of pounds of spent fuel rods (nuclear waste) have already piled up on the shores of Biscayne Bay. There is no long term safe storage on the horizon. With the two new reactors having a much larger power capacity than the existing ones, increasing amounts of spent nuclear fuel containing uranium-235, plutonium, and other dangerous radioactive materials will be accumulating in a flood and hurricane prone location for many years to come. (**0551-2** [Anonymous, Anonymous])

Comment: No New Nukes until you figure out how to dispose of the waste. Letting it pile up for decades in a hurricane potential area is not what the public wants. (**0621-1** [Datz, Amy])

Comment: With the two new reactors having a much larger power capacity than the existing ones, increasing amounts of spent nuclear fuel containing uranium-235, plutonium, and other dangerous radioactive materials will be accumulating in a flood and hurricane prone location for many years to come. (**0625-2** [Felinski, Julee])

Comment: In addition to the highly dangerous nuclear fuel in the reactor cores, Im also deeply concerned about the thousands of pounds of spent radioactive fuel rods being stored on the shores of Biscayne Bay. There is no long term safe storage on the horizon. Two new reactors mean that increasing amounts of spent nuclear fuel rods containing uranium-235, plutonium, and other dangerous radioactive materials will be accumulating in a known hurricane lane as well as a flood zone for decades to come. The tragedy of Fukushima should have been the last word on building nuclear plants in vulnerable coastal locations like this one. (**0674-5** [Dwyer, Karen])

Comment: The half-life of the main fuel, U-235, is 703.8 million years. Plutonium is also routinely created in the process of running a nuclear plant. It is highly toxic and its various isotopes have half-lives ranging from about 25,000 to 80 million years. These extremely

dangerous substances will require secure storage and protection for a very long period of time in an area likely to be hard hit by increasing sea-level rise, storm surges and hurricanes. (**0676-10** [Kassel, Kerul])

Comment: I'd like to conclude with some thoughts regarding the highly toxic radioactive substances involved in nuclear plant operations. The main fuel is Uranium 235 with a half-life of 700 million years. Plutonium which is created in the process of running a nuclear plant has isotopes with half-lives of 25,000 years to 80 million years. These half-lives have to be looked at in conjunction with the depopulation of South Florida as sea level rise occurs. (**0721-32-7** [Schlackman, Mara])

Response: *These comments are concerned with Continued Storage, long-term disposal of spent fuel, and how climate change may affect spent fuel storage at the Turkey Point site. While a repository for final disposal of spent nuclear fuel has yet to be constructed, the Commission has, through rulemaking, considered the environmental impacts of spent fuel disposal in light of the current national policy regarding spent fuel. Specifically, on August 26, 2014, the Commission issued a revised rule at 10 CFR 51.23 and an associated Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel (NUREG-2157). Continued Storage is defined as the storage of spent fuel after the end of the licensed life for operations of a nuclear reactor and before final disposal in a permanent repository. The revised rule adopts the generic impact determinations made in NUREG-2157 and codifies the NRC's generic determinations regarding the environmental impacts of continued storage of spent nuclear fuel beyond a reactor's operating license. As directed by 10 CFR 51.23(b), the impacts assessed in NUREG-2157 are deemed incorporated into this EIS in Section 6.1.6. Section 6.1.6 also explains that current national policy mandates that high-level and transuranic wastes are to be buried at deep geologic repositories and that no release to the environment is expected to be associated with deep geologic disposal. In particular, NUREG-2157, Section 4.17 and Appendix E, describes the effect of long-lived isotopes including those mentioned in the comments.*

Climate change, including future sea-level rise, is addressed in Chapter 2, Chapter 7, and Appendix I of the EIS. NRC-licensed spent fuel storage facilities are evaluated to ensure that the performance of their safety systems, structures, and components is maintained during flooding events, and they are monitored when in use. The NRC safety oversight process includes collection and analysis of information regarding changes in the severity or frequency of natural hazards, such as flooding from storm surge and sea level rise, as discussed in SECY-15-0137 (TN4731). When warranted, the NRC can request licensee study and analysis of changing natural hazards, and can impose additional design or operation requirements to address those changing hazards. The comments provided no information in addition to that considered in the draft EIS analysis and NUREG-2157. Accordingly, no change was made to the EIS as a result of these comments.

Comment: DEIS Section 6.1, Page 6-2, Table 6-1: In DEIS Table 6-1, "Table S-3 from 10 CFR 51.51(b), Table of Uranium Fuel-Cycle Environmental Data", portions of Table S-3 have been omitted. The complete table is found in Table S-3 of 10 CFR 51.51 and ER Table 5.7-1. The omissions in Table 6-1 occur under the subheading "Effluents - Chemical (MT)" following the entry for "Particulates" at the bottom of page 6-2. **Following "Particulates", there are omissions for "Other Gases," F and HCl**, and the associated notes regarding those emissions. The "Other Gases" entries should be followed by the subheading "Liquids" and entries for SO4-, NO3-, and Fluoride. Notes from Table S-3 in 10 CFR 51.51(b) documenting various assumptions about how the reference reactor values were derived and regarding the

likely dilution requirements for liquid chemical constituents have also been omitted. (emphasis added) (**0619-5-1** [Maher, William])

Response: *The missing information from Table S-3 from 10 CFR 51.51(b) has been restored to Table 6-1.*

Comment: The nuclear fuel cycle utilizes large quantities of fossil fuel at all of its stages--the mining and milling of uranium, the construction of the nuclear reactor and cooling towers, robotic decommissioning of the intensely radioactive reactor at the end of its 20 to 40-year operating lifetime, and transportation and long-term storage of massive quantities of radioactive waste, all are risking our environment and our lives. (**0264-7** [Dwyer, John P.])

Comment: Nuclear power is touted as a greenhouse solution, but the ancillary inputs to the nuclear fuel cycle such as mining, milling, reactor vessel construction, dealing with the waste that remains radioactive for millions of years, etc. negates any greenhouse mitigation. (**0371-3** [Haffmans, Edmund])

Comment: They are also not carbon free. It takes many carbon producing steps to prepare the fuel. (**0645-2** [Anonymous, Anonymous])

Comment: The nuclear fuel cycle utilizes large quantities of fossil fuel at all of its stages--the mining and milling of uranium, the construction of the nuclear reactor and cooling towers, robotic decommissioning of the intensely radioactive reactor at the end of its 20 to 40-year operating lifetime, and transportation and long-term storage of massive quantities of radioactive waste, all are risking our environment and our lives. (**0673-7** [Dwyer, John P.])

Response: *These comments relate to fossil fuel use and the carbon footprint of the uranium fuel-cycle activities. The NRC staff evaluated the carbon footprint impacts from the life-cycle of uranium fuel production, construction, operation, and decommissioning of the Turkey Point Nuclear Plant Units 6 and 7. These impacts are discussed in Chapters 4, 5, 6, and 7 of the EIS. The generic impacts of the uranium fuel cycle are codified in 10 CFR 51.51(b), Table S-3, Table of Uranium Fuel Cycle Environmental Data. In accordance with 10 CFR 51.51, the staff relied on Table S-3 as a basis for the impacts of uranium fuel-cycle impacts (including fossil fuel emissions). The staff used the coal and natural gas values in Table S-3 to estimate the greenhouse gas emissions from the fuel cycle. The review team compared the carbon dioxide (CO_2) footprints of nuclear power and reasonable baseload energy alternatives, and this evaluation is presented in EIS Section 9.2.5. Appendix J of the EIS presents a detailed breakout of the CO_2 footprint of a nuclear power plant. The comments provided no information in addition to that considered in the draft EIS analysis and Table S-3. Accordingly, no changes were made to the EIS as a result of these comments.*

Comment: I hope the you & your colleagues are un-biased & have enough integrity & complete enough with your science to come to the stronger conclusions against FPL wanting 6 & 7 Nuclear Reactors, because you have also factored in, along with Global Warming flooding where Turkey Point resulting in even greater damage to people's health & tourism, that:....The very source of nuclear power has to be dug out of the ground, through huge mines & has to be transported over states to the nuclear power plants. As I believe PFL representatives said, not just the one time they start a new nuclear reactor or/and a nuclear power plant, but regularly to replace the spent source. Plus, since the nuclear waste that is created cannot be safety stored, the transporting & attempting to safely store the nuclear waste has a huge cost in terms of global warming & our world's environment. (**0120-3** [Shark, Jason])

Response: *This comment is concerned with Continued Storage, long-term disposal of spent fuel, transportation of radioactive material, and climate change impacts. While a repository for final disposal of spent nuclear fuel has yet to be constructed, the Commission has, through rulemaking, considered the environmental impacts of spent fuel disposal in light of the current national policy regarding spent fuel. Specifically, on August 26, 2014, the Commission issued a revised rule at 10 CFR 51.23 and an associated Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel (NUREG-2157). Continued Storage is defined as the storage of spent fuel after the end of the licensed life for operations of a nuclear reactor and before final disposal in a permanent repository. The revised rule adopts the generic impact determinations made in NUREG-2157 and codifies the NRC's generic determinations regarding the environmental impacts of continued storage of spent nuclear fuel beyond a reactor's operating license. As directed by 10 CFR 51.23(b), the impacts assessed in NUREG-2157 are deemed incorporated into this EIS in Section 6.1.6. Section 6.1.6 also explains that current national policy mandates that high-level and transuranic wastes are to be buried at deep geologic repositories and that impacts to the environment would not be significant as associated with deep geologic disposal. Section 6.1.8 discusses the transportation impacts of the uranium fuel cycle and Section 6.2 discusses the impacts under normal operating and accident conditions of the transportation of nuclear fuel and radioactive waste, in accordance with 10 CFR 51.52 and Table S-4, Environmental Impact of Transportation of Fuel and Waste To and From One Light-Water-Cooled Nuclear Power Reactor. Climate change, including future sea-level rise, is addressed in Chapter 2, Chapter 7, and Appendix I. The impacts of climate change on the storage of spent fuel are included in NUREG-2157. Climate change impacts on the safe operation of Units 6 and 7, including sea-level rise, flooding, hurricanes, and storm surge, will be addressed in the staff's Safety Evaluation Report.*

The comments provided no information in addition to that considered in the draft EIS analysis, NUREG-2157, and Tables S-3 and S-4. Accordingly, no change was made to the EIS as a result of this comment.

Comment: Storage of radioactive waste in such an area can hardly be described as secure; transport of such waste would be extremely hazardous and presently no long term central storage facility exists. (**0463-4** [Gross, Cheryl A.])

Comment: Where will the spent rods be disposed of and how will they be transported? (**0550-3** [H., Pat])

Response: *These comments are concerned with Continued Storage, long-term disposal of spent fuel, and transportation of radioactive material. While a repository for final disposal of spent nuclear fuel has yet to be constructed, the Commission has, through rulemaking, considered the environmental impacts of spent fuel disposal in light of the current national policy regarding spent fuel. Specifically, on August 26, 2014, the Commission issued a revised rule at 10 CFR 51.23 and an associated Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel (NUREG-2157). Continued Storage is defined as the storage of spent fuel after the end of the licensed life for operations of a nuclear reactor and before final disposal in a permanent repository. The revised rule adopts the generic impact determinations made in NUREG-2157 and codifies the NRC's generic determinations regarding the environmental impacts of continued storage of spent nuclear fuel beyond a reactor's operating license. As directed by 10 CFR 51.23(b), the impacts assessed in NUREG-2157 are deemed incorporated into this EIS in Section 6.1.6. Section 6.1.6 also explains that current national policy mandates that high-level and transuranic wastes are to be buried at deep geologic repositories and that no release to the environment is expected to be associated with deep*

geologic disposal. Section 6.1.8 discusses the transportation impacts of the uranium fuel cycle and Section 6.2 discusses the impacts under normal operating and accident conditions of the transportation of nuclear fuel and radioactive waste, based on 10 CFR 51.52, Table S-4. The environmental effects of transportation of fuel and waste are codified in 10 CFR 51.52, Table S-4, Environmental Impact of Transportation of Fuel and Waste To and From One Light-Water-Cooled Nuclear Power Reactor.

The comments provided no information in addition to that considered in the draft EIS analysis, NUREG-2157, and Table S-4. Accordingly, no change was made to the EIS as a result of these comments.

Comment: Storing these elements in spent fuel pools such as FPL proposes for Turkey Point 6 and 7 creates a serious environmental threat to the people, land, air, and water of this community. (**0615-1-10** [Bethune, David])

Response: *Section 6.1.6 discusses the onsite storage of spent fuel during the licensed lifetime of reactor operations. Environmental impacts from onsite spent fuel storage have been studied extensively and are well understood. Further, effects of normal operation are addressed in EIS Sections 5.9 and 6.1.6 (radiological health), Section 5.1 (land use), Section 5.3.1 (terrestrial ecology), and Section 5.3.2 (aquatic ecology). The overall conclusion is that the environmental impacts of radiation exposure would be small. The comments provided no information in addition to that considered in the draft EIS analysis. Accordingly, no change was made to the EIS as a result of this comment.*

Comment: The nuclear industry and especially any new construction should pay for the cost of nuclear waste disposal. This should be a cost of nuclear power and not a cost paid for by the government. (**0404-1** [Leibowitz, Arthuir])

Comment: Nuclear waste is the largest form of LONG-TERM DEBT that any country with nuclear energy will ever have. The cost to store nuclear waste for 250,000 years could bankrupt a country as the cost is INFINITE. (**0603-6** [Anonymous, Anonymous])

Response: *Licensees, and ultimately their electricity consumers, pay for the storage and ultimate disposal of spent fuel. Under the Nuclear Waste Policy Act, licensees are required to pay a fee into the nuclear waste fund, which is to be used to fund permanent disposal of spent fuel; DOE recently suspended collection of the fee in response to the decision in NARUC v. DOE. In addition, under 10 CFR 50.54(bb) and 10 CFR 72.22(e), licensees are required to provide funding for spent fuel storage costs whether the storage occurs onsite or at an independent spent fuel storage installation. As discussed in Section B.3.4 of NUREG-2157, the NRC acknowledges that, because of delays in the siting and licensing of a repository, the Federal government bears an increasing financial responsibility for spent fuel storage costs, and may become responsible for paying all the costs associated with spent fuel storage at some time in the future. The comments provided no information in addition to that considered in the draft EIS analysis and NUREG-2157. Accordingly, no change was made to the EIS as a result of these comments.*

E.2.19 Comments Concerning Transportation

Comment: I am strongly in favor of the addition of 2 more nuclear reactors to the current Turkey Point facility for the following reasons:...[b]y increasing the capacity to generate power from nuclear the dependence on various non-renewable fuels will diminish decreasing the need

for transportation of oil and liquefied natural gas over rail tracks which are becoming overcrowded with new passenger and commuter services to the east, trains plus increased freight demand from the port expansion etc...As development continues to expand fewer people will be exposed to the dangers of train accidents which are even more threatening to people and the environment if the train carried oil or gas...The decrease in train transportation of fuel for the generation of electricity will have a very substantial positive environmental effect and result in a decrease in greenhouse gas emissions from the transportation alone. (**0015-5** [Goldmeier, Barry])

Response: *The review team agrees with the comment. Fewer rail shipments are needed to support operation of a commercial nuclear power plant than would be needed to achieve the same electrical generating capacity at coal- or oil-fired power plants. No changes were made to the EIS as a result of this comment.*

Comment: There are instances in the DEIS where, due to the timing of events with respect to drafting the DEIS, specified dates, or future actions, indicated in the DEIS have passed. Instances in the DEIS include (emphasis added):...DEIS Subsection 7.11.2, Page 7-41, Lines 23-26: The DEIS states: "The Tunnel Access Improvement project is located about 26 mi northeast of the Turkey Point site, but it is unlikely construction of the two projects would overlap because the tunnel improvement project **is scheduled to be complete in 2014**..." This project **was completed in 2014**. (**0619-1-11** [Maher, William])

Response: *Section 7.11.2 of the EIS was revised to remove the reference to the Tunnel Project.*

Comment: DEIS Subsection 6.2.1.1, Page 6-21, Table 6-4: In DEIS Table 6-4, the parameter, "Dose rate at 1 m from vehicle, **mrem/hr**", is reported as 0.1. In ER Table 5.7-6, the same parameter, with a different unit, "Dose rate at 1 meter from vehicle, **person-rem per hour**" is reported as 0.1.? (emphasis added) (**0619-5-2** [Maher, William])

Response: *There appears to be a typographical error in the ER. The correct unit for the dose rate emitted from a shipment is mrem/hr. Person-rem refers to collective radiation doses to groups of persons or populations, and not dose rate. No changes to the EIS were necessary as a result of this comment.*

Comment: DEIS Subsection 6.2.1.1, Page 6-23, Lines 20-21 and Subsection 6.2.1.1, Page 6-23, Lines 27-29: The DEIS (Subsection 6.2.1.1, Lines 20-21) states: "The following discussion **applies to unirradiated fuel shipments**..." Additionally, the DEIS (Subsection 6.2.1.1, Lines 27-29) states: "**In all cases in this EIS**, the NRC staff assumed that the dose rate from the shipping containers would be 10 mrem/hr at a distance 2 m (6.6 ft) from the side of the transport vehicle." This transport dose rate assumption (equivalent to 14 mrem/hr at 1 m) greatly exceeds that presented in DEIS Table 6-4 (0.1 mrem/hr at 1 m for **unirradiated fuel shipments**). Recommend replacing "In all cases in this EIS..." with "In all irradiated fuel cases in this EIS..." (emphasis added) (**0619-5-3** [Maher, William])

Response: *The staff agrees with the comment that the 10 mrem/hr dose rate does not apply to all cases in the EIS. The NRC staff revised the EIS to indicate that the 10 mrem/hr dose rate applies to the analysis of radiation doses to maximally exposed individuals from transportation of irradiated fuel. The radiation dose rates used for calculating incident-free and accident impacts from transportation of irradiated fuel on populations are specified in the EIS Tables 6-6 and 6-8.*

Comment: DEIS Subsection 6.2.2.2, Page 6-34, Table 6-10: In DEIS Table 6-10 footnote (a) indicates the radionuclide inventory in DEIS Table 6-10 was obtained from ER Table 7.4-3. ER Table 7.4-1 contains the radionuclide inventories found in DEIS Table 6-10 with the exception of Kr-85—this exception should be noted in the DEIS Table 6-10. (**0619-5-4** [Maher, William])

Response: *The comment is correct. The Kr-85 source term was taken from an Idaho National Engineering and Environmental Laboratory document (INEEL 2003) and has been included in previous EISs for AP1000 reactors. The NRC staff revised EIS Table 6-10 to reflect this comment.*

Comment: DEIS Subsection 6.2.2.2, Page 6-36, Table 6-11: In DEIS Table 6-11 includes an incorrect footnote (a). Values in the table are reported in person-rem/year, not person-Sv/yr. Footnote (a) should provide the conversion from person-rem to person-Sv as in DEIS Subsection 6.2.1.1, page 6-22, Table 6-5 and DEIS Subsection 6.2.2.1, page 6-31, Table 6-9. (**0619-5-5** [Maher, William])

Response: *The footnote in the EIS Table 6-11 is correct, but the review team agrees with the comment to the extent that the conversion should be from units of person-rem reported in the Table to person-Sv. The review team revised EIS Table 6-11 to reflect this change.*

Comment: DEIS Subsection 6.2.2.2, Page 6-36, Lines 8-10: The DEIS states: "This risk is very small compared to the **4.5×10^{-5} person-rem/yr** that the same population would incur annually...Turkey Point site to Yucca Mountain from exposure to natural sources of radiation." The DEIS Subsection 6.2.2.1, Page 6-33, Lines 10-12 correctly states: "This dose is very small compared to the estimated **4.5×10^{5} person-rem** that the same population...Turkey Point site to Yucca Mountain would incur annually from exposure to natural sources of radiation." (emphasis added) (**0619-5-6** [Maher, William])

Response: *The comment correctly identifies a typographical error in Section 6.2.2.2. The review team revised the statement in the EIS Section 6.2.2.2 to correctly reflect the $4.5x10^{5}$ person-rem/yr exposures to natural background radiation.*

Comment: DEIS Subsection 7.11.2, Page 7-43, Lines 3-7 and Subsection 7.11.2, Page 7-43, Lines 10-12: The DEIS (Subsection 7.11.2, Lines 3-7) states: "...the NRC staff considers to be acceptable for the 1,000 MW(e) reference reactor." Similarly, lines 10-12 refer to a 1,000 MW(e) reference reactor. Impacts presented in Table S-4 are based on an **1100 MWe reference reactor** evaluated in the reference WASH-1238. (emphasis added) (**0619-5-10** [Maher, William])

Response: *The statement in Section 7.11.2 of the EIS was revised to correct this typographical error.*

E.2.20 Comments Concerning Decommissioning

Comment: As a resident of Key Largo, I am hopeful that you will reconsider the proposed expansion and begin thinking about decommissioning the plant as it's useful life reaches its limits. (**0130-4** [Jones, Diane])

Comment: As the Turkey Point reactors age, they should be dismantled. (**0213-5** [Hyams, Charles])

Comment: My god, you should be planning its dismantling even as we speak! (**0384-2** [Franzmann, Paul])

Response: *At the end of the operating life of a nuclear power reactor, NRC regulations require that the facility be decommissioned. Decommissioning is discussed in Section 6.3 of the EIS. The environmental impact from decommissioning a permanently shut-down commercial nuclear power reactor is also discussed in Supplement 1 to NUREG-0586, Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, which was published in 2002. In Supplement 1, NRC staff found that for most environmental issues, the impact from decommissioning activities is considered small.*

No changes were made to the EIS in response to these comments.

E.2.21 Comments Concerning Cumulative Impacts

Comment: According to NRC and NEPA requirements, the DEIS must discuss and analyze the environmental impacts of the proposed Turkey Point expansion, including the direct, indirect and cumulative impacts. Current operations of Turkey Point already pose risks to the ecological integrity of surrounding environments, particularly to Biscayne Bay and Biscayne National Park. Specifically, water from the cooling canal system (CCS), a designated industrial wastewater facility (IWF) used to cool waters from the operation of Units 3 & 4, is seeping into groundwater, creating a hypersaline plume emanating out in all directions. [Footnote 22: Lewis, M. United States Department of the Interior, National Park Service Letter to M. Harris, Florida Department of Environmental Protection, November 13, 2009, L76, 1.] Despite being described as a "closed system" by FPL, the CCS is an unlined system with direct connections to groundwater. (**0113-2-2** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: This failure to address the current crisis of the cooling canals, the fact that there has not been presented any proposed long term solution in the Draft EIS is a fatal flaw in the Draft statement, and can only be addressed by studying these current emergency conditions, and the cumulative effect of this new and likely long-term scenario, the impact of the uprate on the cooling canal system, the significant impact on our water sources, and the CUMULATIVE EFFECT of current conditions when planning for the future, then factoring it into the scenario for the two proposed new plants. The failure to address current conditions and to establish the potential scenario fails to provide a comprehensive evaluation as recommended by the USGC Global Sea Level Rise Scenarios for the US national Climate Assessment. (**0145-6** [Lerner, Cindy])

Comment: The NRC review should not separate the new reactor impacts from the persistent damage being caused by the existing reactor operations. The continued damage to Biscayne National Park must not be allowed to continue as it runs counter to the National Parks mission and the Nation's promise to its citizens that the Park and its biological resources be protected for current and future generations. (**0172-6** [Cava, Daniella Levine])

Comment: Not effectively addressing the ongoing environmental degradation as part of the NRC's environmental review of the proposed additional nuclear power plants would be a disservice to the residents of Miami-Dade County, the rate-payers of the State of Florida, and Nation. Please ensure that the environmental review for Turkey Point 6 & 7 evaluates the cumulative impact and use this opportunity to correct the problems as they exist now. (**0172-8** [Cava, Daniella Levine])

Comment: The DEIS does not adequately describe the cumulative impacts of constructing and operating Units 6 and 7. Information should be included related to impacts from other ongoing actions as we have indicated herein, federal or non-federal, that are likely, when added to the

incremental effects of the proposed action, to have an impact on the affected environment. This view is consistent with the CEQ regulations for implementing NEPA which defines cumulative impacts as, "The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions." Most notably, the analysis does not fully consider the following impacts: effects of sea level rise and storm surge, and impacts from the IWF hypersaline plume, freshwater utilized to alleviate IWF emergencies, operation of the RCWs on NPS resources, impacts on surface water and groundwater, and effects on imperiled flora and fauna and aquatic resources. The NRC should update its cumulative impacts analysis in revisions to the DEIS. Many of the specific cumulative impact concerns are described in previous comments on specific topics such as sea-level rise and climate change, water quantity and quality. (**0622-2-5** [Austin, Stan])

Response: *The NRC is aware of the 1997 guidance from the Council on Environmental Quality (CEQ) regarding cumulative impacts. The NRC's process for assessing cumulative impacts is described in the introduction to Chapter 7. In performing its cumulative impacts analysis, the NRC follows the requirements of NEPA, the NRC's regulations, and the guidance provided in NUREG-1555, the Environmental Standard Review Plan (NRC 2000). This analysis considers the current environmental conditions at the Turkey Point site and in the surrounding region as described in Chapter 2 of the EIS. Chapter 2 includes a description of the existing units at the site and the environmental conditions associated with their operation. The analysis considers the impacts associated with construction and operation of Turkey Point Units 6 and 7 described in Chapters 4 and 5 to be those that are also important to consider in a cumulative impact context. Chapter 7 provides a list of other important projects within the general 50-mi region surrounding Turkey Point that could contribute to cumulative impacts. For each resource area considered, the EIS further describes the geographical area of interest and provides a technical justification for its extent. These geographical areas of interest encompass the areas in which direct, indirect, and cumulative impacts would be expected to occur for each resource area. The EIS has been updated to reflect data collected since the publication of the draft EIS.*

E.2.22 Comments Concerning the Need for Power

Comment: I am strongly in favor of the addition of 2 more nuclear reactors to the current Turkey Point facility for the following reasons: 1-The area needs a dependable long term source of electric power to accommodate future growth[.] (**0015-1** [Goldmeier, Barry])

Comment: I am strongly in favor of the addition of 2 more nuclear reactors to the current Turkey Point facility for the following reasons:...I would imagine that more nuclear generation capacity from new plants will take the strain off the older facilities allowing them to be upgraded and have their safety mechanisms improved. (**0015-12** [Goldmeier, Barry])

Comment: I am strongly in favor of the addition of 2 more nuclear reactors to the current Turkey Point facility for the following reasons:...In the event of a disruption in the power grid because of terrorism, accidents or weather having a Miami-Dade generated source of electric power would proved to be a tremendous advantage for our County and boost our stability. (**0015-8** [Goldmeier, Barry])

Comment: I also am aware that FP&L has decommissioned several power plants in Florida and the requirements for extra power, especially with the huge influx of immigrants and others from our northern states, is critical. (**0035-3** [Larrabee, Laura])

Comment: South Florida is growing and more Electrical Power is needed. (**0041-1** [Williams, Paul])

Comment: There have been some questions about the need for this project, and to us in the construction industry there is no question about the need for this project. All it takes is you drive down Downtown Miami, the Biscayne corridor, Brickell, the Design District and you see cranes everywhere and you see high-rises going up everywhere. And that construction growth, that boom in construction that we're experiencing right now, needs additional power capacity. Each high-rise consumes on the average from 2 to 3,000 kva's of load. And that is the reason why this project is necessary, the need for additional power capacity to maintain this growth. (**0721-27-1** [Rodriguez, Manuel J.])

Comment: In essence we have taken the position as a city the need for additional power as we grow our city. As you all well know our community is growing really fast and we don't have the capacity to generate enough of our own so we do purchase a lot from Florida Power and Light. They are an extremely good partner, they've been with -- you know, we've been partners for a long time. Actually, we're the sister city so of record. (**0722-1-1** [Porter, Jeff])

Comment: I've lived here, as I said, for 30 years which means I lived through Hurricane Andrew. Can I see a show of hands? How many of you here in the room lived through Hurricane Andrew? You know, that is indicative of what happens when you no longer have a reliable supply of electricity. And that is what my concern is and that is what brought me here today.

Turkey Point 6 and 7 represent what I believe to be a necessary element of additional power to this community. We operate, we live at the end of the power grid. All of our energy with the exception of what's coming out of Turkey Point is basically imported from the north which makes us highly vulnerable in the case of storms and other potential natural interruptions. (**0722-10-2** [England, Peter])

Comment: And then aside from that there's the concern that South Florida needs energy. (**0722-5-2** [Silva, Nicolas])

Comment: [W]as the additional power needed? Second, was it safe and cost efficient? Over the years as I've become more informed. I've been convinced that we need -- we will need additional power. (**0723-1-1** [Wallace, Otis])

Comment: ...whereas FPL has plans to expand electrical generation at its Turkey Point facility meeting the electrical needs of its customers and service area in Miami Dade County. (**0723-2-2** [Trowbridge, Mark])

Comment: [A]nd kilowatt hours, that it will bring to extra capacity for Miami Dade County. (**0723-8-3** [McDuffie, Stephen])

Response: *These comments express support for nuclear power because of the growth of the area and the concomitant increase in the need for power. No changes were made to the EIS as a result of these comments.*

Comment: FPL has cancelled its renewable programs for ratepayers, is engaged in anti rooftop solar astroturf campaigns and disinformation propaganda to limit competition from rooftop solar that would make the need for new reactors unnecessary. This is poor coporate social responsibility that should not be rewarded. (**0710-6** [Platt, George Seth])

Comment: And I think the last cost that I think is really hard to quantify is the long-terms cost of business and our economy by doubling down on nuclear at a time when we are not in crisis. No one is predicting brown-outs in the near future. Instead, we're at a time of opportunity. We don't know what our future will be in terms of energy, but we'd be doubling down for 50 to 80 years on nuclear, when we're at a time where on the ballot in 2016 is a measure that would allow us -- allow voters to consider whether they want competition and diversification on how power is generated and distributed. (**0721-1-9** [Rodriguez, Jose Javier])

Comment: Lastly, it's no surprise that FPL argues that there's a need for a $20 billion nuclear reactor project to meet the demand 12 years from now. They have gutted their energy efficiency programs for customers and they don't assign any capacity avoidance value to solar power, so they've cleared the deck of all clean energy options. (**0721-8-10** [Cavros, George])

Response: *These comments express general opposition to the environmental costs of power plant construction or raise societal issues that are not within the purview of NRC or USACE to address as part of the environmental review process. They did not provide new information related to the environmental effects of the proposed action. Therefore, no changes were made to the EIS as a result of these comments.*

Comment: Overall: The overall project purpose is to meet the public's need for reliable increased electrical baseload generating capacity in Florida Power & Light's service territory. My question is: Is this public need for the entire state or specifically for Miami? (**0008-3** [Finver, Jody])

Comment: The NRC wholly relied on the Florida Public Service Commission (FPSC) need determination as stated above [commenter pasted text from EIS Section 8.2.1 and its subsections into their correspondence] - and failed to properly make an "independent" "NEED" determination in this matter. (**0010-4** [Saporito, Thomas])

Comment: FPL should be denied a license for Turkey Point expansion for many reasons:...5. No need. Miami's demand for electricity is falling, not rising. (**0022-5** [Read, Alice Gray])

Comment: We continue to have serious concerns about FPL's proposal to potentially build two new Toshiba-Westinghouse AP1000 reactors at their existing Turkey Point site in Miami-Dade County. The uncertainties of this more than $20 billion, decade-delayed project continue to escalate, putting utility ratepayers and the environment at increasing risk. Fundamentally, there is no purpose and need for the two reactors. (**0112-1** [Barczak, Sara])

Comment: The power lines would be sold upstate, Orlando and Tampa, and out of state. It is not for local use. So who does it serve? (**0149-7** [Nelson, Joyce E.])

Comment: The power that will be generated at these reactors is not for the local area. (**0337-2** [Philips, Sally B.])

Comment: Another reason to support the "No Action" alternative is that there is no need for the proposed ~$20 billion reactors--the fact that they have been delayed several times and the in-service date pushed back at least ten years is just one indication. The fact that FPL will not commit to actually completing the project is clearly another. Further, the NRC's reliance on Florida Public Service Commission orders and the state's utility resource planning process is badly misplaced. The alleged need for the new reactors is the product of a disjointed state utility planning process that the NRC should not rely on. (**0379-4** [Commenters, Multiple])

Comment: It is quite possible that the plants will never be built, if FPL decides, for example that their use would be uneconomical. (**0615-1-13** [Bethune, David])

Comment: When asked to justify the electrical demand for a new plant, another staff member simply reported that the state Public Utilities Commission had deemed it necessary. (**0615-1-4** [Bethune, David])

Comment: Even though you rely upon the state of Florida for the electric needs assessment and determination of need it is important to point out that these two new reactors may not be needed. Florida is moving to an economy based upon new electric sources of power. (**0641-8** [Martin, Drew])

Comment: Florida needs to strengthen and secure its grid through diversity of electricity generation, not create large reactors at the tip of the State that feed energy elsewhere. (**0710-7** [Platt, George Seth])

Comment: And so as I look at this synopsis of the Draft Environmental Impact Statement, I have to wonder about the age of some of the statistical basis that have been invoked by FP&L and by other parts, the Public Utilities Commission, for example, as a basis for making the claim for the need for these two units. So, that's one question that I have, and I want to raise for our visitors. (**0721-17-1** [Breslin, Tom])

Comment: Second one is, our area may need more electricity, but there is no present foreseeable crisis that exists. (**0721-31-4** [Almirola, Alejandro])

Comment: The determination of need right now is based on antiquated data that was done in 2008. The NRC review based on a seven-year-old determination of need that was done before the market crashed and the real estate crash is not adequate information to base this plant expansion on. It seems to be a desktop review and not appropriate with such large threshold questions. (**0721-5-2** [Mendez, Victoria])

Comment: FPL's proposed Turkey Point reactors are neither low cost nor low risk. While there are a host of environmental and safety impacts, from the extremely water intensive proposed reactors, I'm going to limit my comments to the need for power. And with all due respect, Dan and Alicia, there is no need for the proposed reactors. The fact that they have been delayed several times and the in-service dates have been pushed back at least ten years, is but one indication. The fact that FP&L will not commit to actually completing the projects is another clue. (**0721-8-1** [Cavros, George])

Comment: But let me circle back to the DEIS, because, you know, why is this important in that context? Because the alleged need for the power plant is the product of a disjointed State utility planning process upon which the NRC relies. To reach this determination that the need is there the NRC concludes that Florida's utility planning process is systematic, comprehensive, subject to confirmation, and responsive to forecasting uncertainty. (**0721-8-8** [Cavros, George])

Comment: The reason I asked the question earlier about the demand forecast is I don't think you can trust even an honest and well-managed utility with the lowest power cost in the nation, like FPL, to make these projections for the demand for power, baseload power. They have a bias in the system. Basically they get a guaranteed return on every dollar they spend. (**0723-12-1** [Henry, Jim])

Comment: We have to think of some alternatives to the demand forecasts that they have laid out here, which are -- you know, if they're -- I mean, they're directly relevant to the DEIS. Because if the demand forecast isn't right then we have to go back to square one. (**0723-12-4** [Henry, Jim])

Response: *These comments generally suggest that NRC's reliance upon the State's Determination of Need process implemented by the Florida Public Service Commission (FPSC) is invalid, unfounded, or that the need for Units 6 and 7 has not been clearly established. In 2008, the State granted the applicant a Determination of Need for Units 6 and 7. Chapter 8 of the EIS provides the review team's analysis of the findings of the FPSC process in support of granting FPL's Determination of Need. The Chapter 8 discussion includes analysis of the most recent annual update to FPL's feasibility assessment approved by the FPSC in October, 2015. As indicated in Section 8.4 of NRC's Environmental Standard Review Plan (NUREG-1555), when a State agency has regulatory authority over determining a need for power, NRC defers to that agency's decision. Chapter 8 of the EIS has been updated to reflect any relevant new information provided by FPL or the FPSC regarding the need for proposed Units 6 and 7. In addition, it discusses FPSC's condition in its granting of FPL's Determination of Need - that FPL regularly update its long-term forecasting to regularly reassess the need for the project.*

Comment: DEIS Subsection 8.1.1, Pages 8-3/8-4, Lines 4/5: The DEIS states: "FPL relies on **two measures of reliability** in its resource planning..." However, in FPL's 2014 Ten Year Power Plant Site Plan (DEIS reference [(FPL2014-TN3360)], **FPL introduced a third criterion**: "Therefore, FPL is implementing a new reliability criterion of a 10% GRM in its resource planning work to complement its other two reliability criteria: a 20% total reserve margin criterion for Summer and Winter, and an annual 0.1 day/year loss-of-load-probability (LOLP) criterion." (emphasis added) (**0619-5-12** [Maher, William])

Comment: DEIS Subsection 8.1.1, Page 8-4, Table 8-1: DEIS Table 8-1 cites (FPL 2014-TN3360), "Ten Year Power Plant Site Plan 2014-2023", as the reference. However, only the Industrial values can be verified per Schedules 2.1 and 2.2 (pages 37-38) from the Ten Year Power Plant Site Plan 2014-2023. (**0619-5-13** [Maher, William])

Response: *These comments identify inconsistencies or point out reliance on outdated sources in Chapter 8 of the EIS. Changes to Chapter 8 have been made to reflect updated sources of information and to correct any inconsistencies in the text.*

Comment: These "grid-tied" solar systems not only "**decrease" FPL's "NEED**" for more generating base load capacity - they actually "**decrease" FPL's base load requirements. To the exent that the FPSC failed to properly consider these types of grid-tied home solar systems in making their "NEED" determination - the NRC's reliance on FPSC's determination is flawed in kind.** One of the major and leading home solar system providers - Solar City - offers a leasing option for Florida home owners with NO upfront costs as shown here and below: http://www.solarcity.com/residential/how-much-do-solar-panels-cost [ad placed here - refer to PDF file] As can be seen here - a customer of FPL can simply lease a complete home solar power generating system for their home without making any upfront payments. As previously stated - these grid-tied systems generate excess power back to FPL's electric grid. Thus, **FPL's base load demand is reduced in two ways** - (1) reduced customer demand for electric power from the FPL grid since these solar power systems can generate 100% of a home owner's energy needs; and (2) the solar systems generate electric power back to FPL's grid. (**0010-10** [Saporito, Thomas])

Comment: The NRC's reliance on the Florida need determination process is misplaced. The foundation for the need for power, which is a foundational consideration in the DEIS, is based on a 2008 state need determination order by the Florida Public Service Commission (PSC), whose underlying assumptions have been not stood the test of time. In fact, the load forecast assumptions made in 2008 regarding the need for the reactors to meet demand bear no resemblance to today's load forecast realities. Moreover, the NRC analysis of the need determination order is cursory and not weighed against current forecast realities to determine if the process meets the NRC's own requirements (NUREG-1455) for responsiveness to forecasting uncertainty. Instead, the NRC offers a conclusory opinion with mere references to the order that are not independently verified by FPL's own subsequent filings with the Florida PSC. Therefore, the NRC should take a "hard look" at the underlying need for power by conducting an analysis of Florida regulations and the load forecasts, as they exist today, in rendering a decision on the need determination's responsiveness to load forecasting uncertainty. If it does so in a through manner, it can only conclude that the process that determined need for the plant is obsolete, not remotely responsive to load forecast uncertainty, and does not support the need for power upon which the DEIS is based. The NRC relies exclusively on the PSC's Order No. 08-0237-FOF-EI in concluding that there is a need for power. (DEIS 8-4 -- 8-12). Yet, the load projections, and the related assumption for the need for the reactors in the 2008 need determination were flat wrong. The order states, in part that "FPL's peak load is expected to increase by over 6,000 MW by the year 2020." (PSC Order 08-0237-FOF-EI p.10). In fact, the increase in peak load demand projected from the Company's 2015 Ten Year Site Plan shows that the increased peak load from 2008 to 2014 and projected peak load out to 2020 only amounts to a 3,847 MW increase in peak demand. (FPL 2015 Ten Year Site Plan, p. 42). The order upon which the NRC relies, goes on to state the following: [I]if load forecasts were to dramatically drop or the amount of DSM or renewable generation available were to substantially increase, the likely result would be the deferral or avoidance of some natural gas-fired power plants which have not been certified to date, *rather than the deferral* or avoidance of new nuclear base-load generation.(emphasis added). (PSC Order 08-0237-FOF-EI p.10). Truth is, with the dramatic drop in demand, it is the proposed reactors that have been pushed back, not new natural gas plants. The in-service dates for Turkey Point 6 and 7 have been delayed several times. It was most recently announced that the new projected in-service dates for the reactors is 2027/2028.[3] [Footnote 3: FPL Press Release, January 26, 2015. At http://newsroom.fpl.com/2015-01-26-FPL-announces-plans-to-install-more-than-1-million-solar-panels-at-three-additional-solar-power-plants-as-part-of-continued-strategy-of-advancing-affordable-clean-energy-in-Florida. And FPL testimony from Richard O. Brown filed on May 1, 2015 with the Florida Public Service Commission, Docket No. 150009, p. 17, states: "...the in-service dates of Turkey Point 6 & 7 utilized in the 2015 feasibility analyses are changed from 2022 and 2023 to 2027 and 2028. These dates represent the earliest practical deployment date for Turkey Point 6 & 7." At http://www.psc.state.fl.us/library/FILINGS/15/02473-15/02473-15.pdf.] The determination of need never contemplated an in-service date pushed back almost a decade. (PSC Order 08-0237-FOF-EI p.1). In the absence of the proposed reactors, the Company has continued to repower existing natural gas plants and intends to return to the PSC for another determination of need for a natural gas combined cycle plant this year with a projected in-service date of 2019. (FPL 2015 Ten Year Site Plan, p. 9). There is no discussion of this new dynamic in the DEIS. The DEIS continues to be riddled with inaccuracies. It states that FPL is expected to fall below the 20 percent summer reserve margin requirement in 2016 by 824 MW. By 2022, the projected year referenced in the DEIS during which Unit 6 might become operational, the reserve margin would be 5.4 percent. (DEIS 8-9). This is simply incorrect and not consistent with FPL's 2015 Ten Year Site Plan and further indicates the NRC's careless analysis of PSC Order 08-0237-FOF-EI against the realities that exist in Florida today. Moreover, the NRC inexplicably shifts its focus from the 2018/2020 timeframe (in service dates

used in the need determination) to a 2022 timeframe without any explanation of how it transitioned to that year nor why it failed to incorporate the most recent projected operation dates of 2027/28. (DEIS 8-9). The DEIS must analyze its conclusion that there is a need for power in the context of the FPL's current resource planning scenario as identified in its 2015 Ten Year Site Plan. The DEIS does not directly address the fact that FPL has currently missed the projected in service dates by almost a decade, nor does it address the issue that the utility continues to not commit to actually construct the proposed reactors[4] [Footnote 4: Florida Public Service Commission, Docket No. 130009, Hearing Transcript Volume 3, p. 617.] and simply continues to seek determinations of need for natural gas combined cycle facilities that were not contemplated in the very PSC order on which the NRC places its reliance. Not only have the facts today proven that the Turkey Point 6 and 7 need determination is not responsive to forecast uncertainty, as a matter of law, once the order is issued, it cannot be revisited -- rendering any decision related to need unresponsive to load forecast uncertainty. The Florida PSC is the sole forum for a determination of need as plainly stated in Florida statute. In making its determination on a proposed electrical power plant using nuclear materials or synthesis gas produced by integrated gasification combined cycle power plant as fuel, the commission shall hold a hearing within 90 days after the filing of the petition to determine need and shall issue an order granting or denying the petition within 135 days after the date of the filing of the petition. The commission shall be the sole forum for the determination of this matter and the issues addressed in the petition, which accordingly *shall not be reviewed in any other forum*, or in the review of proceedings in such other forum. (emphasis added). (§403.519 (3), Fla. Stat.) Hence, pursuant to the need determination process, the need for the Turkey Point reactors cannot be challenged or revisited once the order has been issued. Therefore, if the PSC grants a determination of need based on economic conditions which are no longer relevant, and the need determination cannot be revisited, it begs the question: how can the NRC reach its tersely explained conclusion that the need determination process is responsive to load forecast uncertainty, when it is in-fact not? The NRC's reliance on the state process is misplaced. The agency must take a hard look at the need for power. (**0112-4** [Barczak, Sara])

Comment: Clarify Analysis of Need for Power and Population Projections. NEPA requires that a final Environmental Impact Statement discuss the purpose of and need for the action "to which the agency is responding in proposing the alternatives including the proposed action." 40 CFR § 1502.13. In particular, Chapter 8 of the Nuclear Regulatory Commission's Environmental Standard Review Plan provides a review and analysis of the "need for power". Through this section, the Nuclear Regulatory Commission may weigh the benefits of the power plant against the environmental impacts of construction and operation of a nuclear power reactor. **Comment 15: The final Environmental Impact Statement should assess and explain projections of future demand for electricity in South Florida.** The Florida Bureau of Economic and Business Research (BEBR) at the University of Florida released a Florida Detailed Population Projection for the years 2015-2040 in 2014. http://tinyurl.com/BEBR2015-2040. This study projects that the rate of population growth in Miami-Dade County will continue to rise until 2020. At that point, the rate of population growth will begin to decrease and level off. The DEIS acknowledges this projection and states that "high rates of population growth are anticipated from 2014 until 2018 and then level off after 2018." DEIS at 8-6. Moreover, BEBR produced a Florida Estimates of Population analysis in 2014. *See* http://tinyurl.com/BEBR2014. This analysis shows that the rate of population growth has decreased from 16.3% to 4.7% in Miami-Dade County from 1990 to 2014. *See id*. at Table 3. The previous study suggests that this rate will continue to decline to 3.1% by the year 2040. Similarly, the SFWMD decreased water allocation from the Biscayne Aquifer in a 2015 water use permit for Miami-Dade County's Water and Sewer Department "due to water conservation measures and updated population projections showing a lower population growth rate through 2033." *See* SFWMD Individual Use

Permit for MDWASD Permit Number 13-00017-W (Description 4-5). Thus, Miami-Dade County has updated its future demand projections with the availability of new population data, thereby reducing the total amount of water required to meet the needs of Miami-Dade County. Accordingly, the demand for power will likely decrease as the rate of population growth in Miami-Dade continues to decrease and then stabilizes over the coming decades. Therefore, the final Environmental Impact Statement should include a discussion of whether or not a decrease in the rate of population growth in Miami-Dade County will affects the projected demand for electricity. (**0456-22** [Miami, City])

Comment: FPL's overall electrical energy demand· has stabilized and is very slowly increasing. With more focus on energy efficient appliances. LED/LCD tv's, Even cable/sat boxes are now being investigated, more efficient A/C, more thermal installation, etc. As electronics reduce chip feature size, power consumption decreases, modem tablets and cell phones consume a fraction of the energy of the devices they replaced. Air conditioners are now more efficient SEER 14 (Jan 1, 2015) minimum by law. Based on FPSC data for the period 2003 to 2012, FPL's overall electricity sales increased 2.7% for that ten year period. Yet for the period 2013 to 2022 FPL projects a 16% net sales growth! I would say FPL's projections are more than overly optimistic! Ref: Review Of The 2013 Ten-Year Site Plans For Floridas Electric Utilities, FPSC October 2013. Item 6 (loss of net metering) is omitted due to limited space. Complete version of letter attached in .pdf format. (**0545-6** [Keating, Tim])

Comment: Also, as residential and commercial properties continue to generate excess daily power by solar energy systems, the utilities in the state will have less of a customer base to bill back as unique charges on their statements for overhead costs (power lines, etc.) resulting in significant increases to their customers over and above the costs of units 6 & 7. (**0653-3** [Hickey, Alan])

Comment: I want to talk briefly about what George Cavros said about conservation. I've been able to conserve a lot. And I think when we talk about the need for these two power plants and the reliance on the PSC we -- that is pretty much a biased organization. I've been able to reduce my power usage significantly. I don't use any outdoor lighting. I turned off my hot water heater. People don't realize this, but most of South Florida originally did not use electric or gas water heaters, they used direct sunlight to heat their water. I currently use direct sunlight and it works very well. And when you talk about building these additional plants and you're talking about the need for this, you are ignoring --and you're ignoring how people can reduce their energy use, then the need assessment does not ring true. And I think that's very important. (**0721-13-5** [Martin, Drew])

Comment: Each year the need for more capacity is deferred. It allows FP&L to choose to build lower cost, more modular resources such as solar power if efficiency cannot meet the entire load in over a decade. Unfortunately, FP&L forthcoming efforts over the next ten years, to help customers reduce energy use and save money on their bills through energy efficiency programs, is simply a national embarrassment. The [Florida Public Service Commission] PSC recently approved the company's request to gut its conservation goals. Now FP&L will meet only 3/100ths of 1 percent of annual demand through energy savings. To put that in perspective. If FP&L were a state it would rank among the bottom, behind Alabama and Mississippi in energy savings for customers. And I have an illustrative chart which I can leave with you. (**0721-8-4** [Cavros, George])

Response: *The review team followed its Need for Power guidance found in NUREG-1555, the Environmental Standard Review Plan. Some of these comments generally suggest that the*

State's Determination of Need process implemented by the FPSC, upon which NRC relies pursuant to Section 8.4 of NRC's Environmental Standard Review Plan (NUREG-1555), is flawed, outdated, or relies upon faulty logic or assumptions. The FPSC process requires FPL to provide an annual update to its feasibility assessment of Units 6 and 7. The FPSC has approved the FPL process through its 2015 independent review of FPL's planning assumptions, cost estimates, feasibility analysis, and other considerations, which FPL must annually report to FPSC. New information regarding the planning assumptions and feasibility of Units 6 and 7 was made public through this process and updates have been made to Chapter 8 and Section 10.6 of the EIS to reflect this new information. The FPSC's 2015 approval of Docket 15009 EI reaffirms the State's 2008 determination that Units 6 and 7 are needed and remain viable (FPSC 2015-TN4521). The review team reviewed the most recent FPSC proceedings in this regard and finds that the process for annually updating the feasibility and associated analyses was (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. Other comments in this set challenge the need for the two new nuclear units in favor of other sources of electricity, primarily conservation and solar power generation. These alternatives are discussed in detail in Sections 9.1 (No-Action Alternative), 9.2.1 (Alternatives Not Requiring New Generating Capacity), and 9.2.3 (Other Alternatives). No changes were made to the EIS because of these comments.

Comment: To make matters worse, FPL has not even committed to actually completing the project if approved! Why should Floridians support such a project? (**0594-4** [Rapuano, Shannon])

Comment: Since, according to the Miami Herald, Florida Power & Light has not formally committed to building the two new reactors, I strongly recommend that NRC withdraw the current document, repair the citations, and reopen the public comment period. (http://www.miamiherald.com/news/local/community/miami-dade/article18627960.html) (**0716-6** [Riccio, Jim])

Response: *The decision about whether or not to build and operate a new nuclear units is made by the applicant in conjunction with State and local public regulators, not the NRC. The NRC's responsibilities are to review the application according to its regulations outlined in 10 CFR Part 52 and 51. No changes were made to the EIS as a result of this comment.*

Comment: As I understand it, FPL does not need these reactors for current use, but is planning for the future. Currently, I believe, they are intending to sell the excess power to more northerly climes. (**0115-4** [Trencher, Ruth])

Comment: If there is going to be a monopoly in our electrical system, then it must be forced to adopt the policies which benefit the most people (taking externalities into account). If not, open up the market and allow for PPAs, the absence of which is squashing solar power in the "Sunshine State". (**0119-3** [de Azevedo, Ricardo])

Comment: This high-voltage, aboveground power line proposes to distribute power to customers outside Miami-Dade County as well. Residents in the affected area are asked to accept the degradation of their communities so FPL can save a few, none-recurring dollars on placement. We pay FPL handsomely for the power they deliver. Now, we are asked to compromise safety, beauty and despoliation of the public landscape with tourism suffering permanent economic damage to aggrandize FPL's Retained Earnings. Moreover, who is willing to negate FPL intends to sell excess capacity to Georgia Power & Light via this aboveground, high-voltage power line? "Profit" is not a gritty word; however, it is a grimy word when spillover-costs are safety and permanent degradation of our communities. (**0408-5** [Sifko, Basilio])

Response: *These comments express concern about the dispatch of the nuclear power from proposed Units 6 and 7 to areas outside the Miami-Dade area. The allocation of the electricity generated to other markets is beyond the scope of the NRC's Need for Power process under NUREG-1555, Environmental Standard Review Plan. No changes were made to the EIS as a result of these comments.*

Comment: Cyndee, it is abundant electricity that makes our society the wonderful place that it is. It is unfortunate, because of the global warming scare, that underprivileged people around the world are not getting the opportunity to enjoy our level of abundance. (**0680-4** [Hubbard, Stanley S.])

Response: *This comment expresses support for nuclear power because of the standard of living it provides. No changes were made to the EIS as a result of these comments.*

E.2.23 Comments Concerning Alternatives - No-Action

Comment: I request that both agencies support the "No Action" alternative in reference to Docket ID: NRC-2009-0337. (**0104-2** [Commenters, Multiple])

Comment: SACE believes that the DEIS fails to adequately discuss and analyze these potentially adverse impacts and insufficient proposals for mitigation. As such, we recommend that the NRC and USACE support the "No Action" alternative. (**0112-3** [Barczak, Sara])

Comment: I request that the Nuclear Regulatory Commission and U.S. Army Corps of Engineers support the "No Action" alternative. (**0148-2** [Brinn, Ira])

Comment: I request that both agencies support the "No Action" alternative in reference to Docket ID: NRC-2009-0337. (**0192-2** [Lebatard, David])

Comment: I request that the Nuclear Regulatory Commission and U.S. Army Corps of Engineers support the "No Action" alternative. (**0379-2** [Commenters, Multiple])

Comment: I support the "No Action" alternative given the project's potentially widespread negative environmental and public health and safety impacts. (**0379-7** [Commenters, Multiple])

Comment: I request that the Nuclear Regulatory Commission and U.S. Army Corps of Engineers support the "No Action" alternative. (**0508-2** [Harrison, J. M. M.])

Comment: Along with probably more than 225 million Americans (i.e. 9 out of 10 Americans in recent surveys) who want more solar and wind power installed rather than more nuclear power and more than 20.236 million members and supporters of the supporting organizations listed below and more supporting organizations, I very strongly urge both agencies to please, right now, support the "No Action" alternative in reference to Docket ID: NRC-2009-0337. (**0592-1** [Brexel, Sr., Charles])

Comment: We strongly oppose the expansion of Turkey Point and strongly urge both agencies to please, right now, support the "No Action" alternative in reference to Docket ID: NRC-2009-0337. (**0592-11** [Brexel, Sr., Charles])

Comment: NO ACTION! (**0609-3** [Khajeh-Noori, Jeri])

Comment: Moreover, the NRC's reliance on the Florida Public Service Commission and its Orders and the State's Utility Resource Planning Process is badly misplaced. As such, we believe that the no-action alternative should be the Agency's preferred choice. (**0721-8-2** [Cavros, George])

Response: *The impacts of a no-action alternative are discussed in Section 9.1 of the EIS. Selecting the no-action alternative would mean a license would not be issued for the proposed reactor and impacts from its construction and operation would not occur. Such a decision would also mean, however, that the purpose and need of the proposed action (to provide additional baseload electrical generation capacity for use in the FPL service territory) would have to be satisfied by other means. The environmental impacts of meeting the need for power by these other means are discussed in Section 9.2, and the review team concluded that none of the feasible alternatives was environmentally preferable to the proposed action. The comments did not provide any information that would change the review team's conclusions. Therefore, no changes to the EIS were made as a result of these comments.*

Comment: Executive Summary, Page xl, Table ES-4: In DEIS Table ES-4, "Summary of Environmental Impacts of Construction and Operation of New Nuclear, Coal-Fired, and Natural-Gas-Fired Generating Units and a Combination of Alternatives", for the Socioeconomics impact category, the environmental impact levels for coal, natural gas, and combination of alternatives are inconsistent with their corresponding impact levels in DEIS Subsection 9.2.2.1, page 9-15, Table 9-1; Subsection 9.2.2.2, page 9-21, Table 9-2; Subsection 9.2.4, page 9-29, Table 9-3; and Subsection 9.2.5, Page 9-30, Table 9-4. In the case of natural gas, the impact level is listed as "MODERATE (beneficial)" in DEIS Table 9-2 and "SMALL (beneficial)" in DEIS Table ES-4. For the combination of alternatives, the impact levels for beneficial and adverse are reversed. For coal, both beneficial and adverse are MODERATE in DEIS Table 9-1; however, in DEIS Table ES-4, the impact level for beneficial is listed as "SMALL (beneficial)". (**0619-2-17** [Maher, William])

Response: *The tables in the Executive Summary and Section 9.2 were edited to correct the inconsistencies noted in the comment.*

E.2.24 Comments Concerning Alternatives - Energy

Comment: We are very susceptible to hurricanes, the last thing we need is 2 more nuclear reactors near us. Why can't FPL invest in solar energy to help them meet the demand of energy that is needed? It comes down to greed. They think about the money and not about the lives they are putting at risk. (**0003-2** [Ortiz, Natalia])

Comment: I urge you to instead invest the money in more environmentally sustainable, renewable energies. (**0004-2** [Engelberg, Jodi])

Comment: Put up wind farms, require all new construction to incorporate solar like France is doing. Get a bunch of catfish to eat up the algae bloom and tell people to stop blasting their AC 24/7 and opening retail store doors to cool the sidewalk. (**0008-13** [Finver, Jody])

Comment: A determination of FPL's application should be done in as sober a manner as possible by weighing the facts. The Greater Miami area has a population of some six million people from Miami to Palm Beach. The prime consideration behind any decision should be the safety and welfare of all of these people. With the abundance of sunshine that South Florida has, it seems clear that clean, safe renewable energy should be pursued rather than a

technology that has a history of catastrophic accidents (Three Mile Island, Chenobyl, Fukushima, to name a few). (**0009-4** [Rose, Simon])

Comment: The NRC Failed to Consider Solar Power Energy Alternatives: The solar power industry is extensive in the United States and the associated installation costs have dramatically decreased over the years. Moreover, the efficiency of solar power generating systems have dramatically increased over that same time period. Moreover, a customer of FPL can "lease" an entire home solar energy system without paying any upfront costs or maintenance costs. These solar energy systems can power an entire home and supply FPL's grid with excess power not consumed by the customer. (**0010-6** [Saporito, Thomas])

Comment: We need more renewable environmentally safe power and educate power consumers to use more efficient electrical devices. (**0012-2** [Shahsavar, Mehran])

Comment: Now is the time to invest in solar, wind, and wave energy. (**0014-2** [Westaway, Katharine])

Comment: The multi 100M-dollar corporation that is FPL, absolutely MUST be employing solar and wind energy. Conservation, solar & wind are the only way to succeed in living in harmony with nature. Nature -upon which ALL life depends. (**0020-2** [Smith, Leigh Emerson])

Comment: Non Nuclear generation of power by solar, tidal current, wind or geothermal methods have no such dangers.or consequences to our life on Earth, which should be a primary consideration in these decision making times. Even natural gas is less expensive and available to accomplish the same goals with less adverse consequences. Florida is blessed with sun and wind as well as the constant Gulf Stream current. Let us take advantage of what we have to our greatest advantage and create the least damage with all our renewal resources. (**0021-2** [Silver, William])

Comment: FPL should be denied a license for Turkey Point expansion for many reasons: 1. Too expensive. Nuclear power is much more expensive than solar (**0022-1** [Read, Alice Gray])

Comment: FPL should be denied a license for Turkey Point expansion for many reasons:...6. Conservation first. Miami could conserve much more than it does. Most important: Distributed rooftop solar should be top priority for electricity generation. It's cheap, clean, safe, efficient, reliable, and resilient in disasters. No excuse not to make the sunshine state generate all it's power from the sun. All that's needed is efficient energy storage. (**0022-6** [Read, Alice Gray])

Comment: In fact, we need to build renewable energy power plants such as wind, solar, etc. so that we can dismantle every single one of our nuclear reactors before they destroy our civilization. (**0023-2** [Joannou, Jr., Benjamin])

Comment: In the face of climate change, what we really need is clean, safe, and affordable renewable energy along with energy efficiency and conservation that will not endanger our health, environment, or future. We do NOT need more nuclear plants. Invest in renwables.We live in the Sunshine state...solar...solar...solar. (**0026-1** [San Pedro, Patricia])

Comment: I would prefer FPL focus their efforts and money on true clean energy, like solar and wind. (**0027-1** [Neal, Kevin])

Comment: Our community needs to consider electricity savings, and sustainable energy sources such as wind and tide, rather than relying on nuclear sources. (**0032-2** [Vinciguerra, Anthony])

Comment: The Sunshine State and the Government of the United States should invest in solar energy rather than on obsolete and dangerous nuclear plants. Nuclear energy plants pose a threat to the environment and to the population that resides near the plant. History proves the dangers of nuclear energy production with examples such as Chernobyl and Fukushima. Catastrophe can be prevented by investing in solar energy. (**0033-2** [Van Thienen, Mateo])

Comment: Although, I understand that population growth in South Florida has gone up year after year but I don't believe that all other alternative power sources have properly been explored and should be prior to this application being approved. (**0034-2** [Rodriguez, Barbara])

Comment: I know this is a difficult decision to make but looking at all the alternative possibilities as to how to supply our community with power for years to come is definitely needed. (**0034-4** [Rodriguez, Barbara])

Comment: We live about six miles from Turkey Point.. I don't go to bed at night wondering if the system will go bad but I do think about the possibilities once in a while. I did know TP was there when I bought my second house in this area and I am not opposed to this kind of energy. However, I am strongly opposed to the stand that Florida's big energy firms have taken on solar energy. Florida is the sunshine state, it says everywhere we go.. Yet we are behind many northern states in encouraging solar as a serious power source and I feel that is mostly due to FPL and Duke doing everything they can to keep solar out of this state. Some companies are offering to lease panels to homeowners which is being opposed by our energy firms in this state. If there is a cleaner, cheaper way to produce electricity I have not heard of it.. It should be everywhere in this state. We should set the pace for the entire country. (**0036-1** [DeMent, David L.])

Comment: And why, with solar and wind power already economically competitive, should we be building any new power plants that have so many problems when wind and solar do not? (**0037-2** [Schoene, William])

Comment: Given the advent of viable, lower cost, and benign alternative power generating technologies such as wind and solar, the risks associated with the expansion of Nuclear Power in South Florida far outweigh any possible benefits that may be derived. As the world moves toward ecologically sound and renewable alternative power technologies, I believe it is contingent upon FP&L to do likewise. FP&L should not resist change, but embrace it. It is in the interests of FP&L's shareholders, customers and a healthier, safer world to do so. (**0039-4** [Violich, Francesca])

Comment: Given the advent of viable, lower cost, and benign alternative power generating technologies such as wind and solar, the risks associated with the expansion of nuclear power in South Florida far outweigh any possible benefits that may be derived. (**0043-2** [Grill, Helen])

Comment: With the advent of viable, lower cost, and benign alternative power generating technologies such as wind and solar, the risks associated with the expansion of Nuclear Power in South Florida far outweigh any possible benefits that may be derived from the proposed Nuclear Power Plants at Turkey Point. As the world moves toward ecologically sound and renewable alternative power technologies, I believe it is essential that FP&L follow such

established examples of viable and safe utility scale energy production. Times have changed and technologies have advanced since the inception of the Turkey Point facility. The changes and advancements in viable power generating technologies have been even more dramatic within the 9 years that FP&L has pursued this goal of expanding the nuclear facilities at Turkey Point. FP&L should not resist change, but embrace it. It is in the interest of FP&L's shareholders, customers, the residents of Miami-Dade County, the residents of the State of Florida, and a healthier, safer world, to do so. (**0044-8** [Commenters, Multiple])

Comment: Why aren't solar farms being considered rather than nuclear power? FPL has done more than any other company in the state to prevent the growth of solar power energy. This is a much safer way to meet the growing demand for more energy. (**0048-3** [Wegner, Geri])

Comment: Worse yet, the cost of the proposed expansions will never be realized by production, as already better, safer, and cheaper modes of energy production abound and the technological increases during just the construction phases of this project will make it obsolete. (**0051-3** [Smith, David W.])

Comment: We should be moving away from nuclear energy and toward more environmentally friendly sources like sun (hello, this is FLORIDA!), wind and ocean current. (**0052-2** [Roos, Monica])

Comment: Let's talk cost. Before billions are spent to build new reactors way far south of the points of use and the transmission lines to carry that power north, we must demand that Florida Power and Light investigate solar panels on all large flat roofs in the urban areas to produce power at the point of use and negate the need for both the reactors and transmission lines to get the power where it is needed. I contend the cost will be levels of magnitude LESS than two nuclear reactors. (**0053-3** [Sasiadek, Alfred])

Comment: Florida is the "Sunshine State". We need to use the resources that nature provides us here to save money and save our environment at the same time. I ask you to consider the consequences and alternative to any decision. (**0053-5** [Sasiadek, Alfred])

Comment: Encourage Florida Power and Light to invest in renewable safe energy sources for the good of all. (**0057-6** [Neway, Roberta])

Comment: It is time we switched to renewable, environmentally responsible energy production in the Sunshine State! (**0058-2** [Imbesi, Nan])

Comment: We need more solar and wind. (**0063-2** [Smay, Betty])

Comment: And last, I would suggest that you ask FPL to allow homeowners to sell their solar generated power back to the grid so that, over time, we can use our sunshine to our advantage. This is a long term goal that many people are arguing now as the solution to nuclear power. But I do not want to spend my retirement years sitting in darkness waiting while the solar and wind industries mature to the point that they can provide the electricity necessary to power 3 million people's needs. (**0070-4** [Lamb, Deborah S.])

Comment: FPL is developing solar power too, but they are doing a teeny tiny fraction of what they could be doing. While 95% or more of their advertising and PR is devoted to promoting how much solar development they're doing, they are actually generating less than 1/10 of 1% (that's 0.01%) of their electricity through solar power. I know, I'm a customer and I read the

brochures that come with my bills each month, and see the commercials on TV! Look at the graphs in their brochures and it's obvious! I brought the brochure that came with my February 2015 bill (see below) if you want to see it in their own words, in black and white - or rather green and white. But printing the info in green doesn't make what FPL is doing green - unless the green you're talking about is cash. (**0078-11** [Wilansky, Laura Sue])

Comment: With so many truly clean, safe, renewable and sustainable technologies now available and in development, there is no reason to build new nuclear plants, which will only drain much-needed resources from full development of better, safer technologies. We will get much better value and results from investing in these technologies. This is THE SUNSHINE STATE! We should be leading the nation, heck, the world in solar development! Instead we rank 13th in total installed solar, and 20th in solar installed in 2014. It' time to end the use of all nuclear power, and put ALL - ALL! of our resources into truly safe, clean and sustainable technologies like conservation, solar, wind, geothermal and others, which absolutely can, and will supply all the energy the state, and the world needs, without destroying the world in the process. (**0078-13** [Wilansky, Laura Sue])

Comment: Finally, in the "Sunshine State" it is unforgivable that we are discouraging solar energy utilization. FPL is against this solely for financial reasons! Please consider the responsible future for Florida power!! (**0080-3** [Reiter, Ben])

Comment: FPL should be looking to better renewable resources of energy instead of investing OUR money into an antiquated, dirty and very risky system. (**0087-5** [Lange, Alexandra])

Comment: I would like to see our local government to explore other sources of energy. Eolic, Solar, even in very underdeveloped countries are using these technologies today. (**0088-3** [Lange, Alexandra])

Comment: Given the falling prices of solar power and new batteries, we question the wisdom of committing customers to $20 billion worth of last century's technology, while closing the door on cheaper, safer and more environmentally responsible options. (**0088-6** [Lange, Alexandra])

Comment: WHY ARE WE NOT GOING TOWARDS SOLAR POWER, particularly in FLORIDA??? (**0089-2** [Hubler, Gina Marie])

Comment: FPL should be looking to better renewable resources of energy instead of investing OUR money into an antiquated, dirty and very risky system. (**0092-3** [Merino, Miriam])

Comment: I recommend that you disapprove any further processing of their Turkey Point Nuclear Power plant expansion proposal for the reasons summarized below2)The proposal is not the most environmentally acceptable alternative. FPL has not adequately evaluated other, more cost-effective alternatives to produce electrical energy which do not add the risk of nuclear waste storage at a highly flood and wind prone site. Alternatives for new energy production abound, but were not evaluated based on the falling prices of solar power due to the introduction of new battery technology. Furthermore, FPL has not evaluated other alternatives including energy conservation and efficiency, at one-fifth the cost of new nuclear power generation, thereby concealing how those alternatives, with conservation included, would cost less and have far less public health and hurricane damage risk than this proposal. This $20 billion project you could only approve by ignoring or deliberately hiding the fact that better, cheaper, safer and more environmentally acceptable alternatives to new power production are available now or in the near future for Southern Florida. (**0094-2** [Fairchild, David])

Comment: I recommend that you disapprove any further processing of their Turkey Point Nuclear Power plant expansion proposal for the reasons summarized below6)Finally, the proposal assumes that future growth in demand for electricity must be supplied from the grid. Rapid evolution in the technology needed to locally generate power from solar, wind and wave sources, together with scalable on-site battery storage make that assumption obsolete. The basic justification for this project is a dubious need for large amounts of grid delivered power. That justification must now be reassessed in light of current or soon available new technologies enabling local, non-grid based power generation. (**0094-6** [Fairchild, David])

Comment: FPL has the opportunity to use wind or solar energy because it a perfect way to generate power without negatively impacting the National Parks, Preserves and Sanctuaries in our eco-sensitive area. (**0096-3** [Roberts, Linda])

Comment: FP&L has bribed the Florida Legislature to block the expansion of solar here in the Sunshine State by blocking net metering. Nuclear is unprofitable, existing only with rate payer and tax payer subsidies. (**0097-2** [Geary, Craig W.])

Comment: Please consider other sources of renewable energy instead of a nuclear plant. Our environment is not the best suited for these type of project. (**0101-2** [Gomez, Gustavo])

Comment: There are other energy choices that don't pose such risks, which are not properly studied in the draft Environmental Impact Statement. Solar power has dropped in price and improved in quality whereas new nuclear reactors continue to increase in cost and have yet to actually be built. Energy efficiency is the lowest cost resource in meeting electricity demand--many times less expensive than these reactors that are approaching $20 billion. Yet, FPL is doing almost nothing to expand energy efficiency or renewables, which are viable alternatives, nor is the Florida Public Service Commission making decisions that will expand these safer, more affordable options. Y our agencies should not rely on their flawed utility planning process. (**0104-3** [Commenters, Multiple])

Comment: I would much rather see them invest in solar power rather than anymore nuclear. (**0114-3** [Cunningham, Sue])

Comment: They have invested very little into solar energy or other renewable sources of energy, sources that do not have the potential problems of a nuclear facility; storage of waste, leakage, breakdown of various elements of the system. (FPL does not encourage the use of solar power on homes and businesses, and, together with Duke Energy, has convinced the Florida legislature to make it **illegal** to sell excess power created through solar collectors. (**0115-5** [Trencher, Ruth])

Comment: Our community (other than those who have FPL stock) is concerned and would like responsible, alternative sources of energy (e.g., SOLAR) to be implemented. (**0116-2** [Garcia, Ruslan])

Comment: By the time construction is complete alternative energy will have become much cheaper and safer than nuclear (**0118-2** [Zakon, Allan])

Comment: They should invest in solar energy. FPL's parent company produces way more solar energy in other states, so it has the capability, knowledge and expertise to do expand solar energy in Florida. It chooses not to because of Florida's weak laws on solar energy. (**0121-2** [Reyneri, Juan])

Comment: We need solar and wind, sustainable solutions. (**0124-2** [Colby, Helen])

Comment: This expansion would cause a lot of harm in our community. I support alternative forms of energy that are less harmful to the environment. (**0125-2** [Colls, Ana])

Comment: Why can't FPL consider championing solar (we are the "sunshine state"), wind or hydro energy? (**0128-3** [Bach, Lili])

Comment: We are totally opposed to the expansion of nuclear generated energy at Turkey Point -- for the following reasons.....4) I would rather FPL spend the money on solar and wind generation. (**0129-4** [Mayer, Doug])

Comment: [C]ould you find a better location for more solar and wind power than South Florida. Wake up please! Save what is left of our environment.! (**0131-2** [Brown, Judith O.])

Comment: I herewith want you to note my objection to FPL's planned new nuclear power plans - a dangerous and superfluous proposition, given....the fact that we have plenty of solar energy opportunities in Florida! (**0135-2** [Thiel, Markus])

Comment: I am writing today from my home to oppose the approval of FPL's two nuclear power at Turkey Point for the following reasons....3. Conservation is by far less costly and productive as is being demonstrated by South Dade Farmers in water conservation with the use of drop irrigation and the use of compost and mulch that hold water and require less irrigation. All energy conservation measures must be implemented now, not more costly nuclear power. Utilize and subsidize more solar power that is making great strides towards becoming more affordable every year. We advertise on our license plates that Florida Is The Sunshine State yet present laws restrict the use if our ever-present Sun to be used for power. We must not commit ourselves to this new nuclear power for 60 years when clean solar energy is being wasted as it is showered over us every day. (**0136-3** [Levy, Morgan I.])

Comment: I am writing today from my home to oppose the approval of FPL's two nuclear power at Turkey Point for the following reasons....4. My family has stock in FPL and we are against spending the $20 million on old technology that will be paid for by its customers. As a stock holder, we would prefer that FPL use whatever financial resources are necessary to get our lawmakers in Tallahassee to make solar energy available to every household and commercial building with the latest technology in batteries that can make solar power available 24 hours a day. (**0136-4** [Levy, Morgan I.])

Comment: There are other energy choices that don't pose such risks, which are not properly studied in the draft Environmental Impact Statement. Solar power has dropped in price and improved in quality whereas new nuclear reactors continue to increase in cost and have yet to actually be built. Energy efficiency is the lowest cost resource in meeting electricity demand-many times less expensive than these reactors that are approaching $20 billion. Yet, FPL is doing almost nothing to expand energy efficiency or renewables, which are viable alternatives, nor is the Florida Public Service Commission making decisions that will expand these safer, more affordable options. Your agencies should not rely on their flawed utility planning process. (**0141-2** [Lucas, Carmen])

Comment: With an abundance of sunshine, our first and best alternative for energy production should be solar. It's time the public be given a chance to install affordable, dependable solar

equipment. Allow tax credits to everyone who can help lower our usage of depleting the worlds reserves. Stop acting in the best interests of what is good for business. (**0146-5** [Grant, Randy])

Comment: This would approve old technology. We need new progressive forms of energy like wind and solar. This is the Sunshine State!! Why spend money on old technology? (**0149-6** [Nelson, Joyce E.])

Comment: It will devastate our already weak political will in Florida for more sustainable energy policy. (**0150-2** [Otis, Martha])

Comment: The nuclear expansion at this particular juncture, at this particular location, puts Everglades restoration in jeopardy; it consistutes a costly and short-sighted energy policy, especially considering the viability in Florida of alternatives such as solar and wind--both cheaper options. (**0150-3** [Otis, Martha])

Comment: Let's put our money and resources in sustainable energy--we live in the Sunshine State! We should be the leader in solar energy development and use. The technology is here--use the money proposed for Turkey Point expansion to give subsidies to residents and businesses for solar energy and we won't need more nuclear power! (**0152-1** [Agler, Mindy])

Comment: This investment of more than 20 billion dollars of the rate-payers money makes no logical sense. FPL should drop this risky project and instead embrace a solar alternative that the company knows its customers want. Solar contains virtually none of the risk of the proposed projects and will contribute to both the ecological ans economic sustainability of our region for years to come. (**0153-4** [Goldman, Emanuel])

Comment: What happened to Solar Power? We **are** the Sunshine State. (**0159-6** [Bazzone, Barbara])

Comment: It's time to exercise environmental responsibility and fast track development of Solar, Wind, and Water powered energy as well as electric and solar powered automobiles! (**0170-2** [Ercole, Steven])

Comment: Instead, we really need to practice more energy conservation and embrace renewable forms of energy especially solar energy in the Sunshine State. (**0178-5** [Almirola, Alejandro])

Comment: The future is in renewable energy, not in foolhardy archaic nuclear technology that is environmentally hazardous for thousands of years. (**0183-2** [Piper, Cynthia])

Comment: We need to more actively provide safe energy, not expand the dangerous, destructive use of nuclear power! (**0185-2** [Balog, Nancy])

Comment: No need for more nuclear energy, we need solar panels in Florida. (**0190-1** [Johnson, Robert])

Comment: There are other energy choices that don't pose such risks, which are not properly studied in the draft Environmental Impact Statement. Solar power has dropped in price and improved in quality whereas new nuclear reactors continue to increase in cost and have yet to actually be built. Energy efficiency is the lowest cost resource in meeting electricity demand-many times less expensive than these reactors that are approaching $20 billion. Yet, FPL is doing almost nothing to expand energy efficiency or renewables, which are viable alternatives,

nor is the Florida Public Service Commission making decisions that will expand these safer, more affordable options. Your agencies should not rely on their flawed utility planning process. (**0192-3** [Lebatard, David])

Comment: Renewable energy alternatives such as solar and wind power, should be the only types of energy production to be built starting now. (**0194-2** [Mayotte, Monica])

Comment: However, the risks associated with nuclear power are completely avoidable because alternatives are available. From improving energy efficiency to increase use of renewable energy sources, we don't need to invest $20 billion into a technology that no one wants in their backyard. (**0207-3** [Cleland, Noel])

Comment: Being in South Florida, we feel that solar power would be a much better choice. (**0212-4** [Ross, Robert and Teresa])

Comment: I suggest that instead of allowing a company to charge me more for electricity and the building of nuclear reactors that I don't even want, the government seriously reconsiders policies on energy to keep up on the times. Models can be found all around the world, including Germany which currently subsidizes cleaner energy initiatives, allowing them to become the forerunners of innovation and manufacturing in cleaner energy. When these antiquated energy sources run out, they'll be selling us the equipment to change our state. Why can't Florida become the centre of clean energy technologies? Why do we have to pander to a for-profit company? (**0214-7** [Zerulla, Tanja])

Comment: Also, at a time of tremendous clean energy and battery advancement, to make a long term, huge financial commitment doesn't make sense. (**0215-1** [Atler, Neal])

Comment: I am an FPL customer, and this proposal is idiotic. There's plenty of solar power potential in south florida! (**0218-1** [Barlow, Jeffrey])

Comment: Instead, the state of Florida should be encouraged to go solar. (**0219-1** [Clay, Cynthia])

Comment: Let's invest our money in renewables instead of something that will eventually destroy us. (**0231-2** [Bonilla-Jones, Carmen Elisa])

Comment: You need to approve solar and wind power plants not nuclear. (**0231-4** [Bonilla-Jones, Carmen Elisa])

Comment: We live in the "Sunshine State" but FPL's commitment to renewable energy has been very weak. FPL under-performs on solar power, generating less than 1/10 of 1% (0.01%) of its electricity through solar power. Given that solar power helps meet peak demand, and power plants are built meet peak demand, meaningful investment in solar would be a step in the correct direction and defer the need for the proposed Turkey Point nuclear reactors, which are very expensive, take a very long time to construct, increase greenhouse gases during construction and are very detrimental to ratepayers. (**0237-1** [Welber, Michael])

Comment: What you need is to switch to solar power, please!!!. (**0238-2** [Padilla, Dora])

Comment: On a final note - this investment of more than 20 billion dollars of the rate-payers money makes no logical sense. Solar power was not considered a viable alternative by the NRC reviewers - even though no state in the eastern half of the U.S. has the solar potential of Florida

- also known as the Sunshine State. And in spite of all the advertising they do on the topic - FPL's actual solar production of less than 1/10th of 1 percent of its "energy portfolio" leaves much to be desired. With initiatives like third party rooftop solar coming online soon (and more about the "Floridians for Solar Choice" project in a future email), FPL should drop this risky project and instead embrace a solar alternative that the company knows its customers want. Solar contains virtually none of the risk of its proposed Turkey Point expansion and will contribute to both the ecological and economic sustainability of our region. (**0240-13** [Commenters, Multiple])

Comment: That money can empower so many Florida homes with solar power as well as businesses public buildings etc. (**0241-2** [Portuondo, Pilar])

Comment: I am opposed to granting FPL permission to build two new reactors at Turkey Point. Now is the time to look at sustainable energy, not to endanger or future. (**0242-1** [Colby, Helen])

Comment: There are other choices for clean, safe energy, without dangerous toxic waste that will be present for years. (**0243-3** [Duran-Pinzon, Jaime])

Comment: Say yes to solar energy. (**0243-5** [Duran-Pinzon, Jaime])

Comment: Say no to expansion into nuclear energy...look to solar expansion for the sunshine state (**0248-1** [Kadis, Patricia])

Comment: I would suggest to you that Florida, the Sunshine State, follow the lead of Spain and Germany whose solar energy is world renown and they are not located in a subtropical country where there is an abundance of sunshine. (**0250-5** [Fulks, Anna Louise])

Comment: Solar roofs would feed residential and commercial needs, with peak power occurring with peak demand, when the heat of the day increases air conditioning loads. Current generators could be installed off Miami Beach, providing for the demands of resorts, hotels and restaurants. The party never stops? No problem, the Gulf Stream flows 24/7. Why are these solutions not being implemented? FPL has virtually blocked residential rooftop solar by manipulating regulatory mechanisms of government. (**0252-16** [Van Leer, Sam])

Comment: This public money will be used to expand Turkey Point. Instead, the money should be either refunded to the people who paid it, or used by others to research or install alternative energy. (**0252-18** [Van Leer, Sam])

Comment: We have wind and solar power that are environmentally safe and will not kill people. (**0256-2** [Myers, B. J.])

Comment: And it is shocking that the powers that be never even considered alternative energy such as Solar! It is long past time to make he Sunshine State the Solar Power State! (**0259-5** [Lettieri, Tammy])

Comment: Solar power should be first considered as a viable alternative by the NRC reviewers. Solar contains virtually none of the risk of the proposed Turkey Point expansion and solar will contribute to both the ecological and economic sustainability of our region for years to come. Florida has huge solar potential - known as the Sunshine State. FPL's actual solar production of less than 1/10th of 1 percent of its energy portfolio & leaves much to be desired.

With initiatives like third party rooftop solar, FPL should drop this risky project and instead embrace a solar alternative that the company knows its customers want. (**0260-1** [Ferro, Colleen])

Comment: With the advent of viable, lower cost, and benign alternative power generating technologies such as wind and solar, the risks associated with the expansion of Nuclear Power in South Florida far outweigh any possible benefits that may be derived from the proposed Nuclear Power Plants at Turkey Point. As the world moves toward ecologically sound and renewable alternative power technologies, I believe it is essential that FP&L follow such established examples of viable and safe utility scale energy production. Times have changed and technologies have advanced since the inception of the Turkey Point facility. The changes and advancements in viable power generating technologies have been even more dramatic within the 9 years that FP&L has pursued this goal of expanding the nuclear facilities at Turkey Point. FP&L should not resist change, but embrace it. It is in the interest of FP&L's shareholders, customers, the residents of Miami-Dade County, the residents of the State of Florida, and a healthier, safer world, to do so. (**0263-5** [Orzechowicz, Holly])

Comment: Solar power was not considered a viable alternative by the NRC reviewers - even though no state in the eastern half of the U.S. has the solar potential of Florida - also known as the Sunshine State. And in spite of all the advertising they do on the topic - FPL's actual solar production of less than 1/10th of 1 percent of its "energy portfolio" leaves much to be desired. With initiatives like third party rooftop solar coming online soon (and more about the "Floridians for Solar Choice" project in a future email), FPL should drop this risky project and instead embrace a solar alternative that the company knows its customers want. Solar contains virtually none of the risk of its proposed Turkey Point expansion and will contribute to both the ecological and economic sustainability of our region for years to come. (**0264-6** [Dwyer, John P.])

Comment: Have you checked out solar? Prices are way down. Using solar during the day time peak-use periods would absorb enough load to make the existing facilities more than adequate. Battery storage is getting cheaper, too, although not cheap enough to go 100% solar this year. (Maybe in five to ten years...) The maintenance expenses for solar are minimal, the safety factor is high, and decommissioning a solar plant, should that happen, is not dangerous or expensive. (**0265-2** [Bennett, Robbie])

Comment: It is beyond me how it is obvious that our best source of power is solar. SUNSHINE STATE. It is a no brainier that investing in solar power technologies would take us into the future and the forefront of implementing the use of solar power in our state. I am sure FPL can absolutely afford to take this on and spend the $ on this totally renewable and clean energy resource.I support use of Solar Power. (**0268-1** [Inguanzo, Maria])

Comment: Other methods of energy generation need to be explored and developed as well as more energy conservation awareness and education. (**0269-2** [Gomez, Christian])

Comment: CLEAN ENERGY production options for South Florida such as SOLAR ENERGY should take priority over more risky options. We appreciate the attention given to our citizen's concerns about energy producing options. (**0272-3** [Zuniga, Family])

Comment: This utility is victimizing Miami residents in the following ways:--blocking attempts by entrepreneurs to produce cost effective solar power. (**0283-3** [Compel, Jr., Joseph])

Comment: It is ridiculous that one of the sunniest states in the United States is far behind states with less solar availability in the development of renewable solar energy. (**0283-5** [Compel, Jr., Joseph])

Comment: If Florida Power & Light Company is as technically proficient as it advertises, it should be required to develop more solar energy[.] (**0283-6** [Compel, Jr., Joseph])

Comment: Because of time and stark changes to the climate, the nuclear era on Biscayne Bay and in Florida is nearing its end. Solar, which accounts for one tenth of a percent of Florida's power, is ripe for massive expansion. FPL has indicated its intent to increase its solar generation and can easily produce enough power through this lower cost, safe and renewable technology to meet the needs of residents and businesses. (**0288-10** [Cleland, Noel] [Jackalone, Frank] [Mahoney, Stephen] [Matthews, Debbie] [Roff, Rhonda] [Scott, John] [Teas, Jim] [Ullman, Jonathan])

Comment: The $20 billion or more investment in two new reactors would be better spent developing lower cost solar energy. Compared to other forms of power generation, solar photovoltaic (PV) power is leading the cost decline, with solar PV module costs falling 75% since the end of 2009 and the cost of electricity from utility-scale solar PV falling 50% since 2010. (Source: International Renewable Energy Agency, http://www.irena.org/DocumentDownloads/Publications/IRENA_RE_Power_Costs_2014_report.pdf) (**0288-13** [Cleland, Noel] [Jackalone, Frank] [Mahoney, Stephen] [Matthews, Debbie] [Roff, Rhonda] [Scott, John] [Teas, Jim] [Ullman, Jonathan])

Comment: Instead of wasting tens of billions of dollars on an unviable Turkey Point project, it's time for FPL to focus on a far more viable, economical technology in the Sunshine State: solar. (**0288-16** [Cleland, Noel] [Jackalone, Frank] [Mahoney, Stephen] [Matthews, Debbie] [Roff, Rhonda] [Scott, John] [Teas, Jim] [Ullman, Jonathan])

Comment: We need a focus on green energy, not high risk nuclear energy. (**0294-1** [Howell, Carol])

Comment: WE NEED TO GO TO WIND, SOLAR, GEOTHERMAL and other RENEWABLE sources of energy (**0302-1** [Jezierski, Elisabeth])

Comment: I wish to express my concern over the expansion of the Turkey Point Nuclear Power Station. I don't agree with the reasons for the expansion and I feel we should begin moving in a more positive direction with solar, wind and water generated renewable energy sources. (**0313-1** [Fecteau, Lynn])

Comment: Now is the time move toward green energy! Invest your exspnsion in solar!! Novel idea?? This is 2015! Move forward!!! (**0315-1** [Johnson, Kay])

Comment: Inexplicabley, our state legislature and our governor have been creating obstacles to solar power instead of encouraging its use. (**0317-1** [Detrick, Mary])

Comment: The sunshine state is burgeoning with solar and wind energy!!! (**0322-1** [Smith, Leigh Emerson])

Comment: Please look more closely at energy efficiency and renewables to meet the projected need for our state. The Sunshine state can, and must, do better than expanding risky, water intensive, expensive nuclear energy. (**0323-4** [Jennings, Cara])

Comment: Go wind and solar!!!!!!!!! (**0325-1** [Hollister, David])

Comment: [T]here are other safer options available for generating power. (**0329-4** [Baumwall, Douglas])

Comment: The owners and operators of Turkey Point have no right whatever to hold the million people of this metropolitan area hostage and to cause them to live in a state of perpetual fear for the owners' business profit, particularly as there are a number of perfectly safe alternatives to nuclear. I believe a referendum is in order that asks the question, "Would you prefer to decommission the Turkey Point nuclear plant and replace it with a plant that utilizes a non-nuclear power source?" (**0332-2** [Ross, Sherwood])

Comment: We need alternatives ... and the Nuclear option shouldn't be one of them: especially not with the issues they are having today with only two (and the poor way in which they are dealing with it.) (**0334-5** [Crystal, Chris])

Comment: Solar or wind is the only way to in this future and FPL should be concentrating heavily on offering the public real options to this renewable energy in our SUNSHINE state. (**0340-7** [Tweeton, Tanya])

Comment: I find it even more troubling that the same utility company that is hoping to expand the size and extend the life of this aging nuclear power plant, FPL is behind lobbying efforts to keep domestic rooftop solar power from competing in Florida. We should examine this entire picture and think carefully about the consequences. (**0342-3** [Merleaux, Derek])

Comment: I live and work full-time in the Florida Keys. The irony of this controversial nuclear initiative is that we live in 'The Sunshine State.' We are being out-flanked by many other nations in sustainable energy production. This is wrong and is not permissable in a civilized world. Choose wisely and don't make us shut you down. Switch to solar and your company will have a future in our fast-growing green economy. Otherwise, Turkey Point, you will be left behind. (**0344-1** [Hull, Meagan])

Comment: We have to much solar to use and never ends. (**0348-2** [Ward, Richard])

Comment: Aside from the absolutely unacceptable, (and I would say immoral) risks to human and natural ecosystem health, nuclear plants are not competitive with alternate forms of energy, including renewable ones. (**0355-2** [Thomas, Bill])

Comment: Safe home energy generation via technologies such as those developed by the Tesla Corp. will reduce the need for power generation from utility company plants. (**0356-16** [Shlackman, Jed])

Comment: With rapid advances in technology and possible release of previously suppressed methods of clean energy generation, adding additional nuclear facilities seems foolish and shortsighted. (**0356-4** [Shlackman, Jed])

Comment: We have lots of sunlight going unused. (**0357-2** [Shapiro, Eugene])

Comment: This is the Sunshine State. -focus on developing solar energy. (**0359-4** [LoBiondo, Roana and Michael])

Comment: By TAKING and USING more and more without considering sustainability of our planet we will inevitably run out of resources to take. Being responsible for our actions by treating nature and our precious resources that sustain us with respect will allow ecosystems to react and recover to development which has ALREADY encroached the area. (**0362-5** [Hurley, Paula])

Comment: There are so many methods of renewable energy production that are clean, environmentally friendly, and affordable for our infrastructure. (**0363-2** [Peters, Emily])

Comment: FPL should be focusing on solar energy, rather than more nuclear reactors. We live in The Sunshine State, and yet our State is behind Georgia in the implementation of solar energy. (**0365-9** [Fischer, Antoinette])

Comment: [Commenter included Attachment: The 1st Millennium Renewable and Sustainable World Energy Prognosis - supporting TurboGreenTM Energy and Advanced Technology Industries Inc.- several pages supporting alternative energy] (**0369-2** [Polk, J. D.])

Comment: We need to be developing Solar and other forms of renewable energy. (**0371-5** [Haffmans, Edmund])

Comment: When are we going to start putting what's right in front of what's financially more lucrative? FPL could invest more in solar energy if it really wanted to, but it's not as lucrative. (**0372-3** [Ortiz, Natalia])

Comment: FPL does not take solar power seriously. I would like panels on my house. I am sure lots of others would too. (**0373-7** [Lee, Nancy])

Comment: [T]he NRC must look more closely at energy efficiency and renewables to meet the projected need. (**0379-5** [Commenters, Multiple])

Comment: Whatever happened to solar and wind power? You can't make enough money on that? (**0390-1** [Passmore, Judith])

Comment: With the recent developments in wind and solar energy, additional nuclear reactors are unnecessary. (**0400-2** [Eckert, Brenda])

Comment: We, the U.S., should be promoting cleaner, renewable forms of energy! We should be global leaders. We have the technology, but lack the insight and support to make it happen in a timely manner. We should no longer be using dirty and dangerous fossil fuels and/or nukes. No form of energy use is perfect, but there are certain forms that are much less damaging. If the govt had supported these forms as they have funded fossil fuels and nukes for the past one or two decades, we would be in a much better position on Earth today! No one cried for wagon makers when the car replaced wagons. The economy will right itself--we need to give it that chance! (**0425-1** [Wingerd, Mala])

Comment: Instead, we should be wroking on converting our energy production to sustainable, environmentally safe GREEN energy solutions. (**0441-2** [Bender, Kae])

Comment: Stop any kind of energy production that isn't from renewable resources. (**0442-2** [Mosca-Clark, Vivianne])

Comment: As an American I am watching as destructive policies like these destroy our environment. Spend the money on renewable solar? Jeez! (**0445-1** [Maida, Cecilia])

Comment: Nuclear is out. Solar, wind and thermal are in. Don't waste money on this dangerous form of energy. (**0446-1** [Hill, Michael])

Comment: It is time to move on to more solar energy --European countries can show us the way. (**0450-1** [Richards, Margie])

Comment: ... need to look into other source of energy that wouldn't be so unstable. (**0455-3** [Hardin, Lillian])

Comment: It is time for The Sunshine State's utility companies to join the 21st century and focus on producing energy from clean, sustainable sources such as solar. (**0463-8** [Gross, Cheryl A.])

Comment: You have a variety of expert testimony, some in favor, some opposed, I'll make my reasons simple. As custodians of this earth and energy users, most desire and are prepared for the responsibility of better alternatives than nuclear. We are ready for solar exploration explosion and ready to put our dollars to this initiative. There are additional energy alternatives but as a Floridian this is particularly attractive as a clean and safe alternative. I and thousands of fellow citizens are willing to put the billions that FPL would spend on nuclear into solar, wind and additional options for energy needs. Our federal EPA does not agree with the current proposal, the costs have skyrocketed from $13.7 billion to $20 billion, and the support of your residents is not behind a massive nuclear addition to the energy challenge. (**0472-2** [Ball, Cheri])

Comment: We need SOLAR, not nukes. (**0473-1** [Shepherd, James])

Comment: [I]n lieu [of nuclear power] establish natural renewable energy sources that are safe such as solar, wind and water power. (**0481-3** [Szabo, Liz])

Comment: Or alternative energy development, which the world is begging for. (**0484-2** [Speno, Charlie])

Comment: Many of us live close enough to this power plant to be frustrated that it is not winding down, but that some people want to expand it. Our homes, our lives, our parks are endangered unnecessarily, since solar power is easily available, cheaper, and safer. (**0495-2** [Mazzarella, Rebecca])

Comment: Nuclear power is the dirty past, we don't need to promote it any more, we need to move into clean renewables. (**0501-1** [Zimmermann, John])

Comment: We should put this money and effort into solar and wind production of energy. (**0514-1** [Massey, Linda])

Comment: There are ways to generate electricity, some of which are explored in the DEIS, that do not create these problems. (**0515-4** [Regalado, Tomas])

Comment: Living in the Sunshine State, we should be moving toward solar energy. (**0517-1** [Keim, Mary])

Comment: Florida being an excellent location for alternative energy sources such as solar power, FPL needs to drop this project and focus instead on safer and more sustainable planning for the future of this beautiful area we all share for our home. (**0523-2** [Mitzkewich, Yuri])

Comment: Please! The insanity must stop somewhere! All the phenomenal amounts of money spent by large corporations to secure permission to operate against all logic or public preference would be far better spent developing safe, clean, and sustainable energy sources. Solar and wind come to mind. (**0525-1** [Bailey, Evelyn])

Comment: The People shouldn't have to keep telling you corporate bullies the same thing over and over....find other solutions to the energy problem. (**0532-1** [Raab, Frances])

Comment: I'd like to know why solar power, in the sunshine state, is not being considered as an alternative. (**0537-6** [Anonymous, Judi])

Comment: Solar is a far better solution and it creates jobs! (**0543-2** [Ryan, Jim])

Comment: FPL needs to invest heavily and seriously in safer forms of energy such as wind and solar; not double down on dangerous or dirty methods in a heavily populated area encompassing and adjacent to delicate ecosystems that are supposed to be being restored not further endangered. (**0544-2** [Ehrenfried, Jennifer])

Comment: Florida should be focusing its efforts towards alternative clean energy. Solar Energy is the ONLY choice for the future of Florida. (**0548-3** [Scott, Ruth])

Comment: Please consider investing in sustainable power such as solar and providing financial incentives to homeowners and businesses to become more enegy efficient. (**0552-2** [Deutsch, Steven])

Comment: We should be using clean, renewable energy. (**0558-2** [Barnes, Janice])

Comment: We should be moving toward more renewable resources, not building more power plants that can harm the environment. (**0563-1** [Ramsey, Betty])

Comment: SO MANY ALTERNATIVES EXIST (**0564-3** [Dimondstein, Carla])

Comment: Florida - the Sunshine State - offers no incentives whatsoever for conservation or solar power - largely due to the influence of FP&L and its desire to expand its nuclear facilities and have them forced into the rate base without a proper discussion of alternatives. Respectfully, adding new nuclear facilities in such a place at such a time is not the right way to go. Please force a consideration of alternatives. (**0573-4** [Trauner, Keith])

Comment: Instead of expanding a plant that is vulnerable to hurricanes and is presently situated in Biscayne National Park, a pristine natural area, Florida Power and Light (FPL), should be expanding its solar energy capabilities. We are the "Sunshine State", but you wouldn't know that by FPL's poor record of involvement and commitment to solar energy. (**0579-2** [Schwab, Roy])

Comment: I say expand solar energy[.] (**0579-5** [Schwab, Roy])

Comment: It is ironic that Florida's license plates proclaim us as the sunshine state and yet solar energy development is an major underused resource. (**0590-1** [Johnson, Diane])

Comment: FPL has a once a year solar grant program for FPL customers. The grants are all taken in the first few minutes customers are allowed to sign into the site and fill out the application. I have been trying to get a solar grant for two year and I can never fill out the form in time to submit. It is my understanding that literally 10,000's of customers try for these grants. Wouldn't it be smarter to expand that program than to spend billions on a two more nuclear reactors. Why not give solar a chance in the sunshine state? (**0591-1** [Lange, Barbara])

Comment: 9 out of 10 Americans, including Republicans, Democrats and Independents, want more solar and wind power installed rather than using natural gas, coal, oil and nuclear power. According to a comprehensive 12-year Harvard survey as of 1/1/15, 90% of all Americans, including Republicans, Democrats and Independents, said that they wanted solar and wind energy to increase and 80% of all Americans said that they wanted solar and wind energy to "increase a lot". It is at http://www.forbes.com/sites/jeffmcmahon/2015/01/01/americans-want-america-to-run-on-solar-and-wind/. The Harvard study found that all Americans overwhelmingly prefer solar and wind power, rather than natural gas, coal, oil and nuclear power, because solar and wind power provide the least local pollution and health risk. (**0592-2** [Brexel, Sr., Charles])

Comment: In addition, the market price evidence is overwhelmingly clear and compelling--nuclear power is an extremely more expensive energy solution. The US energy market continues to move, faster and faster, toward an extremely better value energy future, reliant on solar and wind, not extremely expensive and risky nuclear power. (**0592-3** [Brexel, Sr., Charles])

Comment: Solar and wind power are clearly the most innovative and newest technologies. Solar and wind power are, overwhelmingly, the energies of the present and future. Solar and wind power are where the overwhelming innovations and development are rapidly occurring. (**0592-5** [Brexel, Sr., Charles])

Comment: As of 5/29/15, for the year so far, 84.1% of all new power installations at utility companies were solar power, wind power and other renewables. Natural gas power supplied the rest of the new power installations. It is at http://safeenergy.org/2015/05/29/checking-in-on-the-energy-transition/. Germany and Sweden continue to very rapidly decommission all of their nuclear power plants and to very rapidly transition to solar and wind power. France is also rapidly cutting down its amount of nuclear power and is also rapidly transitioning to solar and wind power. California has only one, very old nuclear power plant left in operation and California is continuing to very rapidly transition to solar and wind power. On 1/7/15, Governor Brown of CA called for increasing the state renewable portfolio standard (RPS) to 50% by 2030, reducing petroleum use in cars and trucks in California by 50%, and doubling building energy efficiency, all by 2030. Legislative bills will be decided on later in 2015. It is at http://www.lawofrenewableenergy.com/2015/04/articles/renewable/governor-brown-announces-new-2030-greenhouse-gas-reduction-target-for-california/. Since 2014 and earlier, Southern California Edison, Arizona Public Service, Tucson Electric Power, HECO, NRG Energy, Duke Energy, Southern Company, Georgia Power, and many other US electric power utility companies have all been quickly and massively ramping up their installations of zero carbon emission, clean energy such as solar and wind power. It is at http://www.utilitydive.com/news/grid-edge-live-2015-the-trends-behind-the-explosion-in-distributed-resourc/401417/. As of 6/11/15, Vermont has a law for electric utilities to be at 75% renewables by 2032 and at 55% renewables by 2017. It is at http://www.utilitydive.com/news/new-vermont-law-mandates-75-renewables-by-2032-targets-residential-emissi/400777/ and http://www.eia.gov/todayinenergy/detail.cfm?id=21852. As of 6/29/15, Governor Cuomo of NY presented an energy plan under NY's REV plan to be at 50% renewable energy by 2030. The Assembly has already passed a bill for the plan and the Senate

bill is awaiting a vote. It is at http://www.governorswindenergycoalition.org/?p=13551 and file:///C:/Users/Charles/Downloads/2015-overview.pdf and http://energyplan.ny.gov/Plans/2014.aspx. Effective 7/1/15, it is the law in Hawaii that 100% of its electricity come from renewables by 2045, with 30% by 2020, 40% by 2030 and 70% by 2040 as interim targets. It is at http://www.utilitydive.com/news/100-renewables-by-2045-is-now-the-law-in-hawaii/400495/ and http://www.eia.gov/todayinenergy/detail.cfm?id=21852. Nuclear power is clearly in rapid decline in use in the US and throughout the world, while solar and wind power are clearly and compellingly experiencing exponential growth for the next 25 years and longer. It will be even harder and even more expensive to get parts, operation, maintenance, support and engineering services for nuclear power as the decline in the use of nuclear power plants continues to accelerate over the next couple of decades. As of 7/5/15, it has already been costing our manufacturing industry, our businesses and our homeowners much less to buy solar power than natural gas, coal, oil, timber, biomass or nuclear power. And, it is expected to continue to cost them typically another 20% less per year for, at the least, the next few years. It is at http://www.usatoday.com/story/money/markets/2015/07/05/motley-fool-solar-energy/29583021/. As of 7/5/15, all bids for selling power from solar power utility-scale projects are now in the 4 cents to 5 cents per kWh range -- this is much less than what it costs you to build a natural gas, coal, oil, timber, biomass or nuclear power plant. It is at http://www.usatoday.com/story/money/markets/2015/07/05/motley-fool-solar-energy/29583021/. As of 7/9/15, two bids for selling power from solar power utility-scale projects have now come in below 4 cents per kWh, with one bid coming in below 3.9 cents per kWh -- this is much less than what it costs you to build a natural gas, coal, oil, timber, biomass or nuclear power plant. It is at http://www.utilitydive.com/news/nv-energy-buys-utility-scale-solar-at-record-low-price-under-4-centskwh/401989/. As of 6/23/15, the price of wholesale solar power has been forecasted by independent analysts at Bloomberg New Energy Finance to continue to decrease, at the least, for the next 25 years. It is at http://www.bloomberg.com/news/articles/2015-06-23/renewables-to-beat-fossil-fuels-with-3-7-trillion-solar-boom. As of 7/5/15, according to GTM Research, the cost of utility-scale solar projects has fallen 67% in the past five years, and is expected to fall another 44% in the next couple of years. As of 7/5/15, "Since solar costs are beating those of competing energy sources, there are expectations of a boom in demand--and it's going to be a global solar boom. GTM Research predicts that solar installations will triple to 135 GW annually by 2020." On 7/5/15, financial analyst Travis Hoium of The Motley Fool said: "We're past the point of no return --solar energy will be the biggest new energy source in the future." (**0592-6** [Brexel, Sr., Charles])

Comment: As of 8/22/14, US wind power hit an all-time national average low purchase price of 2.5 cents per kWh -- this is much less than what it costs you to build a natural gas, coal, oil, timber, biomass or nuclear power plant. It is at http://www.theenergycollective.com/eric-wesoff/468266/price-us-wind-power-all-time-low-25-cents-kilowatt-hour. As of 5/31/15, lawyers for Wal-Mart, a hospital group and a coalition of other ratepayers found that Florida utilities were buying Oklahoma wind power for just 2 cents per kilowatt hour: "Henry and the lawyers for OG&E's corporate customers formed a kind of tag team, taking turns blasting the company for refusing to even study new wind power. They repeatedly pointed out that in-state competitors as well as Florida and New Mexico utilities were buying Oklahoma wind for just 2 cents per kilowatt hour, even cheaper than coal without pollution controls, while OG&E hadn't purchased new wind in four years--even though its ads boasted about its commitment to wind. When its witnesses claimed their transmission lines were too congested to add new wind, Henry produced internal documents suggesting the congestion could be fixed for about 3 percent of the cost of the new coal scrubbers." http://www.politico.com/agenda/story/2015/05/inside-war-on-coal-000002. As of 3/12/15, the price of wholesale wind power will continue to decrease, at the least, for the next 10 years according to a Department of Energy report. It is at

http://www.bloomberg.com/news/articles/2015-03-12/wind-energy-without-subsidy-will-be-cheaper-than-gas-in-a-decade. On 8/8/14, Amory Lovins, a physicist and chief scientist at the Rocky Mountain Institute, found that "Wind and solar become the most economical options while gas and nuclear become the least economical". It is at http://www.theenergycollective.com/eric-wesoff/468266/price-us-wind-power-all-time-low-25-cents-kilowatt-hour. Further, FPL's proposed power from new nuclear reactors can more cost-effectively be met with demand side management programs. In meeting demand, energy efficiency measures meet demand at less than 3 cents per kilowatt hour (kWh)1, while the proposed Turkey Point nuclear reactors will meet demand at a cost of more than 15 cents per kWh. (**0592-7** [Brexel, Sr., Charles])

Comment: Why you don't come to terms with solar? And wind power using the tubed fans? Those resources are all free. You can still kickback your investors also. (**0593-1** [Family, Manzi])

Comment: Florida should be investing in more renewable forms of energy that don't have such negative impacts on the environment. I just returned from Hawaii where solar installations are increasing for home and business use. Florida is sadly lagging behind. (**0594-5** [Rapuano, Shannon])

Comment: FPL has done nothing but discourage solar power on individuals' rooftops, while saying they are working on solar throughout the state. Their small solar initiative pales in comparison to what could be done by individual homeowners and businesses. But they wouldn't make any money that way. (**0596-2** [Sorenson, Katy])

Comment: We need to be concentrating on conservation and renewables – not more nuclear power. (**0596-4** [Sorenson, Katy])

Comment: Why is solar power so unused in a state with more sun than most! (**0600-2** [Edwards, Suzi])

Comment: Shame on you if you allow this boondoggle on Florida ratepayers and the environment. There are many better alternatives for Florida's energy supply that are cheaper with less environmental impact and you know it. Pleas do the the right thing instead of the most "PROFITABLE" thing. (**0601-1** [Quillen, Carter])

Comment: In the face of global climate change, we need resilient solutions today. Clean, safe, and affordable renewable energy along with energy efficiency and conservation will preserve our health, environment, and future (**0602-2** [Colson, Clay G.])

Comment: Turkey Point is the PAST -- lets put the future of 'GREEN" energy on the front burner. (**0608-1** [Anderson, Vaughn])

Comment: SOLAR AND WIND ENERGY ARE CHEAP, RENEWABLE AND HARMLESS TO THE ENVIRONMENT. (**0609-2** [Khajeh-Noori, Jeri])

Comment: Living in the 'sunshine state' would it not make more sense to invest a fraction of the cost of a nuclear plant to develop solar power and other renewable sources? Costa Rica, a very small country but also with fewer economic resources than the U.S, just enjoyed one month without the need of power generated by fossil fuels. They are experimenting with renewable sources. Is there a lesson for us to learn? (**0613-2** [Icaza, Alejo])

Comment: Another way these plants could be abandoned is by the advance of solar and battery technology. The Gemasol solar plant in Spain already operates 24 hours a day thanks to molten salt energy storage and has done so since 2013. Just this week, the New York Times carried a story about Tesla's deployment of 400 home solar storage batteries which allow their owners to run solar electricity at night, including installations at Wal-Mart stores. The company announced that its next solar storage product will be a utility grade battery. With 2417 solar generation and home solar energy storage by batteries already a reality, it is inconceivable that Florida would need baseload nuclear energy at the time of the plant's projected opening 15 years from the start of construction. In fact, it's more likely that Florida would suffer from a glut of electricity produced off the grid, causing FPL to move away from their costly investments in nuclear and fossil fuel plants. (**0615-1-14** [Bethune, David])

Comment: The agency's alternative energy "expert" said that solar wasn't viable because the sun went away at night, an appalling revelation of the agency's ignorance of modern salt storage and battery technologies for solar. The NRC staff member was unaware of the 24/7 baseload solar power plant in Spain and was totally ignorant of Florida efforts at rooftop solar, off-the-grid local power generation, and home battery storage. The extent of his understanding of current US progress in solar energy was revealed when he said that he "thought there might be some research [about solar] in California." (**0615-1-3** [Bethune, David])

Comment: Please stop! Look at the big picture. I am certain you will find an alternative solution. Thank you. (**0616-2** [Puchades, Mary])

Comment: Shift the funding for these plants to solar infrastructure development. (**0621-3** [Datz, Amy])

Comment: No to more cancer machines,let's go solar from now on! (**0624-4** [Galles, Camilla])

Comment: FPL should be investing in solar power, rather than nuclear power, where the risk and payoff make far more sense. (**0625-4** [Felinski, Julee])

Comment: We should be moving completely to renewable energy, wind and solar. (**0627-1** [Dolben, Hollis])

Comment: We don't need to install new reactors, we need to use those funds to start installing solar, wind[.] (**0630-1** [Montalvo, Stephanie])

Comment: There is no need for more nuclear plants if we would finally understand that photovoltaic systems on 50 % of all the roofs in Florida and connected to the grid -same as in so many parts of this country, even far more north, where they have only half the sunny hours compared to "The Sunshine State". (**0632-1** [Moll, Wolfgang])

Comment: I suggest that we build our use of solar energy which is safer, cleaner, and does not detract from the land. (**0635-5** [Seiman, Rhonda])

Comment: Let us learn from the mistakes we as a human race have made. This fragile one of a kind Eco system is irreplaceable. It is time to transform to ways that are in harmony with earth. Why can we not choose to build a solar plant or a solution in alignment that would be much less harmful when a disaster occurs. (**0638-2** [Anonymous, Charity])

Comment: Now is the time to turn this turkey around and plant solar panels instead of nuclear plants. (**0639-4** [Haselhurst, Richard])

Comment: At this time we should be looking for alternative sources of energy such as solar and wind power. In the state of SUNNY Florida we really should not have a great problem generating power with the use of solar energy. (**0642-3** [Rawlins, Steve])

Comment: We need to do more for alternative energy production. I have a design for a device that will use solar and/or wind to produce electrical power. I have even started a company--Pernetic Generator Group LLC to promote my design and bring it to market. (**0650-1** [Kristy, Joseph])

Comment: We must go to renewal energyLike solar and wind (**0660-2** [Sanchez, Sergio and Irma])

Comment: I'm for eliminating fossil and nuclear energy sources and transition to solar and wind energy sources in Florida, where we have plenty of both. (**0662-2** [Anonymous, Elena])

Comment: Instead I would support taking the construction money and building more renewable energy facilities; solar and wind. (**0666-3** [Jens-Rochow, Steve])

Comment: The alternative is renewable energy. If we installed small renewable energy systems at all of the 65,000 new homes and buildings that are constructed in Florida every year and each system generated $20 a month in power x 12 months= $240 annually, this would create $15.6 million annually in free electricity. This free power would increase by an additional $15.6 million each year when 65,000 new homes and building are constructed in Florida annually. Another important benefit promoting this concept is that the manufacturing and installation businesses in Florida will always know how many renewable energy systems will be purchased and installed every year. The U.S. spends $2.5 billion annually in solar energy rebates for 250,000 existing structures and the cost to install one million renewable energy systems at all of the new homes and buildings constructed in the U.S. annually at $2500 each would be $2.5 billion. This is also the same amount of money FP&L intends to spend every year in building the two nuclear reactors with money raised by increasing utility rates. The average amount of free power generated at one million new homes and buildings would be $20 a month x 12 months= $240 x 1,000,000 =$240 million. This will increase by an additional $240 million each year as one million new structures are built annually. After ten years, the systems will collectively generate $2.4 billion each year in free power which is 200% more power produced annually than the two reactors that FP&L wants to build near Miami. These systems will start producing power as soon as they are installed and nuclear plants will not generate power for at least ten years. Investing $1 in renewable energy at homes and buildings will create $2-$4 in free power for consumers and every $1 invested in nuclear power will require consumers to spend $5-$6 more to purchase the power, maintain the plants, disassemble them in the future, and dispose of the nuclear waste. We can expect that within ten years the renewable energy systems will become 100% more efficient and their costs will decline by 50%. At this time we can begin installing ten million systems each year in existing homes and buildings. We should start in low income neighborhoods and train local unemployed workers to install the systems. (**0671-1-3** [Post, Patrick])

Comment: If renewable energy is developed properly, it can help save the world by eliminating all use of nuclear power. This is a major goal of our project! (**0671-2-1** [Post, Patrick])

Comment: We have a proposal for FP&L if they want to help the citizens of South Florida to have access to stable, inexpensive, and environmentally friendly electricity. They should use all of the money that they have collected to construct the two new $25 billion nuclear power reactors and instead use the funds to begin installing solar and renewable energy equipment on all of the 4.5 million homes and buildings that are FP&L utility customers. This effort would be an infinitely better use of our money which FP&L is collecting by raising utility rates. All of the power would be free, clean, and unlimited because it will come from the sun and wind. FP&L could start first with new homes and buildings and we would welcome the opportunity to discuss our proposals with them at any time. (**0671-2-3** [Post, Patrick])

Comment: This proposed investment of more than 20 billion dollars for each of the reactors (of the rate-payers' money) makes no logical sense to anyone except business marketers. Solar power was not considered a viable alternative by the NRC reviewers, even though no state in the eastern half of the U.S. has the solar potential of Florida. And in spite of all the advertising they do on the topic, FPL's actual solar production of less than 1/10th of 1 percent of its energy portfolio is wholly inadequate. Solar contains none of the risk of its proposed Turkey Point expansion and will contribute to both the ecological and economic sustainability of our region for years to come. (**0673-6** [Dwyer, John P.])

Comment: On a final note, this investment of more than 20 billion dollars of the rate-payers money makes no logical sense. Solar power was not considered a viable alternative by the NRC reviewers -even though no state in the eastern half of the U.S. has the solar potential of Florida. FPL should drop this risky project and instead embrace a solar alternative that the company knows its customers want. Solar contains virtually none of the risk of its proposed Turkey Point expansion and will contribute to both the ecological and economic sustainability of our region for years to come. (**0674-7** [Dwyer, Karen])

Comment: FPLs project commits us to expensive nuclear power for the next 60 years without fairly evaluating more cost-effective energy that does not require local storage of radioactive waste. The cheapest, cleanest and safest way to meet our energy needs is through energy conservation and efficiency. Conservation is one-fifth the cost of nuclear generation, yet FPL opposes conservation standards and presses for nuclear, the most expensive and risky investment available. (**0675-3** [Rodriguez, Jose Javier])

Comment: I really do not understand Florida's love affair with nuclear energy. We have so many roof tops that would be prime real estate for solar collectors. either it is a stupid decision or a decision based on greed not to use our greatest resource. (**0700-1** [O'Meara, Patrick])

Comment: We need to put funding into developing more renewable resources -not spending $ on trying to clean up disasters which are inevitable in situations like this. (**0704-2** [Ferry, Lisa])

Comment: Florida is known as the SUNSHINE state. Florida, of all places, should be powered with Renewable Energy. Go to www.thesolutionsproject.org to see how every state can be powered ENTIRELY with Renewable Energy. (**0706-1** [Anonymous, Anonymous])

Comment: We are the Sunshine State and should use the sun and other clean sources of energy for our beautiful state and lead the rest of the nation by example. (**0712-2** [Almer, Anessa])

Comment: Instead of building large power plants, the Florida government should focus on harnessing solar energy. Unlike this nuclear power plant, solar panels do not require any

valuable water or expensive infrastructure. They also do not create waste product and do not require the electricity to be transported. (**0713-3** [Heiney, Jamie])

Comment: [S]unshine state should go all solar and built electric storage, not cancerous reactors. (**0715-3** [Anonymous, Anonymous])

Comment: This seems like a foolish expenditure when FPL could help put solar on every roof, fund LED lighting everywhere, start talks about turning off downtown highrise office lights which are left on all night. foam spray the rafters of every home and building in Miami Dade county. (**0718-2** [Buechler, Jerry])

Comment: Solar power was not even considered a viable alternative by the NRC reviewers - even though no state in the eastern half of the U.S. has the solar potential of Florida -also known as the Sunshine State. And in spite of all the advertising FPL do on the topic -FPL's actual solar production of less than 1/10th of 1 percent of its "energy portfolio" leaves much to be desired. With initiatives like third party rooftop solar coming online soon (and "Floridians for Solar Choice" project), FPL should drop this risky project and instead embrace a solar alternative that the company knows its customers want and it's a no brainer when it comes to humanity and real care of the environment we actually live in. Solar contains virtually none of the risk of its proposed Turkey Point expansion and will contribute to both the ecological and economic sustainability of our region for years to come. (**0720-2** [Bastidas, Mauricio])

Comment: And I think what's really interesting to me is that the parent company of FP&L acquired Hawaii Electric Industries, who has had a lot of success in taking a very different route to generation and distribution, a lot of which has to do with solar. And so I sort of take that as a tacit acknowledgment that there is another future for us possibly in energy that we are exploring. We don't know what that answer is, but why cut it off before we're there. (**0721-1-10** [Rodriguez, Jose Javier])

Comment: So one of the things I wanted to share, and I do have copies to leave with you, is that the Everglades Coalition 2015 Legislative priorities included, and this is representing 6 million environmental members of the Everglades Coalition. Collectively our 57 organizations make up that many people. And our priorities talk about minimizing fresh water waste, salt water intrusion, and flooding through expanded use of renewable and smart energy sources. So what does that mean? That means we have to move toward energy sources that do not use water. Nuclear isn't right for Florida because we don't have the fresh water resources. (**0721-10-3** [Reynolds, Laura])

Comment: We have --our solar panels don't demand any water. Of course this is all post-construction, I admit. The nuclear power plant is constructed, it takes energy, it takes water, it takes whatever. So solar panels are manufactured, but we call it even when they're built. Once they're in operation I'm not using any water, I'm not releasing any toxins, I'm not transporting fuel or waste products anywhere, I don't have to store anything. (**0721-11-8** [Roff, Rhonda])

Comment: Talking about FPL and -- I'm sorry -talking about solar power. We were talking about France's -- or China just had it about the same capacity as France's capacity in solar. To clear up that number, China added about 5 gigawatts of solar power. France has about 5 gigawatts of solar power. France's total output is about 50 gigawatts, 45 gigawatts of which is about -- is produced from nuclear power. And consistently France ranks amongst one of the top countries for air quality. (**0721-15-2** [Kuraza, Devon])

Comment: So let's talk about nuclear power and let's talk about wind and solar. Show of hands, how many of you are in favor of wind and solar as a source of power generation? Okay. And how many of you are against nuclear power? Show of hands. Okay. (**0721-15-4** [Kuraza, Devon])

Comment: So I wanted to mention also to my friends from FPL that there are alternatives in nuclear power. (**0721-16-2** [Rifkind, David])

Comment: So, for instance, when I built my house three years ago I installed a 5 kilowatt array on the roof, and I installed it for $3.00 a watt. So as I understand it, even if we were able to build -- if FPL was able to build these two reactors, and it would be the first time in human history that reactors would actually be built on budget, it would still cost about $9.00 a watt, and as I understand, that's three times what I paid for my rooftop solar array, so I'm kind of wondering, have you really thought about the economics of what it costs to build a nuclear reactor. (**0721-16-3** [Rifkind, David])

Comment: And the other thing that I wanted to mention too, is that, again it's come up, and I know that the NRC has its rules. But I would say that as far as the rule regarding the need to constantly generate power, keep in mind that you guys have all got telephones in your pocket, they've all got batteries. The technology for storing electricity, when the sun's not shining, is not magical, and these are things that can be overcome. The other thing I would mention too is, that even if FPL was able to be the first utility in America to ever build a nuclear reactor on time, it would still be 12 years before these units come online, and in that time we could easily install the 22,000 megawatts of capacity, or the equivalent of that, using solar and other renewable energy sources that don't require -well, don't require any use of water for cooling, don't require any kind of mitigation for radiation and so on. (**0721-16-4** [Rifkind, David])

Comment: So I would just say, again, my own experience from powering my house with solar panels, it shows me that we can do it so much more efficiently, so much more economically, so much more rapidly, and so much more safely, than resorting to nuclear power. (**0721-16-6** [Rifkind, David])

Comment: Solar is right. You can feel that in your gut. Wind energy is right. And there's research. (**0721-18-3** [Bernabei, Catharina])

Comment: People of FPL, if you were to have solar panels, half of Miami, half of South Florida, you have enough. But maybe if it becomes more affordable. My daughter and her husband will pay off in seven years, and they have a child, and that will be her college fund; that it's paid off and then they hardly have to pay any electricity. We collect it through the grid. It goes back to FPL, the excess of sun, of solar energy, will benefit FPL. What are you thinking? You will benefit from all those homes when you see an air -- when you look out of the plane and look at Miami, wow, couldn't you imagine, solar panels here and here, everywhere. It will be sufficient. (**0721-18-4** [Bernabei, Catharina])

Comment: We need solar. Florida, South Florida especially has more solar potential than any place in the continental United States. The EIS looked at solar and they compared this plant to a solar farm. We need rooftop solar. We have millions of acres in Florida of rooftops that are not being used. FP&L --just coming here somebody mentioned that. I heard one of their solar commercials. In terms of their portfolio, 0.06 percent. Not even 1/10th of 1 percent of their portfolio is produced by solar. One way they can do it, don't compare it to solar farms, compare it to rooftop solar and use the model that DishTV came up with. You don't have to create your

own satellite in space. Let FP&L put the solar panels on people's houses. Let them own it, the same way as Dish. You want solar, you call up, they come out, they put the panels. 24 hour, they say we can't do it because it's not 24 hour. That's nonsense. Peak electricity is during the day. That's when we're burning the electricity. We can go to other forms of electricity when we're not using solar. Let FP&L get into that business, installing solar panels on people's houses so people don't have to shell out $20,000, $30,000. That's what the solar initiative coming up right now is all about, getting competition in there. FP&L I don't think is in favor of that. (**0721-22-18** [Schwartz, Matthew])

Comment: With so many truly clean, safe, renewable and sustainable technologies now available and in development, there is no reason to build new nuclear plants. This will only drain much-needed resources from full development of better, safer, technologies. This is the Sunshine State. We should be leading the nation, the world, in solar development. Instead, we rank 13th in total installed solar in the country and 20th in solar installed in 2014. It's time to end the use of all nuclear power and put all, all of our resources into truly safe, clean, and sustainable technologies, like conservation, solar, wind, geothermal and others which absolutely can and will supply all the energy the State and the world needs without destroying the world in the process. (**0721-28-11** [Wilansky, Laura Sue])

Comment: FP&L is developing solar power too, but they're doing a teeny, tiny fraction of what they could be doing. While 95 percent or more of their advertising and PR is devoted to promoting how much solar development they're doing, they're actually generating less than 1/10th of 1 percent, as has been mentioned, .01 percent of their electricity through solar power. I'm a customer, I know, I get the brochures every month in my bills. I brought the brochure that came with my February 2015 bill, if you want to see it in their own words in black and white, .01 percent solar. In black and white, or rather, green and white. But printing the information in green doesn't make what FP&L is doing, green, unless the green you're talking about is cash. (**0721-28-12** [Wilansky, Laura Sue])

Comment: The answer is solar. FP&L knows this, and at .01 percent we are woefully low for the Sunshine State. (**0721-30-10** [Ullman, John])

Comment: And I just want to emphasize the whole point is that why not invest in solar energy. I mean that's just a much more cleaner, safer form of energy. I mean other countries, even Germany, which has less sunshine than us, has 20 percent of energy from solar energy. So I don't know why Florida, being the Sunshine States doesn't, you know, really, you know, live by its own nickname or name, whatever, and try to embrace that and try to have, you know, solar panels at everyone's house. And so instead of doing the FP&L, oh, pay now and get screwed over plan, how about we give the money to us and just we'll put in our own solar panels and save everyone money. We can give the electricity back to FP&L. I think that makes way more sense than, oh, let's give lots of money now, rip me off now, and then, you know, not even come through with a promise. (**0721-31-10** [Almirola, Alejandro])

Comment: It's just, you know, I think we could be smarter and actually pick something that works for everyone. (**0721-31-14** [Almirola, Alejandro])

Comment: By now Florida and the United States should've transitioned to solar and other renewable resources rather than this inherently dangerous power source. (**0721-32-1** [Schlackman, Mara])

Comment: Try it and use solar panel. And why the Florida Power and Light they no make the solar panel and sell it to everybody at good price. And they got a lot of jobs right there to work in the solar panel, to sell it out. Only he looking for money. Money and money. They don't care about the life of the people. So, to me it's the best way, make a solar farm. (**0721-33-4** [Herrera, Luis])

Comment: So when I step away and say I'm an advocate, yeah, I'm an advocate, and yeah, I'm conflicted. But I look at this now and say, you guys from FPL to everybody, I supply Solar City. You guys want to do some special work with Solar City? I'll work with you guys on creating a rack system; cash on hand. You know, we'll put money in front. We'll make this worth your while, whatever you -- let's get creative. (**0721-34-2** [Gomez, Albert])

Comment: I think there's a better way. A gentleman earlier referred to it in terms of renewable energy. The same way if we built this reactor, which I think we should to do. By the time we built this we'd have new renewable energy sources, which would be cheaper and more efficient. (**0721-7-7** [Edmond, Gabriel])

Comment: Additionally, FP&L generates less than 1/10th of 1 percent of its electricity from solar power. Given that solar helps meet peak demand and power plants are built to meet peak demand, meaningful investment in solar could help defer the need for the proposed reactors. Yet, FP&L assigns solar power a zero value in avoiding capacity additions in its resource planning process. And if you make a plug for the ballot petition, if you want to see rooftop solar increased in Florida, please sign the Floridian For Solar Choice ballot petition. (**0721-8-7** [Cavros, George])

Comment: I can tell you after working many years in front of the Public Service Commission on behalf of Clean Energy Advocates, that description simply does not fit the planning process in Florida. There are three disjointed components; the State planning process in Florida, a ten-year site plan, and new determination in conservation goal setting. A ten year site plan is simply a summary planning document that PSC cannot require the utility to change it. The power company cannot change it --or can change it, rather, at any time on its own accord, and there is no open stakeholder process that provides meaningful participation in the utility's long-term planning process. Moreover, energy efficiency and renewable energy are never placed on a level playing field in the Florida planning process, nor considered comprehensively, and we will provide more detailed written comments on the State's disjointed planning process. Suffice to say that the NRC should not rely on it and must take a hard look at energy efficiency and renewables to meet the projected need. (**0721-8-9** [Cavros, George])

Comment: Well, I'd suggest that there's alternatives that they haven't considered because they are biased in the direction of heavy capital investment, continuing the same game they've been playing. You know, they have right now .06 percent of all the mega-wattage that they want in the State of Florida is solar. I think that's an embarrassment. This is the Sunshine State. (**0723-12-5** [Henry, Jim])

Comment: ...but the idea that less than one percent of your installed base is generated by solar energy is just -- I mean, I think it's hard to explain. (**0723-12-6** [Henry, Jim])

Comment: You really need to think about that very long and very hard before you put this puppy to bed. This is a very important time to think about that. And if you need jobs down here it should be in solar. (**0723-3-3** [Star, Priscilla])

Comment: [Y]ou all deserve jobs provided by FPL in solar. (**0723-3-5** [Star, Priscilla])

Comment: In general, we also feel that the needs, future needs of the State of Florida for electrical power could be met by alternative energy sources and conservation. (**0723-5-4** [Teas, Jim])

Comment: NEPA requires an evaluation of a reasonable range of alternatives as part of the keystone to it. The alternative that I mentioned which is distributed solar on rooftops providing the baseload during the day, peak time, when we're using the energy, the air conditioners, that's when we're using most of it, combined with traditional fossil fuel in the evening. That's a combination that apparently was not evaluated. It's missing from the EIS. It's got to go in there. The technology is there, it was not evaluated. It's missing. Solar economy. This is things we want to add a little bit because we are in Homestead, and this is kind of a company town. (**0723-9-2** [Schwartz, Matthew])

Comment: There's so much out there for solar technology. (**0723-9-3** [Schwartz, Matthew])

Comment: I understand this gentleman is running the nuclear plant but you folks could let -- your children could also learn to run solar, not plants, but distributed solar on every house, every building, every store. FPL is always advertising their new solar technology. Look at their numbers, though. Google FPL energy portfolio, 0.06 percent. Not even one-tenth of one percent solar. So the technology is there. (**0723-9-5** [Schwartz, Matthew])

Response: *The NRC does not promote any particular form of energy generation, including nuclear. However, the NRC does examine energy alternatives as part of its NEPA responsibilities. The staff's evaluation of renewable alternative energy sources, including wind, solar, geothermal, fuel cells, and biomass, in Section 9.2 of the EIS describes potential impacts from these sources in comparison with the proposed action. In Section 9.2 the review team determined that none of these renewable energy sources could, by themselves, meet the purpose and need of the proposed action; to provide a target of 2200 MW(e) of baseload power. Alternatives not requiring new generating capacity, including conservation and demandside management, are discussed in Section 9.2.1 of the EIS. The staff concluded in the EIS that these technologies also did not represent reasonable alternatives to a large baseload power plant located at the Turkey Point site because they could not meet the purpose and need of the project. The staff concluded in Section 9.2 of the EIS that none of the feasible alternative energy options were environmentally preferable to the proposed action. The cost of energy alternatives was not considered in the EIS because the options were either not capable of meeting the purpose and need, or were not environmentally preferable. No change was made to the EIS as a result of these comments.*

Comment: The NRC Failed to Consider Natural Gas Energy Alternatives: As a matter of public record -the cost of natural gas is at an all time low due to vast amounts of natural gas production (harvesting) from numerous sources. Clearly, FPL customers would benefit economically from a natural gas fired power plant -rather than a extensively more costly nuclear power plant. Notably, the regulatory cost of constructing and operating a nuclear power plant far exceeds a comparable natural gas fired power plant. Indeed, even after a nuclear power plant is decommissioned -there remain very extensive costs related to that activity which are passed on to the customers. (**0010-5** [Saporito, Thomas])

Comment: We are NOT in favor of any gas plants or the fracking that goes with them. I know that, at this time, gas would be less expensive, but I see it harming our environment at a much greater cost. (**0070-2** [Lamb, Deborah S.])

Comment: Given the operating cost vs that of a gas fired powerplant this just seems like someone's nuclear wet dream. (**0249-3** [Mosher, Paul])

Response: *In Section 9.2.2, the staff concluded that natural gas was a feasible alternative to the proposed action. However, in Section 9.2.5 the staff concluded that natural gas was not environmentally preferable to the proposed action, and the air-quality impacts from the natural gas plant emissions, including greenhouse gas emissions, are a key difference. The cost of natural gas was not considered in the EIS because it was not environmentally preferable. No change was made to the EIS as a result of these comments.*

Comment: the winds have shifted in energy supplies and natural gas is much more affordable and doesnt have to be built along the coast. also, solar and wind and thermal have now become competitive to nuclear, in fact, cheaper than nuclear (considering nuclear plants have a federal subsidy) (**0055-4** [Roedel, Kitty])

Comment: Our area may need more electricity, but there is no present or foreseeable crisis that exists. Therefore, a better thought out and ecologically sensitive plan for electricity should be on the drawing boards for our area including, but not limited to: solar, wind, water currents, etc. (**0073-2** [Commenters, Multiple])

Comment: We know that we have growing demands for electricity. But our land and our drinking water are limited resources. It's time we look to more sustainable, less environmentally impactful energy solutions to fulfill our growing community. (**0076-6** [Daly, Meg])

Comment: 2. While I can see that our area may in the future need more electricity, right now there is no current or foreseeable crisis that exists. A better thought out and ecologically sensitive plan to obtain more electricity should be planned to include but not be limited to solar, wind, water currents, etc. (**0077-2** [de Armas, Maria Cristina])

Comment: As a Florida resident I beg of you to find a more suitable way or place to increase electricity production here in our beautiful state. (**0084-2** [Phillips, Monica D.])

Comment: Don't give FPL green light to build more nuclear towers, please explore other source of energy. (**0088-1** [Lange, Alexandra])

Comment: Smaller, more numerous natural-gas fired facilities could decentralize electric power production here. The consequence would be that smaller transmission lines could be used to distribute the energy so produced, and networks properly designed, could cover a loss of one or two in any natural disaster. Our nation has such plentiful natural-gas supplies that we are exporting it already. Let's use the resources we have here for our own safety and economy. Also, the use of SOLAR power in this Sunshine State has barely begun here as well, and should be exploited fully before resorting to the construction of added nuclear facilities. (**0213-4** [Hyams, Charles])

Comment: The NRC. . . including Florida Power and Light. . . need to return to the draft board to come up with a better solution for Florida's energy needs. (**0250-7** [Fulks, Anna Louise])

Comment: I will like to conclude by praising the positive aspects of renewable technologies (surprising from the tone of the article, I know). Renewable technologies coupled with battery storage have great potential to make our grid more stable. Having small distributed power-storage stations that are powered with wind and solar would be a great way to deal with

localized energy-demand spikes, which would replace the need for gas-fired peaking stations. Renewables could literally outshine and outperform fossil fuels in providing peaking power when it is built upon nuclear baseload power. However, if we do not allow the construction of nuclear units at Turkey Point 6&7--and at other locations--the use of fossil fuels will continue unabated to supply the necessary amount of energy to put food on our tables and power our economy. It is critical to approve Turkey Point 6&7 because without these units we will miss not only on the benefits of nuclear power, but also the benefits of renewables. (**0378-7** [Macher, Nathan])

Response: *The NRC does not promote any particular form of energy generation, including nuclear. However, the NRC does examine energy alternatives as part of its NEPA responsibilities. In Section 9.2.2 the staff concluded that natural gas was a feasible alternative to the proposed action. However, in Section 9.2.5 the staff concluded that natural gas was not environmentally preferable to the proposed action, and the air-quality impacts from the natural gas plant emissions, including greenhouse gas emissions, are a key difference. The staff's evaluation of renewable alternative energy sources, including wind, solar, geothermal, fuel cells, and biomass, in Section 9.2 of the EIS describes potential impacts from these sources in comparison with the proposed action. In Section 9.2 the review team determined that none of these renewable energy sources could, by themselves, meet the purpose and need of the proposed action; to provide a large baseload power source. Alternatives not requiring new generating capacity, including conservation and demandside management, are discussed in Section 9.2.1 of the EIS. The staff concluded in the EIS that these technologies did not represent reasonable alternatives to meet the need for 2200 MW(e) of baseload power in the FPL service territory because they are incapable of generating baseload power, or (for alternatives such as biomass) 2200 MW(e) of baseload power. The staff concluded in Section 9.2 of the EIS that none of the feasible alternative energy options were environmentally preferable to the proposed action because the environmental impacts of the alternatives were either similar to, or worse than, those of the proposed action. The cost of energy alternatives was not considered in the EIS because the options were either not feasible, or were not environmentally preferable. No change was made to the EIS as a result of these comments.*

Comment: I am strongly in favor of the addition of 2 more nuclear reactors to the current Turkey Point facility for the following reasons:...[s]olar and wind although options are very costly and not as efficient as nuclear so those options cant be relied on. (**0015-15** [Goldmeier, Barry])

Comment: Nuclear fission is a technology that we have today and doesn't require the development of another technology, like battery storage; A technology that has not yet reached mass commercial viability. If the world is lucky enough to develop commercial battery storage, then nuclear power will work even better. In contrast, renewable energies merely depend completely on the development of battery storage. Instead of straining our economy with renewables by stretching the technology just to get back to the "volume" of electricity generated today with fossil fuels, we can revamp and transform our economy with abundant nuclear energy. (**0378-2** [Macher, Nathan])

Response: *The NRC acknowledges the commenter's support for new nuclear power. The NRC does not promote any particular form of energy generation, including nuclear. However, the NRC does examine energy alternatives as part of its responsibilities under the National Environmental Policy Act (NEPA). The staff concluded in Section 9.2.5 of the EIS that none of the feasible alternative energy options were environmentally preferable to the proposed action because the environmental impacts of the alternatives were either similar to, or worse than, those of the proposed action. The cost of energy alternatives was not considered in the EIS*

because the options were either not feasible, or were not environmentally preferable. No change was made to the EIS as a result of these comments.

Comment: We should also be harnessing the ocean currents for hydro electric power. Burning fossil fuels, and creating nuclear waste have been proven to be detrimental to our "mother earth". It's time we use our ingenuity as mankind to create sustainable and safe energy production. We only have one earth, one planet. It has to last for many generations to come. (**0146-6** [Grant, Randy])

Comment: If only there was a viable alternative to nuclear power... Oh, that's right, there are many alternatives. Now, we must also consider the alternatives that exist, and FPL's role in preventing their implementation. We are the sunshine state, and Solar infrastructure gets cheaper every year, yet we have minimal Solar PV Power (cloudy Germany is shutting down coal and nuclear plants). We have the Gulf Stream right off shore, yet we're only beginning to "study" current and wave power generation (while Brazil, Holland and Australia have installed operational power plants). We have no shortage of wind (and wind farms are sprouting up in many parts of the USA). (**0252-14** [Van Leer, Sam])

Comment: It is also my very strong opinion, that Florida Power and Light cares more about generating money than it does about the people who rely on its services. For all its glossy, warm and fuzzy flyers about how it is generating environmentally safe and economic power, there is inadequate proof that these claims are true. If they were, all the money we have been charged for "future development" would be showing up in wind, sun, and tide generated power -NOT additional hazardous nuclear plants on the edge of a rising ocean. (**0337-6** [Philips, Sally B.])

Comment: We want clean, renewable energy sources -solar, wind, water. These energy sources are CHEAP and SAFE. Nuclear is neither! (**0381-1** [Khajeh-Noori, Jeri])

Comment: I beg you to go back to the drawing board. We have free and abundant energy sources like water, sun and wind. This is where we need to be headed. (**0633-3** [Cornely, Tina])

Comment: Additionally, the community would be better served by using the projected $20 Billion in cost by exploring power generation of electricity by solar, wind, or wave means. (**0653-2** [Hickey, Alan])

Comment: LETS INVEST IN WATER TURBINE AND SOLAR ENERGY. (**0656-2** [Zhivelev, Leon])

Comment: There are so many ways to produce energy. From the sun, wind, tides, hydrogen, etc. but we have not invested in them. Rather we elect to make energy the old ways with the accompanying horrible ecological consequences. We don't correct our mistakes since how we make energy now is expedient, corporatized, and highly profitable. (**0657-1** [Hartmann, Donald])

Comment: If we were making better use of renewable energy (solar, wind, tide, etc.) at the neighborhood level, we could start to envision a state that doesn't need nuclear plants and their associated nuclear waste. Other nations around the world are already working on a new paradigm, so we need to focus our efforts on catching up to leading edge technology instead of continuing with an obsolete model. (**0677-5** [Chiszar, Benjamin J.] [Jacobs, Lee] [Klopfer, Carol])

Comment: Our area may need more electricity, but there is no present or foreseeable crisis that exists. Also a good thought out and ecologically sensitive plan for electricity should be on

the drawing boards for our area including, but not limited to: solar, wind, water currents, etc. (**0685-1** [Batista, Carlos])

Comment: There exists alternative means to generate electricity in a cheaper moire sustainable manner in South Florida through solar, tidal, and other alternative energy sources. Florida should exhaust all other alternatives before building more reactors. (**0710-4** [Platt, George Seth])

Comment: So it's much better putting solar energy in. We can do the solar panels, put solar farms and combination. I don't see why we can't do that and put wind energy, you know, put windmills on our house. I don't care. I mean, add a new addition or whatever. Maybe even a Gulfstream current, we can put maybe geothermal energy there or somehow harness the energy of the Gulfstream. (**0721-31-12** [Almirola, Alejandro])

Comment: Therefore, a better thought out and ecologically sensitive plan for electricity should be on the drawing boards for an area including but not limited to solar, wind, water currents, et cetera. (**0721-31-5** [Almirola, Alejandro])

Response: *The NRC does not promote any particular form of energy generation, including nuclear. However, the NRC does examine energy alternatives as part of its responsibilities under the National Environmental Policy Act (NEPA). The staff's evaluation of renewable alternative energy sources, including wind, solar, water-driven, geothermal, fuel cells, and biomass, in Section 9.2 of the EIS describes potential impacts from these sources in comparison with the proposed action. In Section 9.2 the review team determined that none of these renewable energy sources could, by themselves, meet the purpose and need of the proposed action; to provide a target of 2,200 MW(e) of baseload power because they are incapable of generating baseload power, or (for alternatives such as biomass) 2,200 MW(e) of baseload power. Alternatives not requiring new generating capacity, including conservation and demandside management, are discussed in Section 9.2.1 of the EIS. The staff concluded in the EIS that these technologies did not represent reasonable alternatives because they also could not meet the need for 2,200 MW(e) of baseload power in the FPL service territory. The staff concluded in Section 9.2 of the EIS that none of the feasible alternative energy options were environmentally preferable to the proposed action because the environmental impacts of the alternatives were either similar to, or worse than, those of the proposed action. The cost of energy alternatives was not considered in the EIS because the options were either not feasible, or were not environmentally preferable.*

Ocean and tidal technologies were evaluated in Section 9.2.3.4 and the NRC staff noted that both are being developed but are in their infancy and have not been used at utility scale. Therefore, the staff concluded that these technologies are not feasible alternatives within the FPL region of interest to the construction of a new nuclear power-generation facility that can generate 2,200 MW(e) of baseload power at the proposed site.

The comments did not provide any information that would change the review team's conclusions. Therefore, no changes to the EIS were made as a result of these comments.

Comment: If any nuclear power generation of electricity is approved, then please approve breeder reactors for their small waste footprint, and require the use of closed steam systems, like a USN nuc sub, where no steam is wasted, steam is cooled and recycled. If land nuc plants did that then less water would be wasted for cooling. And for fossil fuel burning plants with

recycled steam, no Mercury or nox, sox, or COx would be contributing to poor air quality, health and global environmental health of the climate. (**0311-1** [Hunt, Jim])

Response: *There are not any current plans in the United States to build breeder reactors. There are no breeder reactor designs submitted to the NRC for review. Regarding Navy submarine cooling systems, they use an open-cycle cooling system, heating the water they draw in and then discharging the hotter water back into the ocean. Under current EPA regulations, it is unlikely such a system could be approved for a land-based nuclear power plant. Finally, the comment regarding emissions from fossil-fueled plants is unclear. All such plants emit numerous pollutants that affect air quality. No changes were made to the EIS as a result of this comment.*

Comment: Comment 16: The final Environmental Impact Statement should include distributive models of energy generation in its review. FPL has stated that "without the proposed action, nuclear power generation would decline to 16% of its portfolio by 2021 and cause FPL to rely on natural gas power generation for up to 75% of its power generation." DEIS at 8-7. This statement assumes that natural gas, or even centralized energy generation, is the only alternative to a nuclear power plant. In contrast, the final Environmental Impact Statement should assess distributive, or "rooftop," solar power generation options. Although the DEIS assess solar farms, it does not include an assessment of distributive options. With this in mind, the City of Miami used data from the Florida Solar Energy Center at the University of Central Florida to compare the output of a limited distributive generation scenario with nuclear power. For simplicity's sake, the City focused only on solar water heaters. Solar water heaters use solar energy to heat water and hold that hot water in reserve for consumer use. This brief analysis showed that the same energy needs can be met more efficiently with less power output. Not only is solar hot water heating a reasonable renewable energy option, it is also more efficient than traditional electricity generation for the purposes of heating water. Other economic considerations must be incorporated in this analysis, however, the City of Miami believes that if a simple change such as adopting widespread use of solar hot water heaters can result in such an impact in energy demand, this type of scenario should be considered in the final Environmental Impact Statement's analysis of the determination of need for Turkey Point Nuclear Plant Units 6 & 7. **Equations, Variables, & Givens.** $P_kw = E_{kwh} \div t_{hr;}$ P = Power in kilowatts; E = Energy in kilowatt hours; t = Time in hours; Hours in a year = 8, 765.81 hours. For a family of four, typical hot water usage is 25,550 gal/yr at 3,990 kwh/yr to heat electrically. Solar hot water heaters save between 50 - 85% of energy expenditure. For the purposes of a conservative analysis, the City assumed that solar hot water heaters use 1,995 kwh/yr (or, 50% of 3,990 kwh/yr). FPL has 4.7 million customers. Of these, the average number of rural and residential customers is 4,230,063. *See* FPL 10 year site plan. **Comparison Point A: Calculating Yearly Power from One Solar Hot Water Heater.** Pkw = 1,995 kwh ÷ 8, 765.81 hours = .227 kw; .227 kw = 227 w; 227 w/hr × 24 hours/day = 5,448 w/day; 5,448 w/day × 365 days/yr = 1,988,520 w/yr; 1,988,520 w/yr × (1.0×10^{-6}) MW/w = 1.98852 MW/yr; 1.98852 MW/yr = power from one solar hot water heater. **Comparison Point B: Calculating Yearly Power from Turkey Point Nuclear Plant Units 6 & 7.** FPL's Target Capacity for Proposed Units 6 & 7 = 2,200 MW/hr; 2,200 MW/hr × 24 hr/day = 52,800 MW/day; 52,800 MW/day × 365 days/yr = 19,272,000 MW/yr; 19,272,000 MW/yr = total projected power generated from Units 6 & 7. **Conclusion Based on a Limited Population of Adopting Ratepayers: Amount of Power Produced from Solar Hot Water Heaters from FPL Rural and Residential Customers.** If one solar water heater produces 1.98852 MW/yr of power, then: 1.98852 MW/yr × 4,230,063 rural and residential customers = 8,411,565.88 MW/yr; **8,411,565.88 MW/yr** = Amount of power produced in one year if FPL rural and residential customers were required to have a solar hot water heater. **Conclusion Based on Adopting by All Ratepayers: Amount**

of Power Produced from Solar Hot Water Heaters from all FPL customers. If one solar water heater produces 1.98852 MW/yr of power, then: 1.98852 MW/yr × 4,700,000 total customers = 9,346,044 MW/yr; **9,346,044 MW/yr** = Amount of power produced in one year if all of FPL customers were required to have a solar hot water heater. Based on this scenario, the City found that almost half of the projected power output of the new reactors can be generated using a distributive power generation model even under conservative circumstances. Moreover, the final Environmental Impact Statement should assess whether the energy needs anticipated by FPL can be met more efficiently with less power output. (**0456-23** [Miami, City])

Comment: Comment 17: The final Environmental Impact Statement should include distributive models of energy generation in its review. FPL has stated that "without the proposed action, nuclear power generation would decline to 16% of its portfolio by 2021 and cause FPL to rely on natural gas power generation for up to 75% of its power generation." DEIS at 8-7. This statement assumes that natural gas, or even centralized energy generation, is the only alternative to a nuclear power plant. In contrast, the final Environmental Impact Statement should assess distributive power generation options such as "rooftop" solar. Although the DEIS considers solar farms, it does not include an assessment of distributive options. With this in mind, the City of Miami used data from the Florida Solar Energy Center at the University of Central Florida to compare the efficacy of a limited distributive generation scenario against nuclear power. For simplicity's sake, the City focused only on solar water heaters. Solar water heaters use solar energy to heat water and hold that hot water in reserve for consumer use. This brief analysis showed that the same energy needs can be met more efficiently with less power output. Not only is solar hot water heating a reasonable renewable energy option, it is also more efficient than traditional electricity generation for the purposes of heating water. Other economic considerations must be incorporated in this analysis, however, the City of Miami believes that if a simple change such as adopting widespread use of solar hot water heaters can result in such an impact in energy demand, this type of scenario should be considered in the final Environmental Impact Statement's analysis of the determination of need for Turkey Point Nuclear Plant Units 6 & 7. Equations, Variables, & Givens. Pkw = Ekwh ÷ thr P = Power in kilowatts, E = Energy in kilowatt hours, t = Time in hours. The reactors will operate at 93% capacity; each one generating 8,148 hours/yr (8,760 hours in a year x .93 = 8,148). See DEIS at 5-69. 8,148 hours ÷ 24 hrs/day = approx. 340 days. For a family of four, typical hot water usage is 25,550 gal/yr at 3,990 kwh/yr to heat electrically. Solar hot water heaters save between 50 - 85% of energy expenditure. For the purposes of a conservative analysis, the City assumed that solar hot water heaters use 1,995 kwh/yr (or 50% of 3,990 kwh/yr). FPL has 4.7 million customers. Of these, the average number of rural and residential customers is 4,230,063. See FPL 10 year site plan. Comparison Point A: Calculating Yearly Power from One Solar Hot Water Heater Pkw = 1,995 kwh ÷ 8, 760 hours = .227 kw; .227 kw = 227 w; 227 w/hr × 24 hours/day = 5,448 w/day; 5,448 w/day × 365 days/yr = 1,988,520 w/yr; 1,988,520 w/yr × (1.0 × 10-6) MW/w = 1.98852 MW/yr; 1.98852 MW/yr = power from one solar hot water heater. Comparison Point B: Calculating Yearly Power from Turkey Point Nuclear Plant Units 6 & 7, FPL's Target Capacity for Proposed Units 6 & 7 = 2,200 MW(e), 2,200 MW/hr × 24 hr/day = 52,800 MW/day, 52,800 MW/day × 340 days/yr = 17,952,000 MW/yr, 17,952,000 MW/yr = total projected power generated from Units 6 & 7. Conclusion Based on a Limited Population of Adopting Ratepayers: Amount of Power Produced from Solar Hot Water Heaters from FPL Rural and Residential Customers. If one solar water heater produces 1.98852 MW/yr of power, then: 1.98852 MW/yr × 4,230,063 rural and residential customers = 8,411,565.88 MW/yr, 8,411,565.88 MW/yr = Amount of power produced in one year if FPL rural and residential customers were required to have a solar hot water heater.

Conclusion Based on Adopting by All Ratepayers: Amount of Power Produced from Solar Hot Water Heaters from all FPL customers. If one solar water heater produces 1.98852 MW/yr of power, then: 1.98852 MW/yr × 4,700,000 total customers = 9,346,044 MW/yr, 9,346,044 MW/yr = Amount of power produced in one year if all of FPL customers were required to have a solar hot water heater. Based on this scenario, almost half of the projected output of the new reactors can be generated using a distributive generation model even under conservative circumstances. Florida electric capacity from distributive methods has increased about 33% since 2014. http://tinyurl.com/FPSCrenewables. The final Environmental Impact Statement cannot meet the "hard look" standard required by NEPA without analyzing distributive energy generation models. **Expand Consideration of Transmission Line Impacts.** The DEIS notes that "[t]ransmission-line construction would fragment habitat and permanently affect pine rocklands that are designated as critical habitat for listed species." DEIS at 10-5. However, the impacts of FPL's proposed transmission lines are not limited to construction-related disruptions. (**0611-16** [Haber, Matthew S.])

Comment: There is an attempt to greatly increase solar power in the state of Florida. In the past solar water heaters were common. Florida could return to the days of using more solar power. Energy efficiency could be increased. Florida has not made a significant effort to improve energy efficiency. It ranks behind many states on energy efficiency and does not even have a state policy on increasing renewable energy. (**0641-9** [Martin, Drew])

Comment: So I know personally it is possible to do distributed generation instead of central power plants to do distributed generation. And I think about it all the time. I think about -- and I love my solar panels and I love my solar hot water heater, and the solar hot water heater has paid for itself many times over already. The solar panels, not quite, and it will take a while to do that. But when a hurricane comes and the grid is down, I'm up, I'm running. We have batteries. I listened to a Tesla Board of Directors conference call the other day. Tesla, that makes that car, the electric car. They have a proposal to build a new whole house battery. How exciting. A whole house battery that can keep the house up and running when the sun is not shining or the wind is not blowing. (**0721-11-4** [Roff, Rhonda])

Comment: So we've got existing technology that will not have any of these impacts I'm talking about. The company has not evaluated that reasonable alternative. (**0723-9-20** [Schwartz, Matthew])

Response: *Any alternative energy source must be able to meet the purpose and need of the action (i.e., production of 2,200 MW(e) of baseload power to supply the future needs of FPL's service territory). In Section 9.2.1 of the EIS, the review team discussed conservation and demand site management (DSM) programs (under which residential solar water haters would likely fall). The review team pointed out that the FPSC had already approved those conservation and DSM programs that it found to be cost-effective. In addition, the FPSC stated that there are no additional conservation measures that could effectively mitigate the need for the addition of the proposed FPL Units 6 and 7 (FPSC 2008-TN735). Thus, implementation of conservation and DSM programs, including domestic solar water heating, is not a reasonable alternative for providing baseload power-generating capacity. The review team considered solar photovoltaic (PV) power as an alternative in Section 9.2.3.3 of the EIS. The review team concluded that the capacity factor of solar PV is too low to be used as a baseload power generation source and that it was not a reasonable alternative to the proposed action. Considering the relative capacity factors of nuclear and solar PV, to obtain the same annual output as nuclear would require almost 10,000 MW of solar panels and energy storage on a scale that has not been contemplated in any State. The review team also included solar*

PV and conservation and DSM as components of the combination of energy alternatives in Section 9.2.4. However, the review team concluded in Section 9.2.5 that the combination of energy alternatives was not environmentally preferable to the proposed action because the environmental impacts of this alternative were similar to those of the proposed action. No changes were made to the EIS in response to these comments.

Comment: The Executive Summary (pg. xxxvi) states that the NRC staff eliminated several energy sources (e.g., wind, solar, geothermal, and biomass) from full consideration because they are not capable of meeting the need of the project. The EPA would prefer that the NRC evaluation consider the combining of renewable energy sources, such as wind and solar, as an alternative to meet the needs of the project. (**0617-4-12** [Mueller, Heinz J.])

Comment: I think we all share a common goal, more than we want to admit, and that is the elimination of CO2 gasses, or at least a drastic reduction. And a combined mixture of wind, solar and nuclear is definitely the way to go. Reliable base power and reliable solar and wind, especially in the Sunshine State. I've heard the discussion about rooftop solar and solar powered -- solar water heaters, and, yes, those are viable options. (**0721-15-7** [Kuraza, Devon])

Response: *The review team evaluated wind and solar energy as alternatives to the proposed reactors in Sections 9.2.3.2 and 9.2.3.3 of the EIS, respectively, and found neither to be a feasible discrete alternative to the proposed reactor. The review team identified a combination alternative involving natural gas-fired combined-cycle turbines, energy efficiency, and contributions from wind and solar as a technically feasible alternative to the proposed FPL Units 6 and 7. The review team evaluated the environmental and socioeconomic impacts of such a combination alternative, summarizing the projected impacts in Table 9-5. In Table 9-6, the review team compared the projected impacts of the proposed reactor with all of the alternatives that the team found to be technically feasible. The review team applied objective criteria in its evaluation of all the options that were considered to be technically feasible and practically available alternatives to the proposed reactor for satisfaction of the stated purpose and need to provide 2200 MW(e) of baseload power in the FPL service territory, and concluded that the combination of energy alternatives was not environmentally preferable to the proposed action because the environmental impacts of this alternative were similar to those of the proposed action. The comments did not provide any information that would change the review team's conclusions. Therefore, no changes to the EIS were made as a result of these comments.*

Comment: In early 2015, FPL announced the change of the commercial operation dates (CODs) for Units 6 & 7 from 2022 and 2023 to 2027 and 2028, respectively. A new and significant information review was conducted by FPL where it was concluded that there would not be an impact to any significance level or conclusion drawn in the ER with respect to the change in CODs. There are instances in the DEIS, however, where references to CODs differ from the newly announced CODs. Instances in the DEIS include:...DEIS Section 9.2, Page 9-3, Lines 4-12: In DEIS Section 9.2, the in-service dates, along with the impact of extending those dates, are mentioned: "The review team's analysis is based on an in-service date for Unit 6 of 2022 and Unit 7 of 2023 based on FPL's 2014 Ten-Year Plan (FPL 2014-TN3360). Even if the actual in-service date were to slip by a few years, the NRC staff would not expect such a change to affect the overall conclusions regarding energy alternatives for two reasons. First, the projections by FPL and by the U.S. Department of Energy, Energy Information Administration (DOE/EIA) that the NRC staff has used in its analyses do not change appreciably in the later years and are generally consistent with the data used for 2023. Second, the environmental impacts of the feasible alternatives are not likely to change appreciably, so the NRC staff's

conclusions regarding environmental preferability are unlikely to change." (**0619-1-7** [Maher, William])

Response: *The EIS text in the Alternative Energy subsection of Section 9.2 was corrected to reflect the noted inconsistency with the referenced material.*

Comment: By building massive power plants at one spot, FPL must then distribute that power. They want to build massive transmission lines through the Everglades, and along Miami's iconic South Dixie Highway. As I understand it, the towers for these lines are not capable of surviving a Cat 5, much less the tornadoes that we might also expect. If the power plants are being put in to serve public, yet transmission is unsafe, who does this really serve? (**0252-12** [Van Leer, Sam])

Comment: By having power generation distributed near points of demand, massive transmission lines are not needed. (**0252-15** [Van Leer, Sam])

Comment: Start to take stake in the distributed grid reality, take stake in it, get value from it and own your customers. Because if there's another utility that pops up via some co-op or something that's going to take your client business away, you had those clients because you set them up. (**0721-34-5** [Gomez, Albert])

Comment: But the elephant in the hallway is the utility company that says, we won't buy your power or we won't take it off-grid. We will not allow independent power generators, they're not allowed in the State of Florida. You've got a monopoly here. And you know that's what holding up the jobs. (**0723-12-7** [Henry, Jim])

Response: *These comments argue for distributed power generation, an approach that would rely on the types of energy alternatives that the review team considered in Section 9.2 of the EIS. The alternative energy resources considered in the EIS must be able to meet the purpose and need of the action (i.e., production of 2,000 MW(e) of baseload power to supply the future needs of FPL's service territory), in order to be considered feasible. While the use of renewable energy resources for distributed power generation is growing rapidly in some parts of the United States, in Section 9.2 the review team determined that none of these renewable energy sources could, by themselves, meet the purpose and need of the proposed action; to provide a large baseload power source. No changes were made to the EIS in response to this comment.*

Comment: FPL is pushing for this expansion because it will benefit their bottom line and rate payers are stuck with the bill. There are cheaper ways to increase our generation capacity and reduce our electrical consumption with energy efficiency upgrades which have been opposed by FPL because it would obviously take away from the kWh charged to customers. (**0119-2** [de Azevedo, Ricardo])

Comment: This project is a waste of taxpayer dollars, which would be more efficiently (and safely!) spent on energy efficiency projects. (**0661-2** [Segal-Wright, Nicholas])

Comment: Look, it's been well established that energy efficiency is the lowest cost resource in meeting electricity demand. It can meet demand with an investment of less than 3 cents per kilowatt hour, a fraction of the levelized cost of the proposed reactors which is over 15 cents per kilowatt hour. Yet, FPL's past efforts in helping customers reduce energy use and save money on their bills through energy efficiency programs, quite frankly, has been abysmal, capturing a mere 2/10ths of 1 percent of annual energy sales through energy efficiency programs. However, even at these very low levels, had FP&L continued the conservation programs that it had in

place in 2013, it would capture over 1,520 megawatts of capacity, about 70 percent of what it needs in the 2027/2028, the time frame for the proposed reactors. (**0721-8-3** [Cavros, George])

Comment: [U]nfortunately, the people that are hardest hit by these almost non-existent energy efficiency programs are folks on fixed incomes and customers like the working poor that may not have information or the resources to make their homes more energy efficient. (**0721-8-5** [Cavros, George])

Response: *Neither the NRC or the USACE establish public policy regarding electric power supply alternatives, nor do they promote the use of nuclear power as a preferred energy alternative. Decisions regarding which generation sources and alternatives (including energy efficiency, conservation, and DSM portfolios) to deploy are made by the applicant and have to be confirmed by regulatory bodies such as the FPSC. Energy efficiency and DSM programs were reviewed by the FPSC as part of the hearing record, as discussed in Chapter 8 of the EIS. In Section 9.2.1 of the EIS, the review team discussed conservation and DSM programs. The review team pointed out that the FPSC had already approved those conservation and DSM programs that it found to be cost-effective. In addition, the FPSC stated that there are no additional conservation measures that could effectively mitigate the need for the addition of the proposed FPL Units 6 and 7 (FPSC 2008-TN735). Thus, implementation of conservation and DSM programs is not a reasonable alternative for providing baseload power-generating capacity.*

Chapter 9 of the EIS included discussion of energy efficiency and DSM as part of the no-action alternative, and the combination of alternatives. No changes were made to the EIS as a result of these comments.

E.2.25 Comments Concerning Alternatives - System Design

Comment: They said in the EIS they considered all alternatives, but you might be surprised to learn that 40 percent of the nuclear plants on the planet and 20 percent in the United States use once-through sea water to cool their reactors. Some will say there's a problem of entrainment with that. If you check you will see that their technology has reduced that to a manageable level. All of the reactors in Britain, I think in South Korea, and a few other cities, use once-through sea water, and just think of the problems that that eliminates. You put pipes out as far as you have to, into the Gulfstream if you have to. You bring in water, it goes through the reactor once, [and] it goes back out into the Gulfstream; done, finished. All these problems we're talking about go away. (**0721-12-12** [White, Barry J.])

Response: *Alternative heat dissipation systems are addressed in Section 9.4.1 of this EIS, which includes consideration of the type of cooling system described in the comment. None of the systems and/or designs that were evaluated were found to be environmentally preferable to the system design that is proposed for the Turkey Point site. Because this comment did not offer any new or significant information about environmental impacts, it did not result in any changes to the EIS.*

E.2.26 Comments Concerning Alternatives - Sites

Comment: Can this not be erected/expanded in Central or Northern Florida? There are municipalities going completely off grid and Costa Rica has been running on Hydropower for more than a month. Yet Florida is adding on to a run-down nuclear reactor? (**0008-9** [Finver, Jody])

Comment: We can not believe that there is not a remote place (still many in Florida) to build these things. (**0040-2** [Pareto, Rolando and Marlene])

Comment: I am not against nuclear power per se. I just think it should be located away from populated areas. When I first moved to South Florida from Rhode Island, I was not aware that such a plant would be essentially in my backyard. (**0061-3** [Lague, Victoria])

Comment: There are significantly large, low population sites on the eastern Florida shoreline that could be used for a modern nuclear facility. It is simply irresponsible to increase the already inflicted damage and the threat to our vulnerable area. (**0083-2** [Birsh, Arthur and Joan])

Comment: FPL has petitioned NRC to expand the nuclear power plant at Turkey Point. This location was chosen because of the existence of multiple power plants at the same site, including two currently operating nuclear reactors. The convenience and logistical advantages for this site are counterbalanced by the detrimental effect the existing plants are having on the ecology and water supply for Miami-Dade. (**0172-1** [Cava, Daniella Levine])

Comment: We are not against nuclear power, but feel that rural North Florida would be a better location since fewer people would be affected in the event of a system problem. (**0212-3** [Ross, Robert and Teresa])

Comment: Isn't there a more acceptable place for a nuclear reactor besides next to TWO national parks? (**0220-1** [Spigel, Sue])

Comment: I was shocked to learn that the reactor had been allowed in the first place. The Nuclear Regulatory Commission's regulations state, "sites adjacent to lands devoted to public use may be considered unsuitable," and unacceptable impacts are "most apt to arise in areas adjacent to natural-resource-oriented areas." Within six miles of the proposed expansion site there are two national parks, an aquatic preserve, a national wildlife refuge, and a wetland habitat preserve. (**0295-2** [Dietrich, Chris OMeara])

Comment: There are better locations for this. (**0305-1** [Poese, David])

Comment: That's not the smartest choice to place nuclear reactors. (**0347-1** [Petersen, John])

Comment: I question the thinking behind this without much thought or regard for the location it is in. (**0349-2** [Oliva, Vivian])

Comment: It is dangerous to have nuclear plants in populated, hurricane-prone areas. (**0359-1** [LoBiondo, Roana and Michael])

Comment: Follow your own regulations and say NO Expandtion. Case Closed, find a new loaction Turkey Point.. (**0392-2** [Greer, Tom])

Comment: There must certainly be better sites to build this power plant. Why not inland on the east coast of FL? This is where there is more demand. (**0452-1** [Karsten, Annetta])

Comment: I ask. Where is the conscience of those proposing this project. It's likely true that no one wants this stuff in their back yard. But, there must be a better place than this for the monstrosity[.] (**0484-1** [Speno, Charlie])

Comment: I have visited friends who lived a few blocks from Tampa Bay and thought it an extremely risky place to be. (**0492-2** [Mckee, Sarah])

Comment: It would seem to an intelligent person that your regulations would forbid you from undertaking an expansion in this area. (**0526-1** [Kimball, Larry])

Comment: Get real and build these energy plants somewhere else. (**0538-1** [Willett, Greg])

Comment: The draft EIS completely omits these important considerations of the proposed siting and the resulting hazards they present to the environment and public health. (**0615-2-24** [Bethune, David])

Comment: Please don't build the plants in Homestead. (**0686-1** [Sachs, Jean])

Comment: What this really is all about is, is this the place that you want to put a nuclear power plant, and the answer is resoundingly no. (**0721-30-7** [Ullman, John])

Response: *FPL conducted a site-selection study and chose the proposed site at Turkey Point based on that study. Included in the FPL study was a site-by-site comparison of alternative sites with the Turkey Point site. The NRC staff evaluated the FPL process in Section 9.3.1 of the EIS and concluded that it was reasonable and consistent with the NRC guidance for site selection (e.g., NUREG-1555). For example, as discussed in Section 9.3.1.1, FPL used its service territory as the region of interest, consistent with NUREG-1555. In addition, the NRC staff independently compared the alternative sites to the proposed site to determine if any of the alternative sites were environmentally preferable to the proposed site. In Section 9.3.6 of the EIS, the NRC staff concluded that none of the alternative sites was environmentally preferable to the proposed Turkey Point site. In addition, the NRC staff would determine whether building and operating the proposed units at the Turkey Point site would meet all of the safety requirements in the NRC regulations. The results of this review will be documented in a safety evaluation report and those results, along with the EIS, will be considered in the NRC's decision about whether or not to issue the COLs for proposed Units 6 and 7. No change was made to the EIS as a result of these comments.*

Comment: Given the proximity of Turkey Point to the major population centers of South Florida, its location close to the environmentally sensitive, irreplaceable, Florida Everglades, Everglades National Park and Biscayne National Park, the Turkey Point Nuclear Power Plant exposes the population and environment of South Florida to unintended, but nevertheless, extraordinary risk. (**0039-3** [Violich, Francesca])

Comment: Given the proximity of Turkey Point to the major population centers of South Florida, its location immediately contiguous to the environmentally sensitive, fragile and irreplaceable, Florida Everglades, Everglades National Park, Biscayne National Park, and the Florida Keys Marine Sanctuary, the Turkey Point Nuclear Power Plant exposes the population and natural environment of South Florida to unintended, but nevertheless, extraordinary risk. The conditions that were present when The Turkey Point facility was originally sited and constructed in the early 1970s are not the same conditions that exist today. Those original conditions and considerations that may have made Turkey Point a viable location for a Nuclear Power Generating Plant have changed dramatically in the ensuing years. (**0044-3** [Commenters, Multiple])

Comment: The two fold increase in the population density of Miami-Dade County over the last 40 years to approximately 2,500,000.people, coupled with the growing recognition of the value and need for preservation and protection of the fragile and irreplaceable natural resources that surround the plant, require serious reconsideration of this location for Nuclear Power generation. (**0044-5** [Commenters, Multiple])

Comment: Turkey Point's neighborhood includes Biscayne National Park, and four other parks, wildlife and nature preserves, habitats and refuges. This is an extremely sensitive, irreplaceable and biodiverse area which could be devastated by even small amounts of the Uranium 235 fuel, Plutonium and other deadly toxic substances used in and generated by nuclear plants. (**0078-8** [Wilansky, Laura Sue])

Comment: Like so many Americans, I am committed to protecting the National Park System, which preserves our country's incredible array of landscapes, waters, wildlife, and opportunities for exploration. Biscayne National Park is an irreplaceable national treasure that safeguards precious natural resources and recreational opportunities. According to the Nuclear Regulatory Commission's own regulations, "sites adjacent to lands devoted to public use may be considered unsuitable," and unacceptable impacts are "most apt to arise in areas adjacent to natural-resource-oriented areas." Within six miles of the proposed expansion site, there are two national parks, an aquatic preserve, a national wildlife refuge, and a wetland habitat preserve. In following the NRC's own guidelines, the expansion of Turkey Point could have unacceptable and irreversible impacts on these treasured sites. (**0102-4** [Commenters, Multiple])

Comment: Like so many Americans, I love our national parks, which preserve our country's incredible landscapes and waters, wildlife and opportunities for exploration. Biscayne National Park is one of these irreplaceable national treasures. According to the Nuclear Regulatory Commission's own rules, "sites adjacent to lands devoted to public use may be considered unsuitable," and unacceptable impacts are "most apt to arise in areas adjacent to natural-resource-oriented areas." How then can this project proceed when there are two national parks, an aquatic preserve, a wetland preserve and a national wildlife refuge within six miles of the proposed expansion site? (**0103-4** [Commenters, Multiple])

Comment: The proposed action threatens nearby Biscayne and Everglades National Parks and the goals and activities of the Comprehensive Everglades Restoration Plan (CERP). (**0113-1-3** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: Finally, the draft EIS fails to properly and fully consider the superior rated alternate sites for the placement of the two new plants, sites which are located in areas significantly less vulnerable to sea level rise, storm surge and a location of Turkey Point with highly dense urban populations that would compete for water. It is clear that the site selection process was overly biased in favor of building on an existing FPL power plant site, and completely ignored the over stressed current conditions under which Turkey Point is currently operating on a temporary management plan to avert a crisis shut down. It is not clear, or substantiated, how that would factor into the determination that the Turkey Point site could possibly remain the superior site for two new plants rather than the proposed alternate sites that do not currently operate under crisis conditions. The determination of alternate sites is highly subjective, and the statement fails to adequately provide fact specific comparative analysis on the rationale for excluding the alternate sites as environmentally preferable. Neither of those sites are located on as vulnerable a coastal location, neither are located in the middle of two National parks, and neither would impact the sole drinking source for more than four million Floridians. (**0145-13** [Lerner, Cindy])

Comment: The Biscayne and Everglades National Parks are should not be stressed by this ill conceived project. They will be forever changed by this in ways we cannot even begin to imagine. (**0159-2** [Bazzone, Barbara])

Comment: We have a duty to protect our National Parks and if this situation doesn't warrant protecting I don't know what is. (**0176-1** [Sheridan, Michelle])

Comment: The fact that the existing plant is on the shore of the largest marine park in the National Park System makes it doubly foolish. (**0181-2** [Bremen, Gary])

Comment: This is an area I lived near for many years. It is indeed treasured for its wildlife and beauty. What a shame to jeopardize all this. (**0185-1** [Balog, Nancy])

Comment: This site was never an acceptable location for the Turkey Point facility there today and many decades later it has only become an even more unacceptable location[.] (**0192-5** [Lebatard, David])

Comment: Our national parks protect some of our nation's most treasured natural and historical sites. The protection of these parks and their wildlife should be a priority in order that they may remain as they are for future generations. (**0198-1** [Tokunaga, Barb])

Comment: Further, we are concerned by the wide-ranging environmental impacts to Biscayne National Park, wildlife, and adjacent wetlands. (**0208-2** [Ritz, David])

Comment: The proposed action threatens nearby Biscayne National Parks and the goals of the Comprehensive Everglades Restoration Plan (CERP). (**0208-5** [Ritz, David])

Comment: Turkey Point is located within six miles of two biologically rich natural parks, a state aquatic preserve, a national wildlife refuge, and a wetland habitat preserve. Everglades National Park is recognized as a UNESCO World Heritage Site and an International Biosphere Reserve and supports a unique array of ecosystems and wildlife. Biscayne National Park, located directly adjacent to Turkey Point, is one of our largest marine national parks, and home to incredible biodiversity and important marine and wetland habitat. These natural areas offer critical protection to sensitive ecological areas, wildlife, and unique habitat and support the local economy through recreational opportunities, tourism and the provision of ecological goods and services. Biscayne and Everglades National Parks alone generate nearly $137 million in local revenue from 1.6 million annual visitors. According to the standards of the Nuclear Regulatory Commission ("NRC"), "sites adjacent to lands devoted to public use may be considered unsuitable," and unacceptable impacts are "most apt to arise in areas adjacent to natural---resource---oriented areas."[1] According the NRC's own standards, Turkey Point should not be expanded due to the potential for unacceptable impacts to the ecological health and economic viability of surrounding protected areas. (**0210-2** [Sharp, Andrea Heuson])

Comment: Like so many Americans, I am committed to protecting the National Park System, which preserves our country's incredible array of landscapes, waters, wildlife, and opportunities for exploration. Biscayne National Park is an irreplaceable national treasure that safeguards precious natural resources and recreational opportunities. According to the Nuclear Regulatory Commission's own regulations, "sites adjacent to lands devoted to public use may be considered unsuitable," and unacceptable impacts are "most apt to arise in areas adjacent to natural-resource-oriented areas." Within six miles of the proposed expansion site, there are two national parks, an aquatic preserve, a national wildlife refuge, and a wetland habitat preserve. In

following the NRC's own guidelines, Turkey Point's expansion would have unacceptable and irreversible impacts on these treasured sites. (**0228-4** [Yeager, Jerry])

Comment: It [nuclear energy] should also not be located at such low sea level and next to two National Parks. Let's make intelligent choices. How many millions are we investing to restore the Everglades? Let's plan with vision and make sound decisions! (**0235-2** [Bofill, Beatriz])

Comment: Two of South Florida's most important public lands and wildlife habitats - Biscayne and Everglades National Parks - will be put at risk and be forever changed by a project of this scale. Wherever you happen to live - South Florida or not - these special places (hotspots for our planet's biodiversity) are a part of your natural heritage. (**0240-2** [Commenters, Multiple])

Comment: Please have some deep thoughts to safeguard the wildlife and also the livelihood of ALL living beings in Biscayne & Everglades National Park. Your project will forever be harmful to the environment. Our Nation Heritage must be well looked after. Wise people like you know that this project is harmful. So Please, Please have a serious thought before it is too late. A project like this should be carried out at a different location. (**0247-1** [Govindasamy, Rani])

Comment: Comes now the NRC drafting two new reactors located off Biscayne and Everglades National Parks. . . what are they thinking? (**0250-2** [Fulks, Anna Louise])

Comment: Everglades National Park is just a few miles away. (**0252-7** [Van Leer, Sam])

Comment: Turkey Point is located within six miles of two biologically rich natural parks, a state aquatic preserve, a national wildlife refuge, and a wetland habitat preserve. Everglades National Park is recognized as a UNESCO World Heritage Site and an International Biosphere Reserve and supports a unique array of ecosystems and wildlife. Biscayne National Park, located directly adjacent to Turkey Point, is one of our largest marine national parks, and home to incredible biodiversity and important marine and wetland habitat. These natural areas offer critical protection to sensitive ecosystems, wildlife, and unique habitat and support the local economy through recreational opportunities, tourism and the provision of ecological goods and services. Biscayne and Everglades National Parks alone generate nearly $200 million of economic output from 1.6 million annual visitors. According to the standards of the Nuclear Regulatory Commission ("NRC"), "sites adjacent to lands devoted to public use may be considered unsuitable," and unacceptable impacts are "most apt to arise in areas adjacent to natural resource-oriented areas."1 [Footnote 1: U.S. Nuclear Regulatory Commission, Regulatory Guide 4.7- General Site Suitability Criteria for Nuclear Power Stations, Revision 2, 1998, Section C.] According the NRC's own standards, Turkey Point should not be expanded due to the potential for unacceptable impacts to the ecological health and economic viability of surrounding protected areas. (**0253-2** [Bloom, Justin] [Campbell, Cara] [Causey, Charlie] [Cavros, George] [Chenoweth, Mike] [Daly, Meg] [England, Margaret] [Fuller, Manley] [Jones, George L.] [Keller, Alan] [Martin, Drew] [McLaughlin, Caroline] [Reynolds, Laura] [Silverstein, Rachel] [White, Paton] [Williams, Elinor])

Comment: Turkey Point is located directly on the shores of Biscayne National Park, one of our country's largest marine national parks, and home to incredible biodiversity and important marine and wetland habitat. The plant is located within six miles of two national parks, a state aquatic preserve, a national wildlife refuge, and a wetland habitat preserve. Biscayne and Everglades National Parks alone generate close to $137 million in local revenue due to 1.6 million visitors per year, as of 2014. According to the standards of the Nuclear Regulatory Commission (NRC), "sites adjacent to lands devoted to public use may be considered

unsuitable," and unacceptable impacts are "most apt to arise in areas adjacent to natural-resource-oriented areas."[1] [Footnote[1] Text: U.S. Nuclear Regulatory Commission, Regulatory Guide 4.7- General Site Suitability Criteria for Nuclear Power Stations, Revision 2, 1998, Section C.] In following the NRC's own standards, we advise against moving forward with the project as proposed due to the potential for unacceptable impacts on the ecological integrity and economic viability of the surrounding protected natural areas. (**0254-2** [Dudley, Dwight] [Lerner, Cindy] [Regalado, Tomas] [Stoddard, Philip K.])

Comment: Please choose to protect Biscayne National Park's incredible wetland and marine habitats from the threat of nuclear expansion. Expanding a nuclear power plant directly on the shores of Biscayne National Park--in an area vulnerable to sea level rise--will have serious environmental consequences! The NRC and the Corps must ensure that future plans for Turkey Point protect our national parks, water supply, and public health. (**0258-5** [Field, Fran])

Comment: THE PROPOSED EXPANSION IS NOT JUST IMPRUDENT FOR THE PARK AND HENCE THE PEOPLE OF THE COUNTRY AS A WHOLE, IT IS SIMPLY ANOTHER GREED-INSPIRED ATTEMPT AT DEVELOPING AN AREA WHICH IS CRUCIAL TO THE SURVIVAL OF MANY ENDANGERED SPECIES. (**0261-1** [Chirillo, James])

Comment: The two fold increase in the population density of Miami-Dade County over the last 40 years to approximately 2,500,000. people, coupled with the growing recognition of the value and need for preservation and protection of the fragile and irreplaceable natural resources that surround the plant, require serious reconsideration of this location for Nuclear Power generation. (**0263-3** [Orzechowicz, Holly])

Comment: According to the Nuclear Regulatory Commission's own regulations, "sites adjacent to lands devoted to public use may be considered unsuitable," and unacceptable impacts are "most apt to arise in areas adjacent to natural-resource-oriented areas." Within six miles of the proposed expansion site, there are two national parks, an aquatic preserve, a national wildlife refuge, and a wetland habitat preserve. In following the NRC's own guidelines, the expansion of Turkey Point could have unacceptable and irreversible impacts on these treasured sites. (**0277-1** [Mendelsohn, Alex])

Comment: This is the exact definition of being "adjacent to lands devoted to public use," making the site unsuitable, and "adjacent to natural-resource-oriented areas," making the impacts of the expansion of Turkey Point, which could well be irreversible, unacceptable. (**0278-1** [Fass, Amy])

Comment: Perhaps nuclear power plants should be taken elsewhere away from our U.S. National Parks. An idea for relocation is Antarctica or the Arctic Circle. (**0300-1** [Van Pelt, Jason])

Comment: Nuclear expansion can and should be viewed positively as something we can harness for the good of humankind. Nonetheless anything nuclear must be kept far away from National Parks of The United States of America. (**0300-3** [Van Pelt, Jason])

Comment: This goes far beyond the discussion of whether nuclear power is the right or wrong choice at this point in time, said Matthew Schwartz, executive director at South Florida Wildlands Association. Biodiversity in the ecosystem surrounding the existing Turkey Point plant is second to none. This is absolutely the wrong location for a massive new engineering project of this scale. (**0349-3** [Oliva, Vivian])

Comment: The Everglades and Biscayne Bay are one of only one place like this all over the world. Though I realize the importance of the power needed I do think the Commission needs to look at the overall picture. (**0352-1** [Tingle, Peggy])

Comment: why would FPL need to expand a nuclear plant at all in such a sensitive marine park and eco zone? There is a state-managed aquatic preserve, expansive wetland habitat preserve, two national parks and a national wildlife refuge all within six miles of the proposed site. (**0353-2** [Royce, M.])

Comment: Marine parks and huge nuclear plants simply dont go together. Important natural resources would be in serious jeopardy. I'll let the experts explain further the dangers to wildlife and the population, as well as ecotourism. (**0353-6** [Royce, M.])

Comment: There are a state-managed aquatic preserve, expansive wetland habitat preserve, two national parks and a national wildlife refuge all within six miles of the proposed site. (**0356-13** [Shlackman, Jed])

Comment: This goes far beyond the discussion of whether nuclear power is the right or wrong choice at this point in time, said Matthew Schwartz, executive director at South Florida Wildlands Association. Biodiversity in the ecosystem surrounding the existing Turkey Point plant is second to none. This is absolutely the wrong location for a massive new engineering project of this scale. (**0356-7** [Shlackman, Jed])

Comment: Turkey Point is on the shoreline and adjacent to Biscayne National Park, one of the nations largest marine parks famous as an ecotourism destination and teeming with wildlife, said Jaclyn Lopez, Florida director at the Center for Biological Diversity. But with two new reactors, Turkey Point would become one of the largest nuclear facilities in the country. Marine parks and huge nuclear plants simply dont go together. Important natural resources would be in serious jeopardy. (**0356-8** [Shlackman, Jed])

Comment: I strongly oppose the building of any new nuclear reactors in or near Biscayne Bay. (**0360-1** [Palmer, Majorie])

Comment: The two nuclear plants are poorly placed because the massive new reactors are adjacent to Biscayne National Park-one of the nation's largest marine parks. (**0366-2** [Griffith, Ed and Harriet])

Comment: Within just six miles of the proposed site there are a state-managed aquatic preserve, expansive wetland habitat preserve, two national parks and a national wildlife refuge. (**0366-6** [Griffith, Ed and Harriet])

Comment: There are a state-managed aquatic preserve, expansive wetland habitat preserve, two national parks and a national wildlife refuge all within six miles of the proposed site. (**0370-12** [Vayu, Satya])

Comment: But building reactors in a place like this is even more outrageous. Biodiversity in the ecosystem surrounding the existing Turkey Point plant is second to none. This is absolutely the wrong location for any massive new engineering project of this scale. Turkey Point is on the shoreline and adjacent to Biscayne National Park, one of the nations largest marine parks famous as an ecotourism destination and teeming with wildlife. Marine parks and huge nuclear plants simply dont go together. (**0370-6** [Vayu, Satya])

Comment: So what do they suggest instead-let's do more environmental harm to south Florida & the Everglades, because Tallahassee says we can. Miami-Dade, Coral Gables & Pinecrest governments all disapprove of this, the residents disapprove of this, and somehow that doesn't matter. (**0372-4** [Ortiz, Natalia])

Comment: I have just read my email about the proposed Nuclear site near Biscayne Bay and Florida Everglades. I am not sure where the decision making is, but that is totally the wrong site. We in Florida have been fighting the preservation of both our National Parks here in South Florida for years. I am asking you to please choose another site, This operation will totally ruin those Parks . Both Parks are a lifeline for our coastal and freshwater birds and animals, which certainly will suffer as will our tourism. Florida has been fighting for years to save our "River of Grass" Please reconsider your choice. (**0376-1** [Headley, Linda])

Comment: Within six miles of the proposed expansion site, there are two national parks, the Everglades and Biscayne, an aquatic preserve, a national wildlife refuge, and a wetland habitat preserve. This area is also extremely vulnerable to sea level rise and the impacts of climate change. Turkey Point was never a "good" site to develop an expansive power plant; decades later it is only more clear that this is a wholly unacceptable location. (**0379-3** [Commenters, Multiple])

Comment: ABSOLUTELY NO NUCLEAR PLANTS, OLD OR NEW, NEAR NATIONAL PARKS IN USA!!! (**0396-1** [Melby, George M.])

Comment: I am astonished and appalled that a nuclear plant would be put in a National Park. This is an OUTRAGE and is UNacceptable!! (**0405-1** [Macy, Michelle])

Comment: Within six miles of the proposed expansion site, there are two national parks, an aquatic preserve, a national wildlife refuge, and a wetland habitat preserve. In following the NRC's own guidelines, the expansion of Turkey Point will have unacceptable and irreversible impacts on these treasured sites. (**0413-3** [Cobb, Tanya])

Comment: I am all for building more nuclear power plants, but not in this location due both to its proximity to the Biscayne National Park and susceptibility to rising water and flooding. (**0418-1** [Goldstein, Louis])

Comment: When are people going to realize that public lands are not meant for private for profit companies, especially at the cost of the environment. (**0420-1** [Revord, Michael])

Comment: I also approve of the use of clean renewable energy resources and have nothing against Nuclean Power per se; however, additional nuclear power plants in the sensitive area of Turkey Point is not a good idea. It may even be a very dangerous idea. Think about this. (**0421-1** [Malpass, Betsy])

Comment: According to the Nuclear Regulatory Commission's own regulations, "sites adjacent to lands devoted to public use may be considered unsuitable," and unacceptable impacts are "most apt to arise in areas adjacent to natural-resource-oriented areas." Which part of these regulations are considered unimportant? Why are they unimportant? (**0437-1** [Livingston, C. J.])

Comment: Clarify Rationale for Selecting Turkey Point as the New Reactor Site. The DEIS outlines the legal framework for the alternative site selection process and describes some of the criteria used in selecting the final site for the new reactors. The site selection criteria included: •Avoidance of high-population areas, •Avoidance of ecologically sensitive and special

designation areas, •Avoidance of special dedicated land uses (e.g., national parks), •Proximity to target transmission/load centers, •A minimum size of 5,000 acres, etc. At first glance, the Turkey Point site does not rate highly on these measures. The site itself is within 25 miles of Miami, the densest population center in Florida and the second most populous city in the state. Likewise, the site is sandwiched between two national parks and sits atop the Biscayne Aquifer, the sole source of drinking water for most of Miami-Dade and Broward Counties. Instead, the text of the DEIS suggests that Turkey Point was chosen as the site for the new reactors primarily to satisfy the company's business objectives. The DEIS states: Of the original 21 potential sites FPL selected the top 8 ranked sites, and **even though they ranked below these 8 sites**, FPL also retained the Turkey Point and St. Lucie sites "based on the fact that they are existing, operating nuclear power plant sites within the ROI," and FPL's determination that the sites fall within "the special case (described above) for licensed nuclear power plant sites." DEIS at 9-39. The DEIS goes on to conclude that "FPL selected the Turkey Point site as its proposed site based on this ranking and its determination that the site was the preferred site for meeting FPL's overall business objectives." DEIS at 9-40. (**0456-3** [Miami, City])

Comment: Comment 1: The final Environmental Impact Statement should clarify the Nuclear Regulatory Commission's assessment of the site selection analysis conducted by FPL. Tables 9.3-5 and 9.3-6 of FPL's Environmental Report compare Turkey Point with the alternate sites across a range of criteria. As noted above, the DEIS describes some of these criteria. Within Table 9.3-6, entitled "Candidate Site Rankings," the Technical Analysis Composite Rating/Score for each candidate site is compared against several categories, all of which appear to be given equal weight. These categories included land acquisition, site layout, public acceptance, and political considerations. However, the score that matters most within this framework, the reliability of electrical generation, is also the metric on which Turkey Point scored the lowest compared to all alternative sites. Generating additional and reliable baseload power is the primary motivation for constructing the additional reactors. Hence, the final Environmental Impact Statement, as a decision-making tool, should clarify the rationale for proceeding with the Turkey Point site despite the low score on reliability of electrical generation. (**0456-4** [Miami, City])

Comment: Comment 2: The final Environmental Impact Statement should expand its discussion of the criteria that make Turkey Point a suitable site in comparison to the alternatives considered by FPL. As noted above, the Turkey Point site does not appear to rate highly on many of the site selection criteria specifically mentioned in the DEIS. From the City's perspective, Turkey Point is a poor site for the placement of two nuclear reactors that will presumably operate for the majority of the 21st Century. Turkey Point's proximity to large population centers, two national parks, the comparably few evacuation routes available to nearby residents, its location atop a single source aquifer, and the site's vulnerability to extreme storm surges are only the most obvious reasons to question FPL's choice. (**0456-5** [Miami, City])

Comment: In contrast, the Glades alternative site is: Located further from major population centers, Would experience fewer impacts from sea-level rise or extreme storm surge, Near only a small portion of Big Cypress National Preserve, Could draw its cooling water from a groundwater source that is generally not used for other purposes due to the salinity of that water. DEIS at 9-57. The primary drawbacks to placing the reactors at this site appear to be that it would impact unique farmland and it would require a variance from the local comprehensive plan. DEIS at 9-53 and 9-55. Compared to the problems presented by operating additional reactors near the critical and protected ecosystems at Turkey Point, these issues seem minor. Therefore, the final Environmental Impact Statement would benefit from an expanded

discussion of the criteria that led to Turkey Point's selection as the final site for the new reactors. (**0456-7** [Miami, City])

Comment: Comment 3: The final Environmental Impact Statement should expand the site selection scoring criteria to include sea-level rise resilience. Extreme storm surges made possible by sea-level rise and intense storms can affect saltwater intrusion into groundwater resources, thereby affecting the regional availability of freshwater. There are obvious safety implications for storm surges near the reactor site as well. For these reasons, resilience against problems associated with sea-level rise should be incorporated into the site selection scoring criteria. (**0456-9** [Miami, City])

Comment: All questions of whether or not we should have more nuclear power aside, why by Biscayne National Park. Just tell them no. (**0471-1** [Manter, Larry])

Comment: As retirees, Jan and I travel frequently, and our interest centers on national parks and historic sites. The site proposed for expansion is located directly on the shores of Biscayne National Park in an area that is extremely susceptible to sea level rise and the impacts of climate change. (**0485-1** [Blair, Dan])

Comment: Certainly there is a better place to put this (or not put it anywhere) where precious wildlife, the environment and humans won't be affected. (**0486-1** [Douglas, Carolyn])

Comment: I am not against nuclear power. However, construction of nuclear power plants next to National Parks is not good policy. (**0512-1** [Grill, Brock])

Comment: I live across the street from the Everglades National park and moved here for the beauty and naturalness of this place. I grow organic like many of my neighbors and do not support nuclear power in a place like this for obvious reasons. Whether I live here or not, I care about the earth, and you should too! Waters, wildlife and opportunities for exploration. (**0519-1** [Togati, Joanne])

Comment: I frequent and enjoy our national parks; they preserve our country's incredible landscapes and waters, wildlife and opportunities for exploration. (**0522-1** [Routh, Jeffrey])

Comment: Two of South Florida's most important public lands and wildlife habitats -Biscayne and Everglades National Parks -will be put at risk and be forever changed by a project of this scale. (**0537-2** [Anonymous, Judi])

Comment: We need to stop and think about the consequences of our actions on our delicate environment here in South Florida. (**0537-7** [Anonymous, Judi])

Comment: Like so many Americans, I am committed to protecting the National Park System, which preserves our country's incredible array of landscapes, waters, wildlife, and opportunities for exploration. Biscayne National Park is an irreplaceable national treasure that safeguards precious natural resources and recreational opportunities. According to the Nuclear Regulatory Commission's own regulations, "sites adjacent to lands devoted to public use may be considered unsuitable," and unacceptable impacts are "most apt to arise in areas adjacent to natural-resource-oriented areas." Within six miles of the proposed expansion site, there are two national parks, an aquatic preserve, a national wildlife refuge, and a wetland habitat preserve. In following the NRC's own guidelines, the expansion of Turkey Point could have unacceptable

and irreversible impacts on these treasured sites. ***Take note of your own regulations and adhere to them Now!!! (**0540-3** [Burge, Laura])

Comment: I am against building a nuclear plant in Biscayne Bay! I think it could destroy habitat and fish and wildlife and maybe people. I understand FPL is trying to update but let's not kill my favorite park! (**0549-1** [Allison, Noreen])

Comment: Like so many Americans, I am committed to protecting the National Park System, which preserves our country's incredible array of landscapes, waters, wildlife, and opportunities for exploration. Biscayne National Park is an irreplaceable national treasure that safeguards precious natural resources and recreational opportunities. According to the Nuclear Regulatory Commission's own regulations, "sites adjacent to lands devoted to public use may be considered unsuitable," and unacceptable impacts are "most apt to arise in areas adjacent to natural-resource-oriented areas." Within six miles of the proposed expansion site, there are two national parks, an aquatic preserve, a national wildlife refuge, and a wetland habitat preserve. In following the Nuclear Regulatory Commission's own guidelines, the expansion of Turkey Point could have unacceptable and irreversible impacts on these treasured sites. "Every man who appreciates the majesty and beauty of the wilderness and of wild life, should strike hands with the farsighted men who wish to preserve our material resources, in the effort to keep our forests and our game beasts, game-birds, and game-fish--indeed, all the living creatures of prairie and woodland and seashore--from wanton destruction. Above all, we should realize that the effort toward this end is essentially a democratic movement." --Theodore Roosevelt (**0555-2** [Lish, Christopher])

Comment: Save the parks. (**0587-1** [Glasshof, Wendy])

Comment: Because the site designated for this expansion is on the shores of Biscayne National Park, this seems an unwise location for a nuclear operation. (**0588-2** [Hanna, Jane])

Comment: I treasure our National Parks and am grateful for the wisdom of past leaders who insured these special areas would be here for generations to come. The very suggestion that the Biscayne National Park would be put at risk by the expansion of Turkey Point doesn't make any sense. We must not continue to supply our power by nuclear means and certainly not in ecologically sensitive and incredibly special ecological areas. (**0588-3** [Hanna, Jane])

Comment: In adjacent areas are other sites that need protection, another res;possible reason that the Turkey Point site be closed rather than expanded. For far too numerous reasons this plan would threaten many environmentally sensitive areas, this expansion must be prevented. I urge your support for my concerns. Once an area is destroyed, it cannot be resurrected. (**0588-4** [Hanna, Jane])

Comment: We have serious concerns that the proposed expansion of FPL's Turkey Point could significantly impact and degrade the health of our national parks, sensitive ecological areas including extensive wetlands, federally listed threatened and endangered wildlife, and the quality and quantity of limited fresh water resources. We request that both agencies support the "No Action" alternative in reference to Docket ID: NRC-2009-0337. (**0592-12** [Brexel, Sr., Charles])

Comment: There are many reasons why Turkey Point is a terrible location. There are sensitive national parks (Everglades and Biscayne), a wildlife refuge and sensitive wetland habitats very close to the site. (**0594-1** [Rapuano, Shannon])

Comment: It is of course rather unusual to have a nuclear power plant right on the border of a national park. But as I understand it, the plant was there first, and it was necessary to work with the existing situation when establishing Biscayne National Park. Because of this, there is no justification in using the existing plant as a justification for adding more nuclear plants. (**0605-1** [Mundhenk, Norm])

Comment: Glades, Martin, Okeechobee, and St. Lucie were evaluated as alternative sites for nuclear stations. The NRC staff concluded that all of these alternative sites were generally comparable, and that it would be difficult to state that one site is preferable to another, from an environmental perspective. The DEIS then concludes that the Turkey Point site prevailed because "none of the alternatives is environmentally preferable to the proposed site, " (page xxxvii). We also note that the proposed islands for Units 6 and 7 would be elevated 20-25 feet, in order to decrease the risk of flooding from hurricanes and other weather events that are prone to occur in this area. ***Recommendations:*** Given the environmental concerns at the Turkey Point site, particularly regarding the Biscayne sole source aquifer, public drinking water supply well concerns, hypersalinity and radionuclide migration issues, proximity of two national parks, Biscayne Bay Aquatic Preserve, and the issues described in EPA's Section 404 CWA comment letters in addition to the other issues detailed above, the reason for the environmental preference for the Turkey Point site is unclear. The FEIS states that the alternative locations are generally comparable. Therefore, it is unclear why the Turkey Point site is preferred. The FEIS should further clarify and document the rationale that was used, particularly regarding evaluation of viewshed issues and operational analyses. (**0617-4-14** [Mueller, Heinz J.])

Comment: Our legislators delegate hundreds of millions of dollars to help recover the Everglades. This project of adding new nukes could set the recovery effort back substantially. Floridians don't want more pollution for the Everglades and Biscayne Bay area. (**0621-2** [Datz, Amy])

Comment: Future plans for Turkey Point must protect our national parks, water supply, and public health. (**0629-1** [Borie, Edith])

Comment: Two of South Florida's most important public lands and wildlife habitats are Biscayne and Everglades National Parks. i urge you not to allow this project in this particular location to go forward. (**0637-1** [Smoller, Merry Sue])

Comment: An increase of these two reactors will negatively impact these two national parks. Siting of these two new reactors violates the requirement that National Park proximity be taken into account during this evaluation. (**0641-11** [Martin, Drew])

Comment: This project is too close to Biscayne Bay and Biscayne National Park. It is also too close to the Everglades, another incredibly unique place that is a national treasure. (**0654-2** [Guy, Sharon])

Comment: Please review your plans and ensure the future of this area as a natural as mother nature can provide. (**0668-1** [Garey, Jenne])

Comment: This goes far beyond the discussion of whether nuclear power is the right or wrong choice at this point in time, said Matthew Schwartz, executive director at South Florida Wildlands Association. Biodiversity in the ecosystem surrounding the existing Turkey Point plant is second to none. This is absolutely the wrong location for a massive new engineering project of this scale. Turkey Point is on the shoreline and adjacent to Biscayne National Park, one of

the nations largest marine parks famous as an ecotourism destination and teeming with wildlife, said Jaclyn Lopez, Florida director at the Center for Biological Diversity. But with two new reactors, Turkey Point would become one of the largest nuclear facilities in the country. Marine parks and huge nuclear plants simply dont go together. Important natural resources would be in serious jeopardy. (**0676-4** [Kassel, Kerul])

Comment: There are a state-managed aquatic preserve, expansive wetland habitat preserve, two national parks and a national wildlife refuge all within six miles of the proposed site. (**0676-9** [Kassel, Kerul])

Comment: Nuclear power plants do not belong adjacent to ANY Natioonal Park! (**0681-1** [Whitehorn, C.])

Comment: Please, let's have some areas that are wild and safe from human destruction. Let's not put toxic nasty stuff near our national parks. (**0682-1** [Neff, Victoria])

Comment: Florida does need to cut its dependence on fossil fuels, but nuclear power plants are not the correct alternative for us, particularly not in such proximity to natural parks and the relatively wild land and wildlife they shelter. (**0693-4** [Dorn, Kathryn])

Comment: This project is slated for one of the most environmentally delicate areas in FL. (**0704-1** [Ferry, Lisa])

Comment: No additional reactor next to Biscayne Bay! One is enough!! (**0711-1** [Anonymous, Anonymous])

Comment: Two of South Florida's most important public lands and wildlife habitats -Biscayne and Everglades National Parks -will be put at risk and be forever changed by a project of this scale. (**0712-4** [Almer, Anessa])

Comment: One must really question the wisdom of a corporation, a federal agency or a process that would allow for the construction of two nuclear reactors here: [FIGURE - Turkey Point aerial] (**0716-8** [Riccio, Jim])

Comment: I want to agree with Caroline McLaughlin of the MPCA, in which she said about the location. Although I'm not anxious to see it move to a different location, I do think that part of the requirement of the EIS is to look at the location as the two national parks. So I do think that that needs to be considered. (**0721-13-3** [Martin, Drew])

Comment: One of the elected officials spoke earlier said, this is just the wrong place. This is not the place to be building this type of a way of generating electricity. (**0721-22-17** [Schwartz, Matthew])

Comment: Turkey Point's neighborhood includes the Biscayne National Park, and four other parks, wildlife, and nature preserves, habitats and refuges. This is an extremely sensitive, irreplaceable, and bio-diverse area which could be devastated by even tiny amounts of Uranium 235 fuel, Plutonium, and other deadly toxic substances used in and generated by nuclear plants. (**0721-28-8** [Wilansky, Laura Sue])

Comment: Finally, the EIS fails to seriously consider the superior rated alternate sites for the placement of the two new plants. Sites which were located in areas significantly less vulnerable to sea level rise, storm surge, as the location of Turkey Point is, and with nowhere near the

dense urban population. In fact, they are mostly rural areas. There would be no competition for the water as we are currently facing it. The determination of the alternate sites appears to be highly subjective. The Statement fails to adequately provide facts specific comparative analysis on the rationale for excluding the alternate sites as environmentally preferable. Neither of those sites are located in the vulnerable coastal location. Neither are located in the middle of two national parks, and neither would impact a sole drinking source for more than 4 million Floridians. (**0721-3-4** [Lerner, Cindy])

Comment: [These issues are dwarfed by] placement between two national parks and in proximity to other vital public lands and aquatic areas[.] (**0721-32-5** [Schlackman, Mara])

Comment: Upgrades in other nuclear plant locations would jive better next to interior lakes than next to the ocean or the Bay, like in Turkey Point. Serious consideration really needs to be given to alternate sites based on location alone. (**0721-5-5** [Mendez, Victoria])

Comment: First of all, I think my major message here is, I believe this is the wrong location for this. It's the wrong location. Number one, environmental concerns. This is going to be located between Biscayne National Park and Everglades National Park. These are two jewels in our National Park Service. If somebody thought about placing a nuclear reactor next to the Statue of Liberty or Lincoln Memorial, people would all say, put it somewhere else, this is not where you want to put it. Well, in terms of National Parks, the Everglades and Biscayne National Parks are the same thing. It's the wrong location. We shouldn't even be discussing this. It's just not the place to put this. (**0721-7-1** [Edmond, Gabriel])

Comment: And, again, this is the wrong place to put this reactor. It's not the right place to put this. (**0721-7-5** [Edmond, Gabriel])

Comment: [It's] located in one of the nation's most vulnerable areas to sea level rise, on the shores of Biscayne National Park. Biscayne is our nation's largest marine park and a home to incredible bio-diversity, important wetland and marine habitats, and countless opportunities for recreational and educational opportunities. (**0721-9-2** [McLaughlin, Caroline])

Comment: According to the NRC's own regulations, locating a nuclear power plant next to public lands designed to protect valuable wildlife and habitat can have unacceptable impacts. There is a State aquatic preserve, two national parks, a wetland habitat preserve and one national wildlife refuge, located within six miles of the proposed site. One would be hard pressed to find a worse location to build two new nuclear units, especially considering that the construction and the operation of the proposed reactors could have serious impacts on these sensitive ecological areas. (**0721-9-3** [McLaughlin, Caroline])

Comment: According to the NRC's own regulations, locating a nuclear power plant next to public lands that are designed to protect valuable wildlife habitat can have unacceptable impacts. There is a State aquatic preserve, two national parks, a wetland habitat preserve and one national wildlife refuge located within six miles of the proposed site. We would be hard pressed to find a worse place to build two nuclear units, especially considering the severe potential impacts that this could have on these fragile ecological areas. (**0723-4-4** [McLaughlin, Caroline])

Response: *Regarding the proposed site's proximity to National Parks and other public use features, commenters noted language from NRCs Site Suitability guidelines "Sites adjacent to lands devoted to public use may be considered unsuitable…{emphasis added}". The NRC's*

regulations applicable to an applicant's site screening process, 10 CFR Part 100, "Reactor Site Criteria," do not require that such a consideration be applied as an exclusionary screening criterion. Regulatory Guide 4.7 also notes that the context for evaluating impacts must be considered. However, the acceptability of sites for nuclear power stations at some future time in these areas would depend on the existing impacts from industrial, commercial, and other developments.

The NRC's consideration of Everglades and Biscayne National Parks, National Wildlife Refuges, aquatic preserves, and their associated ecosystems, and recreational users involved two basic steps. Using guidance in the Environmental Standard Review Plan (NUREG-1555), Section 9.3, the NRC first independently evaluated FPL's screening process to determine whether the screening process adequately implemented the site suitability requirements for nuclear power stations as defined in 10 CFR Part 100, "Reactor Site Criteria". Next the NRC considered the cumulative impacts that would occur at the Turkey Point site and compared those cumulative impacts to those that would result from construction and operation of two nuclear units at the alternative sites.

In its screening process from the region of interest to candidate areas, FPL excluded from consideration areas within (1) the boundaries of critical habitats for endangered species, (2) dedicated lands such as National Parks and Recreation Areas, (3) census block groups with population density > 300 persons per square mile, and (4) areas too distant from available cooling water. In subsequent screening steps, FPL applied additional environmental, population, and engineering criteria to its site selection process to narrow the range of alternatives sites to a suite of sites that were representative of the licensable alternatives within FPL's service territory. As documented in Section 9.3.1.7 of the EIS, the NRC staff evaluated the methodology used by FPL and concluded that the process was reasonable and consistent with the applicable regulations and guidelines. FPL conducted an adequate site selection study and chose Turkey Point as its proposed site. The review team found that the systematic alternative siting analysis demonstrated a logical selection process and application of screening and exclusionary siting criteria. The analysis enabled the evaluation of the likely environmental impacts associated with the respective sites, including the evaluation of suitability criteria, identified reasonable alternative sites, and clearly provided the mechanism for selection of the final proposed site.

Following its review of this site screening determination, the NRC -- in its independent review, as documented in Section 9.3 of this EIS – first assessed the cumulative impacts that would occur at each of the alternative sites. The cumulative impact analyses combine the impacts of a proposed action with those that have already occurred in the past and present, or may occur in the foreseeable future. As discussed in Section 9.3, these cumulative impact analyses considered impacts such as, but not limited to, land use, surface and ground-water, terrestrial and aquatic ecology, threatened or endangered species and their associated critical habitats, wetlands, recreational, visual, historic and cultural resources, and social and economic impacts.

As a part of the evaluation of cumulative impacts, Appendix I of the EIS documents the review team's consideration of the potential changes in impacts that may occur as a result of the changes in the environment resulting from global climate change including sea-level rise. The changes that were considered include potential changes in temperature, rainfall, and occurrence of severe weather events. The effects of sea-level rise were also considered in this analysis. The potential effects of climate change on resource areas including water and ecology are presented in the appropriate sections of Chapter 5 and the cumulative impacts in Chapter

7. In addition, in its evaluation of alternative sites, the NRC staff would only consider sites that appear to be licensable; i.e., sites for which it appears to be reasonable to expect that the applicant could obtain the necessary licenses and permits from the NRC and other agencies. The safety of the proposed site (including consideration of sea-level rise, storm surge, etc.) will be addressed in the staff's safety evaluation report. The site would not be licensed by the NRC unless the staff determines that it meets the NRC's safety requirements.

As documented in Section 9.3.6, and in Table 9-28, the NRC then undertook a site-by-site comparison of the cumulative impacts at the alternative sites with the cumulative impacts at the Turkey Point site to determine if any of the alternative sites were environmentally preferable to the proposed site. The NRC's review process used reconnaissance-level information to determine whether there were environmentally preferable sites among the alternative sites; however, none of the alternative sites proved to be environmentally preferable to the proposed Turkey Point site. No change was made to the EIS as a result of these comments.

Comment: DEIS Subsection 9.3.1.3, Page 9-37, Lines 2-3: The DEIS states: "...an internal FPL team was canvassed to identify known available sites **within the 16 candidate areas**." ER Subsection 9.3.2.3.1 states: "Functionally, the canvassing was conducted at an August 2006 meeting...The committee was polled to identify the full spectrum of known existing and available sites "**within or near the FPL service territory**." (emphasis added) (**0619-5-14** [Maher, William])

Comment: DEIS Subsection 9.3.1.5, Page 9-39, Lines 18-28: The DEIS section title is "Selection of **Alternative Sites**". Further, the DEIS states: "The resulting five **alternative sites** proposed by FPL..." In both instances, the term "Alternative Sites" should be changed to "**Candidate Sites**" consistent with ER Subsection 9.3.2.5, Identification of Candidate Sites, and terminology in NUREG-1555 where candidate sites include the proposed and alternative sites. (emphasis added) (**0619-5-16** [Maher, William])

Comment: DEIS Subsection 9.3.4.5, Page 9-179, Lines 5-7: The DEIS states, "... after widening of **SR-710**." "SR-710" should be changed to "**SR 70**" consistent with ER Subsection 9.3.3.3.6.5 which states: "To facilitate the additional traffic, a portion of SR 70 could be widened to a four-lane highway..." (emphasis added) (**0619-5-18** [Maher, William])

Response: *The text in the Alternative Sites subsection of Section 9.3 was corrected to reflect the noted inconsistency with the referenced material.*

Comment: DEIS Subsection 9.3.1.4, Page 9-38, Line 3 and DEIS Subsection 9.3.1.4, Page 9-39, Lines 6-7: On page 9-38 of the DEIS, the DEIS section title is "Selection of Candidate Sites". On page 9-39, the DEIS states: "The resulting 10 **candidate sites** were: ..." In both instances, the term "Candidate Sites" should be changed to "**Primary Sites**" consistent with ER Subsection 9.3.2.4, Identification of Primary Sites. (emphasis added) (**0619-5-15** [Maher, William])

Response: *The text was revised to be consistent with the terminology as defined in Regulatory Guide 4.2.*

Comment: DEIS Section 1.4, Page 1-10, Lines 27-28: The DEIS states: "Using this process, FPL reviewed multiple sites and identified **23 candidate sites**...from which the alternative sites were selected." This is not consistent with page 9-37 of the DEIS, Subsection 9.3.1.3, **Selection of Potential Sites**, which states: "Through this process, FPL identified 6 additional greenfield sites to consider as potential sites for a total of **21 potential sites** as identified on Figure 9-4." In both instances, the DEIS cites FPL 2014-TN4058, FPL's ER. The evaluation in FPL's ER is

based on the reference: Florida Power & Light Company Turkey Point 6 & 7, New Nuclear Power Generation (Formerly Project Bluegrass) Augmented Site Selection Study Report, August 2011. Section 4.0, Identification of Potential Sites, of this reference, states: "Cumulatively, a total of **21 potential sites** were identified". (emphasis added) (**0619-3-2** [Maher, William])

Response: *The text in the Alternative Sites subsection of Section 1.4 was corrected to reflect the noted inconsistency with the referenced material.*

E.2.27 Comments Concerning Benefit-Cost Balance

Comment: FPL should be denied a license for Turkey Point expansion for many reasons:...3. Bad Deal. Nuclear Cost Recovery law makes ratepayers bear the cost and risk while FPL reaps profit (**0022-3** [Read, Alice Gray])

Comment: Is this a matter of jeopardizing the public's safety due to economic savings on FPL part? If so, pass it on to the customers. (**0333-5** [Anonymous, Anonymous])

Comment: The estimated cost to build the two reactors is $25 billion. That comes out to $5500 for each FP&L utility customer, which will be paid by raising utility rates. In 2014, the State of Florida approved FP&L to begin charging utility customers for the reactors which are in the design stage. They also passed legislation saying if the reactors are not finished FP&L doesn't have to pay back the money. FP&L has said they can construct the nuclear reactors and start generating power in ten years. After the plants begin producing electricity, FP&L will charge an average of $1.25 billion each year to their 4.5 million utility customers. This amount factors in shut downs for maintenance and refueling every 18-24 months. The $1.25 billion annual charges will continue for 40 years which is the average lifespan of the reactors, equaling $50 billion. That comes out to an additional $11,000 for each FP&L customer. This of course does not include the future costs for disassembling the equipment and disposing of the nuclear waste once the reactors are too old to be repaired. (**0671-1-2** [Post, Patrick])

Comment: The economics are too costly and the burden will fall on ratepayers to foot the bill with increased rates. (**0710-5** [Platt, George Seth])

Comment: Now, the proposed nuclear reactors are already raising monthly customer utility rates by virtue of a State law passed in 2006 that Representative Rodriguez alluded to. That law essentially shifts a financial risk of constructing the plants from the company's shareholders to the company's customers, and the customers are paying in advance for this project. It should also be noted that the net cumulative fuel savings of the project, extolled by FP&L as the prime benefit for this project, will not be realized by customers until 25 to 36 years from today, assuming the project is built at all. So this practically means that a 70-year old FPL customer today may not break even on the project, if at all, until the customer is 106 years old. (**0721-8-6** [Cavros, George])

Response: *The purpose of the EIS is to disclose the potential environmental impacts of constructing and operating the proposed Units 6 and 7, and the associated costs and benefits related to those impacts. Setting retail power rates is outside the NRC's regulatory purview; those determinations are the responsibility of the FPSC. The EIS was not modified as a result of these comments.*

Comment: fp&l does its customers and more importantly its shareholders a disservice by proposing such an expensive proposition. (**0055-5** [Roedel, Kitty])

Comment: When the Turkey Point expansion was first proposed, the projected cost was about $7 billion. The latest projections are $20 billion. Nuclear expansion might make sense for FPL's shareholders but it doesn't for us. That's right. (**0088-5** [Lange, Alexandra])

Comment: We are totally opposed to the expansion of nuclear generated energy at Turkey Point -- for the following reasons.....2) Too expensive (**0129-2** [Mayer, Doug])

Comment: We do not know how much money has been collected already and how much more is needed. Who will pay for this? Miami, Miami-Dade County, some cities, the State? What will it cost? What is the construction timetable? 2 years or more? US1 is a MAJOR thoroughfare with many businesses on it. Who benefits? What is the benefit to us? Who does it serve? Who is going to make money on this? In what other cities in Florida, the United States, the world is this existing? What did it cost? Who paid for it? Has research been done and if so share it.! (**0149-10** [Nelson, Joyce E.])

Comment: The extra expenses associated with nuclear safety and waste handling are making this option less practical, even if it wasn't risking "nuking" the local environment, so to speak. (**0265-1** [Bennett, Robbie])

Comment: Stop pushing dangerous nuclear energy solutions that cost billions of dollars and are a catastrophe waiting to happen. (**0291-2** [Vorachek, Mary])

Comment: It will also be a tremendous economic cost to FPL's ratepayers, who must bear the cost in the form of advance payments (since the capital markets will not finance new nuclear reactors) with little or no benefits (example: the Crystal River nuclear plant fiasco). (**0599-1** [Rock, Andrew])

Comment: Thanks to Florida law, FPL is already charging ratepayers for planning and licensing Turkey Point 6 and 7 and the company will continue to do so up until the moment construction is abandoned, at which point FPL keeps any remaining funds they've collected and passes them to their shareholders. For the United States Nuclear Regulatory Commission to participate in such a con job, or even appear to be associated with it, is unconscionable. (**0615-1-15** [Bethune, David])

Comment: I realize that South Florida has an ever-increasing appetite for energy and that nuclear may seem like an immediate solution to the problem, but we need to take a broader view of the costs involved. (**0626-3** [Miller, Nyana])

Comment: Nuclear energy is NOT carbon free, requiring huge amounts of fossil fuels for mining, processing, construction, transportation, and disposal. Nuclear energy is far more costly than any other energy source, and would not be considered even, without massive federal subsidies. (**0647-2** [Burns, Terry])

Comment: Why is profit more important than our environment and our very lives? This investment of more than 20 billion dollars of the rate-payers money makes no logical sense and it's far from being mindful of our future. (**0720-1** [Bastidas, Mauricio])

Comment: I'm here tonight standing with many of my constituents and my Mayors in opposition to the current plan and the application that was submitted. In terms of why, and the reason it just being it's just way too costly for us. (**0721-1-1** [Rodriguez, Jose Javier])

Response: *These comments reflect concern about the potentially high costs of plant construction or nuclear power plants in general. The costs and benefits of construction and operation of the proposed Units 6 and 7 are summarized in Chapter 10 of the EIS using the best information available to the review team. In Chapter 9, the EIS provides an analysis of the potential for alternative non-nuclear technologies to provide the electricity that could be generated by the proposed plant and the environmental impacts of those alternatives. Neither the NRC nor the USACE has the authority or responsibility by law or regulation to ensure that the proposed plant is the least costly alternative for providing energy services under any particular set of assumptions concerning future circumstances. The NRC is not involved in establishing energy policy. Rather, it regulates the nuclear industry to protect the public health and safety and the environment within existing policy. Therefore, comments regarding the potential effect of a particular nuclear power investment on the future development and implementation of alternative technologies, subsidies for nuclear power, and characterization of financial risks associated with such projects are not within the scope of this environmental review. No changes were made to the EIS as a result of these comments.*

Comment: When is big business more important than a community? (**0149-13** [Nelson, Joyce E.])

Comment: HERE IN CONNECTICUT WE WERE SOLD NUCLEAR POWER AS A WAY TO REDUCE OUR ENERGY COSTS WITH CLEAN ENERGY. MAY i REMIND YOU THAT CONNECTICUT CONTINUES TO HAVE ONE OF THE HIGHEST ENERGY RATES IN THE COUNTRY. WE WERE SOLD A BILL OF GOODS SO THAT THE NUCLEAR CORPORATIONS COULD MAKE MONEY. IN RESPONSE TO THE CLAIM THAT THE INDUSTRY MAKES THAT NUCLEAR POWER IS SAFE, I WOULD ASK WHY THE INDUSTRY DOESN'T SHARE MORE OF THE FINANCIAL RISK IN THE EVENT OF A DISASTER. IT IS THE AMERICAN TAXPAYER WHO IS BURDENED WITH THE MAJORITY OF THE RISK. (**0164-4** [Chrissos, H. L. Chris])

Comment: Our investments should be enacted with long-term vision of the future and not based on a project manager's timeline for getting their annual bonus. (**0207-7** [Cleland, Noel])

Comment: Also the cost of the plant the regulations that must be met will ensure that this plant will not come on line for decades. (**0249-2** [Mosher, Paul])

Comment: How many of these plants actually make money? Probably none. The money is in the cleanup after a shutdown or accident (see info on Vermont Yankee). (**0336-2** [Anonymous, Anonymous])

Comment: I believe that this expansion of the reactors at turkey point are a waste of customers dollars[.] (**0494-1** [Tamargo, Jorge J.])

Comment: Ultimately, I fear that Miami residents will be left to shoulder the costs of this project and its long-term consequences. Securing new supplies of drinking water and protecting coastal lands will be an expensive and difficult task. (**0515-6** [Regalado, Tomas])

Comment: In summary, FPL's allowed profits are based upon a percentage return on total assets(ROI). This still applies even when rate payers pay for those assets upfront(proposed TP

units 6 and 7), Florida statute 366.93. Turkey Points units 6 and 7 are designed to be overpriced white elephants, designed to extract maximum funds from the ratepayers and nothing else. FPL has every incentive to build overpriced capacity, and to discourage outside investment in alternative renewable energy sources. (**0545-7** [Keating, Tim])

Comment: PLEASE DO NOT EVISCERATE ANOTHER SACRED PLACE AND ALL ITS INHABITANTS FOR THE SAKE OF PROFIT AND PERPETUATING A DENIAL SO DELUSIONAL IT'S STUNNING. NUCLEAR POWER MUST NOT BE A WELFARE RECIPIENT, SUBSIDIZED BY MY TAXES, WILLING TO PUT US ALL IN HARM'S WAY. (**0564-2** [Dimondstein, Carla])

Comment: I realize corporations have their bottom line to consider and often have no idea or perhaps money is more important than damaging our country, our natural resources and peoples lives. Projects are always written to protect them from damages caused by their projects and American citizens, e.g.. taxpayers are left with the damages both in physical and monetary terms. (**0569-1** [Lane, N. Jo])

Comment: It appears that a few will be able to profit off this project at the demise of far more people, animals and plant life. Now does that seem like a logical balanced decision. The way it appears it does not really seem to matter what the majority of people or animals that call this amazing place home seem to think, feel or want in this matter. (**0638-3** [Anonymous, Charity])

Comment: THESE ARE STRICTLY PROFIT-MAKING attempts. They have nothing to do with benefiting us. (**0649-1** [Harrison, Norma J. F.])

Comment: WHAT DO THEY SAY? [concerning reopening Nuclear Cost Recovery docket 150009 that governs the amount of money FPL may recover before it constructs the 2 nuclear reactor units and transmission lines] (**0685-11** [Batista, Carlos])

Comment: Selfish. People want the benefits, but let someone else carry the burden. (**0685-6** [Batista, Carlos])

Comment: This is not a worthwhile investment for the people of Florida. If the public was properly informed about the construction they would be against it. (**0713-2** [Heiney, Jamie])

Comment: Let a bank -invester bank roll the reactor, if it is a good investment, get real insurance for it, not taxpayer bailouts. (**0715-2** [Anonymous, Anonymous])

Comment: So I'm talking about the advanced nuclear cost recovery statute. So since 2006 ratepayers bear the cost of siting, licensing, design, construction, or operation of nuclear power plants. So to summarize, basically the costs that FP&L has in pursuing this license, we pay for it. So this year it's going to be over 14 million, last year over 43 million, and in 2013 it was over $151 million that ratepayers paid toward this. And the irony is that everyone here who is objecting to this application in some form or another, if you're in the FP&L rate paying region, which I guarantee you are, businesses, organizations, people, you are paying for the cost of FP&L to pursue this license, and that is a deep irony. And some of us in the Legislature have been fighting for a while to try to get that statute repealed. Just yesterday, along with some of my colleagues in the Tampa Bay area, I led an effort to try to force a vote. We got a vote on the House floor on this issue. We weren't successful, but we have been making progress on getting support for removing this perverse incentive. And I just want to say that, you know, in terms of the comments that you're going to hear, in terms of why these -- why I say the costs are so high.

You know, one is that from the information that I have it's not just that nuclear is the most capital intensive and expensive way to generate, but since the '70s we've learned that it's even more expensive than we imagined. (**0721-1-4** [Rodriguez, Jose Javier])

Response: *These comments express general opposition to the costs of power plant construction or raise societal issues that are not within the purview of NRC or USACE to address as part of the environmental review process. They did not provide new information related to the environmental effects of the proposed action. Therefore, no changes were made to the EIS as a result of these comments.*

Comment: FP&L believes locating TWO NEW Nuclear Power Plants here at Turkey Point is in the best interests of FP&L and its shareholders.. a business decision, pure and simple. FP&L will not compensate you for any losses you may incur due to their business decisions. Your Insurance Company does not cover your home or businesses in the event of a Nuclear "incident". Your insurance company will not compensate you for any losses you may incur. That is a business decision pure and simple. You will still be obligated to pay your Mortgage even if you must abandon your home. The Banks will not forgive your loans. The Government, whether local or Federal, will not compensate you either. **SO....If a nuclear "incident" forces me to abandon my home, my property becomes worthless overnight and I lose almost everything I have. How much money will YOU lose if the value of your home drops to $0 overnight? How much money will YOU lose if the value of your business drops to $0 overnight? How much money will YOU lose if your job disappears overnight? How much money will YOU lose if you can NEVER reclaim your property or reopen your business? How and where will you live without assets, without income without .....anything?** In the blink of an eye, Nuclear Power Generation at Turkey Point has the potential to wipe out every penny of value and income in South Florida. Nuclear Power at Turkey Point has the potential to destroy, in a virtual instant, everything you have spent your life working for. **Are you willing to take this financial risk? Are you willing to let FP&L gamble with your money and your life?** (**0071-1** [Stanley, Gael])

Comment: If the commercial nuclear industry can't support itself after 50 years - and it can't - US taxpayers and ratepayers should not be required to support it with our tax dollars and massive CWIP (Construction Work In Progress) rate increases for plants that may never even be built or completed. (**0078-3** [Wilansky, Laura Sue])

Comment: Instead of promoting more environmentally-friendly energy sources, the government seems to be pandering to a company that's main goal is to make money - a goal which does not include caring about the people or environment of Florida. Why, then, are we allowing them so much power in the decision of our energy future? Since Florida is the "Sunshine State," I was shocked when I came to Miami and hardly any houses had been outfitted with solar panels. In fact, FPL is actively campaigning against solar power because they know that it provides cleaner and cheaper energy to the consumer. (**0214-2** [Zerulla, Tanja])

Comment: This utility is victimizing Miami residents in the following ways: --charging in advance for nuclear facilities it may never build. (**0283-2** [Compel, Jr., Joseph])

Comment: Without federal insurance guarantees no necular plant could be insured or build in a cost effective way. Other sources such as wind turbines require less investment. (**0461-1** [Dickinson, Robert])

Comment: Additional treatment of wastewater and/or provision of best available technology emission controls would add prohibitively to the already extremely high costs of nuclear plant construction. If history serves correctly, estimated project costs will suffer severe over-runs, making it likely that taxpayer and ratepayer dollars will be required to pay for the excessive costs of a project most financial institutions are too wise to fund. (**0463-2** [Gross, Cheryl A.])

Comment: The best way to stop nuclear power construction in Florida and throughout the U.S. is to require the electric utility companies to pay 100% of all costs for building the plants. These companies and their shareholders will never accept these terms because it is not cost-effective for them to be financially involved in these immense long-term nuclear projects. It is only cost-effective for them if their utility customers and U.S. taxpayers pay all of the costs. The question is why do we allow for-profit utilities and their stockholders such as FP&L to retain 100% ownership of the nuclear reactors, giving them a $25 billion asset, when FP&L is not paying any of the costs to build them? (**0671-2-4** [Post, Patrick])

Comment: And I'm going to limit my remarks to the question of why. Why is it that FP&L is pursuing this application so vigorously? And the reason for that is, you know, I'm not a technical expert. I'm sure you'll hear from a lot of technical experts, but I just wanted to kind of offer the indication of giving significant scrutiny to the information that you are getting from the utility in this process. And the reason why, and the way that I believe that I come to the answer of why it's being pursued so much, it's because of the nuclear fee that we have here in the State of Florida that I think distorts FP&L's incentives significantly. (**0721-1-2** [Rodriguez, Jose Javier])

Comment: But it makes economic sense for Florida Power and Light to propose things, even if they never build it. And I hope everybody understands that. That even if a nuclear power plant is not built they still get to recoup the costs that they incur on an annual basis in advance, and they don't have to return it if they decide to change their mind. That's the really sort of simplistic overview of it. But the ratepayers pay it and the shareholders profit and the company profits. So that's why we're here. That's what we're talking about. (**0721-11-3** [Roff, Rhonda])

Comment: I have a problem with Florida Power and Light as far as shareholders versus ratepayers who's on the hook for this. Capital projects need to be done by shareholders and stockholders. That's what stock's for. If you want to build something you sell stock. People take risk. If it works out, great. If it doesn't, you're on the hook, not the ratepayers. Florida Public Service Commission. Our State Reps need to come up with a different way of appointing these folks. The Commission is broken. It too favors the power plants. They've got some big issues with Duke Energy up in the Northwest part of the State. So we need to get on our elected reps to change the way that these PSC people are appointed. I don't know publicly elect them is the way to go, but there needs to be discussion on it because the current PSC is broken and I feel it's corrupt. The process doesn't come out in our favor. We always seem to come out on the short end. (**0721-24-2** [Eastman, John])

Comment: If the commercial nuclear industry can't support itself after 50 years, and it can't, U.S. taxpayers and ratepayers should not be required to support it with our taxes dollars and massive construction work in progress, rate increases, for plants that may never even be built or completed. (**0721-28-4** [Wilansky, Laura Sue])

Comment: Moreover, FPL shareholders will earn a 10-1/2 percent rate of return on the money invested in the nuclear plant while FPL customers shoulder all the financial risk. It's a sweet deal for FPL shareholders but not so much for customers. (**0721-8-11** [Cavros, George])

Comment: And furthermore, they're allowed since 2006 to bill customers in advance of any of these costs for the full cost of what they spend, even before they decide, as they haven't yet decided, to build. So it's going into the rate base. Consumers like me who are paying electrical bills in Juno are already paying for the cost of the planning process and, you know, I think that's biasing FPL toward wanting to make these projections. (**0723-12-3** [Henry, Jim])

Response: *These comments express concerns about cost-related issues outside the scope of NRC and USACE purview, including perceptions about energy policies, tax burdens, or industry subsidies. The principal costs and benefits of the proposed action are summarized in Section 10.6 of the EIS. The summary is derived from careful assessment of impacts across the principal environmental interfaces affected by the action during construction (Chapter 4) and during operations (Chapter 5). In addition, the cumulative environmental impacts of the action are presented in Chapter 7. These impact discussions frame the assessment of overall project benefits and costs that are within the Review Team's scope to assess. The comments did not present any new or relevant information. No changes to the EIS were made as a result of these comments.*

E.2.28 Comments Concerning Climate Change

Comment: Given the overwhelming research and consensus of scientific opinion on climate change, South Florida should not be considered for such a project. Just because there is a minority of climate change deniers with politically driven motives does nothing to mitigate the risks of building more reactors at this location. (**0009-2** [Rose, Simon])

Comment: We are in the 21st Century and this proposed expansion was planned before the reality of climate change was confirmed by scientists. (**0086-3** [Lawrence, Diane])

Comment: For example, extreme flooding due to climate change will significantly affect the regional water management system. This system was initially designed to protect 2 million people and now serves a population of more than 7.5 million. If flooding were to reach new extremes, the water management system currently in place may not be adequate to provide the necessary levels of flood protection. *See Climate Change and Water Management in South Florida: Interdepartmental Climate Change Group,* SOUTH FLORIDA WATER MANAGEMENT DISTRICT (Nov. 2009). The water management structures' lack of capacity makes flooding more likely and may compromise access to the plant site. Similarly, the final Environmental Impact Statement should include a discussion of the level of flooding that will impact plant safety and the corresponding rainfall return period. (**0611-15** [Haber, Matthew S.])

Comment: EPA recommends that this impact analysis also consider extended periods of drought, characteristic of the southeast U.S. (**0617-4-16** [Mueller, Heinz J.])

Comment: You mentioned climate change. Having looked at a great deal of research and having heard from both sides of the issue, Karen, my family and I are convinced that there is no such thing as climate change or global warming. As the great professor, Richard Lindzen of MIT said, "Global warming is the biggest hoax in the history of science." (**0680-2** [Hubbard, Stanley S.])

Comment: I would like to echo George Cavros' comments regarding -- and some of the others' comments regarding what we're doing here, why we are even talking about a nuclear power plant in this location or really in any location in Florida, given that the entire peninsula of Florida is Ground Zero for the impacts of climate change. So we have to worry about increasing severity of droughts, storms, lack of water, water for restoration, water for agriculture, water for

people. We have a lot of people in Florida and supposedly it's growing. People are moving to Florida like crazy. So we really don't have that kind of water to feed these power plants. (**0721-11-2** [Roff, Rhonda])

Comment: I think that sea level rise needs to be looked at in more detail. I don't think the current estimates are adequate. I think that sea level rise will be greater. I think we need to look at that and factor in storm surge, because when we talk about the level of sea level, when we talk about storm surge, that will be on top of the existing sea level rise. So if sea level rise were to be greater, and since this plan -- the life of this plan is in 60 years, and we don't know what's going to happen, that's a particular concern. (**0721-13-4** [Martin, Drew])

Comment: The reality is, we are at the very beginning of a very serious rise in sea level. (**0721-6-3** [Harris, Walter])

Comment: As some of my colleagues have mentioned, in terms of sea level rise. This is a major issue in terms of sea level rise, and as we look at the models the sea level is rising quicker than the models have even shown. (**0721-7-2** [Edmond, Gabriel])

Comment: South Florida, Miami-Dade County is Ground Zero in the world in terms of sea level rise. We already see Miami Beach flooding. (**0721-7-4** [Edmond, Gabriel])

Comment: Finally, Biscayne Bay and South Florida are extremely susceptible to climate change, and Turkey Point in particular is vulnerable to sea level rise, storm surge, and other types of flooding. FP&L's application only accounts for a 1 foot rise in sea levels during the reactor's lifetime. In contrast, NOAA recommends the power plant's account for between 3 to 5 feet of sea level rise during that same time period. By the Federal Government's own recommendations the plan to expand Turkey Point should not be considered safe. Today the President of the United States came to Everglades National Park to discuss the need to prepare South Florida and the nation for the impacts of climate change. I suggest we follow his leadership here and work together towards a more resilient, sustainable and adaptive South Florida. (**0721-9-7** [McLaughlin, Caroline])

Comment: But something else that just was part of the museum was just showing how the shape of Florida naturally changed. Forget climate change and how everyone gets too sensitive about whether we're even doing it or not. Because even if we aren't, the reality is the earth is not so stable. We are in the most unique period in the earth's history of stability and we've gotten used to it. But you know what, 40 years is nothing. (**0723-11-4** [Berendsohn, Catherine])

Comment: ...it was on the second story of the historic house where I had my office, we had a marker of the sixteen and a half foot tall storm surge that went up to the second floor. It was even always still flood there, and I am -- I didn't even realize that your plan only accounts for one foot of water change? That's not even the case when I was four years old. That's the most disturbing thing I've heard in a long time. (**0723-11-5** [Berendsohn, Catherine])

Comment: We -- the Everglades is the only Everglades the world has ever had and it may never be able to return once Florida floods. (**0723-11-7** [Berendsohn, Catherine])

Comment: ...the sea level rise projection of one foot and everybody, including the latest projections in, you know, the scientific community are talking, in the University of Miami, about three to five feet through this time period. We have to look more carefully at those projections. (**0723-12-13** [Henry, Jim])

Comment: If expanded, Turkey Point will become one of the largest nuclear generating facilities in the entire country located in one of the nation's most vulnerable areas to sea level rise and directly on the shores of Biscayne National Park. (**0723-4-2** [McLaughlin, Caroline])

Comment: Finally, Biscayne Bay and South Florida are extremely susceptible to the effects of climate change. At Turkey Point in particular is susceptible to sea level rise, storm surge and other types of flooding. FPL's application only accounts for a one-foot rise in sea levels during the reactors' lifetime. In contrast, NOAA recommends that the power plants account for between three and five feet of sea level rise over the same period. By the Federal government's own recommendation, the expansion at Turkey Point should not be considered safe. (**0723-4-8** [McLaughlin, Caroline])

Comment: The President of the United States came to the Everglades yesterday on Earth Day to discuss the need to prepare this nation for the effects of climate change, particularly here in South Florida. (**0723-4-9** [McLaughlin, Caroline])

Response: *These comments are related to climate change and sea level rise. The review team's evaluation of climate change and sea level rise is discussed in Appendix I. Based on these comments, Appendix I was modified to: clarify the role of the NRC safety review; describe the conformance of Appendix I to CEQ guidance; mention groundwater modeling analysis discussed in Appendix G; describe several reasonably foreseeable adaptations to sea level rise; and mention localized sea level rise changes.*

E.2.29 General Comments in Support of the Licensing Action

Comment: I believe that that COLs should be issued for Turkey Point Units 6 & 7. The site is adjacent to FPL's existing reactors, so it should not impact the environment in any additionally detrimental ways. In fact the NRC's environmental review found no environmentally preferable or superior sites. (**0002-1** [Hamilton, Brent])

Comment: Good for them. I think it is great idea especially as growth in South Florida is uncontrolled. (**0011-1** [Rowe, James])

Comment: Please approve the project quickly. (**0013-2** [Christie, Grazie])

Comment: I am strongly in favor of the addition of 2 more nuclear reactors to the current Turkey Point facility for the following reasons:...[a]s for those who are opposed to nuclear power for philosophical reasons, that closed minded fearful thinking has to be weighed against people like myself who for philosophical reasons are opposed to importing foreign oil which supports the despots that use the income from oil sales to oppress people and because they have the revenue from oil sales make the world a more dangerous place to live. (**0015-10** [Goldmeier, Barry])

Comment: I am strongly in favor of the addition of 2 more nuclear reactors to the current Turkey Point facility for the following reasons:...[f]rom a geopolitical point of view, why would the US assist Iran in building a "safe civilian" nuclear program which could turn into something else while not doing so on US soil. FPL is not Iran by any stretch of the imagination. (**0015-14** [Goldmeier, Barry])

Comment: I AM IN FAVOUR OF BUILDING TWO OTHER NUCLEAR PLANTS THEY ARE MORE EFFICIRNT, AND WE NEED TO BE READY FOR THE INCREASE IN POPULATION IN SOUTH FLORIDA. (**0016-1** [Slonim, Roberta])

Comment: I am in favor of the Turkey Point expansion of two nuclear units. (**0035-1** [Larrabee, Laura])

Comment: Doubt if we can attend hearings but definitely feel the advantages to our area far exceed the risks. (**0038-1** [Hudak, Jill])

Comment: I would like to put my two cents in on the future expansion of Turkey Point's two new nuke plants. Myself and my husband are native Miamians and have had our roots in this area for three generations now. We were here before FPL built their first two nuclear reactors in the 70s and remember all that went into building them. It took some time before FPL could flip the switch on those two. It will take time to build these as well and I am just hoping that the two existing reactors can handle the load until then, since our "esteemed" local politicians don't seem to know how to say "no" to any development, regardless of the crowding or stresses it puts on our infrastructure and resources. We are STRONGLY IN FAVOR of FPL building the two new nuclear plants. (**0070-1** [Lamb, Deborah S.])

Comment: I support the expansion of Turkey Point and oppose the "No Action" alternative. (**0286-1** [Jackson, Donald L.])

Comment: I support the proposed expansion of FPL's Turkey Point. (**0286-3** [Jackson, Donald L.])

Comment: To the NRC under Docket ID NRC-2009-0337 Activists are telling people to voice their concerns about proposed nuclear power plants Turkey Point 6&7. Their supporters are urged to say they want clean, safe, and affordable renewable energy.

Taking these demands apart:

Clean: Nuclear power has a cleaner record than natural gas, which is the only alternative that could make up for more than a fraction of the energy that the proposed units would generate.

Safe: American nuclear power plants undergo the most stringent regulatory review of any sources of electric power.

No civilian injury, or radiation sickness has ever been found to be associated with operation of the plants that have supplied 20% of our nations electricity for the past several decades. The same goes for plant workers.

Nuclear plant and laboratory workers have been studied and their excellent health has been explained in medical literature by a healthy worker effect.

Three Mile Island: Total number of civilian or worker health effects: ZERO.

From handling and disposal of radioactive wastes: ZERO.

In Japan, due to the tsunami disaster at the Fukushima nuclear power plants: Radiation cancers detected or predicted in the future: ZERO. (Predicted by real qualified medical experts rather than discredited activists like Helen Caldicott.) Dead and missing from the tsunami, 17,000 to 20,000 persons.

Affordable: Once built, power from nuclear plants has consistently been the higher economic choice on utility systems.

Plant construction costs are high, demonstrably higher than they should have been had not regulatory delays and demands of activists not been allowed to delay and interfere with construction plans. On utility systems, nuclear and coal plants provide the base load 24-7 power alongside of which solar and wind contributions can be successfully utilized. The NRC must remind activists who attend the Turkey Point public meetings that NRC decisions must be based on factual scientific evidence and not on slogans of people who do not study the scientific evidence or learn to understand the importance of adequate, dependable electric energy to the people of Florida, the United States and the rest of the worlds populations. Every nuclear power plant in the U. S. is licensed, which required a complete Environment Impact Statement in addition to its detailed Safety Analysis Report. Licensing proceedings were held in public in the most transparent and extensive process of any and all energy sources. Claims like those of SACE were all debated and dismissed hundreds of times. Those of us who took part in these processes are appalled to see the same kind of opportunistic groups demand a rehash of proven evidence. It takes time to write this statement, which obviously has become lengthy. SACE can tell its supporters to send bales of meaningless words to take up your reading time, with no more effort than just hitting the CUT and PASTE keys. It is up to you to make your findings based on facts. (**0345-1** [Rossin, A. David])

Comment: Florida has had a long and very successful history with nuclear energy and the plans for new plants in the state (Turkey Point Units # 6 and 7) are based on that history of successful and safe nuclear operation by Florida Power and Light. (**0375-1** [Tulenko, James])

Comment: The State of Florida ranks 6th in carbon dioxide (CO2) emissions among the 50 states. More carbon free energy sources are badly needed. The two new units will provide 2,200 Megawatts of clean, reliable power, which is enough to power more than 1 million homes. This energy output avoids approximately 418 million tons of carbon dioxide emissions over 60 years (equivalent to removing 88 million cars from the road) and will create approximately 3,500 jobs during construction and 800 permanent high-paying jobs in operation. Certainly these plants carbon free output along with FP&L operating experience provides the positive environmental impact needed for approval. (**0375-2** [Tulenko, James])

Comment: In the face of climate change, we need real solutions now. Clean, safe, and affordable nuclear power will put us on the path of obtaining improved public health, a better conserved, protected natural environment, and a more vibrant, creative economy. Approving the application for Turkey Point 6&7 will simply lead to a better future. (**0378-1** [Macher, Nathan])

Comment: This email is to voice my support for the two additional units at the Turkey Point power generation station. (**0575-1** [Roberts, Kenneth])

Comment: I am sorry that you are upset about the proposed expansion of the Turkey Point Nuclear Plant. I'm sorry that Karen and I don't share your concern. (**0680-1** [Hubbard, Stanley S.])

Comment: THE TIME TO OBJECT AND VOICE YOUR SUPPORT FOR THIS IS NOW BEFORE IT IS TOO LATE. (**0685-10** [Batista, Carlos])

Comment: Please do confirm FP&L's request to build new nuclear reactors and certainly do allow placement of these huge high voltage lines in the Miami Roads neighborhood (in or adjacent to any other residential neighborhood). (**0685-4** [Batista, Carlos])

Comment: 2. This flyer doesn't represent what the majority thinks. 3. Info here is incomplete and misleading. (**0685-7** [Batista, Carlos])

Comment: WE DON'T OBJECT! (**0685-9** [Batista, Carlos])

Comment: I am writing in reference to Docket ID: NRC-2009-0337 to express my support to the proposed expansion of Turkey Point Power Plant, located in Homestead, Florida. (**0694-1** [Carpenter, Rory])

Comment: I support the expansion of Turkey Point providing proper designs are in place. (**0694-4** [Carpenter, Rory])

Comment: PLEASE APPROVE the Turkey Point license for two new nuclear plants! (**0707-1** [Pheil, Edward])

Comment: On behalf of our 18,000 members we are requesting that you adopt the recommendations of the final order of certification to certify Turkey Point Units 6 and 7. (**0721-19-1** [Riley, Bill])

Comment: We are convinced that this is an important project which has a strong positive benefit for our entire State, with a very strong environmental partnership with Florida Power and Light, and we urge you to approve this project. (**0721-19-4** [Riley, Bill])

Comment: I represent the Pipefitters Local [Union] 725 of Miami. I am one of 18,000 members of the South Florida Traders Council. As a representative of the 18,000 members I ask that you adopt and recommend the final certification of Turkey Point Units 6&7. (**0721-20-1** [Garcia, Javier])

Comment: I'm here tonight to support the construction of Turkey Point Nuclear Units 6 and 7. (**0721-27-4** [Rodriguez, Manuel J.])

Comment: We're pleased with that and would encourage the NRC and the appropriate governing bodies to allow the nuclear units to be built. (**0722-1-3** [Porter, Jeff])

Comment: To our friend Captain Dan who spoke earlier, as a shareholder, you must have some idea of what the degree of difficulty would be in trying to site a new nuclear facility.

(Recording briefly inaudible.)

-- requires additional electric capacity, it requires it here in Miami Dade County and it requires it at Turkey Point. And we urge the NRC to proceed with the application. (**0722-10-4** [England, Peter])

Comment: [W]e really strongly need and encourage this expansion for the jobs and the economic revitalization of our community. (**0722-11-2** [Knowles, Yvonne])

Comment: [W]e [Redland Market Village] need safe, clean, affordable energy. So that's the reason we are supporting, and please approve the 6 and 7. (**0722-12-2** [Infante, Jose Renee])

Comment: I'd like to speak strongly in support of adding the two nuclear units at Turkey Point. (**0722-13-2** [Duquette, Bill])

Comment: Anyway, so I would like to just lend you our support. (**0722-13-9** [Duquette, Bill])

Comment: This is a position I took on to promote nuclear science and technology and I, along with my fellow students, understand the importance of energy security in our State as much as

anyone. This is why we're here today to support the development of Turkey Point 6 and 7. (**0722-4-1** [Moo, Patrick])

Comment: And after reading through a portion of the EIS we have no qualms about any of the recommendations made by the NRC or the Army Corps of Engineers. The statements made in their assessment fully fulfills our understanding of the Units 6 and 7 and the impact it would have on the surrounding areas. So we recommend that they move forward and go Gator's, go nuclear. (**0722-6-1** [Martin, Allan])

Comment: On behalf of 1,800 of our members we would like to request that you adopt the recommended final order of certificate and certify the Turkey Point Units 6 and 7. (**0722-9-1** [Riley, Bill])

Comment: [W]e hope very much that you will support this application. (**0722-9-12** [Riley, Bill])

Comment: We are convinced that the --this important project will be a strong positive benefit for our entire State in South Florida. (**0722-9-5** [Riley, Bill])

Comment: [W]e strongly urge you to approve this project. (**0722-9-7** [Riley, Bill])

Comment: So I'm not afraid to have this facility in my back yard. I think it's -- any time change comes about there are some necessary elements of it. And I think that the United States has always shown an ability to meet the needs of its community with oversight and the cost -- well, not always cost efficient, I'm not going to tell that lie. (Laughter.) But in a safe way. So after a lot of review, my community supports this project, my council supports this project with the proper oversight, with the proper safety mechanisms in place. And again, when we think about our environment, think about the whole environment. That includes, you, me too. (**0723-1-8** [Wallace, Otis])

Comment: In addition we, as the Chamber of Commerce, looked at the report when we went to the last meeting and are confident that everyone here that has specific knowledge and education has taken sufficient caution and measures to look at all the data, do your analysis, and you are making a report that I think we, as the population of people that live in this area should feel confident that we know, I guess, that you're not lying. You are giving us scientific fact, you've analyzed, so again we thank you for that. (**0723-10-3** [Brito, Rosa])

Comment: We're looking forward to another 40 years of the two new plants. (**0723-10-6** [Brito, Rosa])

Comment: And what I'm concerned about the most is that this project won't be developed. I'm in total favor for the development of this project. This is something that's important to the city, it's important to us as residents for power supply. There's just so many benefits that go along with this project. (**0723-13-1** [Simpson, Chris])

Comment: So as a resident, I just want to express that I fully support the development of this project. (**0723-13-3** [Simpson, Chris])

Comment: On behalf of our 18,000 members we are requesting that you adopt the recommended final order of certification and certify Turkey Point's Units 6 and 7 project. (**0723-14-1** [Riley, Bill])

Comment: We strongly recommend that you approve and adopt this project. (**0723-14-5** [Riley, Bill])

Comment: And one more thing I wanted to say, there is a word, acronym called NIMBY. And I think that "not in my back yard" attitude has probably done more damage than has helped in this country. I think it's important to realize that having the attitude that we want to have power plants but we don't want to have them in our back yard just displaces the convenience, if that makes sense, for people who just want to see something go away and go somewhere else. (**0723-7-5** [Boling, Steve])

Comment: I do approve of the sites being constructed, (**0723-8-7** [McDuffie, Stephen])

Response: *These comments express support for the addition of new nuclear units at the Turkey Point Nuclear Power Plant site. They do not provide any specific information related to the environmental effects of the proposed action. No change was made to the EIS as a result of these comments.*

Comment: I am strongly in favor of the addition of 2 more nuclear reactors to the current Turkey Point facility for the following reasons:...Turnkey Pint along with its infrastructure is already there so it is far better and less intrusive to expand it than locating new generating capacity in Turkey Point than siting any type of power generation facility anywhere else. (**0015-17** [Goldmeier, Barry])

Comment: Like so many Americans, I am committed to protecting the National Park System, which preserves our country's incredible array of landscapes, waters, wildlife, and opportunities for exploration. Biscayne National Park is an irreplaceable national treasure that safeguards precious natural resources and recreational opportunities. I am told that there are, within six miles of the proposed expansion site, there are two national parks, an aquatic preserve, a national wildlife refuge, and a wetland habitat preserve. Sufficient data should exist today to provide design direction and upgrade from existing two reactors. (**0694-2** [Carpenter, Rory])

Response: *The NRC acknowledges the commenter's support for new nuclear power. The review team independently compared the alternative sites to the proposed site to determine if any of the alternative sites were environmentally preferable to the proposed site in Section 9.3. The review team concluded that none of the alternative sites was environmentally preferable to the proposed Turkey Point site in Section 9.3. In addition, the NRC staff will determine whether building and operating the proposed units at the Turkey Point site will meet all of the safety requirements in the NRC regulations. The results of this review will be documented in a safety evaluation report and those results, along with the EIS, will be considered in the NRC's decision about whether to issue the COLs for proposed Units 6 and 7. No change was made to the EIS as a result of these comments.*

Comment: I am strongly in favor of the addition of 2 more nuclear reactors to the current Turkey Point facility for the following reasons:...[t]he lessons from past accidents and knowledge of sea level rise will be incorporated into the design making the planned facility more dependable in the long term than even the facilities FPL has in place. (**0015-16** [Goldmeier, Barry])

Comment: I am strongly in favor of the addition of 2 more nuclear reactors to the current Turkey Point facility for the following reasons:...[m]odern science has learned a great deal in the past 50 years since the existing nuclear facility at Turkey Point was built. Since there has been no major issues with the Miami-dade or Hutchinson Island facilities FPL has run safely for

decades I see no real risk from expanding the existing nuclear capacity of Turkey Point. (**0015-9** [Goldmeier, Barry])

Comment: Provided that the two new reactors are of the latest generation, and hence are much safer than the old ones, I am convinced that this is a great way to generate electricity with very low environmental impact. (**0018-1** [Massa, Arturo])

Comment: I believe that the proposed plants would be a great boost to the economy here and provide economical electricity for business and residential. The latest designs are much more safer than those 50 year old designs of current use. (**0041-2** [Williams, Paul])

Comment: Please accept my support for the proposed new Nuclear Power units at Turkey Point. As Florida population continues to grow, we will need reasonably priced electricity to support that growth. The design of the new generation of nuclear power plants are a great improvement over the old design. (**0069-1** [Williams, Paul])

Comment: So I hope, I really wish, or I hope that I can convince you that the nuclear option is definitely the best option for us right now. It's the best option that we can bring together to the table to going forward into the future to eliminate our dependence on any type of fuel source that produces CO2 emissions. And I hope there's no doubt about that. 6 and 7 is the right choice. Build Unit 6 and 7. (**0721-15-14** [Kuraza, Devon])

Response: *The comments express support for the proposed units at the Turkey Point site. They do not provide any specific information related to the environmental effects of the proposed action. No changes were made to the EIS as a result of these comments.*

E.2.30 General Comments in Support of the Licensing Process

Comment: I'd like to thank the NRC for holding these hearings. I'd like to thank all of you for coming out and showing your interest because this is an extremely important subject. (**0722-10-1** [England, Peter])

Comment: [T]hank you for giving us the opportunity to address the Commission today. (**0722-13-1** [Duquette, Bill])

Comment: I appreciate the forum to come out and speak to you guys today. I just want to express my gratitude to you guys, having you come out and speak today. Appreciate your time[.] (**0722-3-2** [Chatterton, Andrew])

Comment: There is something I am proud of as an American citizen and something that I think stood out was the idea of the system of checks and balances here. (**0723-11-1** [Berendsohn, Catherine])

Comment: But I do appreciate that the NRC is giving this as public. (**0723-8-5** [McDuffie, Stephen])

Comment: I like the way that this project was done or the way this evaluation was done. (**0723-9-1** [Schwartz, Matthew])

Response: *This comment provides general information in support of the NRC COL process. Because it did not provide any specific information related to the environmental effects of the proposed action, no changes were made to the EIS as a result of this comment.*

E.2.31 General Comments in Support of Nuclear Power

Comment: Nuclear Power is safe and environmentally friendly. And cost effective. (**0013-1** [Christie, Grazie])

Comment: I am strongly in favor of the addition of 2 more nuclear reactors to the current Turkey Point facility for the following reasons:...[t]here already is a nuclear reactor there so anyone who is opposed to that source of power should have no argument[.] (**0015-3** [Goldmeier, Barry])

Comment: I am strongly in favor of the addition of 2 more nuclear reactors to the current Turkey Point facility for the following reasons:...[n]uclear generates fewer environmental greenhouse gasses than does gas or oil as a source of electric power[.] (**0015-6** [Goldmeier, Barry])

Comment: Nuclear energy is good and I believe it is an important our past and future energy needs in America. In fact at Merrill Lynch in the early 1970's I help raise the original capital to build Turkey Point. (**0075-1** [Streit, Christopher V.])

Comment: The commenter submitted an article on radiological health effects that states that support for the nuclear energy industry has been largely predicated upon three fallacies: 1. That there is a safe level of exposure to radiation, below which it does no harm. (**0111-1** [Glynn, Simon])

Comment: The commenter submitted an article on radiological health effects that states that support for the nuclear energy industry has been largely predicated upon three fallacies: 2. That in any event the radiation emanating from nuclear power production is only a small proportion of the total level of radiation, from all sources, to which we are exposed, and thus produces a similarly small proportion of the health effects resulting therefrom. (**0111-2** [Glynn, Simon])

Comment: The commenter submitted an article on radiological health effects that states that support for the nuclear energy industry has been largely predicated upon three fallacies: 3. That so long as we monitor radiation levels to insure they do not exceed permitted maximums, expansion of the industry may proceed without producing intolerable health costs. (**0111-3** [Glynn, Simon])

Comment: Solar power is expensive and produces little energy. Expansion of nuclear power plants is the best option. (**0123-1** [Mulet, Tomas])

Comment: Nuclear energy continues to be safer, cheaper, and cleaner than fossil fuel alternatives. (**0286-2** [Jackson, Donald L.])

Comment: Nuclear power will transform our economy because generating electricity through nuclear power can be done at a more inexpensive price point than coal. (**0378-3** [Macher, Nathan])

Comment: A nuclear powered economy will improve public health and help protect the environment. Ventures like indoor vertical farming will put fresh food on tables nationwide. This fresh food will be produced without pesticides or even dirt. Think of all the forests we can save if forests don't have to be cleared for farmland. (**0378-5** [Macher, Nathan])

Comment: Also, nuclear power can scale up to completely displace fossil fuels: France generates 80% of its electricity with nuclear power. Replacing fossil fuels would remove from the environment air pollutants that today kill thousands--if not tens of thousands--of people every decade in North America. In some situations, the intermittent nature of renewables leads to more fossil fuels being burned, which creates more air pollution. As someone who has a couple of family members with asthma, I can tell you that depending on renewables to generate more power than the technology is capable of does not help my family members breathe any easier. (**0378-6** [Macher, Nathan])

Comment: America needs the energy and nuclear energy is the friendliest form to the planet. (**0575-2** [Roberts, Kenneth])

Comment: They will also improve the human habitat and reduce center deaths and health costs caused by air pollution from the alternative fossil fuels. (**0707-3** [Pheil, Edward])

Comment: Nuclear has a proven BEST safety record both for any energy production method already, and new plants will further improve the safety record, while also saving people money by reduced electricity and Healthcare costs. (**0707-5** [Pheil, Edward])

Comment: I know there's a lot of -- there's a negative cloud over nuclear power, particularly in the wake of the Fukushima accident, I understand that. And I think the only way that we can try to reassure the public that we are looking out for their best interest is basically to talk about it and talk about what we did and what we learned from those events. (**0721-15-11** [Kuraza, Devon])

Comment: Another point that was brought up that I wanted to address. Oh, I heard a number about 10 to 15 cents a kilowatt for current nuclear power generation. Closest numbers I could find online about 2.7 cents per kilowatt is the current cost of power generation from a nuclear source. (**0721-15-3** [Kuraza, Devon])

Comment: There's a lot of misconceptions about nuclear power and about what we do and how we do it, and I always say that those in the industry have nobody else to blame but ourselves for not coming out and trying to educate the public about what we do and how we do it. (**0721-15-5** [Kuraza, Devon])

Comment: A lot of people think that because we are pro-nuclear we are somehow against other forms of power generation. That's simply not true. I think the most hard-line advocate in here for nuclear power would tell you that we need a diverse fuel mixture and that includes wind, solar, and of course nuclear. (**0721-15-6** [Kuraza, Devon])

Comment: I, myself, live in an apartment building. I don't have that option, so I need the next best thing, something that is both clean, good for the environment[.] (**0721-15-8** [Kuraza, Devon])

Comment: I want to underscore the significant value the nuclear plants bring to the State of Florida in the form of carbon free energy, jobs, and reliability. Florida's four operating nuclear reactors currently generate 12 percent of the State's electricity while emitting no greenhouse gases, accounting for a full 98 percent of the State's emission free electricity. If the power from even one nuclear reactor were to be taken offline, it would significantly affect the State's emission free energy supply. So it's important to recognize that nuclear power is a critical asset, especially when thinking about standards such as the EPA's Clean Power Plant. (**0721-21-1** [Martin, Patrick])

Comment: Nuclear plants are also unmatched in their reliability. The facilities of Florida operate around the clock, even at times of extreme temperatures and weather to generate 12 percent of the State's total energy mix. They can be counted on the keep the lights on for Florida's businesses and for Florida's residents. I am pleased and honored to be able to offer these supportive comments on behalf of Nuclear Matters and I very much appreciate your time this evening. (**0721-21-3** [Martin, Patrick])

Comment: We work out there, we take pride in where we work and we want our surrounding communities to have the support and the opportunity to understand the growth of the new plants being built are going to be, and that's what we're trying to do with our community outreach. So we want more people that want to come to work at nuclear power plants and we want them to be excited to come and work there and not scared.

So back to my final thing and that's, we're the stewards of this industry and it's my job as a member of the staff out there to make sure that the community and the surrounding neighborhoods understand that it is clean, it is safe, you know. It's Captain Dan's points, the rising sea levels, you know, I appreciate that, I love the water. But we're also the cleanest and the least impactful on the environment that have anything to do with that. (**0722-3-1** [Chatterton, Andrew])

Comment: [W]ith nuclear power you get clean, emission-free energy that's reliable and stable and runs virtually 24/7, so you always have power when you need it. On top of that, the energy that's being produced is also very economic. It will provide many customer savings. And to, you know, be specific, it's also -- within the first year of operations customers will save about $644 million from fossil fuel costs and then projected to 40 years you'll be saving about $64 billion. And for the course of 60 years you'll be saving $173 billion on fossil fuels. I think that these units are economically practical and provide a lot of future support for many generations to come in South Florida. (**0722-5-3** [Silva, Nicolas])

Comment: The question of whether the nuclear option was the best option, I've come to believe it's the most cost efficient and sensible way to approach the problem. (**0723-1-2** [Wallace, Otis])

Comment: Because of the relatively low production cost, nuclear power operations helps us maintain the lowest bills in our State. This is also very important for small businesses who have to account for spending on healthcare, taxes and their utilities. (**0723-10-5** [Brito, Rosa])

Comment: I'd just like to mention a couple articles that was in the paper and I went through them briefly this afternoon. The "Miami Herald" of -- let's see, February 17th, it was written by -- let's see here, Whitman. She used to be the Chairman of the board of H&P, Hewlett and Packard. But she wrote a nice article that covered a lot of the facts about nuclear power and how it was. But a couple of things, it was really motivating, I thought. It was "moreover, nuclear energy provides 98 percent of Florida's carbon-free electricity. Because nuclear plants production process emits no greenhouse gases, Florida reactors have officially offset 15 million of carbon emissions each year, equivalent of removing three million cars from our roadways." And then there was another article that was written by the ex-governor of New Jersey. The -- it was the "Sun Sentinel." "Florida's nuclear energy is exceptionally important as it provides about 12 percent of the State's electric but it accounts for a full 98 percent of our emission-free electricity for Florida." And I think those two statements are very -- are very, very important. (**0723-14-3** [Riley, Bill])

Comment: And whereas nuclear power has been meeting the needs of our citizens of Miami Dade County for nearly 40 years, (**0723-2-3** [Trowbridge, Mark])

Comment: They'll talk about fuel diversity. For myself I was always -- it didn't quite make sense to me, I've only worked in nuclear power. But fuel diversity, right, is where do you get your electricity from? What's the source of your electricity? That is one of those things, having that fuel diversity helps us control the cost of our electric bills. And every single one of us in this room get an electric bill every month. None of us like paying it but we all get it and we have to pay it, right? So you have fuel diversity that helps drive the cost down because natural gas prices move around a lot over the course of a year or five years, ten years. And adding additional nuclear power helps maintain that cost down as long as possible. And that pays for everyone, right. (**0723-6-1** [Murphy, Mike])

Comment: I do know that my family worked at Plant Hatch and how nuclear power has benefited it. But I also do know some of the downsides to nuclear. There's not many that I know of with the nuclear regulations that we have in today's society. (**0723-8-1** [McDuffie, Stephen])

Response: *These comments express support for nuclear power in general. These comments do not provide any specific information related to the environmental effects of the proposed action. No changes were made to the EIS as a result of these comments.*

Comment: Nuclear power is clean, it's carbon free, and therefore it doesn't contribute to climate change. It's safe, it has a very safe record. They talk about Three Mile Island, everything that could go wrong went wrong and nothing happened, so it's a safe industry with a proven track record. It reduces our dependence on foreign oil. It's a win-win for everybody[.] (**0721-27-3** [Rodriguez, Manuel J.])

Comment: [T]he cleanliness of the nuclear energy, the lack of emissions and the carbon footprint that is not being produced because of nuclear energy. I have a new grandson, I look forward to him and his children and his grandchildren having affordable, clean energy for their generations to come, for them and their generations to come. (**0722-13-6** [Duquette, Bill])

Comment: Nuclear power plants typically operate at capacity factors above 90 percent making them the highest among all forms of energy. Nuclear power is also the only emission-free baseload energy for grids, large grids like those in South Florida. This is critical to Florida since we are a State that relies on clean air and beautiful beaches. (**0722-4-2** [Moo, Patrick])

Comment: Turkey Point 6 and 7 would avoid more than 265 million tons of CO2 emissions in the first 40 years of operation. This is an amount that's equal to the annual equivalent of removing 56 million cars from the road. By providing clean and affordable energy that these plants would produce we would help ensure that Florida remains one of the best states to visit and reside in. (**0722-4-3** [Moo, Patrick])

Response: *These comments express support for nuclear power based on avoidance of CO_2 emissions. The calculation of the expected greenhouse gas emissions for a reference reactor is given in Appendix J. The effects of climate change on the environment are discussed in Appendix I. No changes were made to the EIS as a result of these comments.*

E.2.32 General Comments in Support of the Existing Plant or the Applicant

Comment: Taken with FPL's history of stewardship of the environment and their technical expertise in operating world class nuclear plants, I can see no reason for any objections to this project. (**0002-2** [Hamilton, Brent])

Comment: I am strongly in favor of the addition of 2 more nuclear reactors to the current Turkey Point facility for the following reasons:...To date Turkey Point has been well run and dependable which add up to safety and dependability[.] (**0015-2** [Goldmeier, Barry])

Comment: I have worked with FP&L at both the Point Beach NP in Two Rivers, WI, and the Turkey Point NP in Florida City, FL with Bechtel in the Safety Departments and have full confidence in the team to manage these plants safely. (**0035-2** [Larrabee, Laura])

Comment: IN SUPPORT OF FPL. (**0685-5** [Batista, Carlos])

Comment: I've worked on and off for Turkey Point, for Florida Power and Light at Turkey Point since 1988 as biologist that specializes in crocodiles. Over that time we have marked --I have marked over 5,000 hatchling crocodiles and from 500 nests. The cooling canal system is super saline, however, what a lot of people don't realize is within that super saline system are fresh water ponds and less saline ponds which, back in the '80s -- by the way there was only 220 American Crocodiles in South Florida, plus or minus 78. So let's just say 150 to 300. As a result of this cooling canal being built -- and I know they didn't build it for crocodiles. Anyway, as a result of that the numbers of crocodiles have increased to a point where in April of 2007 the U.S. Fish and Wildlife Service down-listed American Crocodiles from Federally Endangered animal to a threatened species. So, again, a lot of that has to do with the management of Florida Power and Light. And I'm talking from my heart and I'm talking from what I see firsthand, and what I've seen for 25 years. Florida Power and Light is a steward for the environment, not only with the crocodiles but with a number of other wildlife species I see out there. What I've learned in working in all of these underprivileged countries that I work, and here in the United States, is that because of the state of the world today, it being Earth Day, the way the population is increasing, the need for power, the need for all of these amenities that we want, that industry and the environment can coexist. And somehow there has to be negotiations throughout all of this, and I just feel good about the job FPL is doing with the Crocodile Program and other wildlife species. (**0721-14-1** [Wasilewski, Joe])

Comment: I heard someone talking about the once-through design for the cooling of the canals using sea water to go through the reactor, through the condensers for cooling, and back out to the sea. The initial design of Turkey Point was something similar to that, or basically a once-through design. Once we started realizing the impacts of the hotter water coming out of the condensers on the local ecosystem we went to the closed canal system. This closed canal system, of course, ended up attracting a lot of the wildlife Joe talked about, American Crocodile in particular. And that success story is now history. It's a great success story, and I think Joe put it best. It's a great way where the environment and a corporation can exist. (**0721-15-1** [Kuraza, Devon])

Comment: And one last point I forgot to talk about as far as the canal water. I know some people talked about the elevated salinity and the algae bloom. The algae bloom was a recent event that occurred. We have been taking corrective actions and we've used an approach that has been tried and proven in the industry. So it's -- it wasn't FPL just going outside of their

normal operation, it was something that we've seen in the industry, we talked about it and then we implemented it. (**0721-15-13** [Kuraza, Devon])

Comment: The South Florida community has benefitted tremendously from Florida Power and Light's investment in nuclear energy and nuclear power for the past 40 years. We built that plant 40 years ago with the Building Trades Council and the Building Trades members. The Turkey Point plant has not only benefit providing Florida Power and Light customers with clean -- clean, reliable energy, but has also been very supportive of our local environment, economy, in creating jobs in the process. (**0721-19-2** [Riley, Bill])

Comment: Economic impact on our city is a very large key to the success of Homestead and from the perspective of the City Council we've been very comfortable with their track record as far as safety is concerned, their ability to respond appropriately to whatever may happen. (**0722-1-2** [Porter, Jeff])

Comment: The plant is operated well, it's operated safely for over 40 years. (**0722-10-3** [England, Peter])

Comment: FPL is --and I should mention that FPL will provide and continues to provide significant tax, property tax revenues not only to Miami Dade County but also helping the school board. FPL is a great corporate citizen, the employees and the administration of Turkey Point are active in many, many events in our community. They provide a lot of money to United Way, for everything. We have Relay for Life at the hospital campus this weekend, they'll be out there. They're very into community activities and being good community citizens. (**0722-13-5** [Duquette, Bill])

Comment: FPL, Turkey Point has been a great environmental advocate. The cooling canals, I don't know if you guys have been over there, I welcome you to -- I would suggest you go over there. They've done a lot environmentally to make sure that all the species and everything is maintained. Plus they have a unit onsite to look at environmental issues. (**0722-13-8** [Duquette, Bill])

Comment: I was offered an opportunity to move to Alabama, very lucrative opportunity, and FPL kept me here. They're very good to work with, I see no evidence of environmental impact, and I support the expansion. (**0722-18-1** [Berzowski, Bill])

Comment: So I think Florida Power and Light is doing a great job. I think that they are without a doubt as much concerned about the environment as anybody in this room[.] (**0722-9-11** [Riley, Bill])

Comment: The South Florida community has benefited tremendously from Florida Power and Light's investment in nuclear power over the last 40 years. Turkey Point has not only been providing Florida Power and Light customers with clean, very clean, reliable energy but has also been very supportive of our local environmental issues along with the South Florida economy while creating jobs in the process. (**0722-9-2** [Riley, Bill])

Comment: Along with a very strong environmental partner like Florida Power and Light we do and think that we can even do better, create random things for the communities and for the environment. (**0722-9-6** [Riley, Bill])

Comment: But the most important issue of all for me was safety for obvious reasons. Florida City is very close to the proposed expansion area and again, given FPL's efforts in the area of safety being the vanguard of best practices for our safety[.] (**0723-1-3** [Wallace, Otis])

Comment: Also I had the opportunity to visit Turkey Point and see the site, and I'm confident that everyone there takes all the necessary cautions to run a safe operation. (**0723-10-2** [Brito, Rosa])

Comment: The Turkey Point plant has not only been providing Florida Power and Light customers with clean -- and I think the word "clean" here has been mentioned several times tonight -- it's clean, very clean, reliable energy. It has also been very supportive of our local environmental issues along with the South Florida economy which creates good paying jobs. (**0723-14-2** [Riley, Bill])

Comment: And so I'm here to talk a little bit about FPL Turkey Point's environmental stewardship. You know, many people don't realize but back in the '60's our then president, McGregor Smith had a vision. It wasn't only just fossil fuel and nuclear fuel providing all the energy needs for humanity but also an interactive communal station for the community to come out and enjoy. We had Boy and Girl Scout camps, we had the deer and duck pond. We had, you know, canoeing and all kinds of activities for the community to go to. And as a child, you got to experience that. (**0723-15-1** [Bertelson, Bob])

Comment: But getting back to, you know, what the original focus, the communal effort, the interactive community coming to us, well that really isn't possible because of 9-11. That affected all of us. However, we don't necessarily have -- I do have a group coming out to us tomorrow for education about our stewardship but we also go out to the community. We reach out. We travel to the Deering Estates. We travel to schools all around to spread the good word of what we do. So it's been rewarding for me, I can tell you. If somebody had said, 35 years from now what would you be doing, I wouldn't have come close to this. And I really thank FPL for that and I also thank you for listening to me. (**0723-15-4** [Bertelson, Bob])

Comment: Whereas, the Coral Gables Chamber of Commerce, one of the community's leading business development organizations recognizes the critical role that Florida Power and Light Company plays in providing electrical generation in our community while serving as a tremendously generous corporate citizen, (**0723-2-1** [Trowbridge, Mark])

Comment: [W]e just want to reiterate our support and let you know that we are very pleased with the corporate support that FPL provides in communities as great citizens, and the things that they do to bring jobs to our community. (**0723-2-10** [Trowbridge, Mark])

Comment: ...clean, safe and reliable generation at the Turkey Point facility. (**0723-2-4** [Trowbridge, Mark])

Comment: The last thing I want to say is, you know, there's a lot of talk about safety and I would say information that maybe is given to us from the NRC or from Florida Power and Light or what have you. Just remember that everyone works out at Turkey Point. Everyone who is involved with the nuclear industry, we all have families. We all have kids. We all have kids and wives and husbands who all live in this area. So we all take the responsibility that we have for running a nuclear reactor with absolute seriousness because we do understand the impact it can have and we do understand what we have -- the safeguards we have to have in place so accidents do not happen. We take it very seriously. There's a large number of guys from work

and -- guys and gals from work here. You can ask any one of them, we take it very seriously because we understand the impact it could have. (**0723-6-4** [Murphy, Mike])

Comment: FPL I can say from experience, it's a trustworthy company. And integrity is our most highly prized value, we talk about it a lot, take it seriously. And we have a way of talking about doing things where we say that we leave things better than we found them, down to the kitchen at work, the coffeepot, the stairwell. Leave it better than you found it. And we have that as kind of a motto of operating in our lives and in our work. And that seems to work out well in nuclear power especially. And so I have also as a matter of appreciation for FPL. (**0723-7-1** [Boling, Steve])

Comment: And all those things somehow work together to create what I believe to be the safest industry in the United States. And I think I could prove that if I had any opportunity and needed to. I don't think I need to. (**0723-7-4** [Boling, Steve])

Comment: And to all the workers that work out at Turkey Point, we do appreciate everything you do for us. (**0723-8-6** [McDuffie, Stephen])

Response: *These comments express support either for the Applicant or the existing reactor units at the Turkey Point site. They do not provide any specific information related to the environmental effects of the proposed action. No changes were made to the EIS as a result of these comments.*

E.2.33 General Comments in Opposition to the Licensing Action

Comment: As a homeowner in the area, I want to express that I do not feel that any more reactors be built in the Miami area. (**0006-1** [Faber, Davenie])

Comment: I am opposed to the building of two new nuclear power plants at Turkey Point in Homestead, Florida. (**0007-1** [Johnson, Nadine])

Comment: I oppose the expansion. (**0008-12** [Finver, Jody])

Comment: I am writing to express my firm opposition to FPL's request for permission to construct two new nuclear reactors at Turkey Point. (**0009-1** [Rose, Simon])

Comment: Saprodani Associates herein submits the following comments regarding the EIS and **urges the NRC and the NRC Commission to deny FPL's construction license and/or operational licenses accordingly**. To the extent that the NRC has already granted the aforementioned license(s) - Saprodani Associates **requests that the NRC and/or the NRC Commission revoke said licenses accordingly**. (**0010-1** [Saporito, Thomas])

Comment: Saprodani Associates has reviewed the NRC EIS extensively and has determined that the NRC has made unreliable **conclusions related to the harm to the environment that will result from the construction and operation of FPL's Turkey Point Nuclear Units 6 & 7**. Notably, the NRC appears to have made unsupported assumptions with respect to the environmental harm -and compensated said environment harm and impact -by offsetting -the same -with **economic considerations for the licensee FPL**. (**0010-2** [Saporito, Thomas])

Comment: I am writing in reference to Docket ID: NRC-2009-0337 to express my opposition to the proposed expansion of Turkey Point Power Plant, located in Homestead, Florida. (**0028-1** [Clapp, Linda])

Comment: I am not in favor of the nuclear reactors to be set in place a turkey point. (**0030-1** [Gomez, Lissett])

Comment: My husband and I, tax paying residents of Miami, are strongly opposed to the expansion of the Turkey Point Nuclear Power Plant. (**0031-1** [Hawkes, Holly Forrester])

Comment: As with many residents of Miami, I would like to express my strong opposition to expanding Turkey Point. (**0032-1** [Vinciguerra, Anthony])

Comment: Members as a resident of the City of Miami I am deeply concerned about the proposal to add two (2) additional reactors in Turkey Point. (**0034-1** [Rodriguez, Barbara])

Comment: This note is to inform you of my opposition to the construction of the Two New Nuclear Power Reactors- 6 & 7- at Florida Power and Light's Turkey Point facility. (**0039-1** [Violich, Francesca])

Comment: I urge the NRC, and FP&L, to reconsider this ill conceived plan. (**0039-5** [Violich, Francesca])

Comment: My husband and I are totally opposed to FP&L's plans to build TWO NEW NUCLEAR REACTORS at Turkey Point. (**0040-5** [Pareto, Rolando and Marlene])

Comment: This letter is to inform you of my opposition to the construction of the two proposed Nuclear Power Reactors - 6 & 7- at Florida Power and Light's Turkey Point facility. (**0044-1** [Commenters, Multiple])

Comment: Please be advised by this e-mail that I am ***strongly*** opposed to the construction of the two proposed Nuclear Power Reactors, 6 & 7 at Florida Power and Light's Turkey Point facility. (**0045-1** [Johannsen, Christian])

Comment: There are quite a few other reasons why these reactors are a bad idea but I hope the ones I listed will be enough to help you make a decision that is in the best interests of the citizens of South Florida. (**0048-4** [Wegner, Geri])

Comment: Please consider my dissent and that of so many other South Floridians who say NO to more nuclear reactors at Turkey Point. (**0052-3** [Roos, Monica])

Comment: i am appalled that the NRC would even consider expanding Turkey Point at all, much less adding two new reactors! (**0055-1** [Roedel, Kitty])

Comment: the NRC needs to do the right thing here. (**0055-7** [Roedel, Kitty])

Comment: pls deny the addition of the two additional nuclear reactors at turkey point. it is a poorly conveived boondoggle by fp&l that the NRC should not entertain in this day and age! (**0055-9** [Roedel, Kitty])

Comment: As a Miami native I protest this expansion of nuclear power at Turkey point reactor, (**0056-1** [McCall, Eric])

Comment: I strongly oppose the construction of the two proposed Nuclear Power Reactors - 6 & 7 - at Florida Power and Light's Turkey Point facility[.] (**0057-1** [Neway, Roberta])

Comment: In short, please do not approve these reactors. Consider history, current conditions at Turkey Point, and the lives of the people of Miami-Dade County and the health of our ecosystem. (**0057-5** [Neway, Roberta])

Comment: The NRC and FPL must NOT expand nuclear power generation at Turkey Point. (**0058-1** [Imbesi, Nan])

Comment: This letter is to inform you that my husband and I share the opposition to the construction of the two proposed Nuclear Power Reactors - 6 & 7 - at Florida Power and Light's Turkey Point facility. (**0060-1** [Beckman, Yvonne and Douglas])

Comment: As a Homestead, FL, resident and a concerned citizen, I am completely against any expansion at Turkey Point Nuclear Power Plant. (**0061-1** [Lague, Victoria])

Comment: As a resident, living a few miles from Turkey Point, I'm opposed to any expansion of the nuclear facility. (**0062-1** [Raits, Eric])

Comment: Please stop more reactors at turkey point. (**0063-1** [Smay, Betty])

Comment: I am greatly opposed to the nuclear expansion of Turkey Point. (**0066-1** [Wong, Christina])

Comment: My childhood home is within the danger zone if something catastrophic were to occur. I grew up with that very real fear, which is still a reality. (**0066-2** [Wong, Christina])

Comment: I am greatly opposed to this expansion. (**0066-4** [Wong, Christina])

Comment: I object to Florida Power and Light's plan to expand Nuclear Power Generation at Turkey Point. (**0067-1** [Commenters, Multiple])

Comment: I strongly recommend that Turkey Point 6&7 nuclear reactors be reconsidered. (**0076-4** [Daly, Meg])

Comment: Please say NO to the two new nuclear plants at Turkey Point! (**0078-14** [Wilansky, Laura Sue])

Comment: I beg you to deny the FPL request for the expansion of the Turkey Point Nuclear Power Plant expansion. (**0081-7** [Benson, Mary] [Skove, Ellen H.] [Tompkins, Constance])

Comment: As a voter I will be unable to support anyone sponsoring this proposal. (**0084-3** [Phillips, Monica D.])

Comment: I am writing to object to the building of more nuclear reactors at Turkey Point and their attendant transmission lines. (**0086-1** [Lawrence, Diane])

Comment: Please do not approve the building of these reactors and the transmission lines. (**0086-4** [Lawrence, Diane])

Comment: It is with grave concern that i write to you in reference to Florida Power and Light request for approval into adding 2 new Nuclear Reactors to their plant in Turkey Point Florida. (**0087-1** [Lange, Alexandra])

Comment: I have read the plan in detail and i am astonished to see that they are still moving forward with a plan that Floridians and Miamians do not want. Their plan fails to guarantee any type of safety to our citizens (**0087-2** [Lange, Alexandra])

Comment: If granted, I for one would move my manufacturing and marketing facilities out of south Florida. (**0091-4** [Boyce, Sheila])

Comment: I would like to strenuously oppose Florida Power & Light's proposed expansion of nuclear facilities at Turkey Point. (**0093-1** [DuPriest, William Robert])

Comment: Turkey Point Nuclear Not a good alternative!!!!!! (**0095-1** [Hubler, Gina Marie])

Comment: Please deny the application for the expansion of Turkey Point Nuclear Power Plant. (**0096-4** [Roberts, Linda])

Comment: I oppose the expansion of nuclear power at Turkey point. (**0097-1** [Geary, Craig W.])

Comment: I am writing to express my concern and oppose to this project being approved. (**0101-1** [Gomez, Gustavo])

Comment: I am writing in reference to Docket ID: NRC-2009-0337 to express my opposition to the proposed expansion of Turkey Point Power Plant, located in Homestead, Florida. (**0102-1** [Commenters, Multiple])

Comment: I am writing in opposition to the proposed expansion of Turkey Point Power Plant in Homestead, Florida. (**0103-1** [Commenters, Multiple])

Comment: I urge you to deny the proposed expansion at Turkey Point and protect the region's people and unparalleled natural resources. (**0103-8** [Commenters, Multiple])

Comment: I strongly oppose the expansion of Turkey Point and support the "No Action" alternative. (**0104-6** [Commenters, Multiple])

Comment: I am writing in reference to Docket ID: NRC-2009-0337 to express my opposition to the proposed expansion of Turkey Point Power Plant. (**0109-1** [Platt, David])

Comment: Please do not expand the Turkey Point Power Plant. (**0109-3** [Platt, David])

Comment: We firmly believe that, due to the deficiencies in the information and analysis provided in the DEIS and the multitude of negative environmental impacts on the surrounding environment, the NRC should not issue COLs for Turkey Point Units 6 & 7. (**0113-2-15** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: I object to Turkey Point power plant's request to build new reactors. (**0114-1** [Cunningham, Sue])

Comment: I am very much opposed to this action, as is the majority of the populace in South Florida! (**0115-1** [Trencher, Ruth])

Comment: Please send FPL back to the drawing board to come up with a solution that serves the community not its shareholders. (**0117-4** [Robertson, Alyce])

Comment: This is a bad idea. ... No (**0118-1** [Zakon, Allan])

Comment: I am an electrical engineering graduate student at FIU and I want to express my disapproval of the expansion of Turkey Point's Nuclear Generation. (**0119-1** [de Azevedo, Ricardo])

Comment: Do NOT approve FPL's request to build two new reactors. (**0121-1** [Reyneri, Juan])

Comment: I am against the expansion of the Turkey Point nuclear power plant. (**0122-1** [Meyer, Paul])

Comment: Please do not approve FPL's application for new nuclear facilities at Turkey Point. (**0124-3** [Colby, Helen])

Comment: I am completely opposed to the expansion of FPL's Turkey Point expansion project. (**0125-1** [Colls, Ana])

Comment: This is my testimony against FPL's plan of expansion. I feel FPL does not understand the extent of their actions, and they will be too late in realizing their mistakes. (**0127-1** [Cusidor, Teresa])

Comment: I wholeheartedly protest this expansion and every plan associated with it. FPL is an energy company monopoly. It's presence is already cancerous enough, do not make fasten our termination anymore. (**0127-6** [Cusidor, Teresa])

Comment: I am adamantly against having FPL's nuclear power plant. (**0128-1** [Bach, Lili])

Comment: Based on what I've read and heard about the environmental impact of the proposed new reactors (and the impact of the existing reactors), I am 100% opposed to the project. (**0130-1** [Jones, Diane])

Comment: I am concerned that expansion may not be the solution. (**0132-3** [Mauri, Tom])

Comment: As a resident of Coral Gables, Florida, I find it disturbing that the NRC would even consider approving such an irresponsible and short sighted proposal as the one being put forth by Florida Power and Light for expansion of the nuclear facility at Turkey Point. (**0133-1** [Corral, Oscar])

Comment: Please listen to the people and decline the FPL proposal for Turkey Point. (**0133-5** [Corral, Oscar])

Comment: Please do not let this happen, (**0135-3** [Thiel, Markus])

Comment: I respectfully request that the US Nuclear Regulatory Commission deny FPL's request for two new nuclear reactors at Turkey Point. (**0136-5** [Levy, Morgan I.])

Comment: I urge you to reject this FP&L proposal and as a 45 year resident and taxpayer, I vehemently object to FPL's project as proposed. Many thanks for your support regarding this vital decision! (**0138-1** [Miller, Howard R.])

Comment: You also need NOT to approve this disastrous plan. (**0140-4** [Rhodes, Karen])

Comment: there is no reason to support the licensing of these proposed reactors. I strongly oppose the expansion of Turkey Point and support the "No Action" alternative. (**0141-5** [Lucas, Carmen])

Comment: I would like to voice my complete opposition to this project. (**0146-1** [Grant, Randy])

Comment: We are against any change to Turkey Point. (**0147-1** [Jones, Joan and Robert])

Comment: I oppose FPL's proposal to build two more nuclear reactors at their Turkey Point site in South Florida. (**0148-1** [Brinn, Ira])

Comment: I am writing to oppose the proposed 2 new nuclear reactors at Turkey Point. I attended the April 22, 2015 meeting at FIU to educate myself on this project. There were over 200 people there to oppose it. I heard nothing to change my opinion only to make this project seem more ridiculous than ever. The U.S. Environmental Protection Agency (EPA) has stated that "the permit for the project should not be approved as currently proposed, because it may result in substantial and unacceptable impacts" to the local environment. (**0149-1** [Nelson, Joyce E.])

Comment: 'PROGRESS ONLY FOR PROFIT' IS NOT WISE. THIS IS NOT SAFE. STOP (**0154-1** [Allen, Maureen])

Comment: I am against this project and it should not be allowed to go forward. (**0159-1** [Bazzone, Barbara])

Comment: Please reject this expansion. It is in the wrong place, wrong time, wrong idea! (**0163-3** [Cook, Cherie])

Comment: I believe the proposed FPL expansion should be rejected as it brings along a plethora of both seen and unpredictable consequences. I hope that the Nuclear Regulatory Commission values safety over profit. (**0171-2** [Oria, Jordan])

Comment: I live near Turkey Point and am not happy about this. (**0175-1** [Sockloff, Judith])

Comment: Thus, I vehemently implore you to unequivocally deny this expansion. (**0177-1** [McVicker, Micah])

Comment: As a lifelong resident of Miami and the Roads Neighborhood, only 25 miles north of Turkey Point, I vehemently oppose the construction and further expansion of this nuclear plant with two more reactors. (**0178-1** [Almirola, Alejandro])

Comment: Please deny this request...pIIn and simple. (**0181-3** [Bremen, Gary])

Comment: I am strongly in agreement with the arguments stated below [opposing the proposed action]. (**0184-2** [Perez, Danica])

Comment: Please do the right thing and do not allow this project to proceed. (**0187-6** [Meyer-Steele, Shawn])

Comment: I strongly oppose the expansion of Turkey Point and support the "No Action" alternative. (**0192-7** [Lebatard, David])

Comment: Please do not allow this project. It isn't good for Florida's environment. (**0193-3** [Shipe, Kathleen])

Comment: MUST WE ALWAYS PUT PROFIT FRIST. IN THIS CASE PEOPLE MUST COME FRIST!!! (**0196-1** [Hart, Barbara])

Comment: I believe this project is not in the best interest of the citizens of Miami Dade. I believe the future is better served by using solar energy and energy conservation and efficiency. As the articles states, FPL's plan is regressive and harmful. I hearby state my OBJECTION to this project. We need to protect the environment for future generations. We need to be wise! (**0204-1** [Cooper, Fran])

Comment: Although this decision may be a means to enrich the shareholders of Florida Power and Light, it places the entire population of South Florida in jeopardy. I hearby request that you deny the construction and operating license for the proposed facilities at Turkey Point. (**0206-3** [White, Holly])

Comment: My children and grand-children live in South Florida, and I want to preserve for them the beauty and natural wonder that I grew up with. (**0207-8** [Cleland, Noel])

Comment: I'm a South Florida resident and I am expressing my opposition to expanding the Turkey Point nuclear plant any further. This project is the wrong project for this location and the permit to add more nuclear reactors should be denied. (**0209-1** [Umpierre, Diana])

Comment: A Sick Dream. That is what adding reactors at Turkey Point is. How do you even consider such madness? (**0216-1** [Osborne, Martin])

Comment: Please look to our children and their future and not to those who try to influence you to ignore what is best for the environment. (**0217-1** [Fitzpatrick, Deirdre])

Comment: I am writing in reference to Docket ID: NRC-2009-0337 to express my opposition to the proposed expansion of Turkey Point Power Plant, located in Homestead, Florida. (**0221-1** [Sophia, Tristan])

Comment: This is a terrible idea--don't do it! (**0222-2** [Glass, Rachel])

Comment: I attended the evening public comment session at FIU. Although, I did not write this letter. It says everything that I would have said and I'm very concerned about each of the issues. (**0223-1** [Robbin, Valerie])

Comment: I oppose the proposed expansion of Turkey Point Power, (**0228-1** [Yeager, Jerry])

Comment: As voters, taxpayers, business owners and grandparents in Fort Lauderdale, we ask you to please prevent the nuclear expansion at Turkey Point. We don't need to list the many reasons why this ill-advised project should be stopped -- you have already heard them -- but please add our names to those who strongly oppose this project. (**0233-1** [Purdy, Shyam and Mohini])

Comment: Not everything in this world is just about money, or getting it by making horrendous and greedy choices which will affect all of us. Please make a difference in this world, doing the right thing!!! I know YOU CAN. (**0238-3** [Padilla, Dora])

Comment: Please do not do this! I don't see how you can collect money from your customers without them knowing where its all going. Not to mention the dangers of this. Is this really necessary? What is wrong with the nuclear power plants we already have? I do not want my money going to this. (**0239-1** [Anonymous, Anonymous])

Comment: As a resident in South Florida I am opposed to the plans for two new nuclear plants at Turkey Point[.] (**0240-1** [Commenters, Multiple])

Comment: No more power plants please. (**0241-3** [Portuondo, Pilar])

Comment: Terrible idea. Do what is right! (**0242-2** [Colby, Helen])

Comment: Their is no logical reason for building these two nuclear reactors. (**0243-1** [Duran-Pinzon, Jaime])

Comment: Do not allow this travesty. Say no to the new nuclear reactors. (**0243-4** [Duran-Pinzon, Jaime])

Comment: Please do not approve the expansion of the nuclear power plant at Turkey Point. (**0244-1** [Haber, Rochelle])

Comment: I believe you should do the right thing and not approve the Turkey Point plant expansion. (**0244-3** [Haber, Rochelle])

Comment: I am writing to express my opposition to the proposed expansion. (**0245-1** [Lindsey, Jerrie])

Comment: Do NOT approve this expansion! (**0245-7** [Lindsey, Jerrie])

Comment: The impacts mentioned above are by no means the only adverse impacts from the addition of two new nuclear reactor units. I hope the NRC will take my comments into consideration and reject FPL's application. (**0246-7** [Shlackman, Mara])

Comment: I live too close to Miami to allow this to happen (**0248-2** [Kadis, Patricia])

Comment: This is a totally irresponsible idea given the potential environmental impact. (**0249-1** [Mosher, Paul])

Comment: I strongly agree with the views expressed by the Mayors of Pinecrest, Palmetto Bay, & South Miami that the expansion of the nuclear facility at Turkey Point by FPL should NOT BE ALLOWED under any circumstances. (**0251-1** [Whitfield, Isabelle])

Comment: As a taxpayer I want the NRC not to approve FPLs proposal for two new reactors. (**0257-1** [Padron-Delgado, Blanca])

Comment: Your recent decision to give tentative approval for two new reactors along the shores of Biscayne Bay via their Draft Environmental Impact Statement is Reprehensible! (**0259-3** [Lettieri, Tammy])

Comment: I urge the NRC, and FP&L, to abandon this ill-conceived plan to expand nuclear power generation at Turkey Point. (**0263-6** [Orzechowicz, Holly])

Comment: In reference to Docket ID: NRC-2009-0337 the proposed expansion of Turkey Point Power Plant, located in Homestead, Florida NONO NO NO NO NO NO NONO NO NONONOT NO NO N O N O NO NO NO (**0266-1** [Defoggi, Virginia])

Comment: This is insane! (**0267-1** [September, P. J.])

Comment: Turkey Point Nuclear Reactor Plant is all ready ENOUGH A TREAT for us in the vescinity. Me and my Family STRONGLY OPPOSE to permitting of new developments of NUCLEAR POWER PLANT projects in this area we have called home for over 5 decades. Please take our concern to the highest level of descition making management for such unwanted projects. (**0272-2** [Zuniga, Family])

Comment: It is illogical and inconceivable to me hat you'd be striving to expand Turkey Point Power Plant in Homestead, Florida. Just a few years ago we were forced to mobilize against development of an international airport at Homestead AFB which would have severely impaired Biscayne and Everglades National Parks. (**0274-1** [Peterman, Andy])

Comment: Do you think we can ever get a grip on what makes sense for our region and country so the few citizens that are awake don't have to keep resisting these noxious proposals ? (**0274-2** [Peterman, Andy])

Comment: Please follow your own guidelines in this matter and deny this request for expansion. (**0275-1** [Hayes, Linda])

Comment: As a lifelong Dade County resident, I oppose Florida Power & Light Company's attempt to build additional nuclear generators at its Turkey Point facility. (**0283-1** [Compel, Jr., Joseph])

Comment: I am writing in opposition to the proposed expansion of Turkey Point Power Plant in Homestead, Florida. (**0285-1** [Miller, Melissa])

Comment: We do not want you to approve construction of 2 new nuclear power plants at Turkey Point. (**0287-1** [Beiriger, Mary])

Comment: The undersigned urge you to reject the application and choose the **No Action alternative**. (**0288-1** [Cleland, Noel] [Jackalone, Frank] [Mahoney, Stephen] [Matthews, Debbie] [Roff, Rhonda] [Scott, John] [Teas, Jim] [Ullman, Jonathan])

Comment: So here is my message to you: JUST SAY NO!! (**0290-1** [Wry, Ellen])

Comment: This is not the place for another power plant. (**0290-2** [Wry, Ellen])

Comment: Our eco system is so sensitive, how can this even be considered? (**0292-1** [Rothstein, Debbie])

Comment: In reference to Docket ID: NRC-2009-0337, I stand strongly opposed to the proposed expansion of Turkey Point Power Plant, located in Homestead, Florida. (**0295-1** [Dietrich, Chris OMeara])

Comment: I strongly oppose the expansion of Turkey Point as proposed in Docket NRC-2009-0337. (**0299-5** [Salatino, Freda])

Comment: I Oppose the Proposed Expansion of Turkey Point, Docket ID: NRC-2009-0337. (**0300-4** [Van Pelt, Jason])

Comment: The only real pressure You will feel is in not protecting your fellow citizens and the environment in which they live. Please do not knuckle under to the Fear of Politics and pressure. You are the one that looks into that mirror every morning. (**0301-1** [Jimenz, Lawrence])

Comment: Although FP&L does a good job in managing as much as possible, expansion would tip the scales too strongly. (**0308-2** [Wallington, Victoria])

Comment: The following paragraphs tell me and I would think would also tell you why it should not be permitted. (**0319-1** [Dent, William])

Comment: To expand upon on already ill-placed power plant is a horrible idea. (**0323-2** [Jennings, Cara])

Comment: Stop this now before there are horrendous repercussions. (**0326-2** [Earnshaw, Shinann])

Comment: The application should be denied. (**0329-1** [Baumwall, Douglas])

Comment: I, as a resident of Palmetto Bay, FL, do not want another nuclear reactor built at the Turkey Point faculty. (**0330-1** [McCarthy, Dawn])

Comment: I live in and my children attend school in Palmetto Bay, and I already feel a constant threat of a nuclear accident. The last thing I want is for further endangerment of our community. (**0330-2** [McCarthy, Dawn])

Comment: Don't let FP&L do it! (**0334-1** [Crystal, Chris])

Comment: I am against any additional nuclear power generation in Florida. (**0335-1** [K., Jeff])

Comment: Accordingly, we respectfully request that you reject the application for additional nuclear facilities at Turkey Point. (**0338-2** [Kavanaugh, Daniel])

Comment: We cannot urge you strongly enough to deny this license. The dangers to the environment, as well as to human life, inherent in such a project are beyond doubt. (**0341-1** [Daniels, Bonnie])

Comment: The disastrous effects of a potential weather event - a hurricane being a highly likely risk in this area - are undeniably real and have been well illustrated by Fukushima. We lived through Hurricane Andrew, and our home is only a few miles from Turkey Point; we do not want, nor see the need for, the risks this project entails in our own backyard. (**0341-4** [Daniels, Bonnie])

Comment: With reference to the upcoming meetings concerning the approvals for a nuclear facility at Turkey point, please note I DO NOT think the project is necessary. (**0343-1** [Cardona, Alfredo])

Comment: Quite to the contrary, I feel that its proximity to a major urban area and its location in a place subject to hurricanes suggests that the permits should be DENIED. (**0343-2** [Cardona, Alfredo])

Comment: I do not approve. (**0347-2** [Petersen, John])

Comment: Please reconsider this project. (**0349-4** [Oliva, Vivian])

Comment: Though I am sure your researchers truly believe the plants will not harm anything I think in the overall picture from generations to come, even they don't have all the answers. Please consider the impacts carefully and make a choice that is right for people and the environment and not for power companies and profits (**0352-3** [Tingle, Peggy])

Comment: This is a terrible idea and I am thoroughly against it. (**0354-1** [Anonymous, Anonymous])

Comment: Please scratch this idea once and for all. (**0355-3** [Thomas, Bill])

Comment: It's time for FPL to face the future rather than fight it, and for public officials to promote the public interest rather than short term corporate financial interests. (**0356-17** [Shlackman, Jed])

Comment: I object to Florida Power and Light's plan to expand Nuclear Power Generation at Turkey Point. (**0358-1** [Norman, Ronald])

Comment: I simply am not willing to take the necessary personal and financial risk to further FP&L's business objectives. I hereby request that you deny the construction and operating license for the proposed facilities at Turkey Point. (**0358-5** [Norman, Ronald])

Comment: I oppose this plan. (**0361-1** [Berndgen, Michelle])

Comment: Please don't approve this short sighted plan. (**0361-4** [Berndgen, Michelle])

Comment: I urge you to not build and expand Turkey Point Nuclear Plant. (**0362-1** [Hurley, Paula])

Comment: I urge you to consider the ENORMOUS effect of the HIGH risks of expanding Turkey Point power plant. Have you ever relaxed and recharged in nature? Please think of your children, grandchildren or others only being able to hear I stories of what beauty was and not being able to experience it themselves. (**0362-6** [Hurley, Paula])

Comment: I am speaking out against the expansion of the Nuclear power plant at Turkey Point. I don't believe it is in South Florida's best interest, nor in the best interest of the world. (**0363-1** [Peters, Emily])

Comment: There is very serious cause for concern regarding the negative environmental impacts of Turkey Point Nuclear Power Plant. The addition of 2 more nuclear reactors will exacerbate the existing problems to a crisis level. (**0365-1** [Fischer, Antoinette])

Comment: Am strongly opposed to granting the licenses for Turkey Point. (**0368-3** [Casey, Sr., Robert J.])

Comment: Building two new nuclear reactors at Turkey Point, an incredibly sensitive natural ecosystem, is a truly terrible idea. (**0370-1** [Vayu, Satya])

Comment: Please do not allow new nuclear reactors to be built at Turkey Point. (**0370-14** [Vayu, Satya])

Comment: Building additional reactor units at Turkey point is a really bad idea. (**0371-1** [Haffmans, Edmund])

Comment: Please say NO to Turkey Point 6 & 7. (**0371-6** [Haffmans, Edmund])

Comment: I've lived in this area for over 30 years. I have 2 young kids. As a parent I'm trying to teach my kids about the importance of recycling and respecting our environment. I am sad, disappointed and scared that FPL was able to get this far in the process. When are we, as adults, going to start practicing what we preach to our kids? (**0372-2** [Ortiz, Natalia])

Comment: None of this makes any sense. I hope and pray that you will do what's right. That you will object to this and show FPL and Tallahassee that money doesn't trump safety. (**0372-5** [Ortiz, Natalia])

Comment: Do not License this application, no way, no how. (**0373-1** [Lee, Nancy])

Comment: In reference to Docket ID: NRC-2009-0337, I oppose FPL's proposal to build two more nuclear reactors at their Turkey Point site in South Florida. (**0379-1** [Commenters, Multiple])

Comment: The Turkey Point 6 & 7 Expansion only adds to a BAD situation. (**0380-1** [Anderson, Vaughn])

Comment: Seriously, some chucklehead must lose his payday over this and it's not a bad idea to lose his/her supervision, as well. Whatever were you thinking? (**0384-3** [Franzmann, Paul])

Comment: THIS IS EXTREMELY IMPORTANT! LIFE DEPENDS ON THIS! (**0385-1** [Greenwald, Ken])

Comment: To think that the expandtion in the area, turns my stomack. What is the management thinking. It seems that theydon't think anything about our ecology. We are poisoning our water and killing fist by the thhousands is some parts of the world. (**0392-1** [Greer, Tom])

Comment: My personal feeling is that this is a Very Bad Idea. Weather, potential water levels and other factors make this facility not worth the risk. (**0395-1** [Fishman, Zelma])

Comment: As a Georgia resident, we spend quite a bit of time in Florida. As a mom, I ensure that my children understand the necessity of our role as humans to protect land and water. Therefore, I am writing in reference to Docket ID: NRC-2009-0337 to express my opposition to the proposed expansion of Turkey Point Power Plant, located in Homestead, Florida. (**0397-1** [Blanck, Heidi])

Comment: The expansion would be a huge mistake from any perspective for South Florida. (**0402-1** [Dunn, Elmo])

Comment: PLEASE TAKE THE RIGHT, FAIR, JUST, HUMANE AND HEALTHY ACTION AND OPPOSE THE PROPOSED EXPANSION OF TURKEY POINT. (**0403-1** [Graffagnino, Mary Ann and Frank])

Comment: A family tradition for 25 years has been "head to Florida to recover from winter and enjoy parks, beach, water and baseball". Homestead is an important location for access to those goals! (**0407-1** [Kaye, Jackie])

Comment: I propose you have enough grid feeds in Florida to supply everybody. If ya need more juice then build another unit at St. Lucie County. I don't live near Miami but I do know what the Biscayne park is as I ride my bicycle there with my bike club...NO is the answer. (**0410-1** [Quinn, George])

Comment: With or without, we face a barren world without animal life and soon without human life and so I am writing in reference to Docket ID: NRC-2009-0337 to express my opposition to the proposed expansion of Turkey Point Power Plant, located in Homestead, Florida. (**0411-1** [Kern, Madeleine Fisher])

Comment: In reference to Docket ID: NRC-2009-0337, I oppose the proposed expansion of Turkey Point Power Plant located in Homestead, Florida. (**0413-1** [Cobb, Tanya])

Comment: Quit destroying the environment----we only have one. (**0416-1** [Underwood, John])

Comment: Please oppose expansion of Turkey Point Power Plant. (**0417-1** [Beattie, Jane])

Comment: Surely you cannot be considering this! (**0422-1** [Yount, Madeline])

Comment: I am a supporter of nuclear power, and believe that it should be a key component of any future energy plan as we transition to an era of less dependance of fossil fuel. However, the expansion of the Turkey Point Power Plant is unacceptable. (**0423-1** [Peterson, Ted])

Comment: Please, this is extremely important not just for our area, or for the entire State of Florida, but for our nation. I am writing in reference to Docket ID: NRC-2009-0337 to express my opposition to the proposed expansion of Turkey Point Power Plant, located in Homestead, Florida. (**0428-1** [Leo, Carlos])

Comment: Biven the points made above, the proposed expansion would be the wrong thing to do. (**0433-1** [Vermeulen, Mary])

Comment: This place should be closed, not expanded. (**0435-2** [West, Eric])

Comment: There is time and place for everything, but this is neither the time or place. (**0436-1** [Boone, Jim])

Comment: We are APPALLED AND OUTRAGED that our own government would propose the expansion of Turkey Point Power Plant, located in Homestead, Florida. (**0440-1** [Hoyle, Lester and Judy])

Comment: The site proposed for expansion is located RIGHT NEXT TO MIAMI[.] (**0440-5** [Hoyle, Lester and Judy])

Comment: SIMPLY ANOTHER ATTEMPT BY CORPORATE ENTITIES TO EXPAND THEIR PROFITS WITH NO REGARD FOR PUBLIC AND PLANETARY HEALTH!!! WE HAVE HAD FAR, FAR TOO MUCH OF THIS CRAP!!! PLEASE DO THE RIGHT THING: SAY ABSOLUTELY NOT!!!!!!!!! (**0444-1** [Bodiford, Loretta])

Comment: Having lived within "blowing up" distance of Indian Point, NY and read about their current problems, we really don't need more expansion, particularly near a national park that is near sea level. (**0450-2** [Richards, Margie])

Comment: As the voting constituents of your administration, we strongly oppose the expansion of nuclear power generating facilities, specially at Turkey Point. (**0451-1** [Durieux, P.])

Comment: In conclusion, the City reiterates its belief that the Turkey Point Nuclear Plant Units 6 & 7 application should not be approved as currently proposed. (**0456-25** [Miami, City])

Comment: Actions that were considered safe during the 1900s, are no longer. The dangers are too great because actions to repair are never enough. (**0466-1** [Kirschbaum, Saran])

Comment: It is not the way to go. (**0469-2** [Weber, Zorina])

Comment: It is a terribly bad idea, a fools' errand. (**0470-3** [Lenz, Andrew])

Comment: This is a bad plan anyway. Even the existing structure poses a potential threat. Why make it even worse? Bucks for someone and other people are just collateral damage? (**0471-2** [Manter, Larry])

Comment: As a resident of Florida, I get a voice in the discussion about the proposed new nuclear reactors at Turkey Point and I say NO to the proposed project. (**0472-1** [Ball, Cheri])

Comment: Please do NOT move forward with the proposed nuclear initiative as FPL has proposed. (**0472-3** [Ball, Cheri])

Comment: NO to Nuclear Expansion! (**0475-1** [Mayer, Karen])

Comment: Please come to your senses. Help your children and grandchildren inherit a world that's worth living in !!! Show them our generation's concern for the rest of the world doesn't end at the tip of our noses !!! (**0478-1** [Svensson, Bo])

Comment: Couldn't believe what I was reading when I saw this. As a former Miamian, and someone who has witnessed the savging of Florida's once-rich resources, this proposal at first seemed like a fundraising ploy - or a bad joke. Even without the inevitable rise in ocean levels, it is a demented and dangerous idea. (**0479-1** [Pearce, J. B.])

Comment: No. Simply NO. (**0480-1** [Simmerman, Scott])

Comment: Send them back to the drawing board. And PLEASE, do not succumb to the probable greedy interests behind this approach to problem solving. (**0484-3** [Speno, Charlie])

Comment: Someone's corporate greed and profits are probably at stake here but they will live without this. (**0486-2** [Douglas, Carolyn])

Comment: Too close for comfort! This is not a smart move! (**0489-1** [Galbreath, Jerry])

Comment: EXPANDING THE NUCLEAR FACILITY WILL DO HARM TO THE ENVIRONMENT. PLEASE DO NOT APPROVE THIS PROJECT. THANK YOU! (**0490-1** [Jurczewski, Carol])

Comment: Saving this beautiful place forever should be a priority. It is very important to sustaining the clean water supply for Florida as well as environment for the wildlife. Please do not destroy anymore habitat at this location. (**0504-1** [Gomez, Toni Thoman])

Comment: This is true information and I think the fact that they kept this out of the news may be good ammunition for you to use to Stop enlarging Turkey Point Nuclear Reactor Now ?? !! (**0505-3** [Buyea, Thomas])

Comment: In reference to Docket ID: NRC-2009-0337, I oppose FPL's proposal to build two more nuclear reactors at their Turkey Point site in South Florida. (**0508-1** [Harrison, J. M. M.])

Comment: The location is vulnerable to Hurricanes, sea level rise and terrorist attack. By all measures this proposal should be rejected. (**0509-3** [Otto, Peter])

Comment: The concerns and objections to this project were succinctly expressed in the following article: http://www.miamiherald.com/opinion/op-ed/article20380647.html. Please add my objection to this enormously impactful and dangerous project. (**0510-2** [Langlieb Greer, Evelyn])

Comment: Please accept and review my letter in opposition to nuclear reactors at Turkey Point. (**0511-1** [Draper, Lonnie M.])

Comment: I am asking you to do everything in your power to protect Miami from these risks. (**0515-8** [Regalado, Tomas])

Comment: Please deny permits for the proposed expansion of the Turkey Point Power Plant in Homestead, Florida. (**0518-1** [Weiss, Arwen])

Comment: IF people were truly smart they would recognize the basic concept of carrying capacity and realize the solution is fewer people. So please stop empowering stupidity and help make people be responsible for their actions. Please do not support this project. (**0520-1** [Bernatis, Jenn])

Comment: As a South Florida resident and a citizen concerned about the protection of our local nature, wildlife, and the future risks to everyone who resides near to this project, it is my duty to tell you that i believe strongly the risks inherent in this expansion outweigh the benefits of constructing extra nuclear capacity. (**0523-1** [Mitzkewich, Yuri])

Comment: Thank you for considering my request. According to the NRC's own guidelines this expansion is prohibited! Why is it even being suggested? Tell them "NO!" and be done with it! (**0531-1** [Slaton, Marina])

Comment: This proposal is in violation of the NRC's own guidelines. Why is it under consideration? (**0535-1** [Bump, Deborah])

Comment: NO EXPANSION OF NUCLEAR PLANT AT TURKEY POINT!!!! (**0536-1** [Mikan, Edward])

Comment: It surely doesn't seem that expanding Turtle Point is a good idea. (**0539-2** [Malone, Peggy])

Comment: It is essential that you stop it now, no new plans for Turkey Point!!! (**0540-4** [Burge, Laura])

Comment: I am very opposed to more reactors at Turkey Point. This is wrong for a large variety of reasons: Environmental, safety, visual (tourist and locals viewing the power lines), impedes Everglades restoration, financial (nuclear has been an expensive boondoggle). I can go on at length. As a taxpayer and user of electricity from FPL I object to having to pay for this. (**0543-1** [Ryan, Jim])

Comment: This is a ridiculous waste and FPL and the NRC are on the wrong side of history. Wake up! (**0543-3** [Ryan, Jim])

Comment: Expanding a nuclear power plant in ths area makes no sense to me. It is in Hurricane Alley, it's at ground zero for sea level rise in the US, it is a beautiful tourist attraction, it is a delicate ecosystem, and the area is already suffering from salt water intrusion that will presumably only be excerbated by these new units. (**0544-1** [Ehrenfried, Jennifer])

Comment: I request that you deny FPL's request to spend in excess of 18 Billion dollars in order to construct two new AP-1000 reactors at Turkey point and operate them mid 2020's onwards to 2090's. (**0545-1** [Keating, Tim])

Comment: I am against the proposed new reactors at Turkey Point and agree with the comments made by the South Florida Wildlands Assn. (**0546-1** [Hoffmeyer, Lisa])

Comment: I am against any nuclear power plants operating in areas that are prone to natural disasters which could cause long-term power outages, flooding, wildfires, or seismic activity. Look at what has happened and continues to happen at Fukushima. Can you fathom the situation if that type of accident were to occur in a deensly populated area in the US? (**0547-1** [F****SH, Peter])

Comment: Please stop the madness! (**0550-5** [H., Pat])

Comment: Please do not approve this project, there are way too many health and environmental risks involved. (**0553-1** [Punnett, Daniela])

Comment: I am leaving Miami if this project goes through, in order to protect my family and two children. It is outrageous that this is even being considered. (**0553-3** [Punnett, Daniela])

Comment: Having spent 31 years in the USMC and travelling the world I clearly understand both perspectives. However, the take away for me is once we destroy what nature has provided, there is no going back! Look at the lessons the world has learned, but can't undo, don't make this another mistake we, and more importantly our children live to regret! (**0557-1** [Smythe, Ana])

Comment: In reference to Docket ID: NRC-2009-0337, our right to clean water, land and air, essential to life liberty and the pursuit of happiness, trumps their right to build a plant and pollute our environment with radioactive waste and discharge, and a possible meltdown, especially in the path of major hurricanes. Have we learned anything from the Fukushima Disaster? Why isnt there a major effort to make the Sunshine State the Solar Powered State? Hence, I vehemently oppose FPL's proposal to build two more nuclear reactors at their Turkey Point site in South Florida. (**0559-1** [Lettieri, Tammy])

Comment: As a retired Bechtel employee involved in nuclear power plants, I am very familiar with plant design and its impacts. (**0562-1** [Hardie, Daniel])

Comment: OUTRAGE AND OPPOSITION TO THE PROPOSED INSANITY OF EXPANDING TURKEY POINT POWER PLANT (**0564-1** [Dimondstein, Carla])

Comment: This is comparable to the Indian Point Nuclear Facility in NY which is now threatening residents in a very wide circle!!!!! (**0566-1** [Rosenfeld, Alice])

Comment: I am writing as a citizen and a physicist in reference to Docket ID: NRC-2009-0337 to express my opposition to the proposed expansion of Turkey Point Power Plant, located in Homestead, Florida. (**0567-1** [Cohen, Howard])

Comment: I am writing in reference to Docket ID: NRC-2009-0337 to express my opposition to the proposed expansion of Turkey Point Power Plant, located in Homestead, Florida. (**0568-2** [Goldberg, Laura])

Comment: As a citizen of Miami-Dade county for my entire life, I am deeply concerned by the actions FPL is trying to take with regard to nuclear expansion. While I understand that our cities and counties have growing needs for energy, I do not believe this is the right route to take. (**0570-1** [Martinez, Orlando A.])

Comment: For these reasons, and others highlighted here: http://www.miamiherald.com/opinion/op-ed/article20380647.html I ask that you NOT grant FPL permission to move forward with it's proposal. (**0570-5** [Martinez, Orlando A.])

Comment: This proposed expansion is a real turkey! It poses danger to our lives, nothing less. Please do not allow expansion. (**0572-1** [Mcintyre, Frances])

Comment: As a member of the local community (living in unincorporated Miami-Dade County only a few miles from Turkey Point), I urge the commission NOT to approve the FPL application. (**0573-1** [Trauner, Keith])

Comment: I'm against this project, this doesn't benefit the HEALTH or ENVIRONMENT. (**0574-1** [Fuentes, Mariana])

Comment: I am opposed to the expansion of the Turkey Point nuclear power plant. (**0579-1** [Schwab, Roy])

Comment: [Do] not allow this expansion to go through. (**0579-6** [Schwab, Roy])

Comment: Are you people crazy??? This scheam is deviant and devoid of any rational thought ! DO NOT DO THIS!!! (**0580-1** [Lawrence, Theresa])

Comment: Think! This is a hideous idea; STOP THIS !!! (**0580-3** [Lawrence, Theresa])

Comment: In my estimation it is time pull the plug on this ill thought out endeavor. (**0585-1** [Hilderbrandt, Todd])

Comment: Having learned about the proposed expansion of the Turkey Point Power Plant that is in Homestead, Florida, I write to urge that this not be approved. (**0588-1** [Hanna, Jane])

Comment: I am an ordinary citizen of Florida and a concerned citizen of the United States. It is so common for we humans to put off until tomorrow what we can do today. With regard to the environment and to clean energy we have put off action so long we really have to STOP doing

business as usual now. Please do not approve FPL's request to build two additional nuclear reactors at Turkey point. (**0595-1** [Ghosh, Susan])

Comment: I object to the new reactors. (**0596-1** [Sorenson, Katy])

Comment: Bad idea! Think that more creativity is needed to solve energy needs without endangering, plant, animal and human life. (**0600-1** [Edwards, Suzi])

Comment: The Point Is: they can't be trusted to do the right thing as only PROFIT drives them!! (**0604-2** [Courliss, William])

Comment: This is irresponsible. (**0606-1** [Metje, Melodie])

Comment: As a SCUBA diver, I can appreciate further environmental issues from nuclear expansion. (**0614-1** [Dauerty, Barbara])

Comment: To put it succinctly, there is no way that the NRC can claim to meet its legal obligations to public health and environmental safety in licensing the construction of these plants in South Florida. The combination of the AP1000's new and untested "passive safety" features and the particular meteorological, hydrological, and population density characteristics of the area preclude the legal licensing of Turkey Point 6 and 7. (**0615-1-12** [Bethune, David])

Comment: Given now the incontrovertible evidence that the applicant's COL for Turkey Point 6 and 7 presents unacceptable risks to human health and the environment, I demand that the NRC swiftly and conclusively terminate these licensing proceedings. (**0615-3-12** [Bethune, David])

Comment: The two new proposed nuclear reactors at Turkey Point are not only dangerous for the environment, but dangerous for the community in a fragile location. (**0625-1** [Felinski, Julee])

Comment: Stop this development at Turkey Point, before it's too late! (**0625-5** [Felinski, Julee])

Comment: Shame on you for even considering this. You're a public menace and this needs to STOP! Oh, but what YOU are doing will be "safe"? Get real! Stop these plans right now!! (**0628-3** [Anonymous, Anonymous])

Comment: Please do not approve this expansion at Turkey Point. (**0631-1** [Griswold, Dave])

Comment: Please reconsider these projects. (**0633-1** [Cornely, Tina])

Comment: The habitat for wildlife cannot-be replaced if there is an accident and I believe the risks are too great to warrant going forward with the Nuclear Power Plant. (**0635-2** [Seiman, Rhonda])

Comment: Please deny the application for more nuclear plants in south Florida. (**0635-4** [Seiman, Rhonda])

Comment: I am writing in opposition to FPL's request for two new nuclear reactors at their Turkey Point location. (**0642-1** [Rawlins, Steve])

Comment: I urge the Nuclear Regulatory Commission to deny approval to the Florida Power and Light company to build two more reactors. Let us start to behave in a way that is safe and environmentally sound. (**0642-6** [Rawlins, Steve])

Comment: But at a minimum, please don't add to the problem! (**0643-4** [Joannou, Jr., Benjamin])

Comment: Please don't add any new nuclear reactors! (**0643-6** [Joannou, Jr., Benjamin])

Comment: I say no. No, no No! (**0644-1** [Anonymous, Anonymous])

Comment: This is absolutely irrational unless you have a vested interest. And you are a sociopath and are devoid of empathy of any kind. (**0644-5** [Anonymous, Anonymous])

Comment: The Homestead/Miami area is also at a high statistical risk for hurricane hits. We all know that Homestead was devastated in August, 1992 by hurricane Andrew. We should take this risk seriously, and admit, that for this reason alone, expansion at Turkey Point Power Plant is a very poor idea. (**0646-1** [Pattison, Janet])

Comment: As a matter of fact I strongly feel it would be absolutely stupid and absurd to expand this plant. (**0651-1** [Young, Kim])

Comment: This expansion should ABSOLUTELY NEVER HAPPEN!!!!!!!! (**0651-3** [Young, Kim])

Comment: PLEASE DO NOT ALLOW THIS TO HAPPEN, WE DO NOT NEED A BIGGER PLANT!!! (**0651-5** [Young, Kim])

Comment: I do not support the construction and subsequent operation of Units 6 & 7 at Turkey Point. I believe the potential negative environmental impact creates too much additional risk for the area. (**0653-1** [Hickey, Alan])

Comment: I am one hundred percent opposed to building/expanding Turkey Point Nuclear Plant. (**0662-1** [Anonymous, Elena])

Comment: bad idea.. (**0664-1** [Alvarez, Chad])

Comment: I vehemently oppose the proposed expansion of nuclear reactors at turkey point. Please, for once, think of the health of the citizens of Miami and their families. Not to mention the environmental impacts could be catastrophic. Please don't let this plan pass, it is a mistake and a tragedy. Miami is vulnerable enough to climate change, let's make a good example of Miami as a leader in environmental protection and human health--oppose these reactors!!! (**0665-1** [Castro, Alyssa Tomasi])

Comment: I am opposed to the building of two additional nuclear reactors at Turkey Point. If they were built the damage to the environment would be huge. (**0666-1** [Jens-Rochow, Steve])

Comment: The building of these reactors is an abomination (**0667-1** [Brown, Bradford])

Comment: No to the two planned nuclear reactors. PLEASE! (**0672-1** [Barnidge, Virginia])

Comment: I urge you to deny the permit for building reactors #6 and #7. (**0674-8** [Dwyer, Karen])

Comment: Don't put our beautiful peninsula in jeopardy by approving more nuclear reactors. (**0677-7** [Chiszar, Benjamin J.] [Jacobs, Lee] [Klopfer, Carol])

Comment: Don't commit our children to this fiasco! It's good for FPL, not the public! (**0679-1** [Jacobs, Lee])

Comment: Please treat our neighborhood as if you were living here. (**0684-1** [Scherr, Matthew])

Comment: How else can the government screw up our natural resources, it goes on and on, and we seem helpless to stop it!!!! (**0690-1** [Egan, June])

Comment: We do NOT need to expand this facility, especially in such a vulnerable area. (**0692-2** [Nickerson, Nancy])

Comment: This project is just a really bad idea. (**0693-2** [Dorn, Kathryn])

Comment: We simply do not need any more nuclear facilities. (**0696-1** [Johnson, Rheta])

Comment: Please, please, please listen. This issue is vitally important to each and every one of us--worldwide. We are writing in reference to Docket ID: NRC-2009-0337 to express our opposition to the proposed expansion of Turkey Point Power Plant, located in Homestead, Florida. (**0698-1** [O'Donahoo, Gayle] [O'Donahoo, Roger])

Comment: The risk of nuclear contamination in this delicate environment is far too great. If we allow this project to move forward we will never be able to turn back again. (**0709-1** [Cummings, Frank])

Comment: The construction of a new power plant is a very bad investment for the people of Florida and should not be carried out. (**0713-4** [Heiney, Jamie])

Comment: Have we gone insane, suicidal or are we just stupid!? (**0718-3** [Buechler, Jerry])

Comment: Please be mindful and recognize this is a choice that comes from greed. We are all one and we are the environment. By taking care of our present, we take care of our future. Please don't let this happen ... It's time for change. (**0720-3** [Bastidas, Mauricio])

Comment: So I'll just conclude it by just saying that, again, I'm not a technical expert, but from my vantage point working in State policy, just asking you to understand that the artificial incentive to pursue this application on the part of our electric utility is because we're being forced to pay for it by State law. And that's the reason why I believe that in their application and in their zeal they can ignore the cost on our economy, they can ignore the cost on our community, on safety, and our environment, and on behalf of my constituents, I ask that you not do the same. (**0721-1-11** [Rodriguez, Jose Javier])

Comment: So what would the environmental impact of building 6 and 7 be? It will compound the disaster which has already occurred at Turkey Point, possibly the worst place to produce energy on the planet. (**0721-12-8** [White, Barry J.])

Comment: So for all of these reasons I encourage all of you to go research some of these things and write in and let's oppose this and stop this plant from being built here. (**0721-23-9** [Bethune, David])

Comment: The many objections from residents like me are outlined in the form letter sent to you. (**0721-26-4** [Koenigsberg, Linda])

Comment: I would suspect that the executives of FP&L, the architects of these reactors, the stockholders who will profit from their construction, and many other amoral participants who will benefit from this insane project, are full of optimism about how safe it is, how environmental,

how necessary. Except that it is none of those things. It is a time bomb being placed in our State, our neighborhood, where the residents are being forced to give up their peace of mind, future safety and property values to satisfy the greed of FP&L and all those who support this highly dangerous endeavor. There were other locations that assumed there was no problem like this. Three Mile Island, Chernobyl, Fukushima. But unlike Chernobyl we're not a remote community that can be isolated in the event of a disaster. We are a major American city and placing us in even the most unlikely danger is a terrible, terrible idea. (**0721-26-7** [Koenigsberg, Linda])

Comment: Please say no to the two new nuclear plants at Turkey Point. (**0721-28-12** [Wilansky, Laura Sue])

Comment: There is just no way that I think anybody can justify expanding nuclear energy in South Florida. (**0721-29-3** [Yovel, Ephrat])

Comment: First of all I just want to say that the Sierra Club opposes the expansion of FP&L Turkey Point at 6 and 7. (**0721-30-1** [Ullman, John])

Comment: This plant is in the wrong place. Just because we had the plant, this plant was -- the first two plants, nuclear reactors were built starting in 1967, that doesn't mean we should continue to build two new reactors there today. (**0721-30-5** [Ullman, John])

Comment: I think in the -- when I was an attorney in the legal world we call what FP&L's proposing, or what the ratepayers are screwed under a statute under, as an illusory promise. What does that mean? It is a promise that doesn't have to be kept. It's like, oh yeah, oh, I can do that. But there's no obligation for them to do that. So, yeah, sure, they can make all the promises they want but they're not bound by it. So you can give them the money now, they charge -- can jack up their rates. And then, oh, midway through a project, no, we don't need to finish it but we'll keep the money. So it just seems like a really bad idea, just, you know, out of common sense that we should never support such a bad idea. (**0721-31-11** [Almirola, Alejandro])

Comment: I ask that the NRC reject this application. (**0721-32-10** [Schlackman, Mara])

Comment: Now, you can see right here how many seat do they have. Florida Power and Light he mention problematic. One of you mention problematic. It's everybody. They no put it in the news. Why they not put it in the news? This room ain't going to be full. So he wants on the people only they can be in favor of the plan. I'm against it. (**0721-33-1** [Herrera, Luis])

Comment: And I think everybody they got to be against this. (**0721-33-3** [Herrera, Luis])

Comment: But to just say that -- I see this and from a quality management perspective there's too many flaws in this. And this is from me being involved for 25 years in manufacturing, and being a supplier to you. I'm telling you right now, this is not the best course of action. There are other ways to make money. (**0721-34-3** [Gomez, Albert])

Comment: I'm the Vice-Mayor of South Miami, and I assure you, everybody in that City is against the additional nuclear reactors. And I would say everybody throughout most of Dade County who is aware of this, is against it. (**0721-6-5** [Harris, Walter])

Comment: I hope the Commission does not build this. (**0721-7-8** [Edmond, Gabriel])

Comment: I'm here to express our serious concerns regarding this project. FP&L has proposed installing two new nuclear reactors at Turkey Point. If expanded, Turkey Point will become one of the largest nuclear generating facilities in the country. (**0721-9-1** [McLaughlin, Caroline])

Comment: I'm representing a large number of students at UM who oppose the expansion of the Turkey Point Power Plant for a couple of reasons. There are many potential risks to public health associated with this project as well as stress to the environment. (**0722-14-1** [Kaul, Devika])

Comment: I just wanted to say we do not support the expansion of Turkey Point. (**0722-14-6** [Kaul, Devika])

Comment: I want jobs, too, but I want to survive and I don't want to lose my heritage which I'm watching disappear. Even my own mother's house, I realize this is -- the trees, I didn't think I would ever have to become such a tree hugger but I'm seeing them all disappear. (**0723-11-9** [Berendsohn, Catherine])

Comment: I'm here tonight on behalf of our nearly one million members and supporters nationwide including over 18,500 members here in Florida alone to express our serious concerns around this project. (**0723-4-1** [McLaughlin, Caroline])

Comment: PROTECT OUR NATIONAL TREASURES...NO NUCLEAR EXPANSION! (**0730-1** [Smith, Pamela])

Comment: This plan is absolutely unacceptable. (**0733-1** [Colby, Helen])

Comment: Are you kidding? The proposed expansion of Turkey Point Power Plant is a disaster waiting to happen! (**0734-1** [Johnston, Judy])

Comment: As a former resident of Miami where two of my children were born I am completely opposed to any further expansion of the Power Plant with future concerns for unborn children in the future. (**0735-1** [Houghton, Francis])

Response: *These comments express opposition to the licensing of new nuclear reactors at the Turkey Point site. The NRC carefully reviewed the application against its regulations that are intended to protect public health and safety and the environment. These comments do not provide specific information related to the environmental effects of the proposed action, and no changes were made to the EIS as a result of these comments.*

Comment: We live in Miami and are opposed to this. This is an opportunity for us to invest in energy that isn't going to be more harmful to the environment as well as the residents in Miami. Please think about the long term impact. (**0003-1** [Ortiz, Natalia])

Comment: Please, as a parent, as a Miami resident, I beg you to do what's right and vote against this. Put yourself in our shoes, would you want this project in your backyard? We want to teach our kids about saving our planet and be green, but as adults we continue to make decisions that go against what we teach. (**0003-3** [Ortiz, Natalia])

Comment: This project is unsafe for the environment and it is unsafe for the citizens who will be impacted by it! (**0007-3** [Johnson, Nadine])

Comment: We have sufficient risk and power. We do not need any additional of any. Especially RISK. (**0019-1** [Bejarano, Antonio])

Comment: Please, either reject this project or require FPL to propose a better proposal to safeguard our health and quality of live. (**0024-3** [Roque, Julio])

Comment: I urge both the Commission and the State of Florida to prevent the expansion of the Turkey Point nuclear plant in Homestead, FL and invest in renewable energy instead. (**0033-1** [Van Thienen, Mateo])

Comment: With all due respect to all involved in the decision making for the Turkey Point Nuclear Expansion, why do you have to put two more reactors in such close proximity to neighborhoods, schools, hospitals etc? (**0040-1** [Pareto, Rolando and Marlene])

Comment: I understand that FPL and Turkey Point wants to build an additional (2) nuclear reactors at the site.....I live about 5 miles from Turkey Point and I am totally against the proposed plan.....First of all, you will be subjecting us to possible inherent risks in building these 2 nuclear reactors.....We live in an environmentally sensitive location where one mistake could be catastrophic to South Florida.....and to everyone that lives anywhere near this plant.

I, for one, do not want these nuclear reactors built, we have seen other catastrophe's that have happened around the world when something goes wrong at these reactor sites.....It would change So. Florida forever. Quite sure you can find some other alternative plan to harness electricity..... (**0042-1** [Tambussi-Brechon, Linda])

Comment: I am **opposed** to the building of any more nuclear reactors at Turkey Point, in South Florida, and elsewhere within the State of Florida. As I am sure you are aware history has shown that the potential exists for unplanned "incidents" to occur at or within nuclear power plants. The most recent of these, of course, was Fukushima. The best of intentions can go wrong and do go wrong. As we have seen, the results of such an unplanned "incident" can be catastrophic and long lasting. We are still experiencing "fall out" from Fukushima; in the Pacific Ocean, in sea life, in the lives of the people of Japan and the wasteland surrounding Fukushima. They are still having difficulty containing the radiated material from the reactor "incident." Given the proximity of Turkey Point to the major population centers of South Florida, its close location to the unique and environmentally sensitive Everglades and its coastal location potentially exposing it to the effects of rising sea levels, the Turkey Point Nuclear Power Plant exposes the population and natural environment of South Florida to unintended, but nevertheless, extraordinary risk. One serious nuclear power plant "incident" and South Florida would be forever changed. Large numbers of citizens, as well as animal and sea life, could be sickened by such an "incident". The fact that the Power Plant is located right on the coastline, would also impact the Atlantic Ocean not just in South Florida but, via the jet stream, the coastline of the eastern United States and coastlines of our European neighbors. It is my understanding that the new nuclear reactors would be providing power for northern Florida as well as the lower south eastern States. At what expense to humankind? (**0043-1** [Grill, Helen])

Comment: I urge the NRC, and FP&L, to abandon this ill-conceived plan to expand nuclear power generation at Turkey Point. (**0044-9** [Commenters, Multiple])

Comment: I had been notified about those dangerous 2 plants that FPL is planning in building in Turkey point FL. I urge not to approve this plan because it is a threat to the public and the all living creatures around. (**0047-1** [Bazzi, Noell])

Comment: Given the advent of viable, lower cost, and benign alternative power generating technologies such as wind and solar, the risks associated with the expansion of Nuclear Power

in South Florida far outweigh any possible benefits that may be derived. (**0049-3** [Kowalski, Kathleen S.])

Comment: I am very much against the expansion of 2 additional nuclear power plants as part of the Turkey Point FPL power system. I am also against the 80 ft tall power poles planned for going along US1 in Miami-Dade County. The risks to the area by having such additional power plants from rising sea levels and the probability of a risk from more power plants are unacceptable. The Greater Miami area is one of the few economic power houses in this part of Florida and it would come to a complete standstill if there were a mishap. (**0050-1** [Simon, Gary P.])

Comment: Simply stated, approve this plan at our peril on the basis of one corporations greed, or follow science, reason, and your duty as a public servant, and deny any expansion of Turkey Point. Please do not let a handful of billionaires give my family radiation poisoning, so that they can make a little more money. (**0051-4** [Smith, David W.])

Comment: This letter is to inform you of my opposition to the construction of the two proposed Nuclear Power Reactors - 6 & 7- at Florida Power and Light's Turkey Point facility. I will not bore you with tales about the dangers of nuclear accidents. Those are already well known. (**0053-1** [Sasiadek, Alfred])

Comment: Well please protect my family, friends and neighbors Please employ some decency, dignity and integrity (that's where you do the right thing when nobody is looking) It matters a great deal. Let this plan be set in motion and it will reduce the entire population of South Florida to just something else they'll give odds on in Las Vegas. below is the standard protest letter but I wanted you to know I love my home and I hope you read this and plays to you as sincere, (**0056-4** [McCall, Eric])

Comment: I urge the NRC, and FP&L, to abandon this ill-conceived plan to expand nuclear power generation at Turkey Point. I sincerely agree with this estimation of probability, (**0056-5** [McCall, Eric])

Comment: The question of whether nuclear power is good or bad is not the main issue here. Rather, the issue is whether this project in this particular location should be allowed to go forward. South Florida Wildlands thinks it should not, and so do I! I will not support this endeavor. (**0059-1** [Holland, Karen])

Comment: Numerous respectable South Floridians have provided valid and scientific back -up to confirm that these nuclear plants should not be build down here. (**0060-2** [Beckman, Yvonne and Douglas])

Comment: This letter is to express my negative to the construction of a nuclear central in Turkey Point. We have the right and the duty of take care of our lives and our security. I say NOT to this project because is dangerous. (**0064-1** [Fernandez, Maria Cristina])

Comment: I simply am not willing to take the necessary personal and financial risk to further FP&L's business objectives. I hereby request that you deny and the construction and operating license for the proposed facilites at Turkey Point. (**0067-4** [Commenters, Multiple])

Comment: I am not. This is a pure and simple business decision. NUCLEAR POWER IS BAD BUSINESS. BAD FOR ME, BAD FOR YOU BAD FOR EVERYONE IN SOUTH

FLORIDA PLEASE SEND A LETTER TO THE NRC BEFORE MAY 22, expressing your opposition to the nuclear expansion of Turkey Point. (**0071-2** [Stanley, Gael])

Comment: I am very much against any plans for adding 2 nuclear towers to the Turkey Pt. Power Plant. I am a resident of the Ocean Reef Club in Key Largo, FL. We understand the impact that this could and probably will have not only on our waters but also the protected wildlife plus hundreds of species of birds that migrate through this area.... To add insult to injury - this is energy being sold to Georgia!! This is our precious environment that we must take care of for the sake of all of our children and their children...It is my hope and prayer that this project is dropped. (**0074-1** [Streit, Didi])

Comment: Now FPL want to build two more nuclear plants at Turkey Point. The plants that already exist, and the new ones proposed, as well as ALL that nuclear waste at Turkey Point, WILL be underwater in the foreseeable future. To me, that one fact is sufficient reason not to build these new plants. Game over! But if that's not reason enough for you, there are plenty of other compelling reasons. (**0078-4** [Wilansky, Laura Sue])

Comment: It [FPL's expansion] would spend billions of dollars that could be better spent on power conservation and alternative energy projects. Its design does not take into consideration the reality of climate change; in fact it puts Florida's power grid at risk. This expansion plan is poorly conceived, inadequately designed, and environmentally harmful. As a resident of Miami-Dade County, Florida, I urge you NOT to approve two new nuclear reactors at Turkey Point. (**0079-2** [Cathey, Turner])

Comment: This is a political and financial dark and ugly play. Take an afternoon and ask your six year old child, grandchild, or neighbor what is important. All we really need to know we learned in kindergarden. LISTEN, LEARN and LOVE. (**0089-3** [Hubler, Gina Marie])

Comment: It is with grave concern that i write to you in reference to Florida Power and Light request for approval into adding 2 new Nuclear Reactors to their plant in Turkey Point Florida. I have read the plan in detail and i am dumbfounded to see that they are still moving forward with a plan that Floridians and Miamians do not want. Their plan fails to guarantee any type of safety to our citizens. It's not cost effective for us and it poses a mayor catastrophic risk in the event a big hurricane hits us or with the rise in sea levels. I can go on stating many other reasons, but I will refrain due to the lack of time you have. I want this letter to be clear and strong statement that I strongly oppose the expansion of Turkey Point with this new reactors. (**0092-1** [Merino, Miriam])

Comment: I am writing in opposition to the proposed expansion of Turkey Point Power Plant in Homestead, Florida. I know that nuclear plants aren't always that dangerous, but national parks are created to protect species. Doesn't that counterproductive? (**0105-1** [Tucker, Lauren])

Comment: I hope the you & your colleagues are un-biased & have enough integrity & complete enough with your science to come to the stronger conclusions against FPL wanting 6 & 7 Nuclear Reactors, because you have also factored in, along with Global Warming flooding where Turkey Point resulting in even greater damage to people's health & tourism, that: When FPL (& the nuclear power industry) claims they are either 'Green' or Carbon Free or Low Carbon Foot Print they are lying, (**0120-1** [Shark, Jason])

Comment: As a lifelong resident of S. Florida (I was born in Miami in 1961 and have lived here ever since) I am asking that we NOT build any more nuclear power plants in South Florida. The

risks are just too great. Our potential for solar energy has hardly been tapped. Please heed the warning of Fukushima, and don't build any more nuclear power plants on coastal sites, so vulnerable to hurricanes, rising sea levels, and more. Thanks for your consideration. (**0142-1** [Dronsky, Rick])

Comment: NO NUKE EXPANSION. (**0144-1** [Warzalla, Jim])

Comment: The risks are entirely too great for this to take place. Please reconsider. (**0147-3** [Jones, Joan and Robert])

Comment: The Miami-Dade County area is highly populated and functioning nuclear reactors within the county would represent a constant threat to the lives of the residents. (**0148-3** [Brinn, Ira])

Comment: Nuclear might have its place--but not in Southern Florida. (**0150-4** [Otis, Martha])

Comment: Please vote NO on any expansion. Have you not heard of Fukushima? (**0158-3** [Carlson, John])

Comment: Will our children, grandchildren and other future generations some day ask us, "Why did you do it? Were we not worth saving our environment?" (**0159-7** [Bazzone, Barbara])

Comment: I am shocked to learn of this project that is clearly out of the question. It is totally unacceptable in this fragile coastal area with incredible biodiversity of plants, fish, birds, and animals. It is frightening to think of all the destruction, and damage you will cause if you are allowed to go through with this project. You are putting humans, wildlife and an irreplaceable landscape and habitat at risk. How dare you even consider such a project that puts us all, not just humans, but all of God's Creations in danger. What you are doing will have far reaching consequences that must not happen. None of us wants to see Florida having to deal with an experience the horrors Japan endured, and that is exactly what you are bringing upon all of us, and I do not think you have the right to sacrifice us for your greed. We do not need or want your Nuclear Reactors, that have the potential to take away the Future Generations and cause pain and suffering, and destroy our Waters. I could go on, and on, speaking about the water you will use for your cooling systems, nuclear waste, spent fuels rods, and all the other science based problems, but I know many have already done this, to obviously blind and deaf individuals who are suppose to care about our well-being and safety. Florida will hold all of you responsible for even the slightest accident! Do not destroy us. Do not do this project. The risks are tod great. (**0160-1** [Larsen, Shannon])

Comment: No more nuclear in Florida PLEASE enough already (**0161-1** [Anonymous, Lynn])

Comment: The recent fire and explosion at the Indian Point Nuclear reactor outside New York City on the Hudson River is a further example of the potential danger of such plants. The Turkey Point nuclear expansion is "an accident waiting to happen." The NRC should use it's powers to prevent such accidents from happening. (**0184-3** [Perez, Danica])

Comment: Please think twice before destroying innocent lives. (**0188-2** [Frederickson, Kelly])

Comment: The proposed expansion of the Turkey Point Nuclear Power Plant has the potential to destroy, in an instant, everything I have spent my life working for. With this fact in mind I would like to object to the plan to expand the Nuclear Power Generators at Turkey Point. (**0206-1** [White, Holly])

Comment: I am extremely concerned about the proposal to add more nuclear reactors to the FP&L Turkey Point Site. I consider this option to be extremely irresponsible to the people who live in South Florida and to the rest of the planet for that matter. (**0207-1** [Cleland, Noel])

Comment: How the expansion of this Nuclear Power Plant can be under consideration is inconceivable! Have we not learned enough from recent history that shows the danger and potential for catastrophic loss of life and damage to the ecosystem! The time to shut down any plans for more nuclear power generation is now! (**0225-1** [Lawson, Ken])

Comment: Please think about the future of your and our families and every living creature. We don't need another threat around us. We all deserve to live in peace and to be safe. (**0238-1** [Padilla, Dora])

Comment: Please invest your dollars in safe energy, public and environmentally responsible energy resources, not two new nuclear power plants. Why are you putting us at risk. I'd rather light a candle. (**0241-1** [Portuondo, Pilar])

Comment: In the final analysis: Expanding the Turkey Point Nukes serves only FPL's corporate shareholders. It exposes the surrounding communities to a mind-numbing level of risk. We are literally paying the price to endanger our whole future. Please don't approve expansion. (**0252-20** [Van Leer, Sam])

Comment: I hope you have the courage to do the right thing for the people and our planet. (**0257-3** [Padron-Delgado, Blanca])

Comment: I do not support nuclear power, and I certainly do not support expanding a facility! Why don't you all move to Fukushima and call it quits... (**0271-1** [Thomas, Gina])

Comment: Haven't you learned enough of a lesson seeing the tragedies that have taken place in the world with nuclear power plants? Please deny this project. (**0287-2** [Beiriger, Mary])

Comment: I grew up near the Turkey Point Nuclear power plant and could see it on the horizon from my neighborhood. I lived in fear of a disaster every time a hurricane approached South Florida. Please do not expand this facility--we should be creating renewable power facilities in this country-not nuclear facilities. (**0316-1** [Parker, Richard])

Comment: Many countries are closing down their Nuclear Power plants, one by one. It is inexcusable for you to consider expanding operations at Turkey Point. (**0331-1** [Anonymous, Anonymous])

Comment: There were other locations that assumed there was no problem with projects like this: Three Mile Island, Chernobyl, and Fukushima. But unlike Chernobyl, we are not a remote community that can be isolated in the event of a disaster. We are a major American city, and placing us in even the most unlikely danger is a terrible, terrible idea. (**0339-5** [Provost, Allan])

Comment: For all the above identified concerns, I absolutely oppose more nuclear reactors to be built in our back yards. (**0340-6** [Tweeton, Tanya])

Comment: As a citizen and current resident of South Florida, I am totally opposed to any expansion of nuclear plants, particularly at Turkey Point. (**0353-7** [Royce, M.])

Comment: Please do NOT allow further nuclear development in South Florida! It is unsafe (remember Fukishima!) and unnecessary. (**0357-1** [Shapiro, Eugene])

Comment: Locating a Nuclear Power Generating Facility in close proximity to a densely populated metropolitan area of more than 2,500,000 people, is an ill conceived notion at best. Although this decision may be a means to enrich the shareholders of FP&L, it places the entire population of South Florida in extreme jeopardy. (**0358-4** [Norman, Ronald])

Comment: Florida Power and Light Company is applying to obtain site certifications and operating licenses to construct and operate two nuclear reactors of 1,117-MWe each at its Turkey Point nuclear power generating facility on Biscayne Bay. Although nuclear power produces less CO2 than fossil alternatives, nuclear power is not affordable, or clean with currently available technology, and there are safety concerns with the new plants being on the coast, and within 10 miles of large population centers. (**0364-1** [Mahoney, Robert S.])

Comment: Let's make it easy for you: No Water, Sea Level Rise, Stupid Idea, Old Technology, Too Much Salinity, Too many people. JAPAN. (**0373-15** [Lee, Nancy])

Comment: Approval should NOT be granted for this project, an expansion of the Turkey Point reactor. the public should be encouraged ... even compelled ... to reduce its overuse of power, especially via nuclear power plants. Stop FPL from further filling its coffers with public money to produce these unwanted plants. (**0374-1** [Livingston, Catherine])

Comment: Do not do evil. Do not do 'dumb'. Our nation is more valuable than to make such an out-of-date decision. (**0439-1** [Hansen, Yvonne])

Comment: I urge you to deny the proposed expansion at Turkey Point and protect the area's people, natural resources, environment and national treasures from this inappropriate plan and dangerous, incredibly expensive and outmoded type of energy system. (**0463-6** [Gross, Cheryl A.])

Comment: The expansion of Turkey Point could have serious environmental impacts on sensitive ecological habitat and the health and sustainability of limited freshwater resources. Just think of what happened this past week at Indian Point. Did New York City narrowly escape nuclear disaster? (**0492-1** [Mckee, Sarah])

Comment: Florida has so much sunshine! Do we really need to continue to expand nuclear power plants? Please veto the proposed expansion of Turkey Point Power Plant in Homestead, Florida. (**0495-1** [Mazzarella, Rebecca])

Comment: I am writing to publicly comment on the plans for new nuclear reactors in Turkey Point. My family and I live in Miami, and we have several properties in the area. I am also an Environmental Scientist. After reading about the plans, I am completely against any new nuclear power in south Florida and hope the NRC will prevent FPL from going through with their plans. (**0499-1** [Pinto, Theresa])

Comment: Please do not expand the nuclear power facilities here in south Florida. Currently the nuclear reactors are located in an environmentally sensitive area directly adjacent to an amazing National Park. They are just above sea level, use more water that is available and there is a huge issue with cooling ponds as it stands today. There is amble opportunities to create power from the sun here in Florida and it is a huge short sighted mistake to try to continue with nuclear at the present location. (**0507-1** [Bryan, David])

Comment: Unlike some, I am not opposed to nuclear power--precisely because I care so much about the threats posed by global warming and ocean acidification. But it is an energy source that must be handled with the greatest of care, and the proposed expansion of Turkey Point illustrates how NOT to do it. Hasn't anybody learned from the horrible example of Fukushima? (**0534-1** [Suda, Maryska])

Comment: We are in a hurricane prone location which can easily damage a nuclear reactor and in an area which will most likely see rising sea levels in the not too distant future. After what happened at Fukushima, I can't believe that we are considering adding nuclear power plants at this location. (**0537-4** [Anonymous, Judi])

Comment: NO to two new proposed nuclear power plants on Biscayne Bay. We barely survived Turkey Point taking a direct hit from Hurricane Andrew. (**0542-1** [Odierna, Cynthia])

Comment: NO, NO, NO .. stop expanding.!!! Dismantle and find alternatives for energy. I'll do my part, I'll use less lights, less air cond. Less everything that requires FPL energy.PLEASE stop. (**0556-1** [Shelley, Cynthia])

Comment: Put the plant somewhere safer or use a renewable source of energy. We are killing ourselves with this. (**0578-1** [Ramankutty, Vishnu])

Comment: The NRC's slogan points out that the sole purpose of the Nuclear Regulatory Commission is "protecting people and the environment." Licensing of the AP1000 design at Turkey Point would represent a catastrophic failing on the agency's part on both counts. It would shatter what little public confidence in the agency might exist and, should an accident ensue, would mean the end of nuclear power in the United States forever. As the agency charged with protecting the people of this community, you must reject these unsafe reactors as if you and your loved ones lived nearby, for I and 5 million other people do just that. (**0615-3-11** [Bethune, David])

Comment: No more poison machines! (**0624-1** [Galles, Camilla])

Comment: As a South Dade resident, I am alarmed at the prospect of having a nuclear plant near such a densely populated area in a hurricane zone. (**0626-1** [Miller, Nyana])

Comment: The safety of my family and my community is not worth sacrificing at the alter of a quick fix. I urge you to deny this proposal and seek safer forms of energy. (**0626-4** [Miller, Nyana])

Comment: The truth is we do not want this close to our homes or in our environment period! It's toxic and deadly to life! We want to live healthy while we are here on this beautiful planet. Please honor life and the planet give back with sustainable non toxic solutions to the environment and all living beings. (**0638-4** [Anonymous, Charity])

Comment: Please deny the license application. I am a full-time resident of Florida and I am opposed to any additional nuclear reactors in Florida. (**0654-1** [Guy, Sharon])

Comment: I guess you forgot that this is FLORIDA! Nuclear plants and hurricanes DO NOT MIX. No matter what they tell you about how safe they are, they are NOT. VOTE NO! (**0658-1** [Willett, Bett])

Comment: No absolute NO. We don't need 2 more Nuclear Plants on Byscaine Bay. It will be a danger to South Florida. (**0660-1** [Sanchez, Sergio and Irma])

Comment: ALL OF THE CURRENT NUCLEAR REACTORS ARE LEAKING AND CONTAMINATING THE SURROUNDING SOILS AND WATER: WHY WOULD ANY REASONABLE PERSON CONSIDER ADDING TO THESE ENVIRONMENTAL AND HEALTH DISASTERS? (**0669-1** [Malyon, Hilary])

Comment: Florida Power & Light argues that its new nuclear project is environmentally friendly, that it will benefit us economically, and that its future plans at Turkey Point are safe. Unfortunately, none of these claims are accurate. FPLs project would reduce the availability of fresh water for our communities, it would commit South Florida to antiquated and expensive nuclear technology from the last century, and it would render our electric system vulnerable to storm surges from rising seas. (**0675-1** [Rodriguez, Jose Javier])

Comment: I am extremely concerned about the proposal to add more nuclear reactors to the FP&L Turkey Point Site. There are much less risky solutions for meeting the energy needs of the area. (**0677-1** [Chiszar, Benjamin J.] [Jacobs, Lee] [Klopfer, Carol])

Comment: I am extremely concerned about the proposal to add more nuclear reactors to the FP&L Turkey Point Site. My main personal concerns are: (1) need to focus on sustainable energy sources such as solar and (2) insufficient evacuation zones and other security issues. (**0678-1** [Klopfer, Carol])

Comment: I am totally opposed to any nuclear plant constructed anywhere in our beautiful state of Florida. (**0709-3** [Cummings, Frank])

Comment: New Reactors at Turkey Point should be turned down for a variety of reasons. The current reactors have had many functional and operational issues in the last few years with little public oversight or accountability. (**0710-1** [Platt, George Seth])

Comment: I am opposed to building a new reactor at Turkey Point since it will require a vast amount of water which is a very valuable resources. It will also be very expensive to construct and could be dangerous in the case of a hurricane. (**0713-1** [Heiney, Jamie])

Comment: Do not allow the building of 2 additional units to the Turkey Point Nuclear Plant. They represent a threat to the lives of a massive number of residents of this country. It is a threat to that we can live without. If you allow this; there will be an extremely high political price to pay for all those involved in the decision. (**0717-1** [Nieto, Victor])

Comment: And until those issues are fixed and corporate responsibility is maintained and it's cleaned up, then two more nuclear reactors cannot be on the table. It's wrong for Florida. (**0721-10-5** [Reynolds, Laura])

Comment: I do want to say that not only are we living in one of the global bio-diversity --the most important bio-diversity areas in the world, this is also an incredibly urban area. And building one of the largest nuclear facilities in an area where FPL has not proven to be a good manager of their existing facilities is reckless and dangerous. (**0721-29-1** [Yovel, Ephrat])

Comment: I echo the sentiments of everyone who's against this proposed nuclear bomb or factory or plant. It's just a bad idea waiting to happen. I mean it's just another -- Turkey Point's going to be a new Fukushima or any other disaster you want to put in the blank, and it's a bad idea waiting to happen. (**0721-31-1** [Almirola, Alejandro])

Comment: I think that would be you know, make more sense than putting another, you know, nuclear reactor, creating two nuclear bombs and having a Homer Simpson-like character blowing it up, you know, because of negligence or any other foreseeable disaster. I just think that it's a bad idea. (**0721-31-13** [Almirola, Alejandro])

Comment: Sierra Club opposes licensing, construction and operation of new nuclear power reactors utilizing the fission process... (**0723-5-1** [Teas, Jim])

Response: *These comments provide general information in opposition to the proposed Turkey Point Units 6 and 7 based on opposition to nuclear power. They do not provide any specific information related to the environmental effects of the proposed action. No changes were made to the EIS as a result of these comments.*

Comment: The location of Turkey Point Nuclear Plant is too sensitive to expand it. (**0004-1** [Engelberg, Jodi])

Comment: When Turkey Point was originally developed in the early 1970s, the conditions that existed then are NOT the same as they are today. Those original conditions have changed dramatically in the ensuing years, making Turkey Point a totally unsuitable location for continued operation, much less expansion. Locating a new facility in close proximity to a densely populated metropolitan area, contiguous to natural resources, within a historically proven High Velocity (Wind)-Hurricane Zone, and defenseless against terrorism threats by not only water but air, seems at best to be an ill-conceived plan. (**0045-3** [Johannsen, Christian])

Comment: As Florida residents, we are very concerned about the ecological and social damage from the proposed expansion at TurkeyPoint. We are opposed to this expansion and ask the commission to look for alternatives. (**0068-1** [Prugue, Jorge and Paloma])

Comment: [W]hat has been proposed for the expansion of the existing Turkey Point Facility is an egregious mistake. Card Sound is a small and shallow body of water in a warm environment. An expansion of the existing plant, which is already taxing our fragile environment would be devastating in the long term. The only advantage would be to the shareholders and management by selling electricity to other parts of North America for profit at the expense of our local environment. If this expansion is approved I will sell all my FLP shares and encourage all those intuitions who hold shares to do the same. Please reconsider. (**0075-2** [Streit, Christopher V.])

Comment: I am writing today because you are about to make judgement on a request in my area that will potentially have terrible irreparable ecological consequences if it goes forward. As you know, FPL is attempting to gain approval on a major expansion to the Turkey Point nuclear plant in South Dade Florida. While I am not an opponent of nuclear energy, I believe it is your responsibility to protect our National Parks when a selection process is initiated. (**0081-1** [Benson, Mary] [Skove, Ellen H.] [Tompkins, Constance])

Comment: I feel that extensive study should be performed before any approval of this project be granted in order to guarantee that our National Parks and surrounding habitats will not be harmed. I have seen no evidence that any such studies have been performed. All I see is the plan to clear thousands of acres of natural bay front habitat bordering our National Park and the creation of a facility that will fit the business plan and line the pockets of a major corporation. (**0081-6** [Benson, Mary] [Skove, Ellen H.] [Tompkins, Constance])

Comment: Based on what I've read and heard about the environmental impact of the proposed new reactors (and the impact of the existing reactors), I am 100% opposed to the project. Given the sensitivity of our coastal waters, including the only living coral reef in the US, I am shocked that we are considering the addition to the environmental burden. Of course, beyond the daily addition of heated waters and waste, the potential disaster related to weather or other operational failure looms large. We might think we've engineered the plant properly, but as Fukishima showed us, Mother Nature has a way of overwhelming man made systems. As a resident of Key Largo, I am hopeful that you will reconsider the proposed expansion and begin thinking about decommissioning the plant as it's useful life reaches its limits. (**0082-1** [Jones, Michael E.])

Comment: We support necessary nuclear energy but certainly not expanding the initial error of placing such a facility in a location exposed to violent storms and surrounded by irreplaceable, fragile National Parks. (**0083-1** [Birsh, Arthur and Joan])

Comment: Please listen to the people who live here in Miami, Florida. We want a healthier environment for our kids and families. (**0088-8** [Lange, Alexandra])

Comment: This article was published in the Miami Herald today, reflecting our elected officials perspective on the nuclear facility being considered. It seems that we are in a time of our planet's future which every decision which is being made for infrastructure and environmental use needs to be monitored and proceeded with an open heart, and mind. This would require ALL to consider the ramifications which we are flirting with in a very serious light. I would implore you and those with whom you work with to look at the situation we are in, not from merely a financial standpoint but also a ecological and humanitarian. (**0089-1** [Hubler, Gina Marie])

Comment: I have no doubt that you will consider FPL's application carefully and can only hope that you come to the same conclusion as myself and countless others who feel that the building of two new reactors would be folly and ultimately harmful to all living things here in South Florida. The damage done to our water supply, our parks and most importantly, the Everglades is immeasurable. Please cast your vote to decline this application. (**0090-1** [Avers, Pamela Dee])

Comment: Increasing the size of the power plant does not make sense as it already impacts the habitat of the area. (**0096-2** [Roberts, Linda])

Comment: I find today's Miami Herald Op-Ed by Mayor Tomas Regalado, Mayor Cindy Lerner and Mayor Philip Stoddard along with State Representative Jose Javier Rodriguez to be most informative about plans for expansion of a Florida energy source. This news is disturbing on many levels. I feel the information that it will reduce safe drinking water and disruptive the tender ecology of the area to be a huge negative for placing nuclear reactors in Miami-Dade County. "FPL's project would reduce the availability of fresh water for our communities, it would commit South Florida to antiquated and expensive nuclear technology from last century, and it would render our electric system vulnerable to storm surges from rising seas. FPL ignores these difficult facts." (**0098-1** [Gavel, Deborah])

Comment: Please consider the harm done to the environment and the shared habitat to sea life and land animals, to the birds as well as the human life forms on this planet. FPL's nuclear-power plan regressive, harmful[.] (**0098-3** [Gavel, Deborah])

Comment: I am a long time proponent of nuclear power and I have never considered myself to be particularly an environmentalist, but I strongly urge the denial of FPL's expansion of the

Turkey Point facility. Having spent time trying to understand the pros and cons of the planned expansion, it seems clear to me that the extensive environmental damage significantly outweighs the gains from the expansion. I have come to this conclusion in spite of being an investor in public utilities and generally having a bias toward FPL. (**0099-1** [Hudson, Harold J.])

Comment: I strongly oppose the expansion of Turkey Point as proposed due to the project's potentially widespread negative environmental and public health and safety impacts and the serious threats it poses to Biscayne National Park. (**0102-8** [Commenters, Multiple])

Comment: I have serious concerns that the proposed expansion of FPL's Turkey Point could significantly impact and degrade the health of our national parks, sensitive ecological areas including extensive wetlands, federally listed threatened and endangered wildlife, and the quality and quantity of limited fresh water resources. (**0104-1** [Commenters, Multiple])

Comment: Our comments demonstrate that there are more affordable, less water-intensive ways for FPL to meet energy demand while protecting the environment and addressing global climate change. As such, there is no purpose and need for the two reactors. If pursued by FPL, the expansion of Turkey Point could have profound and unacceptable environmental impacts to regional water resources, Biscayne and Everglades National Parks, wildlife, wetlands and threaten public health and safety. SACE believes that the DEIS fails to adequately discuss and analyze these potentially adverse impacts and includes insufficient proposals for mitigation. We do not support the issuance of COLs for Turkey Point reactor Units 6 and 7. Instead, we recommend that the NRC and USACE support the "No Action" alternative. (**0112-10** [Barczak, Sara])

Comment: According to the standards of the Nuclear Regulatory Commission (NRC), "sites adjacent to lands devoted to public use may be considered unsuitable," and unacceptable impacts are "most apt to arise in areas adjacent to natural-resource-oriented areas." [Footnote 8: United States Nuclear Regulatory Commission, Regulatory Guide 4.7-General Site Suitability Criteria for Nuclear Power Stations, Revision 2, 1998, Section C.] In following the NRC's own standards, we advise against moving forward with the project as proposed due to the potential for unacceptable impacts on the ecological integrity and economic viability of the surrounding national parks. (**0113-1-14** [Lopez, Jaclyn] [McLaughlin, Caroline] [Reynolds, Laura] [Schwartz, Matthew] [Silverstein, Rachel])

Comment: Please do not increase the drain on our limited water supply by allowing FPL to create two new reactors. (**0115-3** [Trencher, Ruth])

Comment: I am alarmed by the nuclear expansion plans that FPL proposes for South Florida, especially considering our vulnerable water supply. (**0116-1** [Garcia, Ruslan])

Comment: When Turkey Point was first built in 1972, Earth Day was 2 years old and Biscayne National Park didn't exist, and there was no wellfield protection ordinance, you can excuse the environmental degradation it caused because we didn't understand then what we do now. We know what fresh water releases do to Biscayne Bay. We know that sea level rise is happening. We know that there are nuclear accidents like, Three Mile Island, Chernobyl, and Fukushima Daiichi happen. To expand Turkey Point in an environmentally sensitive and flood prone area, claim more water from the Biscayne Aquifer, expand a industrial use at the edge of a national park, is just dumb. (**0117-1** [Robertson, Alyce])

Comment: Regarding FPL's proposed nuclear energy plan, What is there to say other than we, as a state, are currently ignoring just about every warning we've received from every scientist in the world telling us that in a matter of years, we will run out of fresh drinking water. We will be flooded. We will die. This is not an over dramatization, it's simply true. And yet, the only thing worse than doing NOTHING about our current problems is doing something that makes them HORRIBLY WORSE. Teach us how to be better. Save our state. Don't allow corporations to place money over humanity. (**0137-1** [Manuel, Becky Randel])

Comment: I have serious concerns that the proposed expansion of FPL's Turkey Point could significantly impact and degrade the health of our national parks, sensitive ecological areas including extensive wetlands, federally listed threatened and endangered wildlife, and the quality and quantity of limited fresh water resources. I request that both agencies support the "No Action" alternative in reference to Docket ID: NRC-2009-0337. (**0141-1** [Lucas, Carmen])

Comment: Clearly, South Florida is highly vulnerable to sea level rise and the impacts of climate change. This site was never an acceptable location for the Turkey Point facility there today and many decades later it has only become an even more unacceptable location. (**0141-3** [Lucas, Carmen])

Comment: If you drive away wild life and fry our way of living, there really is no need to expand production. Pay some attention to the Aztec civilization and in more modern times the "streets" of Venice. There is a time when life is more precious than the dollar. (**0143-1** [Shepard, J.])

Comment: Please stop this project for the safety of the environment, wildlife, our 2 National Parks, the economy in South Florida, and do what is right. (**0149-14** [Nelson, Joyce E.])

Comment: I am writing to express my grave concerns regarding the expansion of Turkey Point nuclear facility, and any such project bordering the delicate wetlands and fragile aquifers in Southern Florida. This expansion will negatively affect water quality, species survival, wildlife habitat health (including our coral reefs, arguably the reason for an entire state's tourist economy), human health and safety, and even state finances for decades and more in the future[.] (**0150-1** [Otis, Martha])

Comment: Please consider these facts before locating the nuclear reactors in the Biscayne and Everglades National Parks. (**0153-3** [Goldman, Emanuel])

Comment: I am a conerned citizen of Florida and am pleading with you to reconsider your plans for the proposed nuclear reactors for the shores of Biscayne Bay and Everglades National Parks. (**0153-5** [Goldman, Emanuel])

Comment: Turkey Point should never have had a power plant in the first place. Do not further damage the environment and Florida's fresh waters by expanding it now! (**0156-1** [Newman, Donna])

Comment: This asinine proposal is one driven by greed and if not ignorance, at least environmental apathy. Expanding this already marginal operation would only further compromise the area, it's waters both fresh and salt, it's creatures, air, health threats to all, on and on. For someone's profit. Inevitably, to the park's and sentient beings' detriment, it can only cause problems that are impossible to correct. (**0163-1** [Cook, Cherie])

Comment: This statement, written by members of the National Parks Conservation Association, reflects my opinions and beliefs. NPCA speaks for me, and many others concerned with the future of our planet. (**0165-1** [Cooper, Joe])

Comment: This park does not belong to the energy producers, it belongs to citizens of the United States. keep your killing of animals and plants with reactor water away from the places that are sanctuaries for them. (**0166-1** [Freel, Susan])

Comment: Also, it's ludicrous to expand this power plant with such ecologically sensitive ecosystems nearby plus the huge drain on our water supply that would inevitably result from the expansion. (**0178-4** [Almirola, Alejandro])

Comment: It is against any and all sense to place this plant in a dangerous and unstable area. (**0182-1** [Polifroni, Josephine])

Comment: Please do not expand this already ill-conceived location to include any expansion. (**0183-1** [Piper, Cynthia])

Comment: Please protect freshwater and other natural treasures of Biscayne National Park which are threatened by nuclear expansion. (**0186-1** [Macraith, Bonnie])

Comment: I have serious concerns that the proposed expansion of FPL's Turkey Point could significantly impact and degrade the health of our national parks, sensitive ecological areas including extensive wetlands, federally listed threatened and endangered wildlife, and the quality and quantity of limited fresh water resources. (**0192-1** [Lebatard, David])

Comment: Our nation's significant environmental heritage sites should not be sacrificed to industrial planning. (**0195-1** [Harden, Ronald])

Comment: On behalf of the undersigned environmental organization representing hundreds of thousands of citizens throughout the country, we submit these comments in opposition to the proposed Turkey Point Power Plant expansion. Our groups and members are deeply committed to protecting the environmental health of South Florida and our precious freshwater supply. We have serious concerns that the proposed expansion of Turkey Point could significantly impact the health of our national parks, sensitive ecological areas, federally listed threatened and endangered wildlife, and the quality and quantity of our water resources. (**0210-1** [Sharp, Andrea Heuson])

Comment: In the interest of protecting the health and integrity of our valuable natural resources and limited water supplies we strongly recommend that you do not permit the proposed Turkey Point Power Plant expansion. (**0210-7** [Sharp, Andrea Heuson])

Comment: As residents of Key Largo, we oppose the expansion of the Turkey Point nuclear plant. We are within 15 miles of the facility, but we oppose the expansion for other reasons. The existing cooling canals exceeded the 100 degree limit many times last summer. We do not feel that the plan to accommodate 2 additional reactors is adequate and environmental damage is inevitable. (**0212-1** [Ross, Robert and Teresa])

Comment: For all these reasons, I urge you to deny the proposed expansion at Turkey Point and protect the region's people and unparalleled natural resources. (**0218-2** [Barlow, Jeffrey])

Comment: I grew up in Miami Beach and remember how unspoiled Biscayne Bay was even then. It must remain that way--it's a paradise! (**0224-1** [Rennie, Edwyna])

Comment: Although I am a supporter of developing nuclear energy in the United States, I strongly oppose the expansion of Turkey Point as proposed due to the project's potentially widespread negative environmental and public health and safety impacts and the serious threats it poses to Biscayne National Park. (**0226-1** [Karlow, Edwin])

Comment: I strongly oppose the expansion of Turkey Point as proposed due to the project's potentially widespread negative environmental and public health and safety impacts and the serious threats it poses to Biscayne National Park. (**0228-8** [Yeager, Jerry])

Comment: As one who has visited most of our national parks, I believe such parks are the jewels of our natural heritage. Therefore, I am writing to express my opposition to the proposed expansion of Turkey Point Power Plant, located in Homestead, Florida. (**0229-1** [Elton, Wallace])

Comment: Therefore, I oppose the expansion of Turkey Point as proposed due to the project's potentially widespread negative environmental and public health and safety impacts and the serious threats it poses to Biscayne National Park. Please reject this proposal. (**0229-2** [Elton, Wallace])

Comment: The question of whether nuclear power is good or bad is not the main issue here. Rather, the issue is whether this project in this particular location should be allowed to go forward. Many citizens concerned about achieving restoration of the Everglades think it should not. (**0232-1** [Fielding, Ed])

Comment: I oppose the application for Units 6 and 7 at Turkey Point. While it was an ill-advised decision over 40 years ago to locate two nuclear reactors between two national parks, Everglades National Park and Biscayne National Park, which are unique biodiversity hotspots, that decision should not be compounded by adding two additional reactors to the site. (**0246-1** [Shlackman, Mara])

Comment: On behalf of the undersigned environmental organizations representing hundreds of thousands of citizens throughout the country, we submit these comments in opposition to the proposed Turkey Point Power Plant expansion. Our groups and members are deeply committed to protecting the environmental health of South Florida and our precious freshwater supply. We have serious concerns that the proposed expansion of Turkey Point could significantly impact the health of our national parks, sensitive ecological areas, federally listed threatened and endangered wildlife, and the quality and quantity of our water resources. (**0253-1** [Bloom, Justin] [Campbell, Cara] [Causey, Charlie] [Cavros, George] [Chenoweth, Mike] [Daly, Meg] [England, Margaret] [Fuller, Manley] [Jones, George L.] [Keller, Alan] [Martin, Drew] [McLaughlin, Caroline] [Reynolds, Laura] [Silverstein, Rachel] [White, Paton] [Williams, Elinor])

Comment: In the interest of protecting the health and integrity of our valuable natural resources and limited water supplies we strongly recommend that you do not permit the proposed Turkey Point Power Plant expansion. (**0253-6** [Bloom, Justin] [Campbell, Cara] [Causey, Charlie] [Cavros, George] [Chenoweth, Mike] [Daly, Meg] [England, Margaret] [Fuller, Manley] [Jones, George L.] [Keller, Alan] [Martin, Drew] [McLaughlin, Caroline] [Reynolds, Laura] [Silverstein, Rachel] [White, Paton] [Williams, Elinor])

Comment: We, the undersigned elected representatives of the citizens of Florida, write to you united in our opposition to the proposed plan to expand Turkey Point Power Plant, located in

Homestead, Florida. We are dedicated to ensuring the health of South Florida's environment and the integrity of our precious freshwater supply. We are concerned that the expansion of Turkey Point, as proposed, could have serious impacts on our national parks, sensitive ecological areas and the quality and quantity of our water resources, and critical economic drivers that support our communities. (**0254-1** [Dudley, Dwight] [Lerner, Cindy] [Regalado, Tomas] [Stoddard, Philip K.])

Comment: We recommend that, in the interest of protecting the integrity of our valuable natural resources, limited water supplies and a healthy local economy, plans to expand Turkey Point Power Plant do not proceed as proposed. (**0254-7** [Dudley, Dwight] [Lerner, Cindy] [Regalado, Tomas] [Stoddard, Philip K.])

Comment: Turkey Point Power Plant is a nuclear power facility located directly on the shores of Biscayne National Park, one of our country's largest marine national parks. A for-profit utility wants to expand Turkey Point by constructing two new nuclear reactors. Expanding a nuclear power plant in the sensitive ecosystem surrounding Biscayne National Park is unacceptable! (**0258-1** [Field, Fran])

Comment: It is unconscionable for you to waste our hard earned taxpayer dollars on toxic nuclear next to not just a precious ecosystem, Biscayne Bay and the Everglades, but an urban area where millions reside in an area prone to catastrophic damage from monstrous hurricanes! (**0259-4** [Lettieri, Tammy])

Comment: I am writing in reference to Docket ID: NRC-2009-0337. I am opposed to the expansion of Turkey Point Power located in Homestead, Florida. The site is right on the shores of Biscayne National Park and very susceptible to climate changes. Turkey Point will surely have negative impact on the environment. (**0262-1** [Demaria, Karen])

Comment: Given the proximity of Turkey Point to the major population centers of South Florida, its location immediately contiguous to the environmentally sensitive, fragile and irreplaceable, Florida Everglades, Everglades National Park, Biscayne National Park, and the Florida Keys Marine Sanctuary, the Turkey Point Nuclear Power Plant exposes the population and natural environment of South Florida to unintended, but nevertheless, extraordinary risk. (**0263-2** [Orzechowicz, Holly])

Comment: The conditions that were present when The Turkey Point facility was originally sited and constructed in the early 1970s are not the same conditions that exist today. Those original conditions and considerations that may have made Turkey Point a viable location for a Nuclear Power Generating Plant have changed dramatically in the ensuing years. (**0263-7** [Orzechowicz, Holly])

Comment: Biscayne National Park is a treasure in south Florida and expanding this facility with impacts on this ecosystem is unacceptable to me. (**0281-1** [Nye, Janet])

Comment: I strongly oppose the expansion of Turkey Point as proposed due to the project's potentially widespread negative environmental and public health and safety impacts and the serious threats it poses to Biscayne National Park. (**0282-1** [Timberlake, Ralph])

Comment: Expanding a nuclear power plant in the sensitive ecosystem surrounding Biscayne National Park is unacceptable! (**0284-1** [Lopez, Josie])

Comment: Please choose to protect Biscayne National Park's incredible wetland and marine habitats from the threat of nuclear expansion. (**0284-6** [Lopez, Josie])

Comment: Expanding a nuclear power plant directly on the shores of Biscayne National Park--in an area vulnerable to sea level rise--will have serious environmental consequences! The NRC and the Corps must ensure that future plans for Turkey Point protect our national parks, water supply, and public health. (**0284-7** [Lopez, Josie])

Comment: I urge you to deny the proposed expansion at Turkey Point and protect the region's people and unparalleled natural resources. (**0285-3** [Miller, Melissa])

Comment: The ocean level is rising and the coral reef nearby is dying. You have the power to prevent the destruction of this beautiful area. Biscayne National Park is an irreplaceable national treasure that safeguards precious natural resources and recreational opportunities. (**0290-3** [Wry, Ellen])

Comment: I strongly oppose the expansion of Turkey Point because of the project's potentially widespread negative environmental and public health and safety impacts as well as the serious threats it poses to Biscayne National Park. (**0295-5** [Dietrich, Chris OMeara])

Comment: Why would you allow expansion of a nuclear plant in such a vulnerable area? These decisions affect us far, far into the future and that future is uncertain. (**0297-1** [Strouble, Jackie])

Comment: The current administration in that state seems determined to ignore the warnings, but that doesn't mean you have to. Biscayne Bay is also an environmentally sensitive area where further construction is not warranted nor desirable. I urge you to turn down expansion plans in Biscayne Bay! (**0297-3** [Strouble, Jackie])

Comment: Know what we ALL know now...these past reactors would HAVE NEVER been built where they are.....WE CAN now MOST CERTAINLY PREVENT any MORE reactors being built there. (**0306-1** [Bagwell, Wilson Knox])

Comment: The plan to expand nuclear facilities at a location that was not the best idea in the first place, is even stupider. Not just because of the Biscayne National Park, but that is certainly a major reason to deny permission for the expansion but really, when are we going to stop polluting the wetlands and when are we going to face the fact that Florida's coastline is subject to flooding due to climate change (not to mention storms)? (**0310-1** [Stevens, Lisa])

Comment: YOUR AGENCY SHOULD BE PROTECTING NATIONAL PARKS, SO YOU SHOULD VIGOROUSLY OPPOSE THE ENVIRONMENTALLY STUPID PROPOSAL. (**0321-1** [Anderson, Glen])

Comment: I see no benefit to the expansion of the existing Turkey Point plant for the health of South Florida's Biscayne National park and for my family's health. (**0349-1** [Oliva, Vivian])

Comment: I am opposed to any expansion of nuclear power in Florida, especially in the Biscayne Bay area. Further expansion would only increase serious risks to our health and the environment. (**0350-1** [Shasky, Mike])

Comment: I am opposed to any expansion of nuclear power in Florida, especially in the Biscayne Bay area. Further expansion would only increase serious risks to our health and the environment. (**0351-1** [Anonymous, Anonymous])

Comment: We vote AGAINST the proposed new nuclear reactors in Biscayne National Park. (**0359-3** [LoBiondo, Roana and Michael])

Comment: The New Progressive Alliance at http://newprogs.org/ urges you to reject Florida Power and Light's plan to build two new nuclear reactors on the shores of Biscayne Bay. The two nuclear plants are poorly placed, are a clear and present danger to the water supply, and are a bad risk in light of over 50 years of history on the use of nuclear power. (**0366-1** [Griffith, Ed and Harriet])

Comment: We at the New Progressive Alliance ask you to do the right thing because these two nuclear plants are poorly placed, are a clear and present danger to the water supply, and are a bad risk in light of over 50 years of history on the use of nuclear power. (**0366-12** [Griffith, Ed and Harriet])

Comment: We hope to visit Biscayne National Park someday and do not want to find it compromised by an expanded Turkey Point Power Plant! (**0386-1** [Bromage, Joan])

Comment: I have not yet been to Biscayne National Park, but I do hope to visit that and others to complete my goal of experiencing all the NPS units. I am sure that Biscayne National Park is a wonderful place. The manatees, flamingos, corals, and sponges do not need an expanded nuclear power plant in or near their habitat. Please protect Biscayne National Park vigorously. (**0391-1** [Aronson, Murray])

Comment: Please vote on the side of the parks and all the goods things it will distroy in time. Vote No for the parks, people, nature and most of all for that is best for the country. (**0392-3** [Greer, Tom])

Comment: Please do not allow any expansion! (**0394-1** [Dougherty, Kate])

Comment: Do not expand this plant on the shores of Biscayne National Park. Foolish idea and could be very destructive. (**0398-1** [Winters, Gracie])

Comment: Please heed our advice and save our National Parks from ruination. (**0399-1** [Drew, Virginia])

Comment: Please don't let this happen. I'm a scuba diver and have enjoyed diving in Florida. Don't ruin this area of the ocean, not just for me but others to not be able to enjoy in the future. (**0426-1** [Bunker, Diane])

Comment: This area is already showing signs of environmental stress. (**0427-1** [Purcell, Douglas])

Comment: Please consider how many ways this could become a disaster-from freshwater resources, to plant and animal life, to the very likely saltwater intrusion. Please do the right thing & don't try to expand here! (**0429-1** [Schilling, Judy])

Comment: Why do American citizens have to continually fight to keep the World's Greatest Park System in tact??? (**0430-1** [Yost, Gaylord])

Comment: In April, 1991, I visited Biscayne National Park. I enjoyed that trip and would NOT want Turkey Point Power Plant to expand into any of the Park. (**0447-1** [Degges, Frank])

Comment: I hope the proposed addition to the Turkey Point Power plant is rejected so there is no further degrading of Biscayne Bay waters or rising sea levels flooding the existing plant plus the addition. (**0453-1** [Matheny, Kent])

Comment: I PERSONALLY HAVE BEEN TO THE BISCAYNE NATIONAL PARK MANY TIMES AS I HAD RELATIVES WHO LIVED ON KEY BISCAYNE AND IT IS A BEAUTIFUL PARK, SO PLEASE DO NOT LET THIS AREA BE DESTROYED & RUINED BY THIS EXPANSION!!! I DO STRONGLY OPPOSE IT & I PRAY THAT YOU THINK OF THE ENVIRONMENT FIRST!!! IT WILL CAUSE WAY TOO MUCH DAMAGE!!! AGAIN PLEASE DO NOT ALLOW THIS TO HAPPEN!!! (**0457-1** [Poole, Diane])

Comment: Expanding a nuclear power plant in the sensitive ecosystem surrounding Biscayne National Park is unacceptable! (**0491-1** [Halligan, Melody])

Comment: The proposed Turkey Point expansion's potentially widespread negative environmental and public health and safety impacts, and the serious threats it poses to Biscayne National Park, mandate its denial. (**0492-4** [Mckee, Sarah])

Comment: Please oppose the plan to add two nuclear reactors to Florida Power and Light's Turkey Point operation. The reactors would be located between two national parks on fragile wetlands stressed by cooling canals and threatened by rising sea levels. This land is too fragile to support one nuclear reactor - let alone two. (**0506-1** [Fox, Kristi])

Comment: Please do not destroy our delicate environment any further! (**0516-2** [Coffey, Rotraud])

Comment: Some places should be left untouched by industry and this is a perfect example of one of those places. (**0527-1** [Nagel, Karen])

Comment: I am writing to tell you to stop destroying our parks! (**0528-1** [Watson, Fran])

Comment: I strongly oppose the expansion of Turkey Point as proposed due to the project's potentially widespread negative environmental and public health and safety impacts and the serious threats it poses to Biscayne National Park. (**0533-2** [Boone, James])

Comment: I am writing to say that I am against placing additional nuclear reactors at Biscayne Bay. (**0537-1** [Anonymous, Judi])

Comment: I grew up in Kendall, Florida. As a youth, I enjoyed diving in Biscayne National Park and canoing in the Everglades. I am shocked at the short sighted propasal to expand the nuclear facilities at Turkey Point. (**0552-1** [Deutsch, Steven])

Comment: I strongly oppose the expansion of Turkey Point as proposed due to the project's potentially widespread negative environmental and public health and safety impacts and the serious threats it poses to Biscayne National Park. "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise." (**0555-3** [Lish, Christopher])

Comment: Please do not allow this project to happen and protect our National Parks. (**0569-2** [Lane, N. Jo])

Comment: With all of the environmental impact of fresh water draws and overheated cooling canals, not to mention potential hurricane impact on the facility, it seems unconscionable that FPL would be allowed to add additional reactors to its Turkey Point facility. The existing is already pushing the limits of sustainability. (**0571-1** [Darden, Colgate])

Comment: Please do not approve FPL proposal for two new nuclear reactors. The danger to South Florida's most important public lands and wildlife habitats - Biscayne and Everglades National Parks - will be put at risk and be forever changed if this is approved. (**0581-1** [Tweedy, Mary])

Comment: Please oppose the proposed expansion of Turkey Point Power Plant, located in Homestead, Florida near Biscayne National Park. It is close enough to the Gulf of Mexico to be even more fragile. (**0582-1** [Wade, Pat])

Comment: I strongly oppose the EIS for FPL's application to build 2 new nuclear reactors at Turkey Point. They will negatively impact the surrounding community and Everglades and Biscayne National Park and threaten local water and land resources, as well as be a health risk. (**0597-1** [Cullen, Sarah])

Comment: This project that, if built, will impact surrounding communities and sensitive ecological areas such as the Everglades and Biscayne National Park, threaten local water and land resources and increase FPL customers' utility bills. (**0602-1** [Colson, Clay G.])

Comment: It is very disappointing that you would think of building reactors on Biscayne Bay or anywhere for that matter. This action along with many approved building on endangered lands here in South Florida that impact our ability to breath and many endangered plants and species ability to survive have negative consequences .. with no preservation and over development here in South Florida -both our LAND AND SEA must be protected to "survive and thrive" for future generations .... and actions like these are not good. (**0634-1** [Jacobs, Leslye])

Comment: I am writing to protest the application for the Turkey Point Nuclear Plant. I am a resident of Boca Raton and have frequently enjoyed the Everglades National Park and Biscayne Bay. The area is too fragile, beautiful and important to risk a an action that might jeopardize the natural environment. (**0635-1** [Seiman, Rhonda])

Comment: STOP NUCLEAR EXPOSIONS ON BISCAYNE BAY, FLORIDA, THANK YOU. (**0636-1** [Sanfilippo, Val])

Comment: I am very concerned about the environmental ramifications of the proposed nuclear reactors in Biscayne Bay, not to speak also of the industrial ugliness that would be introduced to the landscape. Please do not allow this! (**0640-1** [Dutton, Julene])

Comment: I oppose the licencing of two new nuclear reactors at Turkey Point Nuclear Power Plant. This plant is located next to two National Parks. It is negatively impacting Biscayne Bay National Park by drawing surface water from the Biscayne Bay where salinity levels are too high during dry periods. The park area was originally surrounded by natural areas that permitted sheet flow of fresh water into Biscayne Bay. The addition of two new nuclear reactors will increase an already stressed environment. (**0641-1** [Martin, Drew])

Comment: Who even considers putting such a potentially destructive plant within range of an INTERNATIONAL treasure like the Everglades? Reconsider!!! For the sake of this generation and those to come! (**0652-1** [Le Cronier, Micki])

Comment: No nuclear reactor at Biscayne Bay! (**0661-1** [Segal-Wright, Nicholas])

Comment: I move that the Combined License application for Turkey Point Nuclear Plant, Unit Nos. 6 and 7 be denied. Because of the ecological sensitivity of the proposed area and the high human, animal and fish life usage of the waters and land areas of Biscayne Bay and the nearby Everglades Park and aquifer, the proposed nuclear reactors and generators would produce prohibitive amounts of contamination of the waters and land. Therefore, the approval and funding of this proposal needs to be denied due to the Chemical and environmental impacts on life and health within the proposed project areas. (**0663-1** [Turner, William P.])

Comment: Please do not approve the application for two new nuclear reactors, Unit Nos. 6 and 7, at the Turkey Point Nuclear Power Plant. This project should not be allowed to move forward, in part, because it will irrevocably change and put at risk two of Floridas most important public lands and wildlife habitats the Biscayne National Park and the Everglades National Park. (**0674-1** [Dwyer, Karen])

Comment: Florida Power and Light is seeking permission to build two new nuclear reactors at its existing plant next to Biscayne National Park and other natural areas; the project would be highly water-intensive, potentially threatening Biscayne Bay and the Biscayne Aquifer. (**0676-1** [Kassel, Kerul])

Comment: Please don't let this proposed power plant expansion hasten the death of South Florida's remaining wildlife habitats. (**0693-5** [Dorn, Kathryn])

Comment: But the era of nuclear energy off of Biscayne National Park is coming to an end and we need to prepare for that because it's coming. (**0721-30-12** [Ullman, John])

Comment: In the interest of protecting our national parks and maintaining the quality and quantity of South Florida's fresh water supply, the expansion of Turkey Point, as currently proposed, should not move forward. (**0721-9-8** [McLaughlin, Caroline])

Comment: If this Turkey Point expansion is undertaken Turkey Point will become one of the largest nuclear generating facilities in the country which, in and of itself, is not at all a bad thing. But considering its location, in one of the most --the areas most vulnerable to sea level rise directly adjacent to a national park, a State preserve and some really critical habitat on Biscayne Bay, that does pose a problem. This is a really ecologically and economically important environment. (**0722-7-1** [Silverstein, Rachel])

Comment: And the three major reasons that I'm going to talk about today that this expansion is not appropriate at this location is, potential contamination of our water supply, excessive withdrawals of water related to this project, the vulnerability of the facility to sea level rise and the inadequate incorporation of that aspect into the Environmental Impact Statement as well as the ecological fragility of the surrounding area. It's already been impacted by the existing nuclear power plant and excessive water withdrawals and the cooling canal issues that are already existing. (**0722-7-2** [Silverstein, Rachel])

Comment: I suggest that we follow his leadership and work towards a more resilient sustainable South Florida. In the interest of protecting our national parks and maintaining the quality and quantity of South Florida's freshwater supply, the expansion at Turkey Point as proposed should not move forward. (**0723-4-10** [McLaughlin, Caroline])

Response: *These comments identify general concerns about the ecology surrounding the proposed Turkey Point Units 6 and 7. They do not provide any specific information related to the environmental effects of the proposed action. Ecological impacts of building and operating the proposed units are described in Sections 4.3 and 5.3 respectively. No changes were made to the EIS as a result of these comments.*

Comment: I was quite surprised this plan was going through given the public hearings and continued comments about the facility using outdated data regarding sea level change, the algae bloom issue[.] (**0008-1** [Finver, Jody])

Comment: Are you people totally out of touch with whats happening with a warming climate and a rising sea. Stop this foolishness[.] (**0028-2** [Clapp, Linda])

Comment: It seems insane to do this in the state the most endangered by climate change through rising sea water, and with our hurricanes. There are other, safer ways to provide the country's energy needs. (**0031-2** [Hawkes, Holly Forrester])

Comment: It is simply unthinkable that the NRC would consider approval of any changes to Turkey Point Nuclear Power Plant aside from a plan to shut it down. There is no question as to if it will suffer problems, the only questions are when to what degree of severity. The combination of sea level rise, which no legitimate scientist denies, and the regularity with which severe storms, becoming more so each year, strike the Florida coastline, make the site untenable. (**0051-1** [Smith, David W.])

Comment: Now that I know, I would not like to see the current plant, especially with sea levels on the rise, located so close to any city. (**0061-4** [Lague, Victoria])

Comment: I urge you strongly, as a Florida residence, to deny the nuclear power plant option for FPL. This is irresponsible in light of our local climate and future water shortages. (**0080-1** [Reiter, Ben])

Comment: Given the dangers of hurricanes, sea level rise, and the demands on South Florida fresh water needed to cool the existing plant, any expansion is not only foolhardy but a danger and detrimental the the health and welfare of the South Florida human and marine population. (**0091-1** [Boyce, Sheila])

Comment: Furthermore, expanding a nuclear power plant in an area that is ground zero for sea level rise threatens the future of South Florida. (**0102-7** [Commenters, Multiple])

Comment: This is without even mentioning the environmental effects such an upgrade will do specifically concerning water supply and the danger of sea level rise. (**0119-4** [de Azevedo, Ricardo])

Comment: I am not opposed to all nuclear power. However, the site proposed for expansion is located directly on the shores of Biscayne National Park in an area that is extremely susceptible to sea level rise and the impacts of climate change. (**0155-1** [Morgan, Karen])

Comment: THIS IS A TERRIBLE, TERRIBLE IDEA: TOO EXPENSIVE, DANGEROUS TO THE GLADES, SHORTSIGHTED IN VIEW OF RISING SEA LEVELS, AND YET ANOTHER POTENTIAL WATER HOG. (**0157-1** [Weber, Gae])

Comment: This is an ill-conceived, poorly thought out decision and must not move forward. Even in a state that denies the reality of sea level change, like Florida, reality will hit home. and then what will you do with this facility? It's time to give life a chance because money and profit aren't cutting it. (**0179-1** [Roseberry, Bill])

Comment: Florida is one of the only places in the world where you can see climate change in effect. Why, then, are we building nuclear reactors in an environmentally sensitive location? I haven't forgotten the tsunami that destroyed Fukushima. Recently, a robot sent into that nuclear reactor was destroyed in 10 minutes. Since Florida is an epicentre of hurricanes, tropical storms, and sea level rise, it seems absolutely ridiculous to even consider putting a nuclear reactor here - especially given FPL's outdated and misguided plans. I only foresee disaster within the time that it is here. (**0214-3** [Zerulla, Tanja])

Comment: In summary, I believe that the proposed installation of nuclear reactors at Turkey Point has not considered current climate change science, alternative energy sources for Florida, and proper safety precautions. (**0214-8** [Zerulla, Tanja])

Comment: If we have learned anything in Miami from Andrew, we have learned this: Don't plan for the good days, when everything is perfect. Don't plan for the bad days, when the excrement hits the fan and you get a little splattered. Plan for hell on earth, because worst-case scenarios happen, and they are worse than you expect. The reality is that by building nuclear reactors in "Hurricane Alley", under conditions of Sea-Level Rise exposes both the reactors and the surrounding residents to risks that can not be fully anticipated. FPL is essentially playing Russian Roulette with our community's very existence. (**0252-13** [Van Leer, Sam])

Comment: Please do not approve the expansion of the nuclear power plant at Turkey Point. My biggest concern is that Turkey point, like Fukushima, could be affected by sea level rise. In addition, the existing Turkey point units already have problems with cooling its units. FPL will need to use Florida's natural aquifer to cool its units, should it run out of treated waste water. Neither of these concerns are addressed in the application submitted to your agency. I believe you should do the right thing and not approve the Turkey Point plant expansion. (**0270-1** [Sommers, Andrea])

Comment: I am an engineer. USF '73. And a rocket scientist. But it doesn't take a rocket scientist to see rising seas by a nuclear reactor by an eco park to know a turkey when we see one. $$$ is not the measuring stick. Leaving a better place than we found is. (**0289-1** [Vance, Richard])

Comment: You jest, surely. As sea levels inexorably rise and in a place like Homestead at only 8' above sea level, you want to expand a nuclear power plant. (**0384-1** [Franzmann, Paul])

Comment: Already seacoast cities are experiencing periodic flooding and saltwater has already found its way into their water supplies. Use common sense and deny this expansion at Turkey Point. (**0438-1** [Hoegler, Jean])

Comment: The City believes that the license for the project should not be approved as currently proposed. The Turkey Point Nuclear Plant Units 6 & 7 application should be viewed in

context of a region facing the enormous water quality and land use related challenges imposed by climate change. (**0456-1** [Miami, City])

Comment: Environmental impacts are too great to allow the expansion, not to mention that the site is one where sea level rise and climate change could have terrible effects. (**0539-1** [Malone, Peggy])

Comment: I am all for nuclear power if they are located where they will not have an negative impact on the environment they are located in. With sea levels and eco systems being an issue here I would not allow expansion in this location. (**0541-1** [Zarsky, Terry])

Comment: This seems really stupid since sea level rise will wipe it out. (**0565-1** [Ackerman, Frank])

Comment: I would just end by begging you guys and the NRC, please, you are our only hope. You've seen what the State Regulators, the so-called Regulators are like. They're really not regulators. I mean I'm a State employee. I'm not even sure if I can use the words "climate" and "change" in the same sentence legally. You know what we're dealing with here and you know that we're dealing with a utility that -- look, they're just doing their jobs. But they get paid whether or not they build this reactor. Unfortunately, we're the ones paying them. You may be the only people who can save us from this fate. So I'm just asking you to do everything in your power to save us from Units 6 and 7. (**0721-16-7** [Rifkind, David])

Comment: So now FP&L wants to build two more nuclear plants at Turkey Point. The plants that already exist and the new ones proposed, as well as all that nuclear waste at Turkey Point will be under water in the foreseeable future. To me, that one fact is sufficient reason not to build these new plants. Game over. But, if that's not enough reason for you there are plenty compelling reasons and we've got a lot of them. (**0721-28-5** [Wilansky, Laura Sue])

Response: *These comments express opposition to the licensing of new nuclear reactors at the Turkey Point site due to concerns about global climate change and rising sea levels. Appendix I of the EIS documents the review team's consideration of the potential changes in impacts that may occur as a result of the changes to the environment resulting from global climate change including sea-level rise. The changes that were considered include potential changes in temperature, rainfall, and occurrence of severe weather events. The effects of sea-level rise were also considered in this analysis. No changes were made to the EIS in response to these comments.*

Comment: I would like to register my opposition to the expansion of the Turkey Point Nuclear facility by Florida Power and Light. The location, near dense population centers, adjacent to valuable natural areas, on the edge of ever-increasing sea levels all create too high a level of risk. There are better ways to supply energy to Florida citizens than this. Added to the safety issue is the total disrespect FPL shows to the communities it serves with the stated intent to install huge power poles through the middle of Coral Gables, South Miami and Miami. Please deny FPL permission to build the new reactors. (**0046-1** [Wade, Thomas M.])

Comment: Please do not license these 2 additional power plants and do not allow the huge power poles to be located along US 1. (**0050-3** [Simon, Gary P.])

Comment: Please do not confirm FP&L's request to build new nuclear reactors and certainly do not allow placement of these huge high voltage lines in the Miami Roads neighborhood (nor in or adjacent to any other residential neighborhood). (**0073-7** [Commenters, Multiple])

Comment: 6. Home values will be definitely affected with the close proximity of these proposed lines. For these reasons, I respectfully ask that you consider not confirming FPL's request to build new nuclear reactors and certainly not to allow the placement of high voltage lines in the Miami Roads Neighborhood. (**0077-5** [de Armas, Maria Cristina])

Comment: I want this letter to be a clear and strong statement that I strongly oppose the expansion of Turkey Point with this new reactors as well as the installation of the transmission lines through our neighborhoods and or the Everglades. (**0087-4** [Lange, Alexandra])

Comment: I strongly oppose Florida Power & Light's (FPL) plan to build two new nuclear reactors and miles of transmission lines through residential and downtown Miami. (**0126-1** [Pontier, Christine Hughes])

Comment: US1 is the gateway to one of the most beautiful areas in the State so why make it look like an industrial city. It is historic, the neighborhoods are historic, this is where Miami was first settled, it will destroy our future, and make us an industrial wasteland. (**0149-3** [Nelson, Joyce E.])

Comment: I am writing to state my very strong opposition to both the expansion of nuclear power generating capacity at Turkey Point and the installation of the proposed towers along US1. (**0187-1** [Meyer-Steele, Shawn])

Comment: I wish to express that I AM TOTALLY AGAINST new nuclear reactor units at Turkey Point as well as miles of oversized transmission lines going down US 1. (**0314-1** [Erven, Marlene])

Comment: I am writing to express my opposition to the expansion of the Turkey Point expansion plans and to the placing of lines up and down highway U.S.1. (**0409-1** [Portela, Ana C.])

Comment: There are issues of sea level rise, salt water intrusion, the potential raiding of freshwater supplies needed for our growing population, nuclear waste, damage to the bay's coral reefs and estuaries and the prospect of dangerous and unsightly poles along US1 and in the Everglades. (**0596-3** [Sorenson, Katy])

Comment: I oppose the expansion of Turkey Point nuclear power plant, as well as the new power lines adjacent to Everglades National Park. My reasoning is the same as that put forth by the Miami Group Sierra Club. (**0620-1** [Southern, Tom])

Comment: Even if this new plant were to operate for its entire lifetime with a 100% safety record, the impact of building and operating such a plant and transmission lines will be catastrophic. (**0639-1** [Haselhurst, Richard])

Comment: In the cities near FP&L's nuclear facility south of Miami, there is intense opposition to the building of the two nuclear reactors from mayors, business leaders, and citizens. One part of the opposition comes from the negative impact these reactors will have for decades on the fragile environment of the Everglades, Biscayne National Park, and the Atlantic Ocean which border this nuclear facility. Another part comes from the $25 billion cost and the intrusive construction and traffic problems the plants will cause for years to the thousands of businesses

and residences in the area. The third part comes from the installation of 100 foot high x 5 feet thick concrete power poles that will be used to transmit the power to Miami and other cities. These massive concrete poles will be placed along major highways and streets and they will be visible for miles. In many cases they will be the tallest and most noticeable structures in the historic neighborhoods along coastal Highway U.S. 1. (**0671-2-2** [Post, Patrick])

Response: *The comments express opposition to the proposed units at the Turkey Point site. They do not provide any specific information related to the environmental effects of the proposed action. No changes were made to the EIS as a result of these comments.*

Comment: As a 45 year resident of Coral Gables, FL I want to express my opposition to the construction of additional nuclear power plants in South Florida. Rather, the existing nuclear plants at Turkey Point should be phased out and shut down. (**0213-1** [Hyams, Charles])

Comment: It wholly benighted to even think of building unit # 6 and #7. What should be thought about is permanently decommissioning Turkey Point. (**0264-8** [Dwyer, John P.])

Comment: FPL has spent years developing their PR and campaigns to influence the public and public officials to enable their plan to go forward (often giving false or misleading information to silence safety and environmental concerns), rather than accepting the validity of objections and developing a more progressive and environmentally friendly plan for the future of energy in Florida. (**0356-15** [Shlackman, Jed])

Comment: Rather than expanding Turkey Point, we should be preparing to close it down. (**0463-7** [Gross, Cheryl A.])

Comment: Hello Some information that may help Stop Turkey Point Nuclear Plant from being enlarged ? ! I had heard that they want to enlarge Turkey Point ! Which I think is already past it's time of usefulness maximum time use design already ? I was 14 years old when it came on line and I am 68 years old now. And of course just like Fukoshima it is just waiting for a tsunami sitting rite on the Atlantic Ocean ! (**0505-1** [Buyea, Thomas])

Comment: In truth, my preference would be to shut down Turkey Point, and you are wanting to add more reactors!!! (**0540-2** [Burge, Laura])

Comment: We need to be shutting Turkey Point down safely NOT expanding nuclear energy. (**0548-1** [Scott, Ruth])

Comment: Then we can work on dismantling the existing nuclear reactors, which is really what we should be doing. (**0643-3** [Joannou, Jr., Benjamin])

Comment: It is time to shut down, not expand nuclear plants across the country. (**0647-3** [Burns, Terry])

Comment: Also I strongly feel that this existing plant should be shut down and dismantled as soon as possible!!! (**0651-2** [Young, Kim])

Comment: It wholly benighted to even think of building unit# 6 and #7. What should be thought about is permanently decommissioning Turkey Point. (**0673-9** [Dwyer, John P.])

Comment: Furthermore, please consider decommissioning Turkey point and transporting the spent fuel rods to a safe storage site. (**0674-9** [Dwyer, Karen])

Comment: My common sense is telling me that this nuclear power plant should not be enlarged, it should be decommissioned. (**0695-1** [Nappe, Judith])

Comment: Given sea level rise and that there is no way of disposing nuclear waste from this site at this time, what we should be discussing is decommissioning this entire plant and coming up with plans for removing all waste from an area that will be underwater within decades. (**0714-1** [Gonzalez, Carlos])

Comment: You do not need any more power plant. Shut down the plant. (**0721-18-5** [Bernabei, Catharina])

Response: *These comments express opposition to both the existing units and additional units at the Turkey Point site. They do not provide information related to the environmental review for the proposed action. No changes were made to the EIS as a result of these comments.*

E.2.34 General Comments in Opposition to the Licensing Process

Comment: You should not require regular people to read technical 25 megabyte files that take so long to load and are 717 pages long. You could have made this much shorter. (**0373-14** [Lee, Nancy])

Comment: The report fails to explain the fact that they have obviously ignored their own criteria; that they've avoided locating a project near a national park. Although that was a significant criteria, they are ignoring it and placing it between two very fragile national parks, both of which have habitual and fragile wildlife, particularly vulnerable to the long term adverse impact of the hydrology, the quality and the quantity of the salt water source. There's one other particular species at highest risk of having to compete with the nuclear plants for water, and that is the 4 million human beings who inhabit South Florida. (**0721-3-5** [Lerner, Cindy])

Response: *The NRC licensing process for nuclear power plants includes a thorough review of the proposed plants' impacts on the environment in accordance with NRC regulations. Documenting the thorough review and the NRC's conclusions results in the large document you describe. In addition to making the document available for download, the NRC provided copies of the document to reading rooms and libraries near the Turkey Point site to facilitate review of the EIS. The EIS is also summarized in a Reader's Guide that is available on the NRC website. No changes were made to EIS as a result of this comment.*

Comment: I'm going to say what a lot of us are thinking. The Draft EIS is cursory, perfunctory, and biased in favor of the applicant. (**0721-12-13** [White, Barry J.])

Comment: I am concerned about the probity, the adequacy of the research base that went into this Draft proposal. (**0721-17-3** [Breslin, Tom])

Comment: So the Turkey Point 6 and 7 Draft Environmental Impact Statement has serious omissions in the analysis that make it impossible to determine the likely effects of plant operations on the environment. (**0721-2-1** [Stoddard, Philip K.])

Comment: So the one question is, what are the chances of another Hurricane Andrew happening again at this same site? That's for them to answer. That's what the EIS is supposed to look at. That's the hard look. (**0721-22-11** [Schwartz, Matthew])

Comment: Which brings up a big absurdity here. We keep trying to separate -- the NRC tries to separate safety and environmental concerns. We're talking about radiation. They're the same thing. A radiation release is a safety problem and an environmental problem. So to try to separate those out and say that's a different meeting and the public can't attend the safety meeting -- there is no public comment group like this for the safety meeting, is unconscionable. And it indicates that there is a safety problem that we need to be aware of. (**0721-23-2** [Bethune, David])

Comment: In looking at the Environmental Impact Statement, I don't think they did a good job in terms of projecting what the future will look like. In order to do this properly we have to see what will happen in 50, 60, 70 years, and I think the models that they use are inaccurate. (**0721-7-3** [Edmond, Gabriel])

Response: *These comments express concern about the NRC's licensing process. Because these comments did not provide new information, no changes were made to the EIS.*

E.2.35 General Comments in Opposition to Nuclear Power

Comment: There is no one on earth building new nuclear plants. They are too risky and expensive. No. No. No! (**0004-3** [Engelberg, Jodi])

Comment: No NUCLEAR POWER in the Sunshine State. (**0012-1** [Shahsavar, Mehran])

Comment: I Do Not think it's time to invest in nuclear energy. (**0014-1** [Westaway, Katharine])

Comment: We are opposed to any expansion of nuclear energy. (**0020-1** [Smith, Leigh Emerson])

Comment: Nothing good has come with the endless tinkering, rape and pillage of the natural world. Nuclear energy is the most dangerous energy created. NO technology will reduce the impact of the fossil fuels that we are using to selfishly serve a dangerously high human population - especially the US population which generates the most pollution and waste proportional to our population. (**0020-3** [Smith, Leigh Emerson])

Comment: When you look at the Fukushima disaster in Japan, and you look at the land area that was exposed to radiation, let's assume that would encompass an area from the Palm Beaches to Key West. Can you imagine evacuating that many people from such an area? And can you imagine the decline in property values that would result even if some of those people were convinced that they could return? That kind of thought is abhorrent to me. It is really unimaginable. Yet this is the risk that we take with nuclear power. In my opinion, even though the risks of a disaster are low, the consequences are so high that we really should not be taking the risk at all. We really should be planning for the abandonment of all nuclear reactors. They have the potential to end our civilization. For example, if there were a Coronal Mass Ejection in our Sun, of the magnitude that occurred in the late 1800s, that could cause a global electrical blackout. And in today's society, unlike in the late 1800s, that would be a major event. But the bigger problem would be that all of the control rooms of every nuclear reactor around the world would be rendered inoperable. So we wouldn't even be able to shut down our nuclear reactors. Within a few days, every single nuclear reactor would melt down. I believe the meltdown of every nuclear reactor in the United States would effectively mean the end of our nation. So I hope you see that I firmly believe that we should not be adding to our inventory of nuclear reactors. (**0023-1** [Joannou, Jr., Benjamin])

Comment: I fear what could happen with more nuclear power nearby, ex explosions, terrorist attacks, and magnitude of damage to nearby population. Would not want to put human life in danger for sake of production, prosperity, or economic gain, not for me or future generations. I do not trust decisions of those who do not have same concerns or values. I say look to another way putting welfare of people first. May God guide your final decision. (**0025-1** [Alvarez, Susana])

Comment: My opinion would be to turn the contaminating Nuclear plant and it horrible by product into something that we can live with for future generations. (**0027-2** [Neal, Kevin])

Comment: I am asking you to be selfish, think of yourself, think of your family the future of kids or your kids kids, does their future look good, bright? It does!! I know it does. So I ask whats the POINT in Turkey Point to add more reactors? What is the real point? Is it an addicition? I ask this because to me its like smoking cigarettes. You trick yourself into thinking its good. Where is the good when now is fine until later in life you realize you're dying because you thought it was ALL good. Teach the lesson that you learned to your kids and their kids by saying NO to not only more nuclear reactors, say NO to ALL nuclear reactors. We're all dying from cancer, we cant eat fish from the Pacific Coast because of Fukushima. How they doing now? Ask them if theyre happy with their nuclear reactors. Its not if theres going to be a problem its a matter of WHEN. So WHEN are you going to realize that what YOU are doing affects YOU too & your kids. NOw is the time to make the right choice, not when youre dying from the effects. We have control of our fate here. Use this time to tackle the other issues we need to battle. If you need help there just ask, I WILL gladly assist. I am taking care of my kids by writing you because its ALL I can do so I am going back to LOVING & PLAYING..... what are you REALLY doing (**0029-1** [O'Brien, Lance])

Comment: I recently became a mother and I do not want my son's generation or the rest of mine to have to deal with the endless amounts of radiation the will affect us and the planet haven't we caused enough damage as it? (**0030-2** [Gomez, Lissett])

Comment: As a native resident of south Miami-Dade County with young children and many relatives and friends in this area, I am deeply concerned about the prospect of new nuclear reactors being built at FPL's Turkey Point facility. Turkey Point already makes residents nervous due to its relative proximity to residential areas. (**0052-1** [Roos, Monica])

Comment: The very future of life on Earth is threatened by use of this form of energy! One accident, equipment malfunction, operator error, or terrorist attack at a nuclear plant could literally mean the end of life on Earth. If Fukushima didn't convince you, and you still think a disaster like can't happen at Turkey Point, just think about that little O-Ring on the Challenger. Here in Florida we can never forget that. There is no way to guarantee 100% safety when using this technology, and when it comes to materials that remain deadly dangerous for tens of thousands of years, longer than all of human history, anything less than 100% safety cannot be considered safe. We humans are not infallible, and neither is anything we produce. Nor can we control - or predict - the forces of nature, as much as we might pretend we can. This means that nuclear plants cannot, simply cannot be guaranteed to be safe. And when it comes to nuclear materials, anything less than 100% safety is just not good enough. Nuclear plants are so dangerous even Wall Street won't invest in them, and they'll invest in almost anything, no matter how risky! (**0078-2** [Wilansky, Laura Sue])

Comment: There are so many reasons to develop a forward thinking plan and reduce waste of our precious water. Nuclear is not the way forward. We need a vision that is not harmful to the

environment and uses sound thinking and heartfelt discion making to find our way forward. (**0098-2** [Gavel, Deborah])

Comment: Says it all. Barry [commenter submitted a graphic/picture in original correspondence] (**0100-1** [White, Barry])

Comment: I am unequivocably opposed to any new nuclear power facilities. We keep looking at wrong-headed solutions that are absolutely fraught with potential danger. The massive use of water is not acceptable and we do not want another Chernobyl or Fukushima. (**0124-1** [Colby, Helen])

Comment: [T]he idea of a nuclear power plant terrifies me, and I strongly disagree with this plan on all fronts. (**0128-4** [Bach, Lili])

Comment: Nuclear power has been shown, at Three Mile Island and at Chernobyl, to be unsafe, unreliable, and unpredicatble. (**0140-1** [Rhodes, Karen])

Comment: This type of energy production should be outlawed. (**0146-2** [Grant, Randy])

Comment: INSTEAD OF INCREASING THE FACILITY AT TURKEY POINT, I WOULD HAVE YOU CLOSE THE PLANT ENTIRELY. NUCLEAR POWER IS NOT CLEAN POWER REGARDLESS OF HOW IT IS SOLD. (**0164-2** [Chrissos, H. L. Chris])

Comment: End this dangerous 20th century technology. (**0170-1** [Ercole, Steven])

Comment: Finally, I think it's plainly stupid for FP&L and the US NRC to even be thinking about this since we shouldn't be further investing in a "dying" industry that's simply outdated and too expensive to fund with only government subsidies making it somewhat viable. (**0178-3** [Almirola, Alejandro])

Comment: Nuclear energy puts ALL OF US AT RISK! Nuclear is OUTDATED & DANGEROUS! There are SAFE slternatives! (**0199-1** [Moore, Linda])

Comment: NUCLEAR POWER HAS YET TO CONVINCE US THAT IT IS SAFE (**0201-2** [Reid, Sarah])

Comment: PLEASE FOLLOW THE EXAMPLE OF SANE GERMANY, A LEADER FOR A NUCLEAR FREE WORLD. NO MORE NUCLEAR POWER PLANTS !!!!! (**0201-4** [Reid, Sarah])

Comment: Germany has shuttered all of their nuclear plants. I don't want another Trenoble. (**0203-1** [McDaniel, Diana])

Comment: I have lived in Miami my whole life and I consider this area a piece of paradise. So do the millions of tourists that come to visit. As with any place on our fragile planet, there are unforeseen events that could occur that could decimate our area. Some risks, such as hurricanes or sea level rise, are unavoidable. (**0207-2** [Cleland, Noel])

Comment: Regardless of how hard we try, we cannot make the risk of nuclear catastrophe to be 0%, because we cannot anticipate every possible contingency for failure modes that no one has considered before. So why take an unnecessary risk when we don't have to, even if it seems small. (**0207-4** [Cleland, Noel])

Comment: I was deeply saddened to learn that Florida still relies on antiquated energy solutions. (**0214-1** [Zerulla, Tanja])

Comment: Every time I think it cannot get worse it does! Nuclear power is not the solution to any of the energy problems of this nation or the world for that matter, especially considering the problem of disposing of the uranium, which will be radioactive and pose a threat for at least 10,000 years! Have you no conscious? Do you even care about the children of tomorrow? (**0231-1** [Bonilla-Jones, Carmen Elisa])

Comment: How can you even consider adding more pollution and danger to this nation, which you have sworn to, defend? Is the "Corruption" so ingrained that the very lives of not only all the Country but also your own families mean absolutely nothing? (**0231-3** [Bonilla-Jones, Carmen Elisa])

Comment: Just look at the recent nuclear reactor disaster in Japan. Another in a series of nuclear disasters without end, the consequences of which are still being felt, still happening. Now is the time to think about the damage that is caused with this type of energy and the impact it will have on future generations. Will Miami become the next Fukushima? Will south Florida become a radioactive wasteland? To allow this to happen is a disaster, the risk is criminal. (**0243-2** [Duran-Pinzon, Jaime])

Comment: Please stop being soooo stupid. Until the technology of fusion is practicable nuclear is just a boondoogle waiting to happen. (**0249-4** [Mosher, Paul])

Comment: Nuclear reactors are not the answer especially when there is a liability as noted by the International Atomic Energy Authority Data Summary listed below. (**0250-9** [Fulks, Anna Louise])

Comment: Instead of considering expansion of this dysfunctional and dangerous facility, we should be considering how soon the existing reactors can be dismantled. (**0252-1** [Van Leer, Sam])

Comment: I have spoken to many in the community, and can say that only one out of hundreds is in favor of more Nukes. In conversations with elected officials, they are unanimous in their opposition. (**0252-19** [Van Leer, Sam])

Comment: After the disaster in Japan, I strongly oppose any further expansion of and addition to nuclear energy facilities in this country. (**0256-1** [Myers, B. J.])

Comment: It is time we stop using nuclear energy now. We have already caused irreversible damage to our environment and we must protect the people. You must serve the people and not huge corporations. (**0257-2** [Padron-Delgado, Blanca])

Comment: Your agency exhibits a blatant disregard for the sanctity of millions of lives and the survival of the planet at large! (**0259-2** [Lettieri, Tammy])

Comment: it is a matter of GREAT CONCERN to see the further development of extensive Nuclear Power production plants within our home living radius in South Florida. (**0272-1** [Zuniga, Family])

Comment: If Florida Power & Light Company is as technically proficient as it advertises ... and not submit its victims to the excessive cost and more inherent safety risks of additional nuclear capacity. (**0283-7** [Compel, Jr., Joseph])

Comment: We are opposed to all nuclear power expansion in Florida, as it is unsafe and non-renewable, taxes limited water supplies. It is unworkable, especially in the age of climate change. (**0288-15** [Cleland, Noel] [Jackalone, Frank] [Mahoney, Stephen] [Matthews, Debbie] [Roff, Rhonda] [Scott, John] [Teas, Jim] [Ullman, Jonathan])

Comment: Nuclear is a waste of space. (**0291-1** [Vorachek, Mary])

Comment: Too beautiful and delicate a place to screw around with nuclear crap. (**0293-1** [Hogle, Dick])

Comment: GET REAL! NUKES ARE DEAD, EXPENSIVE AND DANGEROUS, HAVE ALREADY IRRADIATED THE EARTH FOREVER, AND HAVE BEEN SUPPLANTED BY RENEWABLES. READ THE NEWSPAPERS! (**0296-1** [Richardson, Don])

Comment: TOTALLY PHASE OUT NUCLEAR PLANTS, NOT BUILD NEW ONES. (**0302-2** [Jezierski, Elisabeth])

Comment: Nuclear power is a technology of the Past, please move on. (**0304-1** [Zimmermann, John])

Comment: I concur with the above statement and wish to add that as a oat resident of Long Island during the debate regarding the nuclear power plants at Shorham and as a NYC resident living not too far from Indian point that nuclear power is always a bad idea.... it was then, it is now, for so many reasons, among them the entire nuclear waste issue, the whole issue of the potential danger of even small accidents and the simple fact that, with the advances in renewable energy technology, these albatrosses of the energy industry are no longer needed. (**0324-1** [Gibson, David])

Comment: Nuclear energy use should be slowed down and eventually eliminated--not increased, especially in a sensitive area next to a national park. (**0326-1** [Earnshaw, Shinann])

Comment: nukes are bad idea anywhere just look at fukushima (**0327-2** [Anonymous, Anonymous])

Comment: I don't want any more nuclear energy. Nuclear energy is not safe and it's right in our back yard. (**0329-2** [Baumwall, Douglas])

Comment: No, we don't need any more nuclear power plants. They use too much water and pollute the atmosphere and environment. The long chain of events to provide the fuel pollutes and emits C02 (mining, etc) Cleanup after an accident is paid by taxpayers(what a business plan). (**0336-1** [Anonymous, Anonymous])

Comment: The NRC cannot be trusted, they do what the money masters tell them. It's all about the money, and a lot of it comes from taxpayers. Result -"electricity too cheap to meter"? No, it was another lie. Higher electricity bills will be the norm, along with more doses of radiation to the kids and grand-kids. (**0336-4** [Anonymous, Anonymous])

Comment: It is my opinion that these planned nuclear reactors are dangerous. (**0337-1** [Philips, Sally B.])

Comment: I will say that nuclear power should not be used anywhere in the United States. And certainly not in Florida, a state that has had more than its share of severe hurricanes. (**0339-3** [Provost, Allan])

Comment: Not in my backyard thank you. (**0346-1** [Anonymous, Anonymous])

Comment: No more nuclear plants. (**0348-1** [Ward, Richard])

Comment: Not in my backyard. (**0349-5** [Oliva, Vivian])

Comment: This is such a bad idea on so many levels. First of all, a nuclear power plant is an accident waiting to happen and when it does you can't fix it. Ask the folks in Fukushima -oh that's right, there aren't any folks in Fukushima because the nuclear accident made the town and surrounding areas unsafe to live.That should be enough for anyone with common sense, but greed is blind. (**0353-1** [Royce, M.])

Comment: South Florida is a beautiful place that is envied and visited by many around the world. Placing it at increased risk of environmental harm and nuclear disaster is a travesty, and being in denial and telling ourselves a disaster can't happen here is not wise and not necessary. (**0356-6** [Shlackman, Jed])

Comment: The two nuclear plants are a bad risk in light of over 50 years of history on the use of nuclear power. Over half a century of experience throughout the world indicates nuclear energy is not the answer. It is the most expensive, the most delayed, and dangerous. No nuclear plant has yet been built that is not over budget and behind schedule. It is also carbon intensive in uranium mining, uranium processing where fracking is used just as for natural gas, building the nuclear plant, and transportation of uranium to and used radioactive waste away from the nuclear plant. (**0366-10** [Griffith, Ed and Harriet])

Comment: No No NO absolutely not...don't you dare add more water destroying elements to this ridiculous Grid ... we need to dismantle to begin with ...We must stop the stupid Idea of Giant Generation and pushing down wires for miles and miles to get to end user and demand you spend the exact same BILLIONS OF DOLLARS on Distributed Generation @ point of use like Edison envisioned to begin with.... (**0369-1** [Polk, J. D.])

Comment: Nuclear is an outmoded power source that would be economically non viable without massive subsidies. (**0371-4** [Haffmans, Edmund])

Comment: We should be talking about a planned phase out of all nuclear power reactors NOT expansion. (**0380-2** [Anderson, Vaughn])

Comment: Where does it stop? When does it stop? Stop and think, where and when, does it STOP. Does it really have to be when nothing is left? STAND UP. (**0387-1** [Morgan, Carol])

Comment: PS before you take this disastrous course of action given the information above, read up on the consequences of nuclear energy gone sour at San Onofre, California. This site is even more vulnerable ! (**0388-1** [Andersen, Paul])

Comment: No expanding nuclear power!!!!!!!!!!! (**0393-1** [Bereczki, Patricia])

Comment: WHEN WE FIGURE OUT HOW TO SAFELY DISPOSE / DEACTIVATE NUCLEAR MATERIAL SO THAT IT DOESN'T REMAIN TOXIC FOR THOUSANDS OF YEARS, MAYBE THEN NUCLEAR POWER WILL MAKE SENSE. UNTIL THEN--NOTHING! NO NUCLEAR POWER PLANT SHOULD BE COMMISSIONED OR ALLOWED TO CONTINUE TO OPERATE. ANYWHERE IN THE WORLD, LET ALONE THE USA! (**0412-1** [Davis, S. K.])

Comment: At this point in time, we should be looking at shuttering nuclear power plants, not expanding them. Right here in Illinois, we are seeing Exelon looking for massive bailouts just to keep nuclear energy power plants profitable. Yet they, Exelon, has no clue what to do with our tremendous spent fuel rod stockpile. (**0419-1** [Juras, Randy])

Comment: Nuclear power has never been safe. How many examples do we need? Chernobyl is a continuing train wreck in progress; TMI was a disaster; and words fail me to describe the horror of Fukushima. If you think that disaster is over, then you most definitely need to do a little research. For humanity's sake don't enlarge the Turkey Point plant, shut it down! (**0431-2** [Hicklin, Mary])

Comment: I DON'T THINK WE NEED TO BE EXPANDING NUCLEAR POWER PLANTS ANYWHERE. WE SHOULD BE CLOSING DOWN THE ONES WE HAVE. THEY ARE VERY DANGEROUS AND THERE IS NO GOOD SOLUTION WHAT TO DO WITH THE NUCLEAR WASTE WHEN THEY ARE NO LONGER IN USE. (**0432-1** [Olson, Diane])

Comment: No to any more nuclear anything. We are not having a good time with this 'cool' energy product called nuclear energy. It causes death. It causes pollution that an last for over a quarter of a million years. That is a pipe dream that needs to wake up. (**0442-1** [Mosca-Clark, Vivianne])

Comment: Please don't put them here & perhaps no where is really good; (**0455-2** [Hardin, Lillian])

Comment: Our country does not need any more nuclear expansions. We have enough to worry about. No more! No more! (**0462-1** [Bubb, Ken])

Comment: WHY would anyone want to expand nuke power after the Man Made Disaster at Fukushima..?? It is time to stop the nuke power and get to safe alternatives!!! (**0464-1** [Farnsworth, Stu])

Comment: Nuclear power is outdated, why would we want to expand ? (**0468-1** [Nelson, Wendy])

Comment: Let's push to other sources and conservation. Nuclear power CANNOT be managed for 50 more years, we have no storage now. And the idea that we need another nuclear plant is illogical. (**0480-2** [Simmerman, Scott])

Comment: According to science; anything radioactive is NO GOOD. According to science; anything radioactive is harmful to everything-be it human, animal, vegetation and even the soil, water and air. There is nothing good about anything radioactive; not even all the profits the few who profit from it. (**0481-1** [Szabo, Liz])

Comment: Please do not let any further plants be built that will add radioactive harm to the planet. Instead work at phasing out plants that deal with radioactivity[.] (**0481-2** [Szabo, Liz])

Comment: Nuclear energy is not a sustainable resource as one day we will run out of raw materials, and it cannot be considered clean energy until a safe disposal method for nuclear waste is implemented. (**0482-1** [Campbell, Grant])

Comment: Are we really supposed to forget Fukushima? Are we supposed to pretend the ongoing disaster that is Hanford? I'm sorry, but heads in the sand is not acceptable. (**0496-1** [Reed, Jennifer])

Comment: We have ample evidence of the danger of nuclear reactors from the disaster in Japan a few years ago. That reactor is still pumping nuclear waste into the ocean. Nuclear power needs to be phased out, not ramped up. In particular, nuclear power reactors need to be kept away from land Americans own in common--our national parks. (**0498-1** [Bratcher, Suzanne])

Comment: No additional nuclear reactors should be built at Turkey Point and plans should be made to close existing nuclear power generating facilities in order to protect surrounding populations and their progeny. (**0511-2** [Draper, Lonnie M.])

Comment: There is no safe way to manage nuclear power generation and therefore we must not build more reactors and must dismantle our existing facilities in favor of safe, renewable forms of power production. (**0511-5** [Draper, Lonnie M.])

Comment: Those that promote and endorse nuclear fission time-bomb plants are misanthropic psychopaths. Nuclear fission technology is more than insane. It is pure raw evil. It is violation that even Satan would not do. (**0513-2** [Roehl, Richard Ralph])

Comment: Stop this ! Nuclear power is proven to be more of a liability than ever thought. Disagree ? Then make them buy private insurance NOT underwritten by Uncle Sugar Daddy. (**0521-1** [Socie, Robert])

Comment: We do not need more nuclear power period. (**0530-1** [Mccroskey, Carol])

Comment: Nuclear power is not the way towards a sustainable future. (**0553-2** [Punnett, Daniela])

Comment: I strongly oppose of the use of nuclear energy due to the inability to dispose of waste. (**0558-1** [Barnes, Janice])

Comment: NUCLEAR POWER IS POISON and cannot co-exist in the same space with life on earth. (**0561-1** [G., Ambriel])

Comment: A total of 17,155,535 people live within 19 miles of a nuclear plant. I guess that's still not enough for you nuclear madmen to reduce earth's population. Documentaries: Into Eternity (A Nuclear Waste World)"Documentary on the idiocy of the Atomic Age and the long term ramifications of storing nuclear waste. https://www.youtube.com/watch?v=SBrMzwSdSI. The Biggest Nuclear Operators In The United States: http://www.investopedia.com/stockanalysis/2011/the-biggest-nuclear-operators-in-the-united-states-duk-pgn-so-exc-etr-dnee0328.aspx. The Truth about Nuclear Waste Disposal (Full Documentary) https://www.youtube.com/watch?v=5mthzaOyiEO. (**0561-4** [G., Ambriel])

Comment: [N]uclear power is too expensive relative to renewable energy sources, and generates wastes that remain lethal for tens of thousands of years and which we have no means of permanent and safe disposal. With these considerations, NO nuclear plant anywhere

makes any sense, beyond the obvious problems with the current site in question. (**0567-2** [Cohen, Howard])

Comment: After the Fukishima disaster it quite apparent that ALL nuclear power plants should be immediately terminated. Florida is so vulnerable to extreme weather threats. Radiation is increasing day by day on our planet. Alternative forms of power are available and so there is no excuse for not supporting them except the greed of the powers that profit from nuclear power. (**0576-1** [Williams, Penelope])

Comment: I agree with the general message. I especially don't want another nuclear power plant in this country. they can be very dangerous. (**0586-1** [Stamps, Gail])

Comment: Save humanity. (**0587-2** [Glasshof, Wendy])

Comment: NO NUKES! The risks are unacceptable and unnecessary. (**0589-1** [Zook, Caryl])

Comment: On 9/19/14, a UBS report called nuclear power plants the "the DINOSAUR of the future energy system" and Amory Lovins, a physicist and chief scientist at the Rocky Mountain Institute, said that nuclear power was an "OBSOLETE technology": "Banking giant UBS calls the big, slow, lumpy, expensive coal and nuclear plants "the dinosaur of the future energy system: Too big, too inflexible, not even relevant for backup power in the long run." Such obsolete technologies are less at risk from regulatory mandates than from market defeat by a swarm of agile competitors that their promoters don't even recognize." It is at http://www.forbes.com/sites/amorylovins/2014/09/19/micropowers-quiet-takeover/2/. Nuclear power is clearly an obsolete and old technology. Nuclear power is clearly an energy of the past. Nuclear power is not where the overwhelming innovation in new energy technology is occurring. (**0592-4** [Brexel, Sr., Charles])

Comment: Aside from the possible impact to sensitive parks and refuges, I don't think more nuclear reactors is the right solution. (**0594-3** [Rapuano, Shannon])

Comment: Nuclear energy is NOT carbon-emission-free.Nuclear power plants release 90 140 g of C02 per kwh AND, each nuclear power plant releases massive amounts of Carbon-14 which is CONVERTED TO C02 in the atmosphere! Nuclear energy = Carbon14 = C02 = Climate Change. (**0603-1** [Anonymous, Anonymous])

Comment: This said, we should not build any nuclear reactors anywhere ever again. Whoever wants to build more of them should be required to live next to a nuclear waste processing facility and final waste disposal site for the next 250,000 years. (**0607-1** [Veit, Eberhard])

Comment: NO MORE NUCLEAR POWER PLANTS! (**0609-1** [Khajeh-Noori, Jeri])

Comment: No one has figured out how to make nuclear plants REALLY safe. We don't need them! (**0627-3** [Dolben, Hollis])

Comment: You are INSANE to build more nuclear power plants!! (**0628-1** [Anonymous, Anonymous])

Comment: We don't need atomic bombs - nuclear plants will do the job slowly and effectively. (**0632-3** [Moll, Wolfgang])

Comment: If you care about our earth and this comer of the world and co-creating a safe/healthy future for our children you will reconsider this and say no to building nuclear reactors. (**0634-2** [Jacobs, Leslye])

Comment: You have the opportunity to at least stop the growth of nuclear power. Please, no more nuclear reactors. (**0643-2** [Joannou, Jr., Benjamin])

Comment: No more nuclear power plants. They do harm to the environment and people while being propped up monetarily by taxpayers. It is a big money scam. Nobody benefits except the big money players. And why pass on billions of dollars in cleanup/waste management costs to our grandchildren and great-grandchildren and great-great grandchildren. (**0645-1** [Anonymous, Anonymous])

Comment: Nuclear power is DANGEROUS. (**0656-1** [Zhivelev, Leon])

Comment: Nuclear energy is incredibly dangerous to our planet. (**0657-2** [Hartmann, Donald])

Comment: nuclear is dangerous, plus too much nature near by.. (**0664-2** [Alvarez, Chad])

Comment: The building of the reactors would leave a huge carbon footprint. (**0666-2** [Jens-Rochow, Steve])

Comment: Nuclear power comes with a dangerous byproduct, as well as the dangers of operating a nuclear facility. Although the risks have been mitigated with many safety features, the reality is there are still possibilities of a reactor failure due to human error, natural disasters, or even terrorism. (**0677-2** [Chiszar, Benjamin J.] [Jacobs, Lee] [Klopfer, Carol])

Comment: The $20 billion investment in two new reactors would be better spent developing a decentralized energy network that would be less prone to the failures associated with nuclear energy generation. (**0677-4** [Chiszar, Benjamin J.] [Jacobs, Lee] [Klopfer, Carol])

Comment: Not in our backyard[.] (**0677-8** [Chiszar, Benjamin J.] [Jacobs, Lee] [Klopfer, Carol])

Comment: [N]ot in anyone's backyard! (**0677-9** [Chiszar, Benjamin J.] [Jacobs, Lee] [Klopfer, Carol])

Comment: Use of Nuclear energy is foolish, worse than fossil fuel. We still have no safe way of disposing of the toxic radioactive waste. It is insane to even consider expanding it. (**0683-1** [Thompson, Muhammad])

Comment: Any more nuclear facilities in the world are too many. Nuclear reactors should be de-commissioned, not added to. How many more uninhabitable areas of the world must be created before the insanity stops? Nuclear never was nor can it ever be environmentally neutral nor safe. (**0697-1** [Dulicai, Linda])

Comment: South Florida needs a non-nuclear source that does not pose grave health risks. (**0701-1** [Whitlock, Catherine])

Comment: Regarding "manmade" "artificial" "nuclear radiation"--A great man once said --
>"there is no amount of radiation so small that it has no ill effects at all on anybody. There is actually no such thing as a minimum permissible dose. Perhaps we are talking about only a very small number of individual tragedies the number of atomic age children with cancer, the new victims of leukemia, the damage to skin tissues here and reproductive systems there perhaps

these are too small to measure with statistics. But they nevertheless loom very large indeed in human and moral terms.

Radiation, in its simplest terms figuratively, literally and chemically is poison. Nuclear explosions in the atmosphere are slowly but progressively poisoning our air, our earth, our water and our food. And it falls, let us remember, on both sides of the Iron Curtain, on all peoples of all lands, regardless of their political ideology, their way of life, their religion or the color of their skin. Beneath this bombardment of radiation which man has created, all men are indeed equal." ~John F. Kennedy, 2 April 1960, Wisconsin. (**0705-1** [Anonymous, Anonymous])

Comment: Ongoing TRIPLE MELTDOWNS and the continuous FALLOUT from Fukushima, (4 plus years), should be reason enough to STOP this technology dead in it's tracks before it damages any more of our planet Building more Nuclear Plants is a BAD idea. The overall RISK to all living things is just too great. It's proven, containment is a fallacy. [Commenter followed with a quotation by E.F Schumacher, 1973] (**0708-1** [Aha, Chas])

Comment: No more nukes they are dirty, making the fuel is dirty, and the is no safe storing the deadly waste. (**0715-1** [Anonymous, Anonymous])

Comment: Nuclear energy is global warming, should not be in the future. (Nuclear Energy As A Direct Cause Of Global Warming, Acid Rain, Acid Oceans, Extreme Weather, And Super Storms http://agreenroad.blogspot.com/2013/12/nuclear-energy-as-direct-cause-of.html) (**0719-1** [Anonymous, Anonymous])

Comment: Nuclear energy is expensive, dirty, dangerous and toxic (Nuclear Power; EXPENSIVE, Dirty, Dangerous And Toxic; via@AGreenRoad http://agreenroad.blogspot.com/2012/1Ofnuclear-power-expensive-dirty-dangerous.html) (**0719-2** [Anonymous, Anonymous])

Comment: Not nuclear. (**0721-1-3** [Rodriguez, Jose Javier])

Comment: I have probably another 30 years to live and I think a lot about things going on on our planet. I am an American citizen since 2000 and I'm very proud to be an American citizen. My county originally was Belgium, and I go back every year to visit my mom, my brothers and sisters. In Belgium we closed all the coal plants 20 years ago. Coal, we all agree, I hope, has to go. We all have morally a carbon footprint. We are stewards for our planet and we are responsible for generations to come. We cannot think about greed and money. In Belgium we don't have as much sun as here. Nuclear power plants are to go. We have to think about the future. We are closing all our power plants. There is only one left near Antwerp, it's going to close. We have solar mushrooming where my brother just told me, he gets money back from his electric company, from his FPL. Not that we request that. (**0721-18-1** [Bernabei, Catharina])

Comment: What I would like FPL to do, jobs will be there if you really think morally. You know how as a human being we have a gut feeling. Animals have that. We are on the top of the species list. My gut feeling is this is wrong. Nuclear power plants are wrong, all over the world. There's something tremendously wrong. Fukushima is an example, but it's wrong. (**0721-18-2** [Bernabei, Catharina])

Comment: At the risk of reiterating some of our complaints, I will say that nuclear power should not be used anywhere in the United States and certainly not in Florida, a State that has more than its share of severe hurricanes. (**0721-26-5** [Koenigsberg, Linda])

Comment: One accident, equipment malfunction, operator error, or terrorist attack at a nuclear plant could literally mean the end of life on earth. And if Fukushima didn't convince you, you still think that a disaster couldn't happen at Turkey Point, think about the little o-ring on the Challenger. We can never forget that here in Florida. There's no way to guarantee 100 percent safety when using this technology. And when it comes to materials that remain deadly dangerous for tens of thousands of years, longer than all of human history, anything less than 100 percent safety cannot be considered safe. We humans are not infallible and neither is anything we produce. See? That proves it. Nor can we control or predict the forces of nature, as much as we might pretend that we can. This means that nuclear plants cannot --simply cannot be guaranteed to be safe. And when it comes to nuclear materials, anything less than 100 percent safety is not good enough. Nuclear plants are so dangerous that even Wall Street won't invest in them, and they'll in invest in anything, no matter how risky. (**0721-28-3** [Wilansky, Laura Sue])

Comment: We are opposed to nuclear power because it is neither clean nor renewable. (**0721-30-2** [Ullman, John])

Comment: We also learned that while we want to reduce carbon, and some are claiming that nuclear is the way to do that, falsely. (**0721-30-4** [Ullman, John])

Comment: I think the nuclear industry is a Neanderthal industry, it's done with. The economy doesn't prove it's the right thing to do at this point. (**0723-3-4** [Star, Priscilla])

Comment: You have enough nuclear now. I mean, you've got this dog. It's deadly, it's not clean, it's not safe, it's harming the environment. And if you're told otherwise you're being fed lies. (**0723-3-6** [Star, Priscilla])

Comment: [D]evelopment of adequate national and global policies to curb energy overuse and unnecessary economic growth. A resolution of significant safety issues inherent in reactor operation, disposal of spent fuels and possible diversion of nuclear materials capable of use in weapons manufacture and establishment of adequate regulatory machinery to guarantee adherence before drawing conclusions. (**0723-5-2** [Teas, Jim])

Comment: Furthermore, the Sierra Club supports the systemic reduction of society's dependence on nuclear fission as a source of electric power and recommends a phased closure and decommissioning of operating commercial nuclear fission electric power reactors. (**0723-5-3** [Teas, Jim])

Comment: You think nuclear is something new? The nuclear technology that these guys are going to install and they're running is exactly the same that was designed at the University of Chicago in the 1940s to build an atomic bomb. It's exactly the same. Take U235, split it, you get krypton, barium, cesium, ruthenium, it throws off neutrons. It's a small bomb running off in slow motion. I'm not saying it's going to become an atomic bomb but that's the technology. That's what nuclear is, splitting U235. (**0723-9-6** [Schwartz, Matthew])

Response: *These comments provide general information in opposition to nuclear power. They do not provide any specific information related to the environmental effects of the proposed action. No changes were made to the EIS as a result of these comments.*

Comment: Already there are issues keeping the reactors cool and until the technology makes these safer for the environment and those that live around the plant, I strongly oppose any more nuclear plant additions. (**0006-2** [Faber, Davenie])

Comment: I am against any new development of nuclear plants in South Florida. With the new technologies being developed by Tesla, GE and others there is no need to increase the dangers associated with radiation (ie. Chernobyl and Fukushima, Japan). Also our proximity to Cuba with their ties to Venezuela and Russia make this a verrrry bad choice. Please think of our Grandchildren and not corporate profits. How ever much the lobbyists offer you, it can't be worth your reputation. (**0017-1** [Gross, Gary])

Comment: Nuclear power plants around the world have caused serious loss of life and permanent injury to millions of people from Chernoble to Fukashima. The waste from these and other nuclear plants is still alive and decaying at a rate to disappear perhaps in a few thousand years or escape into the atmosphere. We must learn our lessons from history. (**0021-1** [Silver, William])

Comment: I do not want South Florida to have "antiquated and expensive nuclear technology from last century..". (**0127-5** [Cusidor, Teresa])

Comment: Just because nuclear power is "clean" doesn't mean it's safe, it's dangerous. Think: Fukushima. (**0189-1** [Forbes, J.])

Comment: I think we need to take a lesson from the Fukushima disaster and opt for safer forms of energy. (**0626-2** [Miller, Nyana])

Comment: With nuclear contamination in Japan as one example of ever cleaning up the mess a nuclear power plant has made. We must look to natural resources for our planet to survive. (**0709-2** [Cummings, Frank])

Response: *These comments and the attached statement provide general information in opposition to nuclear power. Some comments cite the Fukushima accidents as evidence that nuclear power is unsafe. They do not provide any specific information related to the environmental effects of the proposed Turkey Point Units 6 and 7. Issues related to safety are beyond the scope of the environmental review and will be evaluated in the NRC staff's safety evaluation report for the proposed units which is tentatively scheduled for publication November 2016.*

Comment: Alternative power sources, such a solar, wind and waves, are being successfully used elsewhere. We do not want more nuclear facilities adjacent to our growing urban area. (**0093-3** [DuPriest, William Robert])

Comment: We need to be investing in decentralized power. This would provide a much greater level of redundancy, and meet the local power needs. If we were making better use of renewable energy (solar, wind, tide, etc.) at the neighborhood level, we could start to envision a state that doesn't need nuclear plants and their associated nuclear waste (have we found a place to permanently put the waste yet?). Other nations around the world are already working on a new paradigm, so we need to focus our efforts on catching up to leading edge technology instead of continuing with an obsolete model. (**0207-5** [Cleland, Noel])

Comment: NUCLEAR POWER PLANTS' IMMORTAL WASTES ARE CAUSING HUGE STORAGE PROBLEMS ALREADY. IT'S INSANE TO BUILD MORE. INSURANCE

COMPANIES WON'T INSURE THESE MONSTROSITIES BECAUSE THEY KNOW THE RISKS. FRESH WATER IS ALREADY AT RISK, SPECIES ARE AT RISK AND THIS POWER PLANT IS IN AN IRREPLACEABLE LOCATION. NOW IS THE TIME TO DEVELOP GREEN ENERGY, NOT PROVIDE ANOTHER OPPORTUNITY FOR A PRIVATE POLLUTING INDUSTRY TO FORGE AHEAD. (**0303-1** [Pikus, Barbara])

Comment: The time for nuclear power expansion is over. We should no longer permit building of any additional nuclear plants and instead transition to solar and wind and other sustainable systems. (**0309-1** [Lundholm, Mark])

Comment: There are plenty of other alternative ways to create energy that are way less risk of severely damaging or completely destroying the environment around it. Please really look into the aspects to keep something like a nuclear plant up and running compared to any alternative energy method & the risk if something catastrophic were to happen, with irreplaceable damage to the environment and the people/inhabitants that will suffer. (**0367-1** [Rosenberry, Casara])

Comment: Creating more nuclear power reactors is a bad idea anyway since we don't know how to safely manage radioactive waste, don't know where or how to adequately store it, it creates incredibly dangerous risks from accidents, and we don't need it since efficiency, wind, and solar can meet our energy needs if investment is redirected toward those sensible options. (**0370-5** [Vayu, Satya])

Comment: I suggest that we may want to consider renewable wind or solar energy before we head down the path of more dangerous nuclear power plants. (**0424-1** [Corey, Sheffield])

Comment: Why are we not phasing out nuclear energy and going green? Nuclear is no longer an energy option and must be closed down. (**0529-1** [Brandariz, Anita])

Comment: Stop dragging your feet and move to energy that is safer. (**0529-3** [Brandariz, Anita])

Comment: We do NOT need more nuclear reactors. We need CLEAN GREEN ENERGY!!!!! (**0568-1** [Goldberg, Laura])

Comment: No more nuclear plants - close down existing plants and develop solar and wind instead. (**0577-1** [Cook, J.])

Comment: There are other ways and places to produce energy. Consider carefully what you are doing and do not impose 6 & 7 and its consequences on this and future generations. (**0598-4** [White, Barry J.])

Comment: Personally, I would not even want to live near ONE, let alone TWO, nuclear reactors. This is hazardous and LETHAL material to ALL LIFE. Power should be provided by natural, RENEWABLE and, especially, SAFE sources. THIS is what power companies SHOULD be working on, NOT toxic power that will further pollute our Earth. (**0648-1** [Fray, Antje])

Response: *These comments identify general concerns about alternative energies being used instead of the proposed Turkey Point Units 6 and 7. They do not provide any specific information related to the environmental effects of the proposed action. Alternative energies including wind and solar were evaluated and are described in Section 9.2 (Energy Alternatives) of the EIS. No changes were made to the EIS as a result of these comments.*

Comment: Attached is a response to the new Turkey Point Nuclear Reactors [Commenter attached a file authored by the Indigenous Elders and Medicine Peoples Council, a statement on Fukushima with file titled "COUNCIL_FUKUSHIMA_STATEMENT_OCT_2013[1].pdf"]. (**0255-1** [Larsen, Shannon])

Response: *This comment and the attached statement provide general information in opposition to nuclear power. Some comments cite the Fukushima accident as evidence that nuclear power is unsafe. They do not provide any specific information related to the environmental effects of the proposed Turkey Point Units 6 and 7. Issues related to safety are beyond the scope of the environmental review and will be evaluated in the NRC staff's FSER for the proposed units which is tentatively scheduled for publication in November 2016.*

E.2.36 General Comments in Opposition to the Existing Plant or the Applicant

Comment: the NRC made a big mistake in allowing FPL to expand its capacity and to allow it to continue in operation after its original design period expired. this has proven to already be catastrophic: the cooling canals now do not work at this increased capacity. and s. Florida will be faced with either 1) black outs in peak demand summer months 2) or letting FP&L use our scarcest resource, more water to cool the expanded facility. already this year, one of the reactors was taken off line for some mysterious reason. (**0055-2** [Roedel, Kitty])

Comment: I was at a meeting at audubon house years ago when you told us that if you put gas turbines into turkey point that you would not do any further nuclear. You are liars, something we all knew but now it is plainly obvious. (**0072-1** [Logan, Brian])

Comment: As a resident of North Key Largo for 27 years, I am living under the threat of an accident at Turkey Point, whether it be from a hurricane, operating accident or age related. Just the operation of the existing facility has stressed the fresh water supply. The heated water has made a marked affect on marine life. (**0096-1** [Roberts, Linda])

Comment: The existing reactors at Turkey Point are aging, and have been questionably managed and maintained. Time and time again, they have bent and outright broken regulations and have put the local community at risk! Their cooling mechanism, a series of manmade waterways, is overgrown with algae or similar organism, causing significant overheating of the water. They have demanded a new ongoing source of water from our local aquifer to reduce the temperature. We are, as the result of their actions, facing a huge plume of salt water intruding into the fresh water supply, contaminating many wells used by other entities for other purposes. We are already facing problems created by the existing nuclear reactors. (**0115-2** [Trencher, Ruth])

Comment: Florida Power & Light is a monopoly, but is intended to serve the public. FPL has not been responsive to the needs and concerns of our community, instead, has chosen to bulldoze their way through our community in their effort to maximize their profits at our expense. (**0115-9** [Trencher, Ruth])

Comment: Why does FPL dictate all energy power. (**0149-5** [Nelson, Joyce E.])

Comment: This monopoly has bullied us all. Their only concern is profit, so they buy the influence that guarantees their revenue. FPL and other power monopolies have exerted massive force, using $millions to ensure that the Public Service Commission (PSC) and other levels of government are populated by those who put corporate profits first, and public safety

and benefit last. FPL has been granted authority by the PSC to impose fees for Nuclear Power on every user account. (**0252-17** [Van Leer, Sam])

Comment: I believe that this expansion of the reactors at turkey point.....will increase the risk we all ready have we a plant that has been cited various times every year for the last 10 years for oversight and for defective equipment. (**0494-2** [Tamargo, Jorge J.])

Comment: I had a friend who worked for FPL and about 25 years ago told me it once almost melted down. They have two large control rooms like we saw in the China Syndrome movie and a third smaller control room, They were doing some work in the room in the radioactive section of the reactor and a crane dropped something heavy on a pipe that had all the wires from the three control rooms to the reactor and shorted out all the wires so they had no control over the reactors and the only thing that saved it from meltdown was a system inside the reactor that when certain things melted it automatically flooded it or something turning it off, But it came very very close to melt down ! But they managed to keep it out of the news completely !! They advertised and hired a lot of one time employees I think they call them jumpers ? Who went into the hot section for only the maximum allowed time of a couple hours wearing radiation suits and did repairs! (**0505-2** [Buyea, Thomas])

Comment: No to FPL. (**0660-3** [Sanchez, Sergio and Irma])

Comment: But I do want to say corporate responsibility. This EIS, if you're not considering the current issues on the ground then what are we talking about? (**0721-10-1** [Reynolds, Laura])

Comment: And what I've seen here is that the operational excellence or the operational reality of FPL has not been brought into the EIS. And that's a serious problem. The operational reality is why you want up-rating. And now you're reducing monitoring standards for that because of their operational a/k/a excellence or the reality that they've met the protocols listed out in the 2009 agreement. Implementing an EIS before that and not realizing that there's been quality control issues in the time of the EIS initiation that would have weighted a quality control document in any other industry, whether it be medical -- you know, I've had FDA letters coming out of the ears of customers because they didn't have a voice basket in the right place. And here we are having steam leaks, value fractures, shutdowns. Serious issues here. And those weren't even weighted in the EIS? While they're having an up-rating processing of reducing monitoring standards for GMP, you know, good manufacturing practices. It starts to fall apart in my mind, and I'm looking at it from just a manufacturing quality management standpoint. (**0721-34-1** [Gomez, Albert])

Response: *These comments express opposition to the existing units at the Turkey Point site or to the applicant. They do not provide information related to the environmental review for the proposed action. No changes were made to the EIS as a result of these comments.*

Comment: Anyone reading the local paper here in Miami knows that FPL's recent problems concerning reactor cooling water temperatures do not bode well for the future of the existing plant and serve as a strong warning against future nuclear construction in this area. (**0057-2** [Neway, Roberta])

Comment: The NRC should, through the EIS process, identify opportunities to limit or remove environmental damage already being caused by the presence of Turkey Point 3 & 4. Clearly the 1960's "technology" of thousands of miles of cooling canals is no longer a pragmatic or functional solution to the demands of the existing power plants and has been shown to have

significant deleterious impacts on the immediate environment and is damaging the ecological health of Biscayne National Park. Even if two years of water diverted from the National Park temporarily cools the Turkey Point canal system, it is evident that the hyper-saline conditions were present before the recent uprate and are largely responsible for accelerating salt water intrusion into the Biscayne Aquifer -Miami-Dade's only drinking water source. That same water source that is being impacted by Turkey Point 3 & 4 is the planned "backup" water for Units 6 & 7, further impacting the availability of fresh water flows to the National Park. (**0172-7** [Cava, Daniella Levine])

Comment: Turkey Point's operations are already impacting Biscayne Bay's habitat, water quality, and salinity, which are vital for the health and productivity of the bay. (**0284-4** [Lopez, Josie])

Comment: FPL has already failed to maintain sufficient cooling capacity in the canals it maintains to service the plant it has. now[.] (**0341-2** [Daniels, Bonnie])

Comment: The ones already built are damaging the Bay and need to be better managed before there are any more proposed. (**0667-2** [Brown, Bradford])

Comment: Please include the below Miami Herald article just published 3 days ago and read the whole article referenced in the last line. [Commenter attached a copyrighted Miami Herald newspaper article] (**0718-4** [Buechler, Jerry])

Comment: Before Unit 1 was built at Turkey Point, in the eastern part of the Everglades, the salinity of water there was the same as the rest of Everglades is today, about 400 practical salinity units, PSU; 400. Under 500 is fresh water. Today, after 55 years of producing energy for Florida, Georgia and the rest of the nation the salinity at Turkey Point is 35,000 PSU, the same as sea water. That's from 400 to 35,000. And in the cooling canals it reached 95,000 PSU in 2014. Salt water, which used to begin a few miles offshore at Turkey Point, has now intruded inland four miles due to the now hypersalinity, due to the energy production on the site. (**0721-12-1** [White, Barry J.])

Response: *These comments express opposition to the existing units at the Turkey Point site or to the applicant. They do not provide information related to the environmental review for the proposed action. The proposed units will not use the cooling canals. No changes were made to the EIS as a result of these comments.*

E.2.37 Comments Concerning Issues Outside Scope - Emergency Preparedness

Comment: Also we wonder how the Citizens Safety and Protection agency feels about this and what would happen if they were contacted by all of us who will be affected if, God forbid, anything were to happen at Turkey Point. (**0040-3** [Pareto, Rolando and Marlene])

Comment: The question of whether or not Miami Dade County will ever experience another Hurricane Andrew or similar natural disaster is not a question of "if" but "when". Clear, unobstructed and safe evacuation routes are paramount to the safety of the residents of Miami-Dade County. (**0044-6** [Commenters, Multiple])

Comment: I live approximately 7 miles from Turkey Point and I have for years wondered what I would do in the event of a "melt down". Unfortunately, given my proximity, there really is nothing I CAN do. (**0045-2** [Johannsen, Christian])

Comment: south florida has no feasible alternatives to mass exodus in case of a nuclear accident at the aged turkey point. yhe population explosion in 40 years has left all of us vulnerable to this accident waiting to happen. (**0055-8** [Roedel, Kitty])

Comment: The Turkey Point plant is already the largest generating station in Florida, in close proximity to a relatively large population and no feasible evacuation plan in an emergency. Through most of the day, the main artery (US-1) is already bumper to bumper. Further concentrating the risk in that area is irresponsible and increases the danger to the surrounding cities and towns. (**0187-2** [Meyer-Steele, Shawn])

Comment: I wonder if our cities have any type of plan in place if there is a leak,terrorist attack,or damage from a Hurricane. (**0223-2** [Robbin, Valerie])

Comment: FPL mailed us all a book in Palmetto Bay called be prepared. It shows evacuations routes by FPL if sirens sound in Palmetto Bay. When I call Miami Dade they have no idea of my assigned shelter. I called Palmetto Bay they said take old Cutler and go North to South Miami. We are to listen to radio and turn off air and stay sealed in house for how long? We are NOT ready for units we have now. (**0234-1** [Samole, Sharon])

Comment: Had an additional threat emerged, we could have had a Fukushima-level event in a densely populated American city. With the whole community reeling from massive infrastructure, transportation and communication damage from the Hurricane, rapid evacuation would have been impossible. I was here, I know what South Dade was like, and it was worse than a war zone. (**0252-8** [Van Leer, Sam])

Comment: [O]ur history with hurricanes has proven how difficult it is too evacuate such a heavily populated area during hurricane season when we are for the most part prepared, let alone the chaos that would ensue on the limited escape routes headed north in the event of a nuclear meltdown. (**0259-6** [Lettieri, Tammy])

Comment: The question of whether or not Miami Dade County will ever experience another Hurricane Andrew or similar natural disaster is not a question of "if" but "when". Clear, unobstructed and safe evacuation routes are paramount to the safety of the residents of Miami-Dade County. Constructing the associated new 110' tall High Voltage Electrical Power Line Transmission towers, exempted from the high velocity hurricane zone requirements of the Florida Building Code, in a location that historically experiences Very High Velocity Hurricane force winds, at 200 foot intervals along the length of US One, the major north - south evacuation route for Dade County, poses unacceptable risks to the population of Dade County. Doing so is simply inviting catastrophe in the event of a natural or man-made disaster requiring evacuation. (**0263-4** [Orzechowicz, Holly])

Comment: One item that was incontrovertible was the impossibility of evacuating South Florida to save us from a nuclear disaster. Mere hurricane evacuation makes our evacuation routes by land, sea and air impassable and effective communication impossible. (**0264-1** [Dwyer, John P.])

Comment: If something serious happens, the public might not be warned to take precautions, like the Three Mile Island meltdown which wasn't made public for 9 years. Who made that decision? (**0336-3** [Anonymous, Anonymous])

Comment: As it is, there is inadequate means for evacuation in the event of a nuclear accident. (**0337-5** [Philips, Sally B.])

Comment: I don't have a working Thyroid. A lot of good iodide will do me. Although I would like to try the cherry flavored syrup to see how it tastes (if kids will actually drink it). (**0373-13** [Lee, Nancy])

Comment: I know I am not supposed to address this but god guys, how are you going to get people in the keys evacuated. There is only one way to go past the plant. There are almost 4 million people in a 50 mile radius. I have yet to hear the evacuation plan. (**0373-5** [Lee, Nancy])

Comment: They also increase the difficulties of emergency preparedness and evacuations. (**0615-2-14** [Bethune, David])

Comment: Any accident at Turkey Point serious enough to create widespread environmental contamination by fallout will also necessitate evacuation of large numbers of the resident population, making evacuation a factor in environmental impact planning. (**0615-3-7** [Bethune, David])

Comment: Traffic flow to and from the Florida Keys is entirely constrained by a single road and, in essence, most South Florida traffic is constrained to three roads: US 1, Highway 95, and the Florida Turnpike. Bounded by the Everglades to the west, Florida simply does not have the east-west transportation infrastructure to make evacuation from Turkey Point viable. In the event of an emergency, all traffic flow would be constrained to the same north-south evacuation routes along the coast. By virtue of the road system ending in the Florida Keys, evacuation southward is also an impossibility, leaving northward travel by three roadways as the only evacuation option in case of a nuclear accident at any of the four reactors which would constitute the Turkey Point site if units 6 and 7 were completed and fueled. On a typical weekday, Miami and Fort Lauderdale experience considerable delays in trying to use these north-south roadways. During holidays, the corridor between Homestead and Key West is known to be particularly impassible. Hurricane evacuations from the Keys take 3-4 times as long as a trip during any other time, and none of these is a mass catastrophe on the order of a severe accident at Turkey Point. South Florida simply does not the geography or the road system to handle a mass evacuation such as would be necessitated by a serious nuclear accident at Turkey Point today and adding two more reactors to the site would only compound the problem. The draft EIS for Turkey Point 6 and 7 is incomplete because it fails to take into account the problems of evacuating the large population surrounding the plant when only a few northbound travel options exist and these are already constrained. Lacking a clear and workable evacuation plan, any significant radiation release (not just a meltdown) would present a considerable and unjustifiable hazard to human health and the environment. The resulting attempt by the public to evacuate a nuclear accident despite the lack of viable roadways could lead to violence, car crashes, and other hazards to people. The draft EIS is incomplete because it did not compare evacuation problems and options with other proposed sites. (**0615-3-9** [Bethune, David])

Comment: Also, the evacuation scenarios of the Florida Keys should be evaluated as part of the siting issues, and compared with the evacuation scenarios of the alternative sites. The Florida Keys communities are offshore, and therefore have different evacuation routes than other potential sites that do not involve offshore communities with evacuation concerns. The evacuation of offshore communities in the event of an emergency should be thoroughly considered, and should also take into account the possible impacts of hurricanes occurring in conjunction with a nuclear plant emergency. (**0617-4-15** [Mueller, Heinz J.])

Comment: The proximity of this plant to a large population that does not have adequate escape routes due to being on a peninsula increases the safety risk. (**0641-6** [Martin, Drew])

Comment: One item that was incontrovertible was the impossibility of evacuating South Florida to save us from a nuclear disaster; Mere hurricane evacuation makes our evacuation routes by land, sea and air impassable and effective communication impossible. (**0673-1** [Dwyer, John P.])

Comment: So my only point, in conclusion, there is an excellent plan for Dade County and an excellent plan for Monroe County on how to handle not just a nuclear waste or nuclear air quality or nuclear -- or how to get the cars out of town. It's all good, it's all tied in together, it's two separate studies. One's been in existence for a long time. Well done. (**0722-15-3** [McColgan, Robert])

Comment: My only complaint --that's what I come down here for -- Broward County has no safety plan. I did call a Broward County Emergency Management a few months ago and I asked them for their Turkey Point nuclear plan in case something happened. And plan like similar to Dade or Monroe. And I asked, can I have a copy of your plan? And they looked and looked and couldn't find it. Then they called me back 15 minutes later and they said, oh, it's not required. So therefore, I'm coming back to the source, the one who requires it. Also a high-level person, a friend of mine who's environment health administrator with the Broward County, the Division of Health for the State, I asked him to help on this and he come back a week or so later, he had a funny look on his face. I know, it's not required. He said, you know, it's not required, that's why it's not done....So therefore, everybody means well. There's -- if it's from NRC is the one who requires it or doesn't or coordinates, why can't NRC have, okay, we've got Dade County here, Monroe County here, why can't Broward County be tied in? Why does it have to have these boundaries like ten miles or fifty miles? Why can't we change that? Why can't we have some sort of plan for Broward County even if it showed people how to get out of town or what to do? (**0722-15-4** [McColgan, Robert])

Comment: But I really, in the back of my mind, have to make a plan of leaving. And right near the front of my door I have the Turkey Point exit plan which, how will it work if you have 15 minutes to get out? And we can't even move, I can't even get to my school in 15 minutes and I have to get out of this giant cone of influence? (**0723-11-8** [Berendsohn, Catherine])

Response: *These comments relate to the adequacy of emergency plans, which is a safety issue that is outside the scope of the NRC staff's environmental review. As part of its safety review, the NRC staff will determine, after consultation with the U.S. Department of Homeland Security (DHS) and the Federal Emergency Management Agency (FEMA), whether the emergency plans submitted by the applicant are acceptable. The currently operating units have an emergency plan in place that has been reviewed and approved by both the NRC and DHS/FEMA. No changes were made to the EIS in response to these comments.*

E.2.38 Comments Concerning Issues Outside Scope - Miscellaneous

Comment: Nuclear advocates frequently state that both xenon and krypton decay and disappear in a matter of seconds or minutes. What they don't tell us is that these isotopes decay into daughter isotopes that are extremely deadly emitters. The corporate proponents of nuclear power have used all kinds of disinformation and tactics to protect the industry--compelling the nuclear complex to arm guards to 'protect' these secrets and to 'protect' civilian reactors. It is not only 'terrorists' that the nuclear establishment seeks to protect us from: the armed guards and classified documents are to prevent the public from learning the truth about the destruction of

documents, the disappearing of evidence, the falsification of reports and records, the calculated fudging of risk and safety assessments. (**0673-5** [Dwyer, John P.])

Response: *The comment did not provide information relevant to the environmental effects of the proposed action. No changes were made to the EIS as a result of this comment.*

Comment: It turns out that nuclear power plants don't just consume uranium. By the way, yesterday's article in the "New York Times" said that 80 percent of the world's uranium supply is now controlled by President Putin. With his help of some deft contributions to the Clinton Foundation and the -- you know, some Canadian investors, we have the Russians basically who, over time, they have acquired a lynchpin control over the uranium supply for the world. (**0723-12-10** [Henry, Jim])

Comment: But for the uranium supplies in the future, we want to turn to Russia? I mean, that's a technology risk that I don't want to make. It may not be within the scope of this DEIS. In the timeframe that we are considering, we should be thinking about that security issue. (**0723-12-11** [Henry, Jim])

Response: *These comments discuss the available uranium-ore supply and associated potential impact on the viability of the nuclear industry, which are outside the scope of the environmental review. No change was made in the EIS as a result of these comments.*

Comment: You people are only in it for money and greed. You'll kill everyone eventually after you've killed everything that living creatures, including us, depend on. Hope I'm already dead! (**0107-1** [Black, Mary Beth])

Comment: I hope the you & your colleagues are un-biased & have enough integrity & complete enough with your science to come to the stronger conclusions against FPL wanting 6 & 7 Nuclear Reactors, because you have also factored in, along with Global Warming flooding where Turkey Point resulting in even greater damage to people's health & tourism, that: ... Germany (The Western European country with the most cloud cover) that gets so much of the power from solar energy that they are decommissioning nuclear power plants, with the aim of having none. The information out there that Germany uses more International Corporations' Coal than they are using solar power (making the only way their program of providing mortgage type loans for all their home owners to have the chance to own & use solar panels is able to work) is also a lie. I have read & heard from sources (I trust) that the only reason they use non-solar power & wind energy is because they & The EU already had established trade deals, with other countries. (**0120-2** [Shark, Jason])

Comment: I am fearful of the monopolistic and lobbying power FPL has managed to obtain in our city. (**0171-1** [Oria, Jordan])

Comment: The corporate proponents of nuclear power have used all kinds of disinformation and tactics to protect the industry -- compelling the nuclear complex to arm guards to 'protect' these secrets and to 'protect' civilian reactors. It is not only 'terrorists' that the nuclear establishment seeks to protect us from: the armed guards and classified documents are to prevent the public from learning the truth about the destruction of documents, the disappearing of evidence, the falsification of reports and records, the calculated fudging of risk and safety assessments. (**0264-5** [Dwyer, John P.])

Comment: Nuclear power is something very powerful that we as fellow equal human beings are still developing and still learning about. We know better than to use nuclear weapons against one another as United Nations. I believe there is a responsible and sensible use for nuclear technology. Maybe nuclear development will come in handy one day when the people of Earth are ready to explore deep into outer space. (**0300-2** [Van Pelt, Jason])

Comment: I don't know why these agencies even consider going through with allowing this, I still get amazed at the lack of foresight and stupidity. I continue to hope that intelligence will prevail.. (**0312-1** [Geiger, Marcia])

Comment: The state process is flawed and NRC should not rely on a bad state utility planning process that could have a tremendous negative impact on myself and all residents in the region. (**0323-3** [Jennings, Cara])

Comment: But you're not looking at the big picture, and I want you to deal with it. (**0723-11-10** [Berendsohn, Catherine])

Response: *These comments did not provide information relevant to the environmental effects of the proposed action. No changes were made to the EIS as a result of these comments.*

Comment: On a final note-If any nuclear energy is to be pursued in this country there is no intelligent alternative besides Thorium. China is developing LFTR from technology the USA pioneered. (**0235-1** [Bofill, Beatriz])

Comment: 1) the reactors need to be removed from the biosphere that we live in - meaning get the reactors a couple thousand feet underground (or in space); the steam generators and all other facilities can be on the surface, (**0502-1** [Brumleve, Charles])

Response: *The COL applicant is responsible for selecting the reactor design it prefers to have reviewed by the NRC during the licensing process. The NRC then reviews the application in accordance with its regulations and its licensing procedures. By separate action, the NRC has certified certain reactor designs as conforming to its safety standards, including the design selected by the applicant for Turkey Point Units 6 and 7. At this time there is no design for a liquid fluoride thorium reactor or for a reactor that operates outside the biosphere certified for use by the NRC. No change was made to the EIS as a result of these comments.*

Comment: Nuclear power is something very powerful that we as fellow equal human beings are still developing and still learning about. We know better than to use nuclear weapons against one another as United Nations. I believe there is a responsible and sensible use for nuclear technology. Maybe nuclear development will come in handy one day when the people of Earth are ready to explore deep into outer space. (**0300-2** [Van Pelt, Jason])

Response: *The NRC has carefully reviewed the application against its regulations that are intended to protect public health and safety and the environment. More information about the NRC's roles and responsibilities is available on the NRC's website at http://www.nrc.gov/about-nrc/regulatory.html. No changes were made to the EIS in response to this comment.*

Comment: I don't want to continue to see the utility company belittle the efficacy of solar power. I don't want to expand a reactor because Sarasota doesn't want one. I certainly hope it doesn't come down to Legislators and a Governor that not only don't believe in climate change but gag-order all state EPA employees from even acknowledging 8th-grade science. (**0008-11** [Finver, Jody])

Comment: You just flunked fifth grade grammar. Your readers deserve better. (**0085-1** [Quarles, Greyson])

Comment: This power company has already acted cynically and irresponsibly to inhibit the development of solar energy (in the "Sunshine State"!) to enhance its bottom line. It has also profitted handsomely from future 'cost recovery' tariffs imposed on its customers. Enough is enough! (**0341-5** [Daniels, Bonnie])

Comment: Your uniqueness, your monopoly reality that you have been able to cultivate over the years, it's not always going to be there. And the reality is, is if you have a chance to decentralize your client base as well as your production, therefore qualifying your distribution. Because the reality is that message of the distribution, somebody has to take care of the lines and somebody has to -- so centralized versus distribution, that doesn't make sense. (**0721-34-4** [Gomez, Albert])

Comment: So, there's an opportunity space here. And there's someone in a management perspective -- it's old management thinking, it's not creative, it's not lateral, and I'm really depressed to know that I am supplying a company that has started to rest on their laurels, they have lost their innovation edge, and they are resting on the fact that they own the market. And it always happens, when anyone owns the market they're the biggest target. So I would just have you think from Board perspective that your stakeholders should demand more innovation, should demand more, and they're from a local citizen and from a subject matter expert in the manufacturing field, and being immersed in quality management on a day-to-day basis. (**0721-34-6** [Gomez, Albert])

Comment: I think FPL has set up a nuclear tech program here at the local college. Why not a solar tech project? (**0723-9-4** [Schwartz, Matthew])

Response: *These comments are directed to the applicant, therefore no changes were made to the EIS as a result of these comments.*

Comment: Ms. Bladley, another matter that I hope you can appreciate is the fact that we have politicians down here (I think by now that is a known infamous and shameful issue, from governor Scott to Tallahassee legislators to local politicians down) who are denying environmental changes and are scrupulously gaming the energy issues. A South Miami mayor really snowed the residents by fighting huge power lines along a route from Turkey point North a few years ago. His re-election campaign was mostly financed by special interests and people who opposed the power lines. At those hearings the citizens were lulled in believing that the "reactors will never happen". South Miami spent lots of money on legal fees and promptly lost the powerline fight against FPL and the mayor was re-elected. The same mayor proceeded to forge a 30 year franchise fee agreement with FPL where alternative options were presented and available. And now, its election time again, the same mayor is a poster boy against the nuclear plants, and I am afraid that history will repeat itself. Said clever mayor was incomprehensibly chosen to be with president Obama in the Everglades on Earth day. Except for photo-voltaic panels on his own roof there is no evidence in his leadership that tells us he is truly an environmentalist. **All I want to ask you is to listen to the people and not just align with a list of elected officials to make the decisions.** Florida just passed a referendum where 75% of the Florida Population voted to preserve and protect environmentally sensitive land and water. The Turkey point site belongs in that category and guess what: Politicians are already trying to game that issues because of the huge sums of taxpayer money involved. (**0060-6** [Beckman, Yvonne and Douglas])

Comment: In following the NRC's own guidelines, the expansion of Turkey Point could have unacceptable and irreversible impacts ... even if the governor does not believe they exist. (**0470-2** [Lenz, Andrew])

Comment: And we're in a State with a Governor who doesn't even recognize that or won't even talk about it, and that's where the Public Service Commission comes from, and if somebody on the Public Service Commission who doesn't agree with the overall attitude of, let's not worry about it, they're replaced. (**0721-6-4** [Harris, Walter])

Response: *The comments did not provide information relevant to the environmental effects of the proposed action. No changes were made to the EIS as a result of these comments.*

Comment: I am worried about the mountain tops that we are blowing up to supply more than 20% of South Florida's electricity. (**0127-7** [Cusidor, Teresa])

Response: *This comment relates to the environmental impacts of mining uranium for use as fuel in a nuclear power plant. The NRC staff evaluated the impacts from the life-cycle of fuel production, construction, operation, and decommissioning of the Turkey Point Nuclear Plant Units 6 and 7. The results of this analysis are presented in Chapters 4, 5, and 6 of the EIS. The generic impacts of the fuel cycle are codified in 10 CFR 51.51(b), Table S-3, Table of Uranium Fuel Cycle Environmental Data. In accordance with the guidance in 10 CFR 51.51, the staff relied on Table S-3 as a basis for the impacts of uranium fuel-cycle impacts. No changes were made to the EIS as a result of this comment*

Comment: Please due the right thing for future generations. (**0383-1** [Brown, Robert])

Comment: Please take the time to think of our future, more importantly the future of our children, of our planet. (**0389-1** [Fitzpatrick, Deirdre])

Comment: We must do all we can to protect Biscayne National Park (**0454-1** [Ehrmann, Nancy])

Comment: Please help save this precious park and its wildlife! (**0465-1** [Caswell, Gail])

Comment: In following the NRC's own guidelines, the expansion of Turkey Point could have unacceptable and irreversible impacts on these treasured sites. Poo-for-brains is ownly good for watching fox news. (**0500-1** [Pew, Don])

Comment: I have been actively involved in working to protect our environment since 1970. President Theodore Roosevelt begin the National Park System by designating Yellowstone as our nation's first National Park. (**0583-1** [Harper, Diane])

Comment: We need to take a lesson from California and not risk ruining our state for both visitors and our residents! (**0659-1** [Abalos, Jessica])

Comment: Thank you very much to everyone for being here. It's good to be here on Earth Day with the President right around the corner celebrating the Everglades. I helped organize the very first Earth Day celebration in Syracuse in 1970 and I've been working to protect the environment since long before that, and that's what I'm doing here today. (**0721-28-1** [Wilansky, Laura Sue])

Response: *These comments express a general concern about the impact of Turkey Point Units 6 and 7 on the region. No specific information is provided in these comments and no changes were made to the EIS as a result of these comments.*

Comment: I would say this, on the more the technical side but on the understanding of what it means to have a nuclear power station in your town. You can talk about Chernobyl in Russia where it did not have a free press, it did not have a diversity of opinion, and where one did not have any checks and balances, one could operate with impunity regardless of what others believed or would like to know. Or you can operate like Japan did where there has been an understanding if there existed a free press and checks and balances, but was there really? (**0723-7-2** [Boling, Steve])

Response: *This comment indicates that the free press in the United States creates a climate of extensive oversight for the operation of nuclear power plants. It provides no information relevant to the environmental review. No changes were made to the EIS as a result of this comment.*

Comment: I would be able to do more if the United States Postal Service's officials was legal compelled to afford victims of their adverse actions due process, access to the information employed to indict their customers rights and privileges, and granting of a requested impartial hearing. Ralph Timberlake of 2117 Atkins Drive, Huntsville, Alabama 35810 mail is encumbered for his aforementioned address and his mailing is being encumbered. (**0282-2** [Timberlake, Ralph])

Comment: In the 1950's I was an enginer assigned by the Air Force to study the radiation fallout effects of atomic weapon explosions during the Nevada Weapons Test Program. Conditions have changed extensively but the basic problem of understanding the radiation phenomenon still remains and demands full current understanding regardless of the radiation source. EPA needs to give this subject complete overview and action, especially the complete disposal of ALL nuclear weapons around the world. (**0560-1** [Anderson, Vaughn])

Comment: Further, your Thorium-based nuclear systems are still too dangerous and will last a few hundred years instead of 10,000 or more years from uranium waste. I believe it was Dana Durnford, the Nuclear Proctologist who said "Thorium is more expensive than uranium because it can't sustain a reaction by itself and must be bombarded with neutrons." (**0561-3** [G., Ambriel])

Comment: And this Fracking thing? Causing major pollution of our underground springs-for a bit of oil? (**0593-2** [Family, Manzi])

Comment: [Commenter attached a file entitled: Addendum To Indigenous Elders and Medicine Peoples Council Statement Fukushima, Beyond Climate Change to Survival on Sacred Mother EARRTH. United Nations - September 21, 2014] (**0610-1** [Larsen, Shannon])

Comment: The "atoms for peace" program was a cover for producing bomb materials in civilian reactors. In other words, it is a lie. Typical for the government. (**0645-3** [Anonymous, Anonymous])

Comment: WHY KILL OUR ENVIRONMENT OR RISK A DISASTER? TEPCO IS EVIL (**0656-3** [Zhivelev, Leon])

Comment: PITIFUL ARGUMENT [City of Miami]. (**0685-12** [Batista, Carlos])

Comment: WHAT DOES THIS [terminating the current monitoring program for the Turkey Point power plant cooling canals] REALLY MEAN? (**0685-13** [Batista, Carlos])

Comment: The devastation of habitat makes it very difficult for some rare species to survive. Many natural medicines, materials, foods, etc disappear with deforestation. I would not mind if companies drilled wells or dug up coal, if they actually cleaned up their mess afterwards. However, companies never take responsibility for their actions as they should under a free enterprise system. Companies NEVER clean up their mess and should not be allowed to pollute other countries and the US should condemn other countries' companies who do. Pollution IS terrorism!!!!!!!!!!!!!! It harms everyone on the planet. (**0687-1** [Shifflett, Jr., James E.])

Comment: If "profit" is what you're after, then why not follow Colorado's example and make Cannabis legal and see how much the sales of it will add to the State's bottom line making any type of technology for our citizens affordable! (**0712-5** [Almer, Anessa])

Comment: Another big issue is being a native down here. I've seen our Dade County master plan. There is no master plan. You know, they come up with a plan, we're going to build here and not allow it further, then it goes more, more, more. This X amount of density, oh, no, we'll change that. So we need to have a master plan and stick to it and we need to limit further construction and the endless inflow of people down here, because people need electricity. And if you don't want to have to build nuclear power plants and produce mega power, which people need to live, then we need to start limiting the inflow of population through endless construction and increasing our density with vertical construction. (**0721-24-5** [Eastman, John])

Response: *These comments are outside the scope of this review and do not provide specific information related to the environmental effects of the proposed action; therefore they will not be evaluated further. No changes were made to the EIS in response to these comments.*

Comment: Quit supporting the most bailed out industry in US history, the nuclear power industry, since it's beginning. repeal Price-Anderson. (**0508-3** [Harrison, J. M. M.])

Comment: And someone mentioned about Wall Street won't pay for this. Well, also insurance companies will not insure nuclear risks. There's a Federal law that provides for coverage for that. I think it's called the Price Anderson Act. So insurance companies will not insure this, it's such a horrible risk. (**0721-32-2** [Schlackman, Mara])

Response: *The NRC is not involved in establishing energy policy; rather, it regulates the nuclear industry to protect public health and safety within existing policy. Thus, matters related to the Price-Anderson Act of 1957 are outside the scope of this review and will not be included in the EIS. However, the EIS includes an evaluation of potential health impacts of operating a nuclear plant on the Turkey Point site in Chapter 5. In addition, the safety assessment for the proposed licensing action was provided as part of the application. The NRC is in the process of developing a SER that analyzes all aspects of construction and operational safety. The NRC will only issue a license if it can conclude that there is reasonable assurance that: (1) the activities authorized by the license can be conducted without endangering public health and safety, and (2) such activities will be conducted in compliance with the rules and regulations of the NRC.*

E.2.39 Comments Concerning Issues Outside Scope - NRC Oversight

Comment: Your failure to protect my family and the families of others who reside in South Florida will result in protracted litigation, of this I can assure you. (**0051-2** [Smith, David W.])

Comment: YOU PEOPLE HAVE LOST YOUR MINDS !!!! YOU NEED TO RESIGN....YOU ARE NOT WORTHY OF YOUR OFFICE !!! (**0477-1** [Garmon, Toni])

Comment: At the time of its creation, the NRC was charged with serving as the public's guardian over the activities of civilian nuclear power plants such as those at Turkey Point. The law which formed the NRC did so with the purpose of separating the function of protecting the public from the task of promoting nuclear energy. The NRC is to have no role in aiding the nuclear industry or in promoting the development of its products or agenda. It is not the agency's job to justify, rationalize, or encourage the industry's attempts to spread nuclear power. Yet faced with overwhelming public support for true clean energy options, particularly the solar option in South Florida, the NRC finds itself continually defending the nuclear industry's sales pitch. The lighthearted, promotional tone of the summary EIS materials presented at the April 22nd public meeting was shocking and reprehensible. As an informed and concerned citizen, I urge the agency to clean up its act. If the people of the United States decide that there is no future in nuclear power, as the people of Australia, Belgium, Germany, Italy, Japan, the Philippines, Sweden, and Switzerland have already decided, then the NRC will simply have to accept that fact and "go out of business," as one commenter on regulations.gov recommended. (**0615-3-10** [Bethune, David])

Comment: Good oversight is a plus. (**0685-8** [Batista, Carlos])

Comment: There's a lot of holes here, both in the EIS. You have to be lateral and connective to all the different inputs and I don't see that. There's a lot of compartmentalization going on and I think that it's time for you guys to start open kimono on this thing and really get into it, because from a Nuclear Regulatory Commission this is your legacy. This is your watch. You're here now. So you need to shake it up and start to realize that it's your role. (**0721-34-7** [Gomez, Albert])

Comment: There is a collusive reality in the fact that the Commission -- you know, I remember, I've read your history from the '60s all the way up, how it developed and the whole thing, and reality is, it's tough, it's a tough reality that you're in, because you need to promote it, in the sense that you have to see it forward, it's an operating entity. You have to promote the entity as it operates. You're not obstructive to the entity, you want to make sure that the nuclear power plants doesn't shut down. (**0721-34-8** [Gomez, Albert])

Comment: But I would like to see you guys take charge here, at least with regards to being more open, more holistic, and really look at the quality control issues that are occurring now that would affect the EIS. And this meeting is about the EIS. (**0721-34-9** [Gomez, Albert])

Comment: [T]he NRC's oversight of the nuclear industry has provided the United States with the best, most cost efficient nuclear power in the world. So I'm a lot more comfortable now than I was maybe five years ago as we looked into the matter. (**0723-1-4** [Wallace, Otis])

Comment: This country and this industry that we operate, that we work in, we truly have a system of checks and balances that's rigorous. Plus we have intense government oversight and regulation, appropriately. We have an unfettered free press, we have diversity of opinion where people can come in, because of freedom of speech they can come in, they can contest what our

company wants to do, they can do it freely, openly and because FPL is not able to just do whatever we want whenever we want, we have standards we're held to and we have regulations. (**0723-7-3** [Boling, Steve])

Comment: We've got this extremely risky project going on and the Draft EIS says, eh, it's minor, go ahead and do it. They erred and they did not follow something called a precautionary principle which means when the outcome of a project is not known, don't do it. Err on the side of caution. They didn't show that caution. (**0723-9-21** [Schwartz, Matthew])

Response: *The comments did not provide information relevant to the environmental effects of the proposed action. No changes were made to the EIS as a result of these comments.*

E.2.40 Comments Concerning Issues Outside Scope - Safety

Comment: I understand nuclear energy is safe, I'm also concerned about human error. I've been a pharmacist for 30 years. I've had FPL workers come in to me stressed out because there was a leak in the reactor and they had to shut down. It was an immediate issue and I can't disclose because have a HIPAA requirement that I can't talk about a patient's stress. But there is human error at any job site, I don't care how safe a nuclear reactor or nuclear power plant is. (**0722-17-2** [Swenson, Cyndee])

Comment: It takes courage to oppose what you're all doing because you want jobs and you want to stimulate your economy. But this is America, it's just not the Everglades and Key Biscayne and FPL and NRC. It's a country. We cannot afford a meltdown here. We cannot afford human error to make a mistake for all the jobs this is going to create. And that's what created the meltdown in Japan, human error. So as many jobs as you're going to create, think of the lives if there's a mistake made, with two more nuclear power plants in the State of Florida abutting two national parks. (**0723-3-2** [Star, Priscilla])

Response: *The issues raised in the comments are outside the scope of the environmental review and are not addressed in the EIS. That said, the following are examples of how the NRC addresses operational safety issues. The NRC maintains resident inspectors at each reactor site. These inspectors monitor the day-to-day operations of the plant and perform inspections to ensure compliance with NRC requirements. In addition, the NRC has an operational experience program that ensures that the safety issues found at one plant are properly addressed at the others, as appropriate. Finally, the design of any new reactors will have already benefited from lessons learned at existing reactors and incorporate new safety features that would be impracticable to backfit onto existing plants. The NRC will only issue a license or permit if it can conclude that there is reasonable assurance that (1) the activities authorized by the license or permit can be conducted without endangering the health and safety of the public, and (2) such activities will be conducted in compliance with the rules and regulations of the Commission.*

Comment: Locating a new, untested, and questionable Nuclear Power Plant design with reduced safety features and possible susceptibility to "flying projectiles," in close proximity to a densely populated metropolitan area, contiguous to extremely fragile natural resources and within a historically proven State of Florida defined High Velocity (Wind)-Hurricane Zone, seems at best to be an ill conceived notion based upon faulty logic and outdated information. (**0044-4** [Commenters, Multiple])

Comment: It has also been shown by the tidal wave event in Japan to be highly vulnerable to natural disasters. (**0140-2** [Rhodes, Karen])

Comment: In 1992, the two existing nuclear reactors at Turkey Point took a direct hit from Hurricane Andrew. According to the NRC's own report: "The onsite damage included loss of all offsite power for more than 5 days, complete loss of communication systems, closing of the access road, and damage to the fire protection and security systems and warehouse facilities...the high water tank collapsed onto the fire water system, rendering the fire protection system inoperable. In addition, the storm threatened safety-related equipment (e.g., potential collapse of the damaged Unit 1 chimney onto the diesel generator building)." In other words - South Florida dodged a very big bullet in 1992. There is no need to build more risk in this hurricane-prone location. (**0240-5** [Commenters, Multiple])

Comment: Locating a new, untested, and questionable Nuclear Power Plant design with reduced safety features and possible susceptibility to "flying projectiles," in close proximity to a densely populated metropolitan area, contiguous to extremely fragile natural resources and within a historically proven State of Florida defined High Velocity (Wind)-Hurricane Zone, seems at best to be an ill conceived notion based upon faulty logic and outdated information. (**0263-8** [Orzechowicz, Holly])

Comment: Although the nuclear power industry has probably improved the performance and safety of reactors, and has proposed new safer reactor designs, but have they been tested? Generally, they have been untested. There is no guarantee to the general public that the reactors will be built and operated correctly. (**0333-1** [Anonymous, Anonymous])

Comment: Since mistakes do occur and the reactors designers at Fukushima in Japan did not anticipate that a tsunami would disable the backup systems that were supposed to stabilize the reactor after the earthquake. This has cast doubt on whether even an advanced economy like Japan can master nuclear safety. (**0333-2** [Anonymous, Anonymous])

Comment: As a person residing inside the 50 mile radius around the Turkey Point nuclear plant and already subjected to its dangers, I distressingly find myself a party to the ongoing licensing process for two unsafe, untested AP1000 reactors which FPL wants to add to the site. (**0615-1-1** [Bethune, David])

Comment: In lieu of the traditional "defense in depth" safety features found in conventional nuclear power plants, the AP1000 design proposes a set of unproven "passive safety" features which are assumed to prevent or contain a meltdown accident without human intervention. The proposed plants share a number of design problems with the reactors and fuel pools at Fukushima Daiichi, problems compounded by the removal of traditional safety features as a cost-saving measure. (**0615-1-16** [Bethune, David])

Comment: The most important safety function of any nuclear power plant, emergency cooling, is the most severely compromised in the AP1000 design. Its predominant feature is a water supply tank located on top of the reactor building which offers only a 3 day supply of cooling water. If a plant emergency lasts more than 3 days, humans are expected to come refill the tank. In a meltdown situation, radiation at the site would severely limit human access, making further cooling difficult or impossible. With life threatening radiation levels surrounding the fuel pools there, workers at Fukushima were not able to physically approach the plant to assist in cooling and they would not be able to approach Turkey Point 6 or 7, either. Storm surge levels at the Turkey Point site can also preclude access by personnel. The draft EIS fails to consider the environmental impacts of the anticipated fission product releases from a station blackout condition lasting more than 3 days and completely the evidence of historical and predicted storm surge height at the site. (**0615-1-17** [Bethune, David])

Comment: It cannot be reasonably assumed that the AP1000 design will do a better job of preventing a meltdown by having only a single large cooling tank on top instead of a series of backup pumps and water supplies. The cooling design itself is dubious, involving dripping water around the outside of the containment building rather than over the fuel rods themselves. Placed in direct sunlight on the roof as it is, the cooling tank's water is subjected to solar heating, which further reduces its potential cooling effect. (**0615-2-1** [Bethune, David])

Comment: Lacking the multiple backups of traditional emergency core cooling systems, the AP1000 design relies on the environment to provide its cooling functions. There is no proof that this emergency core cooling function will work in the year-round warm temperatures at Turkey Point and, if it fails, the ensuing core meltdown would present a catastrophic and unacceptable risk to the people and the environment of Miami-Dade, Broward, and Monroe counties, as well as to the surrounding waterways of the United States. The draft EIS offers no evidence that the proposed in-core cooling system, which relies strictly on air circulation around the outside of the containment vessel for heat removal, will work as designed in the meteorological environment found at the site. (**0615-2-10** [Bethune, David])

Comment: An essential part of the AP1000's emergency cooling is the chimney design in which the containment vessel sits. The chimney draws in air from the side and spews it out the top, unfiltered. Should any leak or breach of the containment vessel ever occur, the ensuing fission products would be immediately carried up the chimney and out into the environment. The design is reminiscent of the Windscale reactor in England which sprayed its radioactive leaks into the atmosphere, resulting in widespread exposure to fallout and contamination of land, water, farm animals, and crops. The narrow gap in between the containment vessel and the composite shell prevents simple inspections, making it easy for containment leaks to go unnoticed while they pour fission products into the sky. The design is full of small, moist spaces that will make it easy for corrosion, and therefore leaks, to develop around the containment vessel, and these will be immediately swept up and outside. If the air inlets at the sides of the reactor building are blocked for any reason the crucial air circulation function will be lost. Lacking the traditional array of redundant core cooling methods, this chimney design represents a single point of failure for the AP1000's emergency cooling. Both the water tank mounted on top and the pool to be dumped inside rely on the chimney air interface to actually remove heat. At Fukushima, we saw how a hydrogen explosion at an older reactor could launch debris that damaged a spent fuel pool at a different reactor. The Turkey Point siting of two AP1000's next to two older reactors would present a nearly identical situation. (**0615-2-11** [Bethune, David])

Comment: The draft EIS for Turkey Point 6 and 7 also fails consider how the corrosive sea air at the site will affect its containment integrity, ignoring the NRC's own documentation of containment leaks at other US nuclear facilities. The combination of the containment vessel and chimney design add a new and unnecessary risk to people and to the environment, especially given the large population in the affected area and the massive fission product release that could result from a prolonged loss of cooling. (**0615-2-13** [Bethune, David])

Comment: The AP 1000 design stores spent fuel in a what is essentially an indoor swimming pool inside a simple building constructed of the same brittle, untested material as the reactor housing. If the water in this pool were to drain to a level where the fuel rods were exposed, radiation from the fuel rods would be so intense that the spent fuel building would no longer be accessible by human beings. Westinghouse design documents show that, depending on water level and the amount and age of the fuel rods in the pool, spent fuel can melt down in a period of hours to days. Although Westinghouse claims that the fuel pool can be kept cool for 7 days in an emergency, some battery-backed parts of the system will only function for 24 hours. It is not

only conceivable, it is highly likely that a hurricane affecting Turkey Point would prevent human access to the site for more than 24 hours or even 72 hours. The proposed on-site batteries, themselves of little duration, could be easily wiped out by storm surge as they were at Fukushima. Being at sea level, the entire area can become inaccessible during severe storm surge flooding. The NRC's own assessment of the events of Hurricane Andrew reported that workers were not able to reach the Turkey Point site for 5 days after the storm due to flooding. If humans cannot reach and attend to the fuel pool and reactor cooling functions, a meltdown is assured. A fuel pool meltdown is particularly dangerous since the spent fuel rods sit in an open pool of water, rather than inside a shielded reactor. The AP1000 fuel pellets are coated in a zinc alloy, like those at Fukushima, which reacts with water and steam during an accident to produce explosive hydrogen. A hydrogen explosion in the AP1000 fuel handling building would result in a massive and catastrophic release of fission products, contaminating all of the Miami area as well as the surrounding waterways and making the area unlivable for thousands of years. Less severe accidents have also taken place in fuel pools of this design, each requiring a huge and expensive cleanup. In many ways, an open spent fuel pool is a nuclear weapon which is already deployed but is waiting to be activated. (**0615-2-16** [Bethune, David])

Comment: Hydrogen explosions in two spent fuel pools at Fukushima allowed the fission products from self-sustaining fuel rod fires to be released into the environment with catastrophic results. The hydrogen results from the zinc alloy coating on the fuel pellets reacting with the water and steam inside a melting pile of fuel rods. Although the AP1000's containment vessel contains hydrogen igniters which claim to be able to explode the hydrogen before the hydrogen explodes the building, these are unproven systems which only work in computer models. The most vulnerable part of the plant, the spent fuel pool, has no hydrogen igniters at all. When hydrogen ignited above the spent fuel pools at Fukushima it blew off part of the roof of the building. This wasn't hard to do, as the fuel pools were located outside of the containment structure. Despite what transpired at Fukushima, the proposed reactors at Turkey Point 6 and 7 present an identical risk to people and the environment by virtue of using zinc alloy coated fuel pellets and racking them in the same type of unprotected pool. The draft EIS for Turkey Point 6 and 7 fails to demonstrate how hydrogen explosions will be avoided during a core or fuel pool meltdown scenario, despite the agency's own Fukushima task force recommendations on this subject. The most dangerous scenario for Turkey Point is also the most likely to occur, an extended station blackout combined with extensive site flooding due to a hurricane. Although extended station blackout and storm surge flooding have taken place at Turkey Point already and are expected to continue or even increase in the future as a result of climate change, the draft EIS fails to examine any aspect of this site-specific scenario. A hydrogen explosion which opened the reactor core or the top of the fuel processing building would result in a widespread release of fission products, potentially making the entire Miami metropolitan area uninhabitable for thousands of years. (**0615-2-18** [Bethune, David])

Comment: The top-heavy nature of the tank's location makes the reactor building particularly susceptible to hurricane damage and therefore especially unsuited for South Florida. (**0615-2-2** [Bethune, David])

Comment: The proposed plant's fuel pool design is dangerous in its similarities to Fukushima, a danger compounded by the use of new and unproven building materials. (**0615-2-23** [Bethune, David])

Comment: A hydrogen explosion which opened the reactor core or the top of the fuel processing building would result in a widespread release of fission products, potentially making

the entire Miami metropolitan area uninhabitable for thousands of years. (**0615-2-28** [Bethune, David])

Comment: Unlike traditional reactors with two containment structures, the AP1000 design offers only one. In a setup Westinghouse calls "passive cooling," this containment building would be directly exposed to the moist, salty, and corrosive air found at the Turkey Point site. The chimney-style design takes in the warm, wet air outside the building, heats it further, and sends it out the top. Nearly the entire outer surface of the containment vessel is exposed to the moist, corrosive sea air at the proposed site. Incidents of severe corrosion, including complete holes through containment vessels, have been discovered at other nuclear plants in the United States located in far less harsh environments. (**0615-2-4** [Bethune, David])

Comment: The draft EIS for Turkey Point 6 and 7 fails to examine how the building design and materials would affect the plant's structural integrity during hurricane winds or impact from a hurricane-launched object. Should the reactor building or fuel processing building be damaged in a storm, the resulting release of fission products would present a serious environmental and health impact which remains unexamined. The emergency cooling support structure, being the reactor building itself, presents a new and unjustifiably risky design, while the open fuel pool in an unreinforced building at ground level simply repeats the problems found at Fukushima. The draft EIS is incomplete because it lacks a model for hurricane damage to crucial plant structures around the reactor and fuel pool and the potential for ensuing fission product release. (**0615-2-5** [Bethune, David])

Comment: The outer building, which offers no containment function, is made of a new steel and concrete composite deemed proprietary by Westinghouse. No buildings have ever been built of this material in the United States and Westinghouse refuses to disclose its composition, preventing independent testing. The NRC's own lead structural engineer famously described the brittle nature of this composite when he said that it could "shatter like a glass cup" upon impact. After pointing out to Westinghouse that the proposed material wouldn't meet standard nuclear building codes for reinforced structures, the NRC accepted the company's reply that computer models were equivalent. When the primary part of the reactor building, called Module #2, failed in a Westinghouse test, the company claimed the test results were proprietary and couldn't be released to the public. The irregular physical design of the proposed reactor buildings and support structures, combined with the use of a new, unproven material, make it impossible to model the plant's structural behavior using any existing computer code. In a hurricane, the reactor building, rooftop cooling pool, or fuel storage pool could be damaged in unpredictable ways, posing an exceptional and unjustifiable risk to public safety and the environment. (**0615-2-6** [Bethune, David])

Comment: The draft EIS for Turkey Point 6 and 7 fails to consider that the containment vessel could be compromised by the highly corrosive environment at the site or to compare the corrosion rates of such a vessel in South Florida's climate with those of the locations where reactor containment perforations have already occurred. A leak in the containment vessel of any size is an event which presents a substantial risk to human health and the environment. It is a risk which can only increase over the proposed plant lifetime of 60 years as the vessel continues to be attacked by moisture and minerals from the outside and radiation from the inside. The draft EIS omits any study of the long term effects of corrosion from the outside of the containment vessel under the lifetime aging conditions of the plant, including aging of materials due to nuclear stresses. (**0615-2-8** [Bethune, David])

Comment: In lieu of redundant cooling systems and water supplies in the reactor core, the AP1000 design relies on a completely new and untested method of in-core emergency cooling. It purports to circulate water from a single pool without pumps using only convection and condensation. The NRC has questioned the legitimacy of such a cooling method, which is likely to be just as impossible as it sounds. In an emergency, the contents of a single pool of water will be dumped into the bottom of the reactor containment vessel. The water is expected to evaporate or boil, rising to the top of the vessel where it is collected as steam, condensed, and returned to the bottom. The actual emergency removal of heat from the system is expected to be accomplished not with multiple sources of water as in a traditional PWR reactor, by merely by the containment vessel's air interface as described previously. Westinghouse refers to this strategy as "the atmosphere is the ultimate heat sink." A better description might be that it's the only heat sink. It is a single point of failure in all core cooling scenarios in the AP1000 design. Without pumps, this in-core cooling system is claimed to be able to remove enough heat to prevent core meltdown -- but only for 72 hours. After 3 days, human intervention is again required, and the entire system will only function if there is no damage to any of its many parts, especially the screens designed to keep out debris which would clog the condensation return path. When challenged on how the system could prevent the screens themselves from becoming clogged, Westinghouse again retreated to a proprietary claim and refused to disclose the screen's makeup. (**0615-2-9** [Bethune, David])

Comment: There is no need to build more risk in this hurricane-prone location. In 1992, the two existing nuclear reactors at Turkey Point took a direct hit from Hurricane Andrew. According to the NRC's report: "The onsite damage included loss of all offsite power for more than 5 days, complete loss of communication systems, closing of the access road, and damage to the fire protection and security systems and warehouse facilities ... the high water tank collapsed onto the fire water system, rendering the fire protection system inoperable. In addition, the storm threatened safety-related equipment (e.g., potential collapse of the damaged Unit 1 chimney onto the diesel generator building)." In other words -South Florida dodged a very big bullet in 1992. (**0655-1** [Tamburr, C.])

Comment: The second thing that really disturbs me about AP-1000 is that it has a very thin containment structure. Only one containment building, not two like a traditional reactor. And that containment structure is exposed to the environment. It's actually exposed by design. It has air baffles on the side that bring air in around the sides of the containment vessel and sends it out a chimney in the top. Now, if that sounds like a good containment design to you, maybe you haven't lived in South Florida very long, because it's a very corrosive environment where we have hot, moist air full of salt water and other minerals. When the steel containment vessel is exposed to this air 24 hours a day because of this convection design around the side that's built into the plant, we're exposing ourselves to corrosion risks. We've already seen through hole corrosion in other in other nuclear reactors in the United States, and it's perfectly plausible for a hole to develop in this reactor and nobody even notice. These places are tight and tiny and radioactive and it can't be easily inspected. So the entire containment design is really unsuitable. It presents an enormous environmental risk. (**0721-23-3** [Bethune, David])

Comment: The fuel processing and storage building in AP-1000 doesn't have any special protection to prevent that kind of explosion. It doesn't even have the hydrogen ignitors that are in the core, where FPL and Westinghouse know that a potential hydrogen explosion is possible. (**0721-23-6** [Bethune, David])

Response: *The NRC conducts a concurrent safety review of each COL application along with the environmental review; the results of the NRC's safety review of Turkey Point Units 6 and 7*

will be published in a Final Safety Evaluation Report, which is scheduled for publication in November 2016. Regarding concerns about the viability of the AP1000 reactor design, approval of new reactor designs is contingent on the rigorous safety review of the design control document (DCD). New reactor construction is verified by inspections, tests, analyses, and acceptance criteria prior to initial startup testing and plant operation. The AP1000 reactor design underwent a lengthy and thorough safety review, resulting in issuance of the AP1000 Design Certification (DC) Final Rule in December 2011. The AP1000 DC website (http://www.nrc.gov/reactors/new-reactors/design-cert/ap1000.html) provides links to Westinghouse's license amendment application and the NRC's safety evaluation report.

Comment: It is not beyond all likelihood that a coastal facility in Florida could be subjected to extremes of weather or the vagaries of our planet's infra-structure. An earthquake in the Canary Islands eg could send a Tsunami here too. (**0213-3** [Hyams, Charles])

Comment: The Westinghouse AP-1000 reactor design has a number of tradeoffs, fewer active emergency cooling systems, significantly reduced concrete content, larger secondary containment volume with passive cooling, etc. Normally these would be considered improvements, except these enhancements have also added a new risk factor, buoyancy. If a tsunami, 60-80ft or higher impacts these relatively lightweight/high cubic volume secondary containment structure, it will achieve buoyancy. Ref: Canary islands volcano subsidence has been modeled (Ward and Day. Cumbre Vieja Volcano --Potential collapse and tsunami at La Palma, Canary Islands) estimated Florida beaches would be impacted by a 20-25 meter Tsunami, flooding several kilometers inland. Once the secondary containment achieves buoyancy the main steam pipes and control connections to the turbine and control buildings would be highly stressed, and very likely rupture. Such a major mechanical disruption would likely compromise the connected steam generators and the primary coolant loop. Once the flooding event is over, the containment structure itself might end up flopped on it's side, thus defeating AP-1000's passive emergency cooling system. The Atlantic seaboard would be devastated. But like we've seen at Fukushima, the subsequent meltdown and semi-permanent radioactive contamination of surrounding area and the Atlantic ocean would make things far worse for survivors. (**0545-4** [Keating, Tim])

Comment: Increased seismic activity in the Caribbean is something also that is not addressed in the Draft EIS Statement. (**0721-5-3** [Mendez, Victoria])

Response: *The tsunami hazard for Turkey Point site is a part of the safety review and it is discussed in Chapter 2 of the Safety Evaluation Report. A somewhat exaggerated account of possible scenarios that could cause large magnitude tsunamis impacting the east coast of United States was published in paper by Ward and Day (2001). Since then additional studies performed by government agencies (i.e., National Oceanic and Atmospheric Administration and USGS) and academic organizations, and published in peer-reviewed journals, have repudiated and questioned the validity of the scenarios described in this paper. This subject is considered out of scope for environmental review. No changes were made to the EIS as a result of these comments.*

Comment: The clustering effect of four reactors in one coastal at-risk location, similar to the clustering of reactors at Fukishima is very worrisome. Should a disaster strike, there is a possibility multiple reactors will be impacted at once, considerably reducing FPL's ability to isolate and contain the damage. (**0288-6** [Cleland, Noel] [Jackalone, Frank] [Mahoney, Stephen] [Matthews, Debbie] [Roff, Rhonda] [Scott, John] [Teas, Jim] [Ullman, Jonathan])

Comment: You are putting entirely too many plants in one place. What do you think we are Japan? (**0373-10** [Lee, Nancy])

Comment: Not only would Turkey Point 6 and 7's fuel pool buildings be susceptible to damage from an accident at the older Turkey Point 3 and 4, so would the AP1000's chimneys which are essential for every emergency core cooling scenario. Debris from any kind of accident or hurricane could block part of this air circulation system, such as the filters at the air intake or the narrow annulus that separates the containment vessel from the shell building, threatening the entire setup and potentially leading to meltdown and massive release of fission products. A hydrogen explosion or turbine accident at one of Turkey Point's other two, older nuclear plants could clog these crucial air paths and prevent emergency cooling of one or both of the AP1000. The draft EIS for Turkey Point 6 and 7 fails to take into account how the single point of failure represented by the the AP1000's atmospheric cooling design could be further compromised by the older reactors at the site or by hurricane damage. (**0615-2-12** [Bethune, David])

Comment: The draft EIS for Turkey Point 6 and 7 ignores the the NRC's own recommendations from its Fukushima task force by looking at the two new reactors in isolation and failing to take into account that placing a total of four reactors at the same site, differing in age and design, will affect the plant's environmental impact during an accident. (**0615-2-15** [Bethune, David])

Comment: The draft EIS also completely ignores the very serious issue of siting the plant next to two existing, aging nuclear reactors. The NRC's own task force on Fukushima found that sites with multiple nuclear plants present special concerns in the face of extended station blackouts. (**0615-2-21** [Bethune, David])

Comment: Two new reactors increase the risk of an accident. Adding two new reactors could increase the risk of a nuclear accident. This plant is very close to the ocean. Storm surge or a tidal wave could cause damage to the plant and create a radiation leak. (**0641-5** [Martin, Drew])

Response: *The issues raised in the comments are outside the scope of the environmental review and are not addressed in the EIS. Multi-unit effects are considered in the Safety Evaluation Review of the COL. No changes were made to the EIS as a result of these comments.*

Comment: The draft EIS fails to consider the environmental impacts of the anticipated fission product releases from a station blackout condition lasting more than 3 days and completely the evidence of historical and predicted storm surge height at the site. (**0615-1-18** [Bethune, David])

Comment: The draft EIS for Turkey Point 6 and 7 fails to examine the environmental impacts of a meltdown event resulting from the a failure of the in-core cooling system or its atmospheric heats ink, especially during a hurricane when station blackout may last longer than 3 days and storm surge may prevent worker access to the facility. The in-core cooling system relies on the circulation of condensation and outdoor air cooling and the efficacy of these approaches has not been tested under South Florida weather conditions. (**0615-2-20** [Bethune, David])

Comment: In its mission to protect public safety and health, the NRC must err on the side of caution and presume that a beyond design basis accident will resemble what took place at Fukushima and, given the particular conditions at the Turkey Point site, also involve an extended station blackout lasting longer than 3 days combined with site inaccessibility due to storm surge or flooding. Given the hard evidence that an accident involving a similar

arrangement of multiple units, the loss of on-site power, and high radioactivity due to meltdown has already occurred, the draft EIS for Turkey Point 6 and 7 is substantially incomplete as it assumes on human access to prevent catastrophic environmental releases when it may not be possible for humans to reach Turkey Point during or following a hurricane. The draft EIS omits any discussion of the environmental impact of a station blackout lasting longer than 3 days or one involving long-term site inaccessibility due to storm surge, even though both of those events are anticipated to occur at the site. (**0615-2-3** [Bethune, David])

Comment: Consider, too, that Biscayne Bay is ground zero for the landfall of hurricanes. In 1992 Turkey Point sustained a direct hit from Hurricane Andrew. According to the NRC's own report: "The onsite damage included loss of all offsite power for more than 5 days, complete loss of communication systems, closing of the access road, and damage to the fire protection and security systems and warehouse facilities...the high water tank collapsed onto the fire water system, rendering the fire protection system inoperable. In addition, the storm threatened safety-related equipment (e.g., potential collapse of the damaged Unit 1 chimney onto the diesel generator building)." In other words, South Florida dodged a very big bullet in 1992. There is no need to build more risk in this hurricane-prone location. (**0674-3** [Dwyer, Karen])

Comment: When we build a nuclear plant here we increase our potential risks of a radiation based accident like we saw in Fukushima. And this particular plant design, as I've been finding out, has some really serious concerns. It combines a lot of the problems of the Fukushima plants and it also has some new, untested technologies that we're relying on to keep us safe. I don't think that we can really rely on those. So I want to point out a few of them to you so that you can do your own research and make some public comments to the NRC afterwards about what you find, because this is what I found out. The main source of emergency cooling in this plant is a water tank on top. The supply will only last three days. We've just heard a gentleman explain that we already had a hurricane at that location where the power was out for five days. So we're basically asking for, with this design, a meltdown. We are creating a situation in which there is no backup water supply to cool the reactor after three days. Human beings would have to go there and refill the water tank on the top of this reactor, which is completely insane. We saw people battling the radiation at Fukushima for weeks and months, not for days. And we already know that Florida can lose power for days and weeks at a time. So building a new design that's lacking in basic safety features, because they want to save money, and leaves us with basically a three-day outage period is completely unacceptable. It provides -- it presents not only an environmental risk but also a safety risk. (**0721-23-1** [Bethune, David])

Comment: I don't see any discussion in the EIS about accident mitigation at all. Basically we're assuming that the design basis accident, the three day accident is the only one that could ever happen, and that's ridiculous. (**0721-23-4** [Bethune, David])

Response: *The issues raised in the comments are outside the scope of the environmental review. No changes were made to the EIS as a result of these comments.*

Comment: From what I can see the only lessons that were learned after the Hurricane Andrew impact on the Turkey Point facility dealt with wind damage. Given the serious impact that flooding had on the Fukushima Daiichi nuclear plant in Japan what precautions have been taken by FPL after the Fukushima incident? Hurricanes can produce severe storm surges and may create a similar flooding event as was experienced in the Fukushima incident. I would request that FPL detail the actions they have taken to prevent a meltdown due to flooding from a storm surge. In particular what preventative measures they have already taken to protect the two current reactors and the assumptions that underly those measures. It would seem prudent to

me to have an understanding of how rigorous the current preventative measures are, so we as citizens can have an idea of what to expect from the company with regard to the new units. In the unlikely event that no action was taken after the Fukushima incident, I would very much like to understand the current measures in place to protect against a storm surge and have a copy of the review that must have been conducted after the Fukushima event. (**0001-1** [Tacher, Ian])

Comment: The reactor itself it old and run down. (**0008-4** [Finver, Jody])

Comment: I also know that I would much rather prefer new, state of the art, reactors rather than continually relying on the original two that are already past their original useful life and have needed improvements to increase their outputs. This pushing the original operational envelope is much more concerning to me than providing newer, safer units. I understand the concern that people have with nuclear safety, especially since the accident in Japan, but wonder how many realize that FPL reactors are not configured and will not operate the same way. (**0070-3** [Lamb, Deborah S.])

Comment: It relies on outdated data (some decades old) when estimating its safety. (**0126-2** [Pontier, Christine Hughes])

Comment: I am aware that nuclear power plant technology has come a long way over the years. We now have the ability to run plants that can reuse their nuclear fuel much longer, resulting in a much more stable radioactive waste when the fuel is finally retired. I am unaware if this new, more eco-friendly plant has been implemented on this site. My suggestion would be to deny the creation of any new reactors before the likely old style reactors at this plant are replaced with the new, safer, cleaner models. Go one further and suggest they undertake this task not only at this location, but all locations where this company owns nuclear power plants. If they are so eager to spend money, let them do so and help the environment at the same time. Win-win, in my book. In the process, they build company loyalty, as you've suddenly made plants that are far safer for the workers who maintain and operate them. They build community relationships because the people who live in the vicinity of this power plant can sleep a little bit easier, knowing they have the most current, safest, and most environmentally-friendly nuclear power plants in existence. Before they know it, they are a leader in the nuclear power industry based on this tiny change in their mission statement. (**0230-1** [Delateur, Marc])

Comment: My concerns, along with what Laura Reynolds said on the fact that there are current problems with the maintenance and operation of 3 and 4. I understand, from what you've told me, you're not going to look at that. (**0721-13-1** [Martin, Drew])

Comment: The older plants are '70s vintage designs, they have their own problems. Any kind of accident, including a turbine break at one of the older plants, 3 and 4, could cause flying debris that can damage the AP-1000, including clogging these important cooling vents on the side and preventing emergency cooling. It could also land in the spent fuel pool and cause damage to the fuel pool or the pumping and equipment that's used to move that water between the reactor and the fuel pool. So just creating an additional plant at the same site where we already have old plants exponentially increases our risk. Those old plants become a risk factor for the new plants. (**0721-23-10** [Bethune, David])

Comment: The opportunity to replace units 3 and 4 by units 5 and 6 is not really reviewed, even though the NRC will claim that all they could do is approve or recommend this project. Serious consideration should be looked at replacing aging nuclear reactors rather than adding to the project. (**0721-5-6** [Mendez, Victoria])

Response: *NRC staff can only review the proposed application for Turkey Point Units 6 and 7. The decision about whether or not to decommission the existing Units 3 and 4 is a decision made by the applicant, FPL. Also, safety matters related to aging of the existing units at Turkey Point are outside the scope of the environmental review of the proposed Units 6 and 7. No changes were made to the EIS as a result of these comments.*

Comment: Liquid, gaseous, and solid radioactive waste management systems would collect and treat the radioactive byproducts of operating the proposed Turkey Point Units 6 and 7, and these byproducts would be handled separately from the byproducts of existing Units 3 and 4. Spent nuclear fuel will require continued on-site storage. Due to the uncertainty regarding future availability of a geologic repository or other away-from-reactor storage facility, on-site storage may be required for many decades, until a permanent repository is established. The DEIS notes that each nuclear island would consist of a containment building, shield building, and auxiliary building; the radwaste building would be separate from the island, approximately 36 feet above grade (page 3-19). ***Recommendations:*** The FEIS should clarify plans regarding how the storage of spent nuclear fuel will be handled in order to prevent contamination, in the event of flooding at the site. We note that the proposed Units 6 and 7 will be elevated to provide safety from potential flooding, however, the low sea level in this area combined with the area's history of hurricanes requires that measures to address potential flooding be thoroughly evaluated and documented. (**0617-2-2** [Mueller, Heinz J.])

Response: *On August 26, 2014, the Commission issued a revised rule at 10 CFR 51.23 and an associated Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel (NUREG-2157). Continued Storage applies to the storage of spent fuel after the end of the licensed life for operations of a nuclear reactor and before final disposal in a permanent repository. The revised rule adopts the generic impact determinations made in NUREG-2157 and codifies the NRC's generic determinations regarding the environmental impacts of continued storage of spent nuclear fuel beyond a reactor's operating license. As directed by 10 CFR 51.23(b), the impacts assessed in NUREG-2157 are deemed incorporated into this EIS in Section 6.1.6. Section 6.1.6 also explains that current national policy mandates that high-level and transuranic wastes are to be buried at deep geologic repositories and that no release to the environment is expected to be associated with deep geologic disposal.*

The radwaste building is at plant grade within the power block. Section 5.11.2.4 explains that the design basis flood elevation (24.8 ft) is below the design plant grade (26.0 ft), and no further evaluation of accidents resulting from external floods is required. Climate change, including future sea-level rise, is addressed in Chapter 2, Chapter 7, and Appendix I. The impacts of climate change on the storage of spent fuel is included in NUREG-2157. Climate change impacts on the safe operation of Units 6 and 7, including sea-level rise, flooding, hurricanes, and storm surge, will be addressed in the staff's Safety Evaluation Report.

No change was made to the EIS as a result of this comment.

Comment: Does FPL have the infrastructure to maintain this project?! (**0149-12** [Nelson, Joyce E.])

Response: *The NRC's principal responsibility is to protect the health and safety of the public when authorizing the use of radioactive material. The regulations governing the environmental review are set forth in 10 CFR Part 51, Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions, and the regulations covering the safety review are in 10 CFR Part 52, Licenses, Certifications, and Approvals for Nuclear Power Plants, and other*

regulations referenced therein. The NRC will only issue a license or permit if it can conclude that there is reasonable assurance (1) that the activities authorized by the license or permit can be conducted without endangering the health and safety of the public and (2) that such activities will be conducted in compliance with the rules and regulations of the Commission. Applicants must demonstrate they can meet the NRC established requirements before a license is issued. No changes were made to the EIS as a result of this comment.

E.2.41 Comments Concerning Issues Outside Scope - Security and Terrorism

Comment: I would also like to know how security concerns of a potential terrorist attack are being addressed in the expansion project plans as well as the current power plants in operation today. (**0132-2** [Mauri, Tom])

Comment: Catastropic scenarios involving terrorist attacks are also conceivable. (**0333-3** [Anonymous, Anonymous])

Comment: Also, at a time when there is so much terrorist activity, I cannot think of a better target for attack than a nuclear plant in the City of Miami-the very model of America's most desirable lifestyle--staffed by at least a few Homer Simpsons. (**0339-4** [Provost, Allan])

Comment: It also represents a national security threat, with nuclear facilities a target for any nation or group seeking to inflict harm by triggering a nuclear disaster through attack or sabotage. (**0356-5** [Shlackman, Jed])

Comment: Seaside nuclear power plants are vulnerable targets with a large multiplier factors (5,000 to 50,000x verses tactical n-weapon) for radioactive fallout and contamination. In a world that seams to becoming more unstable as time progresses, it's just a matter time before one these facilities are targeted. (**0545-5** [Keating, Tim])

Comment: A terrorist attack on the poorly-protected fuel handling building, especially by air, is a notable risk. (**0615-2-25** [Bethune, David])

Comment: The nearby location of Miami International Airport and the even closer Homestead Air Reserve Base add another level of danger as any accident or terrorist incident involving the considerable low-altitude air traffic in the vicinity could damage the reactor buildings. The primary emergency cooling tank, the highest point above ground level, presents a particular risk, as does the spent fuel storage pool its poorly protected location. (**0615-2-7** [Bethune, David])

Comment: **NRC 's Draft EIS is Flawed Because it Fails to Adequately Address the Threat of Terrorism and the Potential Consequences of a Meltdown in Multiple Units.** The NRC's NRC's Environmental Impact Statement for Combined Licenses (COLs) for Turkey Point Nuclear Plant Units 6 and 7, Draft Report for Comment (NUREG-2176) fails to address the threat of terrorism to the Turkey Pont site. Since 9-11 it has come to light that U.S. nuclear reactors have viewed as targets by the like of Al Qaeda. In fact the FBI has arrested and convicted terrorist suspects in the US who referred to U.S. nuclear reactors as "nice targets" (http://articles.latimes.com/2012/nov/13/nation/la-na-nn-saudi-student-texas-terrorism-20121113).

But according to NRC's DEIS: The comments that are outside the scope of the environmental review for the proposed Turkey Point site are not included in this appendix. These include comments related to the following: safety, emergency preparedness, NRC oversight for

operating plants, security and terrorism, support or opposition to the licensing action, licensing process, nuclear power, hearing process, or the applicant. (See Appendix D.) However, almost decade ago, the U.S. Court of Appeals for the Ninth Circuit required that the NRC account for the environmental impacts of terrorism under the National Environmental Policy Act's Environmental Impact Statement (EIS) provision. (San Luis Obispo Mothers for Peace v. Nuclear Regulatory Commission, 449 F.3d 1016, 1035 (91h Cir. 2006). The 9th circuit determined that the possibility of a terrorist attack was not so "remote and highly speculative" and that the NRC should not exclude it from consideration under NEPA Furthermore, the court found NRC position to be "inconsistent with the government's efforts and expenditures to combat this type of terrorist attack at nuclear facilities." (Id.) The Court determined that NEPA requires that the NRC take a 'hard look' at the consequences of a terrorist attack upon a nuclear power plant. Mother for Peace was not asking the agency to engage in speculation or conjecture but to adequately address the range of environmental impacts if an attack took place. (Id.) The NRC's DEIS ignores this decision. Although it remains an open question in Florida due to a split between the 9th and 6th circuits, sound regulation and a federal agency cognizant of and responsive to public concerns would have long ago adjusted its process to account for terrorism during the preparation of an EIS on known terrorist targets. (http://www.pillsburylaw.com/siteFiles/Publications/839E98B17AA3C8E45DOAD74928D1108.pdf) (**0716-11** [Riccio, Jim])

Comment: Also at a time when there is so much terrorist activity, I cannot think of a better target for attack than a nuclear plant in the City of Miami, the very model of America's most desirable lifestyle, staffed at least by a few Homer Simpson's. (**0721-26-6** [Koenigsberg, Linda])

Response: *Comments related to security and terrorism are safety issues that are not within the scope of the staff's environmental review. No changes were made to the EIS in response to these comments.*

E.2.42 General Editorial Comments

Comment: There are a few instances where the references to DEIS Appendix I (The Effect of Climate Change on the Evaluation of Environmental Impacts) and DEIS Appendix J (Greenhouse Gas Footprint Estimates for a Reference 1,000 MW(E) Light-Water Reactor) appear to be reversed. Instances in the DEIS include: a. DEIS Subsection 6.1.3, Page 6-8, Lines 20-21. b. DEIS Section 6.3, Page 6-39, Lines 40-41. Additionally, the title of Appendix J, "Carbon Dioxide Footprint Estimates for a 1,000 MW(e) Reference Reactor", listed in DEIS Subsection 1.6, page 1-12, line 27, is not consistent with the Table of Contents or Appendix J, "Greenhouse Gas Footprint Estimates for a Reference 1,000 MW(E) Light-Water Reactor" (**0619-1-13** [Maher, William])

Comment: There are instances in the DEIS where a reference is either incorrectly cited, corrupt in ADAMS, or not consistent with the information referenced. Instances in the DEIS include: a. DEIS Subsection 2.6.1.2, Page 2-186, Table 2-54: DEIS Table 2-54 lists the source as (USCB 2009-TN1462). The file in ADAMS, Accession No. ML14287A731, for the DEIS reference (USCB 2009-TN1462) is corrupt. b. DEIS Subsection 6.2.2, Page 6-27, Lines 15-16: The DEIS references Addendum 1 to NUREG-1437 as the 2013 Revision 1 of the GEIS (NRC 2013-TN2654). The correct reference for Addendum 1 of the GEIS is DEIS reference (NRC 1999-TN289). c. DEIS Subsection 8.1.1, Page 8-2, Line 37: The DEIS cites "(TenYrPlan2014)" as the reference. The reference should be cited as (FPL 2014-TN3360). d. DEIS Subsection 10.6.1.2, Page 10-20, Line 31: The DEIS references Section 5.4.3.1 for additional information about the economic impacts of constructing and operating Units 6 & 7. DEIS Section 5.4.3.1

references FPL 2011-TN435 which is "Personal Communications with Miccosukee Tribe of Indians of Florida, Metro Miami Action Plan Trust and Miami-Dade Office of Community Advocacy." The reference should be a U.S. Bureau of Economic Analysis reference: BEA 2012-TN1569; BEA 2012-TN4074; or BEA 2014-TN4075. e. DEIS Subsection 11.0, Page 11-43, Lines 36-37: The DEIS reference cited, (FPL 2011-TN303), refers to FPL's "Stormwater Management Plan and Calculations" with an Accession No. ML12192A226. This Accession No. is linked to a SANDIA National Laboratories document, "RADCAT 2.3 User Guide" in ADAMS. f. DEIS Appendix F-2, Section 2.1, Page 2-4/2-5, Line 43/2: Appendix F-2 states: "A new substation...would also be necessary (**Error! Reference source not found**. Figure 2-3)." g. DEIS Appendix F-2, Section 4.10, Page 4-7, Lines 27-28: Appendix F-2 states: "As discussed in FPL's Ten-Year Power Plant Site Plan (FPL 2013-TN2630), population estimates...1,000 to 2,000 individuals." The reference cited, (FPL 2013-TN2630), is FPL's Ten Year Power Plant Site Plan 2013-2022. This document does not provide information about crocodile populations. The correct reference is the FPL Threatened & Endangered Species Management Plan, Rev 1 (FPL 2011-TN1283). Page 12, paragraph 3, which states, "Ogden (1978a) estimated that between 1,000 and 2,000 American crocodiles existed in south Florida in the early 20th century..." h. DEIS Appendix F-2, Subsection 5.10.5, Page 5-9, Lines 31-34: Appendix F-2 states: "The 2014 death involved an adult crocodile...not attributed to plant operations (NRC 2014-TN3718)." The reference listed could not be verified. The DEIS reference cited (NRC 2014-TN3718) refers to NRC's Event Notification Report: Offsite Notification due to Deceased American Crocodile, July 25, 2014 with an accession No. ML14338A556. This Accession No. is linked to the Appendix F-2 . (emphasis added) (**0619-1-18** [Maher, William])

Comment: The DEIS identifies FPL as "Florida Power and Light Company" and the ER identifies FPL as "Florida Power & Light Company". The correct legal name is "Florida Power & Light Company". (**0619-2-15** [Maher, William])

Comment: Executive Summary, Page xxxv, Table ES-1: In DEIS Table ES-1, the DEIS indicates: a. For the "Land Use" Resource Category, that the **operation environmental impact** level is "MODERATE (NRC authorized **construction impact** level is SMALL.)" (emphasis added). b. For the "Socioeconomic Physical Impacts" Category, that the construction environmental impact level is "**SMALL**." This is not consistent with DEIS Section 4.12, page 4-148, Table 4-19 and DEIS Subsection 10.2.1, page 10-7, Table 10-1, where this impact level is listed as "**SMALL** (adverse) to **MODERATE** (beneficial) (NRC authorized construction impact level is **SMALL**)." (**0619-2-16** [Maher, William])

Comment: Inconsistencies identified in draft EIS and ER, Rev 6: Subsection 10.4.2, Page 10-15, Lines 28-33 "FPL states in Table 10.2-1 of its ER that construction of the...two new units at Turkey Point would involve... **22,000 tons of rebar**.... (FPL 2014-TN4058). Construction would also use **large quantities** of aluminum, copper... and quarry materials (nuclear and construction grade fill material, aggregate, sand, etc.)." ER Table 10.2-1 ER Table 10.2-1 lists **20,000 tons of rebar** and states, "**Small quantities**" related to aluminum, boron, titanium, tungsten, and other natural resources. (**0619-2-28** [Maher, William])

Comment: DEIS Subsection 8.1.1, Page 8-2, Lines 35-36: The DEIS states: "FPL is **interconnected with 21** municipal and rural electric cooperative systems (FPL 2014-TN4058)." ER Revision 6 indicates **19 external connections** as illustrated in ER Figure 8.1-3. (emphasis added) (**0619-5-11** [Maher, William])

Comment: DEIS Section 7.0, Page 7-3, Table 7-1: In DEIS Table 7.1 under the subheading "Energy Projects" the first project listed is "Turkey Point Units1-4". This should be changed to

"Turkey Point Units 1-5" as stated in DEIS Section 7.1, Page 7-9, Line 5. (**0619-5-7** [Maher, William])

Response: *These comments are editorial in nature. Hyperlinks to documents within internal systems were inadvertently left in the electronic version of the draft document and led to the "corrupt and Error" messages for external readers. The hyperlinks will be removed in electronic version of the final EIS. Changes were made to reflect the correct legal term for Florida Power & Light. Additional changes were made to text in Sections 4, 7, 8, 10, Appendix I, and Executive Summary to reflect these comments.*

Comment: In a letter dated March 17, 2014, DEIS reference (FPL 2014-TN3569), FPL removed the FPL-owned fill source from the application; however, there remain instances in the DEIS where the FPL-owned fill source is referenced. Instances in the DEIS include: a. DEIS Subsection 2.7.2, Page 2-197, Line 11. b. DEIS Subsection 4.3.1.3, Page 4-60, Line 22. c. DEIS Subsection 4.5.1.1, Page 4-120, Line 30. d. DEIS Subsection 4.8.1.1, Page 4-129, Lines 34-35. e. DEIS Appendix F-2, Section 4.7, Page 4-6, Lines 3-4. f. DEIS Appendix F-2, Section 4.8, Page 4-6, Lines 31-32. g. DEIS Appendix F-3, Section 2.0, Page 2-1, Line 28. h. DEIS Appendix F-3, Subsection 3.1.2, Page 3-7, Line 31. (**0619-1-5** [Maher, William])

Response: *The text in EIS Sections 4.3.1, 4.5, and 4.8 was revised to remove references to the FPL-owned fill source. Revision 6 of the ER includes the FPL-owned fill source in the description of the Area of Potential Effect (Section 2.5.3.3.1). To maintain consistency with the application, the fill source will be included in the features described in Section 2.7.2 of the EIS. Appendix F-2 and F-3 contain the BAs submitted to the FWS and NMFS as part of ESA Section 7 consultation. No changes were made to submitted consultation documents as result of this comment.*

E.3 Form Letter Authors

Approximately 10,618 of the written submissions were form letters. The U.S. Nuclear Regulatory Commission (NRC) identified 9 form letter templates (see Table E-4). Table E-4 includes a reference for the first piece of correspondence recived by the NRC for each of the nine form letters. The majority of the form letters were sponsored by the National Parks Conservation Association (Multiple Authors 2015-TN4716). Identical comments contained in form letters were captured only once; however, any additional comments contained in form letters were treated as unique comments. Authors and ADAMS accession numbers for form letter submissions are identified in Tables E-5 through E-13, one table per form letter.

Table E-4. Form Letter Identification Numbers

Correspondence Identifier	ADAMS Accession No.	Table of Author Names	Reference
TURK-COL6&7-DR-00044	ML15139A604	Table E-5	Multiple Authors 2015-TN4723
TURK-COL6&7-DR-00067	ML15139A651	Table E-6	Multiple Authors 2015-TN4722
TURK-COL6&7-DR-00073	ML15139A668	Table E-7	Multiple Authors 2015-TN4724
TURK-COL6&7-DR-00102	ML15140A000	Table E-8	Multiple Authors 2015-TN4716
TURK-COL6&7-DR-00103	ML15139A729	Table E-9	Multiple Authors 2015-TN4721
TURK-COL6&7-DR-00104	ML15140A141	Table E-10	Multiple Authors 2015-TN4720
TURK-COL6&7-DR-00379	ML15141A259	Table E-11	Multiple Authors 2015-TN4719
TURK-COL6&7-DR-00240	ML15146A110	Table E-12	Multiple Authors 2015-TN4718
TURK-COL6&7-DR-00679	ML15191A341	Table E-13	Multiple Authors 2015-TN4717

Table E-5. Individuals Submitting the Form Sponsored by Brickell Unites with Correspondence ID TURK-COL6&7-DR-00044 and Representative ADAMS Accession No. ML15139A604 (Multiple Authors 2015-TN4723**)**

Commenter	ADAMS Accession #	Commenter	ADAMS Accession #
Arostegui, Al	ML15139A606	Kavanaugh, Brigitte	ML15139A623
Baldwin, Brandi	ML15139A636	Lanoff, Robert and Andrea	ML15139A619
Billings, Marc	ML15139A625	Logan, Scott	ML15139A629
Corda, Charles R.	ML15139A610	Logan, Scott	ML15139A637
Curry, Carolyn	ML15139A626	McCall, Eric	ML15139A624
Curry, Richard E.	ML15147A201	Rocha, Bea	ML15139A627
Echeverria, Diego	ML15139A614	Romero, Alejandro	ML15139A618
Ehrlich, Jr., Peter R.	ML15139A608	Segor, Joseph	ML15139A630
Fernandez, Jackeline	ML15139A665	Shlachtman, Barbara	ML15139A658
Fernandez, Susie P.	ML15139A642	Soto, Angela	ML15139A638
Font, Lauri	ML15139A639	Ubieda, Yailky	ML15139A615
Grill, Helen	ML15139A596	Valente, Free N.	ML15139A670
Horowitz, Ira	ML15139A643	Vinciguerra, Anthony	ML15139A635
Hubler, Gina Marie	ML15139A604	Violich, Francesca	ML15139A592
Imbesi, Nan	ML15139A631	Wellins, Debra	ML15139A650
Ismail, Noreen	ML15139A671	Williams, Lashawnda	ML15139A640
Johannsen, Christian	ML15139A605	Wyman, Vicki	ML15139A641

Table E-6. Individuals Submitting the Form Sponsored Brickell Unites with Correspondence ID TURK-COL6&7-DR-00067 and Representative ADAMS Accession No. ML15139A651 (Multiple Authors 2015-TN4722**)**

Commenter	ADAMS Accession #	Commenter	ADAMS Accession #
Becerra, Francisco	ML15139A654	Hecht, Deborah	ML15139A652
De Villiers, Elena	ML15139A675	Hubler, Gina Marie	ML15139A653
Diaz, Mayra	ML15139A660	Maurer-Guy, Lourdes Lina	ML15139A662
Echeverria, Diego	ML15139A651	McCabe, Mead	ML15139A663
Hamilton, McHenry	ML15160A312	Stanley, Gael	ML15139A664
Hawkes, Tim	ML15139A673	Wilder, Jo	ML15139A632

Table E-7. Individuals Submitting the Form with Subject "Objection to FP&L's Plan to Place Huge High Voltage Lines on Poles on or Near SW 1st Avenue in the 'Miami Roads' Area" with Correspondence ID TURK-COL6&7-DR-00073 and Representative ADAMS Accession No. ML15139A668 (Multiple Authors 2015-TN4724**)**

Commenter	ADAMS Accession #
Alvarez, Rosa	ML15128A183
Arias, Vivian G.	ML15161A393
Arias, Vivian G.	ML15146A128
Ayerdis, Wenddy	ML15218A210
Batista, Carlos	ML15128A183
Cavlineau, Carmen	ML15128A183
Cavlineau, Nicolas	ML15128A183
Crousillont, Patrick	ML15218A210
de Armas, Maria Cristina	ML15139A676
Dean, Glenn M.	ML15128A183
DeSalle, Edward	ML15128A183
Dogan, Zynel Oleay	ML15218A210
Echevarria, M. Paz	ML15161A393
Elguaras, Carlos L.	ML15218A210
Febles, Ignacio	ML15161A393
Febles, Maria V.	ML15161A393
Fifer, Brian	ML15128A183
Fifer, Mark	ML15128A183
Fifer, Richard Glen	ML15128A183
Frade, Silvia	ML15218A210
Frade-Eguares, Silvia	ML15218A210
Garcia, Aida S.	ML15146A128
Garcia, Aida S.	ML15161A393
Garcia, Armando	ML15128A183
Garcia, Caridad R.	ML15128A183
Garcia, Enrique J.	ML15161A393
Garcia, Enrique J.	ML15146A128
Garcia, Enrique J.	ML15146A128
Glass, Bonita	ML15148A482
Gonzalez, Juan and Jaqueline	ML15161A393
Guirola, Chavela Maria Isabel	ML15218A210
Hernandez, Dagin	ML15218A210
Hughes, David	ML15138A092
Hughes, David	ML15161A393
Hughes, David	ML15139A718
Koenigsberg, Linda	ML15128A183
Lappen, Jennifer	ML15139A677
Lucero, Olga	ML15161A393
Lucero, Olga	ML15139A728
Lucero, Olga	ML15162A855
Malcolm, Kelley	ML15218A210
Martinez, Serafin	ML15218A210
Mathia, Judith L.	ML15128A183
Menendez, Mike	ML15128A183
Milan, Craig	ML15128A183
Murillo, Maria M.	ML15218A210
Pajor, Claudia	ML15218A210
Provost, Allan	ML15198A118
Provost, Allan	ML15128A074
Reyes, Graciela	ML15161A393
Reyes, Graciela	ML15146A128
Scherr, Matthew	ML15128A183
Scudierc, Veronica	ML15146A128
Scudieri, Veronica	ML15161A393
Stoerger, Alexandra	ML15218A210
Stoerger, Stephen	ML15218A210
Stoerger, Zarda	ML15218A210
Suquet, Guillermo	ML15161A393
Valladores, Debra A.	ML15139A668
Vazquez, Cristina M.	ML15161A393
Vinuela, Maximilian	ML15218A210
Warren, Robert H.	ML15128A183
Whitlock, Catherine	ML15218A210
Zapata R., Martha C.	ML15146A128
Zapato R., Martha C.	ML15161A393
Zarazun, Nikki	ML15218A210

Table E-8. Individuals Submitting the Form Sponsored by National Parks Conservation Association with Correspondence ID TURK-COL6&7-DR-00102 and Representative ADAMS Accession No. ML15140A000 (Multiple Authors 2015-TN4716**)**

Commenter	ADAMS Accession #
Aaron, Allysa	ML15159B080
Aaron, Emory	ML15156B135
Abadia, Betty	ML15160A935
Abare, Jeff	ML15159B475
Abbasparker, Ibn-Umar	ML15161A696
Abbott, Shaun	ML15156A528
A'Becket, Suzanne	ML15153A963
Abel, Jerian	ML15162A431
Abraham, Mirla	ML15156A590
Abrams, Michael	ML15154C261
Abrams, Saliha	ML15153A966
Abrantes, Elizabeth	ML15148A897
Abreu, Sayuri	ML15162A422
Abshire, James	ML15155C078
Ackerman, Frank	ML15153A511
Ackerman, Laura	ML15155B717
Ackerman, Lynn	ML15154A811
Ackerson, David	ML15155A949
Ackroff, Karen	ML15148B212
Acosta, Angel	ML15148B241
Acuna, Carina	ML15161A629
Adam, Dawne	ML15141A755
Adam, Jackie	ML15156B197
Adams, Brett	ML15154C240
Adams, Carol	ML15154C286
Adams, Charlotte	ML15147A720
Adams, Cindy	ML15159B537
Adams, Jean	ML15156A981
Adams, Kim	ML15148A893
Adams, Lynn	ML15154B988
Adams, Robert	ML15142A271
Adams, Ruth	ML15154B962
Adams, Sandra	ML15156A936
Adams, Victoria	ML15161A697
Adan, Elizabeth	ML15148A175
Addis, Linda	ML15159A472
Adelman, Saul	ML15153A684
Aderhold, Steven	ML15159A041
Adler, Ken	ML15155A304
Adobajor, Alisa	ML15142A298
Adobajor, Alisa	ML15154A411
Adsit, Roy	ML15162A542
Aenlle, Willy	ML15141A757
Affolter, Angie	ML15154B697
Aflatooni, Mark	ML15154C001
Agostinho, Elizabeth	ML15156A589
Aguirre, Robert	ML15155A785
Ahlstrand, Heidi Lynn	ML15156A828
Aiken, Edwin	ML15154A739
Ailill, Dane	ML15148B227
Ainsley, Brian	ML15156A255
Alamprese, Laura	ML15148B441
Albanese, Dawn	ML15154C267
Albar, Mike	ML15159B417
Albers, Harold	ML15156A095
Albert, Cheryl	ML15159B558
Albert, Laura	ML15142A264
Albertson, Pat	ML15156A748
Albonni, Adam	ML15159B512
Albrandt, Patti	ML15155A367
Albrecht, Lonnie	ML15148B442
Alden, Rory	ML15159A963
Alejandro, Patricia	ML15155A018
Alexander, Charles	ML15160A923
Alexander, Mark	ML15158A111
Alexander, Mary	ML15156A110
Alexander, Mary	ML15156A882
Alexander, Thomas	ML15154B714
Alfano, Joseph	ML15142A327
Alfaro, Elaine	ML15154B280
Alfonso, Nadine	ML15156A211
Alford, Linda	ML15154B343
Alguacil, Oscar Revilla	ML15159B240
Alippe, Lorraine	ML15158A174
Alisau, Patricia	ML15155A370
Allbee, Dwight	ML15148B342
Allbright, Galloway	ML15148B390
Allen, D. Patrick	ML15159A317
Allen, Dennis	ML15154A391
Allen, Elise	ML15160A975
Allen, J.	ML15141A228
Allen, Jerre	ML15156A318
Allen, Juanita	ML15162A584
Allen, Judy	ML15155B023
Allen, Keith	ML15156A488
Allen, Kenneth	ML15162A573
Allen, Linda	ML15159A237
Allen, Llowell	ML15154A086
Allen, Mary	ML15142A026
Allen, Maureen	ML15141A653
Allen, Melissa	ML15156A667
Allen, Monique	ML15154A024
Allen, Ron	ML15154B637
Allen, Rosamond	ML15141A644

Commenter	ADAMS Accession #
Allen, Suzanne	ML15154A137
Allen, Tracey	ML15156A932
Allen, Travis	ML15156A179
Allenby, Coral	ML15154B885
Alleyne-Chin, Donna	ML15154B797
Allgood, Jean	ML15159A554
Allphin, Toby	ML15155A751
Allred, Shelley	ML15155C029
Almeida, Gabriela	ML15154A270
Almendarez, Mary	ML15148A615
Almirola, Alejandro	ML15159A881
Almirola, Alejandro	ML15159A948
Alovis, Elly	ML15155A126
Altman, Jeff	ML15155A043
Altman, Penny	ML15155A046
Alvare, Michelle	ML15158A224
Alvarez, David	ML15159A414
Alzuro, Nick	ML15141A493
Amador, Nicole	ML15141A783
Amalfitano, Gloriamarie	ML15141A460
Aman, Michael	ML15155A515
Amaro, Hector R.	ML15148B225
Amato, Julie	ML15155A814
Amato, Nicole	ML15153A992
Amato, Sarina	ML15158A135
Ambler, Lana	ML15162A140
Ambrosio, Antoinette	ML15159B027
Ameen, Arshad	ML15154A729
Amell, June	ML15158A100
Ames, Karin	ML15155B697
Ames-Curtis, Juli	ML15142A241
Amick, Tom	ML15154C007
Ammon, Cara	ML15160A787
Ammon, Clifford	ML15156A955
Anderholm, Jon	ML15159A005
Andersen, Kirsten	ML15156B436
Andersen, Paul	ML15148B181
Anderson, Angela	ML15159A528
Anderson, Anthony	ML15156B506
Anderson, Arlete	ML15156A966
Anderson, Barry	ML15142A041
Anderson, Christine	ML15156B256
Anderson, Clifford	ML15142A265
Anderson, David	ML15154A741
Anderson, Diana	ML15154B686
Anderson, Dina	ML15148A238
Anderson, Edna	ML15154A360
Anderson, Glen	ML15156B027
Anderson, Joel	ML15155B710
Anderson, Judith	ML15142A226
Anderson, Julie	ML15153B303
Anderson, Julius	ML15155B991
Anderson, Karen	ML15148B092
Anderson, Karen	ML15154B938
Anderson, Katrina	ML15155C215
Anderson, Kevin	ML15154B969
Anderson, Larry	ML15140A155
Anderson, Margaret	ML15156B318
Anderson, Mary	ML15153A317
Anderson, Matthew	ML15154B235
Anderson, Mike	ML15154C197
Anderson, Patricia	ML15155C196
Anderson, Robert	ML15156B210
Anderson, Sandy	ML15153A831
Anderson, Shel	ML15148A879
Anderson, William	ML15154A331
Andersson, Joan	ML15155A166
Andrade, Stacy	ML15160A871
Andre, Javier	ML15155B061
Andregg, S.	ML15148A198
Andresen, Bette	ML15148A231
Andreula, Ann	ML15156A050
Andrews, Becky	ML15160A790
Andrews, Becky	ML15160A792
Andrews, Susan	ML15156A539
Andrews, Terry	ML15154B975
Anduskey, Susan	ML15158A226
Angel, John	ML15154A031
Angell, J.	ML15155A839
Angelovich, Nancy	ML15162B089
Angelovich, Nancy	ML15162B137
Angotti, Kathleen	ML15155B752
Angus, Billy	ML15154B512
Ankli, Gene	ML15155A011
Anner-Bolieu, Lynn	ML15148B208
Ansari, Fariba	ML15142A274
Ansarifar, Vafa	ML15155A668
Ansay, Gabriele	ML15160A786
Anthis, L.	ML15155A242
Anthony, Art	ML15159B472
Anthony, Bahuaud	ML15159B403
Anthony, Judy	ML15153B245
Anton, Michael	ML15160A976
Antosiak, Carol	ML15156A126
Apfel, Sarah	ML15155A385
Appelbaum, Anita Brooks	ML15155A056
Appell, Stephen	ML15154B531
Appenzeller, Cary	ML15154B864
Apperson, Mariko	ML15140A026
Appleman, Luisa	ML15154B108
Araluce, Tiffany	ML15154B945
Arana, Josefa	ML15156A447
Aranita, Rosita	ML15162B091
Aranita, Rosita	ML15162B146
Arapoudis, Sandra	ML15159A717
Arbolaez, Fidel	ML15148B100
Arbour, Carole	ML15154B886
Archambault, Caitlin	ML15160A830

Commenter	ADAMS Accession #
Archbold, Edwin	ML15155B654
Archer, Linda	ML15147A752
Archuleta, Patricia	ML15156B494
Arcure, Barbara	ML15140A178
Arens, Donnis	ML15155A798
Arent, Raymond	ML15162A605
Arfin, Danielle	ML15141A637
Argenzio, Diane	ML15158A029
Armato, Frank	ML15154C085
Armbrust, Deborah	ML15153B004
Armenteros, Clara	ML15159A122
Armentrout, Harley	ML15148B237
Armer, Joan	ML15154B826
Armillas, Mercedes	ML15148A710
Armitage, Chris	ML15142A247
Armour, Kelly	ML15141A528
Armstead, Betty	ML15141A629
Armstead, Leroi	ML15153B265
Armstrong, Jennifer	ML15155B945
Armstrong, Marsha	ML15148A713
Arndt, Dolores	ML15155C037
Arneson, Andrew	ML15161A626
Arnett, Catherine	ML15158A127
Arney, Kevin	ML15155A632
Arney, Tracey	ML15155A800
Arnold, Arthur	ML15159A342
Arnold, Ben	ML15158A102
Arnold, Marge	ML15159A033
Aronson, Murray	ML15153B137
Aronson, Sylvia	ML15153A910
Arosarena, Oneida	ML15159A622
Arrington, Aubrey	ML15155A140
Arsiaga, Rosa	ML15142A276
Artigas, Josep	ML15153A458
Arumugham, Vinu	ML15155A285
Arveson, Michael	ML15158A215
Asbury, Craig Lee	ML15155B912
Ascenzo, Carey	ML15153A900
Aschenbrenner, Eva	ML15155C139
Ashcraft, Hugh	ML15154B923
Ashcraft, James	ML15154C106
Ashley, Cathy	ML15154A578
Ashmore, Sandra	ML15154A716
Ashton, Elyse	ML15142A102
Ashton, Linda	ML15156B399
Askew, Georgena	ML15148A998
Askins, Ed	ML15140A171
Astalos, Andrew	ML15155B188
Asteinza, Josef	ML15155B417
Atcheson, Sandra	ML15148B109
Atchison, Dorian	ML15155B241
Atkins, Ilene	ML15156B268
Atkinson, Paul	ML15159A852
Atmore, Wendy	ML15147A722
Atwell, J.	ML15155C067
Audette, Jarryd	ML15148B041
Augenstern, Joy	ML15142A288
Aughey, Arlene	ML15153B183
Augusto, Keith	ML15160A865
Aulgur, John	ML15148A765
Aulgur, John	ML15154B624
Aungst, Judith	ML15154B904
Aurigemma, Kaye	ML15154B529
Ausenbaugh, Jean	ML15148A730
Ausman, Emma	ML15154B257
Austin, Genevieve	ML15159A366
Austin, Gregory	ML15154C192
Austin, Joyce	ML15154C019
Austin, Laird	ML15148A162
Aversa, Amy	ML15159A102
Avery, Patricia	ML15156A028
Avery, Sara	ML15155A771
Avetikyan, Jose	ML15154A296
Avidor, Roberta	ML15162A107
Avrutick, Alice	ML15155A283
Ayala, Joe	ML15162B044
Ayala, Joe	ML15162B099
Ayers, Frank	ML15155A543
Ayers, Mark	ML15154B128
Aylor, Anne	ML15154B756
Aylward, Diana	ML15162A649
Azcona, Gon	ML15162A101
Azzarello, Joe	ML15154A465
B., Angelene	ML15140A157
B., Angelene	ML15156B456
B., Christine	ML15154B687
B., Enzo	ML15154A077
B., J.	ML15142A351
B., Shary	ML15146A370
B., Susan	ML15154B349
Babb, Winifred	ML15155C142
Bachman, Jerald	ML15140A114
Bacic, E.	ML15154A480
Backstrom, Karin	ML15154B833
Badders, Christine	ML15154A341
Bader, Jessica	ML15162B089
Bader, Jessica	ML15162B134
Bader, Sandra	ML15155A305
Bader, William	ML15153A345
Badus, Theresa	ML15156A092
Badyrka, Jill	ML15155A516
Bagby, Janet	ML15160A867
Bagnoli, Connie	ML15155A035
Bagwell, Wilson Knox	ML15156A862
Bahn, Ted	ML15154A871
Bahris, Angie	ML15155B924
Baier, Carol	ML15140A202
Baier-Barnes, DeAnna	ML15156A279

Commenter	ADAMS Accession #
Bailey, Chrissy	ML15160A808
Bailey, Evelyn	ML15148B220
Bailey, Larry	ML15154A766
Bailey, Mary	ML15154B729
Bailey, Stephen	ML15142A123
Bailie, Janae	ML15156A532
Bailiff, Elliott	ML15153B202
Bailiff, Elliott	ML15154C259
Bails, Jean	ML15155B729
Bainbridge, Kathryn	ML15154A420
Bainbridge, Tamara	ML15155A050
Baird, Barbara	ML15156A014
Baird, Larry	ML15155B589
Bak, Patrick	ML15155B603
Baker, Frank	ML15159A078
Baker, Helene	ML15141A671
Baker, Joy	ML15154B107
Baker, Karen	ML15155C155
Baker, Kristina	ML15148A212
Baker, Leslie	ML15142A035
Baker, Louis	ML15154B725
Baker, Mary Sue	ML15159A808
Baker, Richard	ML15156A003
Baker, Sara	ML15155A084
Baker, Sasha	ML15155A068
Baker, Sharon	ML15154B892
Baker, Vickey	ML15155B935
Baker-Smith, Gerritt and Elizabeth	ML15154B181
Bakr, Rania	ML15156A065
Balaska, Konstantina	ML15159B274
Baldino, Vincenza	ML15155A007
Baldock, Jason	ML15156A302
Baldwin, Jeff	ML15142A280
Baldwin, Tanya	ML15160A726
Baley, Patricia Mcrae	ML15162B042
Baley, Patricia Mcrae	ML15162B097
Balfour, Joan	ML15154A738
Balke, Bruce	ML15159A953
Ball, Evelyn	ML15158A284
Ball, Tim	ML15159B508
Balles, Katherin	ML15159A710
Balog, Nancy	ML15159B075
Balosie, Dean	ML15154A683
Balzan, Darlene	ML15154C044
Balzer, Johanna	ML15142A094
Bamberger, Wayne	ML15141A725
Bamford, Robert	ML15153A604
Bamford, Stephen	ML15154C048
Banach, Darlene	ML15161A664
Banever, C.	ML15142A289
Banever, Robert	ML15153A904
Banfield, David	ML15158A235
Bangham, Jerry	ML15140A005
Banken, Ella	ML15154A440
Banks, Janice	ML15156A170
Banks, Michele	ML15160A805
Bannon, Kevin	ML15155A258
Baouche, Karen	ML15159A767
Barber, Marilyn	ML15154A657
Barberi, Lillyam	ML15153A501
Barbuto, Paul D.	ML15160A711
Barclay, Daniel	ML15153B116
Barcomb, Wendy	ML15141A620
Barcott, Nick	ML15158A139
Barger, John	ML15148A865
Barile, Kathryn	ML15146A371
Barker, Anne	ML15154A091
Barker, Chris	ML15155C187
Barker, Donald	ML15154B127
Barker, Mary Clare	ML15141A788
Barker, Monica	ML15159A722
Barker, Scott	ML15142A105
Barkley, Dan	ML15154C175
Barlow, Scott	ML15154C141
Barmeyer, Sarah	ML15155A148
Barnard, Michele	ML15155C190
Barnes, Linda	ML15155B896
Barnes, Richard	ML15158A086
Barnett, Barbara	ML15159B078
Barnett, Lynn	ML15154B465
Barnett, Peter	ML15156B299
Barnett, Renee	ML15155A012
Barnett, Sandra	ML15155A872
Barney, Martin	ML15160A596
Barnhart, Katherine	ML15154A394
Barns, Suzanne	ML15159A791
Barr, Alwyn	ML15160A925
Barr, Ellen	ML15162A624
Barr, Ford	ML15156A873
Barr, Jay	ML15154B698
Barr, Nancy L.	ML15158A117
Barragan, Rosa	ML15148B242
Barreras, Terri	ML15153A749
Barrett, Donna	ML15159A219
Barrett, Elizabeth	ML15154B452
Barrett, Janet	ML15159B231
Barrett, Lisa	ML15156A800
Barrett, Martha	ML15156A185
Barrington, Tim	ML15155A701
Barron, Mikail	ML15155B004
Barrows, Steven	ML15159B583
Barrrons, Susan	ML15159A109
Barry, John	ML15141A552
Barry, Lynda	ML15154B014
Barry, Marion	ML15155B826
Barshter, Rebecca	ML15148A955
Bartholomew, Alice	ML15155A241

Commenter	ADAMS Accession #
Bartkowicz, Richard	ML15159B216
Bartleman, Mark	ML15160A730
Barton, Alyssa	ML15159B147
Barton, Gary	ML15142A140
Barton, Janelle	ML15154B474
Basile, C.	ML15155A270
Basman, Melis	ML15160A071
Bass, Lanny	ML15140A267
Bass, Wanda	ML15141A469
Bassett, Christine	ML15154C303
Bassett, Jan	ML15156B032
Bassett, Susan	ML15154C232
Basso, Jeremy	ML15156A726
Bastron, Diana Kukule	ML15154C250
Basye, Mae	ML15154B277
Bates, Abigail	ML15148B178
Bates, Shivaun	ML15155A396
Bathrick, Patricia	ML15156A037
Battaly, Gertrude	ML15160A644
Baucco, Matthew	ML15159A817
Bauder, William	ML15142A086
Bauer, Cynthia	ML15154C282
Bauer, Linda	ML15155A797
Bauer, Mary	ML15155A054
Bauer, Philip	ML15153B250
Bauer, Terri	ML15161A644
Baumann, Scott	ML15153A410
Baures, Timothy	ML15155A182
Baxter, Lou	ML15155B966
Bayer, Judith	ML15156B431
Be, Nancy	ML15153B076
Beach, Muriel	ML15148B385
Beale, Jr., Howard K.	ML15159B509
Beam, Stephanie	ML15159A458
Beaman, Deena	ML15154A297
Beans, Sheree	ML15159A960
Bearden, Jim	ML15154A552
Beardsley, Rebecca	ML15159B434
Beatini, Tom	ML15155B272
Beattie, Jane	ML15154B523
Beatty, Lorne	ML15155A261
Beavers, John	ML15159B123
Beavers, Nancy	ML15155C197
Bechtoldt, Lenore	ML15159A520
Becker, Elaine	ML15160A693
Beckman, Linda	ML15155A499
Bedat, Suzanne	ML15155A369
Bedell, Stephen	ML15156B265
Beebee, Kara	ML15155C064
Beecher, Christina	ML15148B133
Beeghly, Charles	ML15155B880
Beeler, James	ML15148B329
Beerheide, Erna	ML15160A862
Beery, Richard	ML15154B993
Begley, Christina	ML15162A576
Begley, Matt	ML15154B552
Begrisch, Mary	ML15141A634
Begum, Khani	ML15148B157
Behan, Darren	ML15148B328
Behl, Daniel Max	ML15161A624
Bein, Ann	ML15153A885
Bejgrowicz, Thomas	ML15140A024
Belanger-Iott, Nancy	ML15155B202
Belcastro, Frank	ML15155A464
Beldin, Joan	ML15148B060
Belfer, Morgan	ML15160A723
Bell, David	ML15159B330
Bell, Denise	ML15140A196
Bell, Gary	ML15160A968
Bell, Jennifer	ML15154B852
Bell, Jim	ML15153B108
Bell, Lesli	ML15158A199
Bell, Linda	ML15154A218
Bell, Randall	ML15148B247
Bellas, Brian	ML15148B359
Bellefeuille, Barbee & Ronald	ML15158A241
Bellini, Cynthia	ML15155B339
Bellomo, Stephen	ML15155C050
Belloso-Curiel, Jorge	ML15155B833
Beltran, Olivia	ML15148A878
Beltz, Judith	ML15162B044
Beltz, Judith	ML15162B112
Benco, Mike and Andrea	ML15156A070
Bender, Kae	ML15154C263
Bender, Nancy	ML15148B028
Bender-Muir, Marie	ML15159A662
Benedetto, Mona Stephanie	ML15155A611
Benet, Marjorie	ML15142A082
Bengel, Anna	ML15161A653
Bengston, Lynn	ML15148B139
Bening, Allison	ML15155A342
Benito, Alejandra	ML15155A062
Benjamin, Alex	ML15148A850
Benjamin, Andrew	ML15148B349
Benjamin, Elaine	ML15142A188
Benjamin, Emily	ML15162A043
Benkert, Cynthia	ML15141A670
Bennett Jr., Frank Z.	ML15155B932
Bennett, Astrid	ML15148B330
Bennett, Bryan	ML15155A003
Bennett, Jesse	ML15154A233
Bennett, Maris	ML15154B232
Bennett, Michael V. L:	ML15155A030
Bennett, Robbie	ML15148A890
Bennett, Robert	ML15154A307
Bennett, Virginia	ML15147A710

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Benning, Sheryl	ML15159B337
Benoit, Marguerite	ML15154B352
Bensberg, Wilhelm	ML15148B094
Benson, William	ML15159B344
Bentley, Kathy	ML15140A016
Benton, Stan	ML15153B179
Benton-Janetta, Lori	ML15156B499
Bentz-Letts, Alan	ML15155A421
Beqaj, Oliver	ML15154B579
Berard, Carol	ML15156A078
Berchem, Marie-Ange	ML15141A439
Berecz, Illya	ML15140A240
Bereczki, Patricia	ML15153B232
Berens, Bruce	ML15153A889
Berezansky, Nick	ML15155A647
Berg, Elaine	ML15155B338
Berg, Jon	ML15156A523
Bergen, Jaye	ML15153A678
Bergen, Peggy	ML15148A827
Berger, Keith	ML15155A159
Berger, Melissa	ML15140A159
Berger, Sally	ML15155A165
Bergeron, B.	ML15141A657
Bergey, Don	ML15155A415
Bergey, Nancy	ML15153A881
Bergman, Don	ML15154C190
Bergmann, Amy	ML15162A115
Bergstedt, Charlie	ML15155C091
Beringer, Laurie	ML15154B912
Berisford, Daniel	ML15161A646
Berkshire, David	ML15140A043
Berliner, Alice	ML15154A219
Berliner, Diane	ML15158A071
Berliner, Jill	ML15155A487
Berman, John	ML15160A642
Berman, Pearl	ML15155B519
Berman, Steven	ML15141A672
Berna, Patricia	ML15155A634
Bernache, Marie	ML15141A616
Bernard, Christina	ML15162A087
Bernard, James	ML15148B343
Bernardo, Kathleen	ML15154A826
Berner, Kris	ML15142A163
Berner, William	ML15155A413
Bernstein, Laura Ann K.	ML15155A817
Bernstein, Marcy	ML15148B356
Bernstein, Roslyn	ML15154A488
Berowski, Kim	ML15155A001
Berowski, Kim	ML15156A820
Berry, Bethany	ML15162A718
Berry, Kenneth	ML15148B337
Berry, Marla	ML15158A158
Berry, Paula	ML15153B184
Berry, Victoria	ML15156A908
Bersell, Barbara	ML15154A665
Bertol, Alina	ML15159A367
Berzins, Ieva	ML15159B531
Betti, Mark	ML15155A615
Betts, Cynthia	ML15155B927
Bettum, Gary	ML15159B278
Betz, Brian	ML15159A244
Beuscher, Will	ML15156B022
Bever, Emily	ML15148A653
Beveren, Chantal	ML15159A486
Beverly, J.	ML15154B778
Beverly, Robert	ML15155C137
Beyerle, Brittany	ML15154A951
Bhence, Blaze	ML15154A620
Bianchi, Melanie	ML15148B265
Biccum, Susan	ML15158A068
Bickel, Michael	ML15153B117
Bicking, Ann	ML15153B107
Bicknell, Mary	ML15154A014
Biddle, Maxine	ML15154B237
Bidney, Martin	ML15141A746
Bidwell, Troy	ML15159B400
Biedermann, Martin	ML15155A642
Bielaus, Edward	ML15140A013
Bielawski, Richard	ML15154A535
Bielke, Patricia	ML15159A357
Biere, Debbie	ML15154A311
Bieszk, John	ML15148A858
Biffl, Betsy	ML15154A385
Biggs, Amy	ML15154B877
Biglia, Monique	ML15153A928
Bilenko, Stephanie	ML15154B187
Bill, Alma	ML15160A847
Billey, Catharine	ML15154A170
Bindas, Janet	ML15156B305
Binder, Caroline	ML15162A671
Binder, Gene	ML15155A128
Birch, Beatrice	ML15162A076
Bird, Richard	ML15154B149
Birkeland, Celeste	ML15148A967
Birnbaum, Dara	ML15159A000
Bishop, Cori	ML15159A607
Bishop, Norman	ML15159A814
Bishop, Shirley	ML15156A257
Bisser, John	ML15153B143
Bissett, Tina	ML15162A510
Bissram, Nyla	ML15153A577
Bitter, Josh	ML15154C033
Bjornbak, Kris	ML15153A500
Black, David	ML15159A146
Black, Karina	ML15154A203
Black, Mary Ann	ML15155A402
Black, Mary Beth	ML15141A499
Black, Pauline	ML15154B012

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Blackwood, Jean	ML15148B076
Blaesing-Thompson, Shawn	ML15148A254
Blair, Dan	ML15154A284
Blaire, Jan	ML15154A474
Blaisdell, Jill	ML15153A743
Blake, Frank	ML15155A706
Blake, Jocelyn	ML15153A474
Blake, Richard	ML15160A630
Blakemore, Richard	ML15148A662
Blanchard, Ann	ML15160A067
Blanchard, Rob	ML15159A287
Blanchette, Laura	ML15140A040
Blanck, Heidi	ML15155C231
Blandford, Tom	ML15148B088
Blanding, David	ML15155A000
Blaney, Carol	ML15160A583
Blank, Charles	ML15159A376
Blankenship, E.	ML15153B289
Blanton, Robin	ML15156B014
Blaschke, Lawrence	ML15154B007
Blau, P.	ML15142A272
Blay, Nora	ML15140A039
Bleby-Lewis, Joyce	ML15155B817
Bleecker, Skip	ML15153A832
Blesi, Donald	ML15155B736
Bley, Ann	ML15160A073
Blinder, Linda	ML15154B230
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Bliss, Richard	ML15154A708
Block, Gary	ML15155A392
Block, Julie	ML15162A702
Bloedow, MaryAnn	ML15154C063
Blond, Olivia	ML15153B072
Bloom, Gary	ML15156B257
Bloom, Martin	ML15155A824
Bloomquist, Kristofor	ML15140A182
Blossom, Laurel	ML15155A411
Blount, Susan	ML15158A074
Blumert, Joel	ML15155B038
Blurton, Joan	ML15159A143
Bobb, Mary	ML15156B165
Bobb, Mary	ML15160A732
Bobroff, Alexander	ML15153A739
Boccagna, Emilia	ML15155C080
Bockino, Alida	ML15155A274
Boden, Jeff	ML15148A243
Bodiford, Loretta	ML15156B342
Bodleaender, Peter	ML15147A721
Boeckermann, Jesse	ML15159B357
Boehler, Karen	ML15154A012
Boerner, Gary	ML15161A657
Bogan, Susan	ML15153A709
Boggs, George	ML15155B856
Bogin, Ronald	ML15153B282
Bohac, Stephen	ML15162A206
Bohanan, Crickett	ML15156A143
Bohl, Calleen	ML15155A277
Bohlen, Curt	ML15159B211
Böhm, Birgitt	ML15160A632
Bohn, David	ML15156B367
Boise, Gretchen	ML15156B247
Boka, Erika	ML15155A386
Bolcon, W.	ML15147A745
Bolen, D. K.	ML15155A520
Boliver, Emily	ML15154B580
Bollini, Margaret	ML15148B063
Bolman, David	ML15155A419
Bolsky, Debbie	ML15153A747
Bombar, Timothy	ML15156A938
Bon, Eric	ML15155B419
Bonaceto, Helen	ML15158A116
Bondy, Mamie	ML15159A512
Boner, Karen	ML15162B064
Boner, Karen	ML15162B110
Bonetti, Donna	ML15148A988
Bonfanti, Fran	ML15142A295
Bonfield, Barbara	ML15155A391
Boniface, Kathryn	ML15154A108
Bonilla-Jones, Carmen Elisa	ML15142A324
Bonini, L.	ML15160A046
Bonitatibus, Amber	ML15159B397
Bonk, Denise	ML15154B039
Bonnell, Christine	ML15162A117
Bonner, Tracey	ML15154B497
Bonnett, Andrea	ML15148B233
Bonney, Patty	ML15155A185
Bookheimer, Donna	ML15148A165
Bookwalter, Eleanor	ML15153A951
Boone, Foster	ML15154A165
Boone, James	ML15155A604
Boone, Jim	ML15154C045
Boone, Merrill	ML15148B395
Boone, Michael	ML15154A301
Booth, Erik	ML15155A627
Booth, Fay	ML15156A151
Booth, John	ML15140A165
Booth, Nancy	ML15254A396
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Booth, Nancy	ML15162B144
Booth, Richard	ML15155A033
Borame, Joan	ML15153A578
Borbon, Maria	ML15155B690
Borchardt, Jerrold	ML15156B354
Borcherding, Paul	ML15154A106
Bordegaray, Dana	ML15154B370
Bordelon, Tika	ML15154B689

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Borges, Gretchen	ML15154B787
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Borie, Edith	ML15156A016
Borland, Matthew	ML15155A008
Born, Steven	ML15155C055
Boroshok, Ruth	ML15155A434
Borske, Cindy	ML15158A256
Bortoletto, Federico	ML15156B514
Boshears, Michael	ML15155B818
Boshell, Willis	ML15155A523
Bosque, Edgar Chico	ML15155A896
Bossard, Eudell	ML15159A217
Bostelmann, Allan	ML15155B686
Bostic, Byron	ML15148B340
Bosworth, Carol	ML15155A851
Both, Bill	ML15153B100
Bottesch, Marla	ML15153A962
Bougie, Ronald	ML15156A157
Boulan, Cassidy	ML15159A597
Bourlotos, George	ML15154A068
Bouse, Ari	ML15155B246
Bousman, Thomas	ML15155A758
Bovee, Emily	ML15154A215
Bowden, Joan	ML15156A054
Bowen, Mary Ellen	ML15154C238
Bower, Mike	ML15153A612
Bowers, Gary	ML15148A916
Bowie, Mary	ML15153B258
Bowles, Sherry	ML15141A709
Bowley, Kat	ML15158A110
Bowman, Alix	ML15154B564
Bowman, Candy	ML15155A325
Bowman, Jennifer	ML15159B018
Bowman, Kenneth	ML15158A134
Bowman, Robin	ML15155A733
Boyce, Richard	ML15153A913
Boyd, Erin	ML15154B858
Boydston, Charlene	ML15155A051
Boyens, Marguerite	ML15155A115
Boyer, David	ML15155B206
Boynton, Robin	ML15155C112
Boza, Mario	ML15148B073
Brabson, Thomas	ML15159A942
Bracken, Fay	ML15155A692
Bracken, Kyle	ML15154B144
Bradbury, Margaret	ML15159A154
Bradford, Leslie	ML15159A377
Bradford, Mishelle	ML15154B666
Bradley, Al	ML15154A401
Bradley, Alan	ML15153B048
Bradley, Kathy	ML15154C147
Bradley, Mark	ML15142A127
Bradshaw, Barbara	ML15156A581
Bradshaw, Beverly	ML15156A334
Bradshaw, John	ML15154A743
Bradshaw, Mary	ML15162A563
Bradshaw, Susan	ML15154B209
Brady, Cheri	ML15153A981
Brady, Daren	ML15155B732
Brady, Sarah	ML15154B909
Bragg, Emma	ML15154B034
Braithwaite, Georgia	ML15142A084
Bramblett, Sharon	ML15153B036
Bramlette, Jenny	ML15155A195
Branagan, Jackie	ML15155B698
Branch, Clair	ML15162B089
Branch, Clair	ML15162B141
Brandariz, Anita	ML15148B306
Brandes, Susan	ML15159A427
Brandon, Annette	ML15154A214
Brandon, Janet	ML15154B779
Brandon, Jennifer	ML15154A931
Brandow, Shanna	ML15154B799
Brandreth, Zena	ML15159B306
Brandstetter, Charles	ML15148A139
Brandt, Emily	ML15154B185
Brandt, V.	ML15154A953
Branfman, Judy	ML15153A750
Braoudakis, Spyros	ML15155B439
Bratcher, Deborah	ML15159A139
Bratcher, Suzanne	ML15155A332
Bratvold, Gretchen	ML15148A872
Braunlich, Julie	ML15160A696
Braus, Joseph	ML15155A744
Braverman, Tobi	ML15156A593
Brawley, Elizabeth	ML15148A253
Braxton, Angelika	ML15162A554
Brayfield, David	ML15153A696
Brazis, Christine	ML15159A166
Breakfield, Sandra	ML15154B847
Breakstone, Enid	ML15154A182
Brebner, Linda	ML15154B139
Breckinridge, Lynn	ML15153A825
Bredow, Cindy	ML15159B070
Breeden, Paul	ML15156B016
Brehm, Anita	ML15154A140
Breiding, Joan	ML15160A057
Breiling, Ellen	ML15156A286
Breitkreuz, Paul	ML15140A132
Brelsford, Susanna	ML15154A343
Bremen, Gary	ML15159B232
Bremmer, Faith	ML15142A354
Bremner, Deborah	ML15159B214
Brenner, Jared	ML15153A658
Brenner, Thomas	ML15148B121
Brents, Julie	ML15154B696
Brenza, Tina	ML15155B034
Bresnahan, Rose	ML15155A522

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Brewer, John	ML15154B340
Brewer, Laurel	ML15158A123
Brewer, Matt	ML15154A424
Brewer, Suzanne	ML15159B295
Breyman, Steve	ML15162A058
Bricic, Jasmina	ML15148A170
Bricker, Linda	ML15159A843
Brickner, Marvin	ML15153A922
Briddick, Gary	ML15159A815
Bridges, Linda	ML15156A644
Brief, Allan	ML15156A032
Brien, Ray	ML15154B105
Brier, Jonathan	ML15148B146
Briery, Georgia	ML15156A007
Brigger, Kathy	ML15148A974
Briggs, Janice	ML15142A260
Briggs, William C.	ML15158A248
Brigner, Liberty	ML15159A536
Brill, Elizabeth	ML15154A723
Brillet, Matthieu	ML15155C058
Brimm, Martha	ML15156B221
Brincka, Frank	ML15156A797
Brink, Tom	ML15154B792
Brinkman, John	ML15154B028
Britton, Joanne	ML15162A304
Broadwater, David	ML15156A448
Brobst, Robert	ML15158A143
Brocious, Pamela	ML15140A239
Brod, Natalie	ML15160A779
Broderick, Kathleen	ML15142A075
Brody, Alice	ML15153B126
Broer-Leroux, David	ML15148B189
Bromage, Joan	ML15148B122
Bronik, Darlene	ML15156A451
Bronner, Dennis	ML15159A020
Bronner, Eric	ML15160A908
Brooker, Eric	ML15142A061
Brooker, Gary	ML15161A701
Brooks, Olivia	ML15154A122
Brooks, Patricia	ML15154B344
Brooks, Sandy	ML15155C235
Brophy, Tracy	ML15155A483
Bros, Sam	ML15154B386
Brose, Janice	ML15155A095
Bross, Carol	ML15160A770
Brothers, Jill	ML15156B426
Broughton, Beatrice	ML15156A321
Browder, Erin	ML15142A346
Browder, Susan	ML15154A157
Brower, Cristina	ML15154A418
Brown, Gina	ML15155A279
Brown, Alan	ML15159A655
Brown, Brandye	ML15141A751
Brown, Brian	ML15154B804
Brown, Craig	ML15148A939
Brown, Damon	ML15159B093
Brown, Daniel	ML15162A044
Brown, David	ML15154B316
Brown, Dorothy	ML15153A675
Brown, Duncan	ML15158A010
Brown, Elizabeth C.	ML15142A189
Brown, Greg	ML15154B881
Brown, Jeannine	ML15148A782
Brown, Jennifer	ML15147A726
Brown, Jessica	ML15148B394
Brown, Jim	ML15154A034
Brown, Joseph	ML15156A505
Brown, Kathleen	ML15153A829
Brown, Kiley	ML15142A169
Brown, Laura	ML15141A461
Brown, Lauren	ML15154A327
Brown, Leo	ML15154A431
Brown, Margot	ML15142A363
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Brown, Sally	ML15154A760
Brown, Stevan	ML15141A729
Brown, Susan	ML15142A292
Brown, Susan	ML15142A297
Brown, Terrence George	ML15154A711
Brown, Tina	ML15140A135
Browne, M. Lou	ML15148A911
Browne, R. J.	ML15154B062
Browne, Tina	ML15158A126
Brownell, Deirdre	ML15154C132
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Browning, Cassandra	ML15156B428
Browning, Craig	ML15155A190
Brownlee, Cathy	ML15142A263
Brown-Nesbit, Parker	ML15156A776
Brstow, Mary	ML15156A021
Bruck, Jonathan	ML15153B228
Brucker, Bob	ML15148A841
Bruegge, Debra	ML15160A834
Brumby, Val	ML15153A546
Brumleve, Charles	ML15155A420
Brummette, Carrie	ML15156A454
Brunelli, Anne	ML15154A907
Bruner, Edward	ML15156A890
Bruner, Linda	ML15160A595
Brunick, Cathy	ML15154B101

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Brunson, Pat	ML15147A707
Brunswick, Susan	ML15155A220
Brunton, James	ML15154A412
Brushaber, Marcie	ML15155B791
Bruton, Babette	ML15160A921
Bryan, Ellen	ML15159A480
Bryan, Judith	ML15154B514
Bryant, Anita	ML15141A736
Bryant, Cade	ML15159A240
Bryant, Judith	ML15159A055
Bryer, Gladys	ML15155B873
Bubb, Ken	ML15148B039
Bucciere, Janet	ML15154A340
Buch, Anthony	ML15155A993
Buch, Sophia	ML15140A280
Buchan, Martha	ML15154B338
Buchanan, Ellen	ML15159B405
Buchsbaum, Judy	ML15148B403
Buck, Mary Lou	ML15155B646
Buckley, Nan	ML15154A288
Bucklin, Lucia	ML15159A490
Bucolo, James	ML15153A688
Budde, Sharon	ML15155B658
Budnik, Bradley	ML15154C198
Buenrostro, Marta Rico	ML15155A260
Buensuceso, Antonio	ML15154B614
Buerger, Michelle	ML15162A070
Buergermeister, Sabine	ML15142A045
Bugbee, Michael	ML15142A055
Buhowsky, Joseph	ML15159A754
Buil, Beyssa	ML15156A449
Bulatova, Nuriya	ML15162A112
Bull, Michael	ML15159A245
Bullock, Debbie	ML15159B276
Bump, Deborah	ML15148B317
Bunchongruksa, Sudarat	ML15154A737
Bunker, Diane	ML15154B857
Bunker, Greg	ML15156B200
Buonaiuto, John	ML15156A072
Buono, Carmen Dello	ML15154B250
Burch, Maryann	ML15155C122
Burdick, Rebecca	ML15154C211
Burgard, D. J.	ML15155B567
Burge, Ken	ML15142A197
Burge, Laura	ML15156A161
Burger, Elizabeth	ML15142A107
Burger, Nancy	ML15155C219
Burger, Scott	ML15159B530
Burgess, Anthony	ML15148B311
Burgess, Ryan	ML15154C302
Burk, Robert	ML15148A164
Burkart, Marie	ML15140A227
Burke, Bonnie Margay	ML15141A662
Burke, Emily	ML15159B413
Burke, Gerald	ML15155A504
Burke, Maureen	ML15154B668
Burke, Patricia	ML15156B108
Burkhart, Don	ML15154A605
Burkhart, Imogene	ML15147A737
Burks, Connie	ML15154A625
Burks, James	ML15156A718
Burks, Paul	ML15154A275
Burlew, Jessica	ML15154B954
Burnash, George	ML15159A124
Burnell, Nathan	ML15155A293
Burns, Bruce	ML15148B136
Burns, Catherine	ML15153A519
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Burns, Dan	ML15154A154
Burns, Laurel	ML15158A171
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Burns, Rebecca	ML15148B305
Burns, Terry	ML15155B716
Burns, Vikki	ML15160A708
Burr, Marcia	ML15156A608
Burress, Edward	ML15148B118
Burstein, Mimi	ML15159B233
Burt, John	ML15155A894
Burtch, Robert	ML15142A028
Burton, Christina	ML15158A225
Burton, Matthew	ML15158A232
Burwasser, David	ML15153A890
Burwell, Carol	ML15156A670
Busacco, Jeanne	ML15155B822
Busani, Elena	ML15155B364
Bush, Nancy	ML15159B494
Bush, Victoria	ML15159A575
Buslot, Chantal	ML15148B174
Busnach, Nadine	ML15155B661
Bustamante, Desiree	ML15162A285
Buster, Katey	ML15154A434
Bustos, Ray	ML15148A131
Butenko, Melody	ML15162A699
Butkiewicz, Mike	ML15155B447
Butkus, Joann	ML15159A162
Butler, Amber	ML15148B066
Butler, Donna	ML15156A009
Butler, Linda	ML15156B053
Butterfield, Colleen	ML15154B376
Butterfield, Doris	ML15155C193
Butterworth, John	ML15141A498
Butterworth, Leslie	ML15148A941
Buttles, Kathryn	ML15153A797
Button, Pat	ML15156B243
Button, Reyna	ML15154C309
Butts, Judith	ML15156B077

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Buxman, Ryan	ML15154A705
Buyea, Thomas	ML15155A458
Byland, John	ML15159A897
Byrd, Darlene	ML15154A044
Byrer, Dianne	ML15154B519
Byrne, Carolyn	ML15156A145
Byrne, Rosemary	ML15140A167
Byrnes, Leslie	ML15155A153
Byrnes, Richard	ML15155C158
C., Erin	ML15158A291
C., Lynne	ML15155B201
C., Max	ML15155A135
C., Michael	ML15154A220
C., Mike	ML15148B445
C., Shaz	ML15155B189
C., Sylvie	ML15142A349
C., T.	ML15154A821
Caballero, Luis	ML15162A050
Cabrera, Luis	ML15155B805
Cachopo, Patricia	ML15153A681
Cadot, Andrew	ML15154B373
Cadwallader, Terry	ML15154C101
Cafarelli, Cenie	ML15142A309
Caflisch, Kathie	ML15156B150
Cahillane, Leila	ML15159A057
Caillouette, Brook	ML15155B314
Cain, Lisa	ML15156B519
Calambro, Leslie	ML15160A789
Calcagno, Philip	ML15154A740
Caldwell, Dotty	ML15158A064
Caldwell, Ellen	ML15154A467
Caldwell, Kathleen	ML15159A626
Caldwell, Myron	ML15156B295
Caldwell, Robert	ML15153A973
Callahan, Loretta	ML15155A607
Callard, Diane	ML15148A716
Callow, Wayne	ML15148A714
Calvert, Mary Ann	ML15158A160
Calvert, Rick	ML15148A715
Camerman, Virginia	ML15148B290
Cameron, Cami	ML15154B099
Cameron, Jean	ML15156A883
Camp, David	ML15159A901
Camp, Timothy	ML15159A296
Campbell, Allan	ML15159A645
Campbell, Grant	ML15155A310
Campbell, Karolyn	ML15156A069
Campbell, Susan	ML15160A890
Campbell, Theresa	ML15154B616
Canale, Susan	ML15158A236
Candela, Macyle	ML15153A820
Candelaria, Tiffany	ML15155A052
Candlin, Celia	ML15154C184
Canepa, John	ML15147A724
Canning, Christine	ML15156A063
Canning, John	ML15154B679
Canning, Rick	ML15155A740
Canning, Tom	ML15155A881
Cannon, Elizabeth	ML15154C164
Cannon, John	ML15162A552
Cannon, Maxine	ML15162A550
Cannon, Thomas	ML15156A004
Canny, Carlyn	ML15159A112
Cantu, Eva	ML15155B971
Cantu, Roel	ML15155C214
Caolo, Rosemary	ML15154A124
Capezzuto, Raymond	ML15154B462
Capone, Shantell	ML15159A002
Capotorto, Jeanette	ML15156A313
Cappa, Karen	ML15156A643
Cappuccio, Sharon	ML15160A650
Capstick, Hilary	ML15154C102
Capurro, Lyn	ML15159A735
Carden, E.	ML15154B264
Cardoso, Toby	ML15154A138
Cardwell, Paul	ML15156A791
Carey, Susan	ML15156A795
Cargman, Jered	ML15156B497
Cargulia, Guy	ML15155A675
Carideo, Ida	ML15156B049
Carideo, Ida	ML15159B373
Carl, Jeannie	ML15155A917
Carley, James	ML15159B470
Carlin, Catherine L.	ML15154B267
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Carlin, Catherine L.	ML15154C151
Carlino, Thomas	ML15140A194
Carlisle, Shelley	ML15154A834
Carlisle, Thomas	ML15155A407
Carlson, Carol	ML15158A257
Carlson, Sandy	ML15162A274
Carlton, Thomas	ML15140A176
Carman, Heather	ML15154B532
Carman, Iris	ML15159B406
Carmean, Roxann	ML15159A338
Carne, Carol	ML15156B076
Carney, Cheryl	ML15141A676
Carney, KC	ML15153A435
Caro, Steve	ML15162B089
Caro, Steve	ML15162B138
Carollo-Zeuner, Christine	ML15141A635
Carpenter, Dale	ML15162B079
Carpenter, Dale	ML15162B127
Carpenter, Gary	ML15155A741
Carpenter, Matthew	ML15155A228
Carpenter, Rory	ML15155B705
Carpenter, Steven	ML15155A999

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Carpenter, Victoria	ML15148A694
Carper, Robert	ML15154C140
Carr, Brittany	ML15159A620
Carr, D.	ML15154C081
Carr, Gaile	ML15155B796
Carrell, James	ML15154B821
Carrier, Cornelia	ML15154B941
Carrier, Paula	ML15159A475
Carriere, Richard	ML15156A949
Carringer, Nancy	ML15160A768
Carrington, Martha	ML15153B214
Carroll, Donna	ML15159B466
Carroll, John	ML15154A798
Carroll, Mary A.	ML15155A384
Carroll, Niall	ML15155B928
Carson, Debbie	ML15159B369
Carswell, Brandon	ML15159A361
Carter, Carl	ML15148A630
Carter, Gary	ML15153B169
Carter, Jackie	ML15156A022
Carter, Jacqueline	ML15154B366
Carter, Michelle	ML15160A629
Carter, Natalie A.	ML15159A871
Cartwright, Jennifer	ML15154B951
Carvajal, Mauricio	ML15154C114
Case, Alex	ML15158A107
Caseau, Sheri	ML15155A176
Casey, Jill	ML15141A562
Cashman, Sharon	ML15155A874
Caskey, Mark	ML15154B356
Caskey, Sally	ML15154B863
Caskey, Sally	ML15156A190
Caspar, Julia	ML15148A926
Casper, Laurel	ML15159B553
Cassar, Kristine	ML15154B365
Cassasdy, Marsh	ML15141A579
Cassel, Candice	ML15155C233
Cassidy, David	ML15154C242
Castaneda-Mendez, Kicab	ML15153B286
Castellon, Leigh Anne	ML15155B039
Casten, Liane	ML15155A333
Castillo, Anthony	ML15154C189
Castillo, Esther	ML15159B085
Castner, Rebecca	ML15155B819
Castri, Serenella	ML15160A044
Caswell, Gail	ML15148A721
Caswell, Susan	ML15154A305
Cathcart, Melissa	ML15156A690
Catlin, Linda	ML15160A971
Catskill, Clover	ML15154B442
Caudill, John	ML15158A138
Caudill, Lori	ML15162A653
Cavalier, Andre	ML15155A417
Cavan, Noz	ML15148B264
Cavasian, Edward	ML15154B732
Cayton, Chris	ML15156A554
Cease, Jane	ML15155A416
Cenc, John	ML15155A021
Cerny, Jayne	ML15153B060
Cerrella, Joseph	ML15156A084
Cerretti, Robert	ML15148A848
Cervene, Amy	ML15154C307
Cervene, Shirley	ML15141A748
Cesnik, Michael	ML15153A724
Ch, Lv	ML15154A558
Chacich, Elizabeth	ML15153B142
Chadwick, Carina	ML15159A123
Chaffee, Shon	ML15140A138
Chalfen, Karen	ML15142A134
Chalker, Mikki	ML15154B952
Challenger, Brett	ML15156B410
Challinor, Suzanne	ML15154B061
Chambers, Nola	ML15161A703
Chambers, Patricia	ML15148A923
Chambers, Robert	ML15156B478
Chan, Nancy	ML15159A451
Chandler, Randy	ML15155A076
Chandler, Vickie	ML15148B429
Chaney, David	ML15156B249
Chang, Bryna	ML15155C015
Chang, Patricia	ML15155B760
Changus, Carol	ML15155B688
Chanon, Renee	ML15155A380
Chapdelaine, Perry	ML15156A549
Chapin, Robert	ML15162B044
Chapin, Robert	ML15162B118
Chapman, Antony	ML15158A166
Chapman, Charles	ML15148A190
Chappell, Carol	ML15154A164
Char, Elizabeth	ML15156B515
Charest, Karry	ML15160A962
Charleston, Robert	ML15159A510
Charnas, Kelley	ML15160A081
Charnas, Kevin	ML15142A254
Charter, Donna	ML15158A168
Chase, Cheryl	ML15154C080
Chase, Felicia	ML15162B089
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Chase, Janet	ML15156A141
Chase, Linda	ML15154A189
Chasin, Barbara	ML15156A079
Chasteen, Don	ML15154B888
Cheffi, Gisele	ML15154C177
Chelland, Ron	ML15153A472
Chelmecki, Patricia	ML15140A271
Chemai, Beverly	ML15159B519
Chen, Alicia	ML15155B861
Chen, Allan	ML15159A647

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Chen, Grace	ML15159A242
Chen, Te-Fen	ML15154B928
Chenoweth, Karen	ML15156B250
Cheo, Dorothy	ML15142A157
Chernysheva, Elena	ML15159A931
Cherubin, Elizabeth	ML15148B068
Chesire, Chris	ML15159B437
Cheslock, Michael	ML15153A649
Chianis, Antonia & Andrew	ML15158A290
Chiappa, Russell	ML15160A911
Child, Katrina	ML15141A691
Chirillo, James	ML15155B963
Chisari, Andrea	ML15154B995
Chisholm, Angell	ML15141A667
Cho, T.	ML15155A259
Choi, Ali	ML15142A116
Chopyak, Anne	ML15148B223
Chorba, Louis	ML15158A012
Choy, Duane	ML15154B248
Chrissos, H. L. Chris	ML15159A039
Christ, Mlou	ML15154B752
Christ, Ronald	ML15153A875
Christeller, Lois	ML15156B416
Christensen, Deb	ML15154B706
Christensen, Roger	ML15156A601
Christenson, Amy	ML15155B605
Christiansen, Sue	ML15155B995
Christianson, Chris	ML15160A961
Christie, Roxanne	ML15159B371
Christine, Dena	ML15159A411
Christman, Mary	ML15153B109
Christoff, Stephanie	ML15154B129
Christopoulos, James	ML15155A361
Christy, Alice	ML15153A767
Christy, Alice	ML15153A800
Christy, Mary	ML15159B141
Chung, Winnie	ML15141A753
Chuplis, Cindy	ML15162A402
Church, Mary Lou	ML15155A430
Churchill, Rhonda	ML15159A513
Churchman, Pat	ML15148B196
Chynoweth, Iris	ML15140A189
Cianciotti, Frank	ML15156A326
Cifuentes, Simone	ML15159A908
Cignoli, Karen	ML15159A286
Ciliberti, Ava	ML15154A208
Cisna, Todd	ML15148B117
Citron, Alan	ML15155B965
Civitate, Gregory	ML15162A589
Clagett, Kathleen	ML15156A909
Claiborn, William	ML15160A535
Clair, Kate	ML15155A328
Clapp, Jonathan	ML15160A858
Clapp, Linda	ML15159B286
Clark, Alexander	ML15155A297
Clark, Carol	ML15154A396
Clark, Colleen	ML15148A960
Clark, Diane	ML15153A944
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Clark, Elaine	ML15148A970
Clark, Geoffrey	ML15153A997
Clark, Greg	ML15158A084
Clark, Jamie	ML15148B384
Clark, Jean	ML15159A904
Clark, Jenny	ML15155A308
Clark, Joe	ML15156A026
Clark, Jr., James A.	ML15156A115
Clark, Judy	ML15142A142
Clark, Kathleen	ML15159A461
Clark, Kenneth	ML15156B130
Clark, Leigh	ML15158A031
Clark, Maxine	ML15153A763
Clark, Morgan	ML15153A793
Clark, Rebecca	ML15162A509
Clark, Roger	ML15154C272
Clark, Ruth	ML15156B149
Clark, Stephanie	ML15154B908
Clark, Susan	ML15156A607
Clark, Todd	ML15147A758
Clark, Toni	ML15148A141
Clarke, Bob	ML15154B879
Clarke, Darrell	ML15142A056
Clarke, Tom	ML15159B015
Clasemann, Joel	ML15159A423
Clason, Susanna	ML15141A779
Claus, Carol	ML15154B245
Clausen, Nina	ML15153B225
Clausing, Melinda	ML15154A038
Clayton, David	ML15156A319
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Cleaver, Melissa	ML15142A083
Clegg, Ann	ML15160A905
Clem, Jessica	ML15156B074
Clemens, Beatrice	ML15156A094
Clemens, Robert	ML15156A436
Clemens, Scott	ML15154B784
Clements, Scott	ML15147A715
Cleve, Della	ML15162A103
Clewett, Barbara	ML15159A036
Clifford, Rosemary	ML15154B994
Clifton, Robert	ML15155A899
Clipka, Mike	ML15155C172
Cloud, Michael	ML15155A395
Clough, Cyndi	ML15155A529
Clough, Steve	ML15141A762
Clower, Kimberly	ML15154A794
Coahran, Scott	ML15154A037
Coakley, Michele	ML15154C157

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Cobb, Priscilla	ML15155B096
Cobb, Robert	ML15156A959
Cobb, Sandra	ML15156A557
Cobb, Tanya	ML15153B269
Cobb-Adams, Diane	ML15159A508
Coburn, Donald	ML15156B460
Cocco, Brian	ML15160A936
Cochran, Harold	ML15142A290
Cochran, John	ML15155C061
Cocke, Sandra	ML15154A152
Cocks, Verna Bloom	ML15160A051
Codina, Edward	ML15153A927
Coe, Michael	ML15159B087
Coeburn, Jeanette	ML15155A605
Coffey, Margery	ML15154B368
Coffin, Doug	ML15155A017
Cogar, Nicki	ML15161A695
Cogelja, Izabela	ML15162A137
Cohen, Bernard	ML15148B440
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Cohen, Bruce	ML15140A066
Cohen, C.	ML15156A456
Cohen, Elaine	ML15156A205
Cohen, Fritzi`	ML15153A849
Cohen, Harriet	ML15154A854
Cohen, Howard	ML15155A936
Cohen, Howard	ML15153A585
Cohen, Howard	ML15156A274
Cohen, Judith	ML15155B968
Cohen, Judy Ann	ML15158A025
Cohen, Patricia	ML15148B080
Cohen, Paula	ML15154A849
Cohen, Wendi	ML15159B410
Cohn, Robert	ML15156B140
Colborn, Sheree	ML15159A081
Coldwell, Sherilyn	ML15155B583
Cole, Brian	ML15155A731
Cole, Elizabeth	ML15154A076
Cole, Elizabeth	ML15155A664
Cole, Joan	ML15156A209
Cole, Merrill	ML15142A284
Cole, Patricia	ML15156A331
Cole, Tracy	ML15140A106
Coleman, Nina	ML15140A143
Coleman, Richard	ML15156A080
Colerich, Edward	ML15148B131
Coley, Linda	ML15154B549
Collar, Michelle	ML15153B180
Collas, Judith	ML15148A637
Collecchia, Geri	ML15158A292
Collimore, Robert	ML15156A036
Collins, Carol	ML15154A446
Collins, Jeffrey	ML15156B106
Collins, Kathy	ML15153B175
Collins, Megan	ML15153A787
Collins, Teresa	ML15154C145
Collinsworth, Van	ML15156A294
Collison, Chelsea	ML15140A248
Colllins, Greg	ML15141A648
Colombini, Denise	ML15153A761
Colombo, Kathleen	ML15142A270
Colson, Lynn	ML15156A609
Colter, Alfred	ML15153B030
Colvin, Felicia	ML15154A537
Combs, Adele	ML15148B142
Combs, Cris	ML15155A248
Combs, Debi	ML15159B071
Combs, William	ML15148B374
Commander, Wanda	ML15148B323
Commons, Judy	ML15140A007
Como, Marianna	ML15155A830
Compher, Margaret	ML15162A712
Comrack, Janine	ML15142A048
Comstock, Ginger	ML15148A267
Conant, Deborah	ML15155A790
Conelley, B.	ML15148B362
Confer, John	ML15160A549
Conklin, Joyce	ML15155A345
Conklin, Lindsay	ML15160A966
Conlan, Mike	ML15156B398
Connell, Brendan	ML15159A705
Connelly, Walter	ML15155C236
Conner, Art	ML15153A320
Conner, Steve	ML15155A355
Connick, Cherie	ML15141A697
Connolly, James	ML15154B670
Connolly, Joe	ML15148A135
Connolly, Makenna	ML15162A567
Connor, Arthur	ML15156B327
Connor, David	ML15148B391
Connor, Elizabeth	ML15154A363
Connors, Joe	ML15159B219
Conrad, Lori	ML15154B728
Conroy, Beverly Ann	ML15155A956
Conroy, Eleanor	ML15148B143
Conroy, James	ML15155A466
Conroy, Laurie	ML15156A267
Conroy, Peggy	ML15156A064
Conroy, Thomas R.	ML15142A038
Constance, Bianca	ML15155A700
Conti, Sandra	ML15154B645
Contreras, Cristian	ML15154A416
Conway, Clayton	ML15155A371
Conway, Julianne	ML15155B879
Cook, Bruce	ML15155B931
Cook, Cherie	ML15156A492
Cook, Gary	ML15154A190

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Cook, Gary	ML15154B930
Cook, Geoffrey	ML15155B542
Cook, Patty	ML15155A710
Cooke, Douglas	ML15154B720
Cooksey, Marti	ML15148A723
Cooley, Marian	ML15155A048
Cooley, Richard E.	ML15155B955
Coons, Christine	ML15154A366
Cooper, Charlene	ML15155A142
Cooper, Edith	ML15154C038
Cooper, Gwendalle	ML15155B613
Cooper, Isabella	ML15156A073
Cooper, Joe	ML15159A077
Cooper, Michael	ML15154A350
Cooperman, Allan	ML15155C107
Cooperman, Sima	ML15155B234
Copanos, Beth	ML15148B119
Cope, Peggy	ML15158A140
Cope, William	ML15156B356
Copeland, Jeanette	ML15156A558
Copeland, Sue	ML15155A196
Coplan, Rosemary	ML15153A540
Coppotelli, Heide Catherina	ML15155A047
Copulsky, Steve	ML15155A275
Corby, Kathleen	ML15155B252
Corcacas, Phyllis	ML15142A287
Cordero, Carole-Anne	ML15162B091
Cordero, Carole-Anne	ML15162B153
Corey, Sheffield	ML15154B767
Corkey, Peter	ML15148A184
Corkran, Thomas	ML15156A129
Cormier, Jerry	ML15156A146
Cormier, Joyce	ML15148A824
Cornelia, Jared	ML15141A618
Cornell, Denice	ML15158A153
Cornelsen, Christy	ML15153A906
Cornett, Nina	ML15154A365
Cornetta, Eric	ML15142A244
Cornish, Christopher	ML15155B655
Corr, F.	ML15158A164
Corradini, Pamela	ML15155A468
Corredoira, Carmen	ML15159B224
Corriere, Caryn	ML15154B223
Corriere, Jim	ML15148A907
Corrigan, Jim	ML15153A493
Corrigan, Sean	ML15155C054
Corrigan, Theresa	ML15159A249
Corry, Ronit	ML15156A649
Cortez, Loyd	ML15142A144
Corwin, Diana	ML15148B236
Coscione, Brian	ML15156B433
Cosgrove, Pamela	ML15153B001
Costa, Lynn	ML15155B236
Costa, Sandra	ML15156A697
Costanzo, Linda	ML15147A777
Costello, Anthony	ML15162A582
Costello, Sheri	ML15162A583
Costigan, Andrew	ML15154B049
Cotham, Keith	ML15159B430
Cotrell, Katharine	ML15158A246
Cotta, Mary	ML15160A665
Cottrell, David	ML15148A946
Cottrell, David	ML15154A330
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Cottrell, David	ML15154B967
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Cotturo, Mary L.	ML15159A067
Couch, Jaime	ML15156B328
Couch, Jayda	ML15153B046
Couch, Mike	ML15154B900
Couch, Sandra	ML15156B213
Coughlin, John	ML15156A668
Coulaz, Yolanda	ML15159A911
Coulson, Sue	ML15154B835
Council, Barbara	ML15155A348
Countryman, Carol	ML15154C134
Countryman-Mills, Gayle	ML15148B338
Courliss, William	ML15153A991
Courtney, Donald	ML15148B135
Cousino, Joyce	ML15154A904
Cousins, Vera	ML15155A198
Cousins, Virginia	ML15153A488
Coval, Deirdre	ML15154B854
Covell, Sandi	ML15162A079
Covington, Diana	ML15158A282
Covington, Lainie	ML15159B347
Covington, Laurel	ML15154A052
Covney, Chris	ML15160A605
Covney, Chris	ML15162A069
Cowan, Donald	ML15159A053
Cowie, Virginia	ML15154A127
Cowin, Caryn	ML15159A635
Cowles, Traver	ML15155A029
Cox, Chris	ML15148B126
Cox, David	ML15154A557
Cox, John	ML15148A908
Cox, Lanie	ML15155B926
Cox, Mary	ML15148B145
Cox, Sharon	ML15154B609
Cox, Sharon	ML15155A319
Coyle, N.	ML15153A926
Coyne, Ellis Heyer	ML15155A682
Coz, Ann	ML15159B132
Cozzi, Steven	ML15156A868
Cracchiolo, Anthony	ML15140A224
Craft, Robin	ML15155A063
Craig, Susan	ML15161A682

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Crandall-Bear, Joanne	ML15154A863
Crane, Jeff	ML15154A576
Crane, Marcella	ML15159A042
Cranmer, Pat	ML15155A841
Crannell, Raymond	ML15158A155
Cranston, Jr., Andrew	ML15156A201
Cranston, Thomas	ML15153B077
Crase, Kirsten	ML15161A671
Crase, Steve	ML15155C069
Cratty, Bruce	ML15156A177
Crawford, Donald	ML15155A676
Crawford, Jason	ML15154C049
Crawford, Licia	ML15159B525
Crawford, P. E.	ML15159A233
Creagh, Donna	ML15155A215
Cresseveur, Jessica	ML15154A249
Crickenberger, Ray	ML15162A233
Crider, Erika	ML15159A961
Crim, Noel	ML15155B062
Crispin, Kim	ML15159B490
Crist, Michael	ML15141A658
Criswell, Gary	ML15155A273
Critser, Jackie	ML15159A251
Crittenden, Kathleen	ML15156A457
Crittenton, Cynthia	ML15148A983
Crockett, Shirley	ML15148A894
Croft, Samuel	ML15141A421
Crommett, Jennifer	ML15153B244
Cronin, Donald	ML15154A174
Cronin, Gary	ML15154A941
Croom, Carolyn	ML15155B674
Crosby, Donald	ML15156A550
Crosiglia, Nella	ML15155C165
Cross, Dave and Rita	ML15154B925
Cross, Heather	ML15154A952
Cross, Russ	ML15147A716
Crotwell, Kd	ML15155A865
Crowden, Michael	ML15154A381
Crowe, Edith	ML15153B226
Crowe, Nancy	ML15148B235
Crowley, Jeanne	ML15155B802
Crowley, Lori Ann	ML15159A613
Crozier, John	ML15154C246
Crozier, Mary	ML15154C036
Cruger, Kurt	ML15155A446
Cruickshank, Lynda	ML15154B873
Cruikshank, Anna	ML15156A041
Crumpacker, Barb	ML15141A625
Crupi, Kevin	ML15159A151
Cruz, Marian	ML15154A306
Cruz, Marian	ML15154A868
Csaszar, John	ML15147A782
Csenge, Debra	ML15162A400
Csenge, Rich	ML15160A900
Csicsery-Ronay, Elizabeth	ML15155C199
Cuadrado, Lola	ML15147A718
Cucchiara, Philip	ML15142A110
Cuff, Kermit	ML15155A213
Culbert, Laurette	ML15155B079
Cull, David	ML15159B016
Cullinan, Sarabeth	ML15162A065
Culp, Philip	ML15148A965
Culver, Bruce	ML15156A931
Cummings, Connie	ML15161A639
Cummings, George	ML15154A432
Cummings, Kady	ML15155C168
Cundiff, William	ML15148B370
Cunha, Carlos	ML15160A977
Cunningham, Alan	ML15155A657
Cunningham, Cynthia	ML15153A586
Cunningham, Helen	ML15154B056
Cunningham, Jennifer	ML15155A320
Cunningham, Khari	ML15155B070
Cunnius, Cheryl	ML15141A785
Cuolahan, Sylvia	ML15154B335
Cupp, Stephanie	ML15154A222
Curia, Peter	ML15154C285
Curley, Frank	ML15141A764
Curow, Jerry	ML15156A699
Currey, Wally	ML15159B043
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Curry, Donna	ML15155B790
Curtis, Candy	ML15153A892
Curtis, Colleen	ML15156A976
Curtis, Frank	ML15153A481
Curtis, Kevin	ML15141A706
Curtis, Marie	ML15156A452
Curtler, III, Hugh	ML15148A720
Cuticka, Sheri	ML15142A353
Cutler, Annalisa	ML15161A681
Cutright, Sheri	ML15154A232
Cutting, Kimberly	ML15155A424
Cutting-Brady, Joanna	ML15154A160
D., Susan	ML15155B929
Dabanian, Kathylynn	ML15159A356
Dabrowski, Linda	ML15153A955
Dace, Letitia	ML15153B016
Dahl, Kevin	ML15155A868
Dahlberg, Nancy	ML15153B222
Dahlgren, Shelley	ML15154B983
Dahoda, Jeff	ML15142A039
Dail, Michelle	ML15154A110
Dailey, Christa	ML15155B381
Daily, G. Allen	ML15155A880
Daiss, Becky	ML15148B322
Dakouzlian, Md	ML15154A501
Dal Cais, Sandra	ML15153A856
Dalal, Namita	ML15140A105

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Dale, Felicia	ML15156B373
D'Alessandro, Jenette	ML15142A365
D'Alessandro, Keith	ML15142A318
Dalition, Mitch	ML15155A129
Dalnekoff, Cecilia	ML15154A928
D'Amato, Susan	ML15156A323
Dame, Laura	ML15156A160
Dameron, Susan	ML15148B230
Dammert, Colleen	ML15154B735
Damon, Rhea	ML15162A626
Dander, Katherine	ML15148B081
Danehy, Cecile	ML15155C198
Danek, Richard	ML15154B629
Daniell, David	ML15148A910
Daniels, Elizabeth	ML15153A783
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Daniels, Michael	ML15154B667
Daniels, Patricia	ML15156B520
Daniels, Stacey	ML15160A869
D'Anna, Tina	ML15154B897
Dannelley-Mccree, Sylvia	ML15153B301
Dannhardt, Beth	ML15153A712
Danos, Teri	ML15156A059
Dantonio, Lisa	ML15155A900
Darby, Sara	ML15156B251
D'Arco, Donna	ML15147A739
Darcy, Kevin	ML15162A642
Dare, Cheryl	ML15142A122
Darilek, Marilyn	ML15162A703
Daskal, Sharon	ML15154C037
Dater, Suzanne	ML15153A326
Dauerty, Barbara	ML15155C003
Daugherty, Amy	ML15153A587
Daugherty, Bret	ML15141A458
Dauphin, Jill	ML15159B505
Davee, Heidi	ML15159B489
Davenport, Cheryl	ML15161A658
Davenport, Jeanne	ML15148A933
Davenport, L. B.	ML15153A510
Davenport, Susan	ML15155B348
Davenport, Susan	ML15156B005
Davidson, Amber	ML15158A024
Davidson, Bruce	ML15154A430
Davidson, David	ML15159A341
Davidson, Kathryn	ML15159A170
Davidson, Penny	ML15154A414
Davidson, Sharon	ML15154A349
Davidson, Sharon	ML15154A532
Davies, Charlene	ML15153A791
Davies, Gyllian	ML15148B298
Davine, Jill	ML15153A921
Davis, Clark	ML15158A194
Davis, Cynthia	ML15155B586
Davis, Donna	ML15156B177
Davis, Eleanor-Ann	ML15154A615
Davis, Ellie	ML15140A004
Davis, Irene	ML15158A190
Davis, Jacqueline	ML15159A818
Davis, Janice	ML15156B509
Davis, John P.	ML15155A907
Davis, Jolynn	ML15155A117
Davis, Kathleen	ML15140A009
Davis, Kevin	ML15155B778
Davis, Lynn	ML15159B518
Davis, Marilyn	ML15153A596
Davis, Mary	ML15156B451
Davis, Michelle	ML15156A942
Davis, Randy	ML15154B511
Davis, Roger	ML15154B225
Davis, S. K.	ML15153B256
Davis, Sarah	ML15159B356
Davis, Sharon	ML15155A531
Davis, Shirley	ML15156B162
Davis, Shonna	ML15154B958
Davis, Susan	ML15147A769
Davis, WIlliam	ML15154C054
Dawdy, Kenneth	ML15160A089
Dawdy, Sandra	ML15141A589
Dawes, Steven	ML15155A039
Dawson, Elizabeth	ML15154C012
Dawson, Kathyrn	ML15154B674
Day, Charlie	ML15155A028
Day, Christopher	ML15140A236
Day, Cris	ML15156A183
De Baca, Sylvia	ML15160A722
de Bruyn Kops, Julianna	ML15154A195
De Castro, Brian	ML15155A991
De Feo, Joseph	ML15154B819
De Gregorio, Ermanno	ML15153A876
de la Rosa, Marco	ML15148B358
De La Rosa-Young, Maria	ML15148A186
De Laval, Jerry	ML15148B402
De Leon, Lori	ML15141A621
De Lima, Carol	ML15159A116
De Lu, Dirk	ML15148A839
De Mars, Matthew	ML15162A511
De Raat, Maia	ML15154B773
De Saglietto, Eve	ML15159A481
De Vlaming, Victor	ML15159A819
De Vos, Paul	ML15154B081
Deal, Brandie	ML15148B006
Deal, Jeff	ML15154C191
Dean, June	ML15155B094
Dean, Sue	ML15156B392
Deane, Tricia	ML15156B207
Debing, Therese	ML15153A347
Deboer, Elisa	ML15155A825

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Deciccio, Robyn	ML15148A760
Deck, Avis	ML15148B042
Decker, Eleanor	ML15155A085
Deddy, John	ML15156A779
Dee, Diana	ML15155C012
Defauw, Rachel	ML15159A332
Defazio, Richard	ML15148A906
Defilippo, Terri	ML15153A679
Defoggi, Virginia	ML15148B204
Degges, Frank	ML15156B481
Dehn, Dennis	ML15142A205
Deist, Barry	ML15153B167
DeJong, Joan	ML15156A584
Dekalb, Sue	ML15155B412
Del Gado, Tanya	ML15154A925
Del Valle, Javier	ML15155A346
Delaney, Elisha	ML15155A232
Delaney, Janet	ML15155B910
Delateur, Marc	ML15142A281
Deleone, Barb	ML15148B434
Delgado, Crystal	ML15158A141
Delgado, Sasha	ML15160A655
Dell ' Italia, Patrick	ML15159A734
Dellera, Jayne	ML15140A046
Dellinger, Robert	ML15156A103
Deloff, D.	ML15156A852
Delorenzo, Pete	ML15156B339
Deluna, Marie Claire	ML15155A457
Demarais, Jackie	ML15158A218
Demarest, Kandie	ML15141A679
Demarest, Russ	ML15147A763
Demaria, Karen	ML15155C181
Demers, Melanie	ML15156A594
Demin, Vladimir	ML15162A737
Demott, Lisa	ML15160A652
Demott, Margaret	ML15154A173
Dempsey, Sheila	ML15153A754
Dempsey, Stephen	ML15154B313
Denberg, Judy	ML15160A872
Denison, James	ML15153A833
Denison, Lou Anna	ML15159B567
Denn, Gina	ML15141A650
Denninger, Sandra	ML15154A806
Dennis, Gudrun	ML15154A903
Dennison, Brett	ML15155C018
Denny, Rachael	ML15158A073
Densing, Lindsey	ML15155A168
Densmore, Paul	ML15154B734
Dent, Resi	ML15162A119
Dent, William	ML15162A094
DePante, Michael	ML15159A248
Depew, Robert	ML15158A266
Deppong, Genevieve	ML15159A140
Depue, David	ML15155C189
Der, Don	ML15155C140
Derasary, Lara	ML15159A549
Derbick-Johnson, Mary	ML15155A482
Derbort, Wendy	ML15148A272
Derfner, Phyllis	ML15156A606
Dermody, Cathy	ML15141A696
Deroche, Russel	ML15155B075
Derrickson, Ray	ML15154B915
D'Errico, Didi	ML15153A358
Dervin, John	ML15154A631
DeSanctis, Joseph	ML15148B176
Desarbe, Michael Lauren	ML15156A260
Deschenes, Paul	ML15156A081
Desecki, Nancy	ML15154B458
Destrooper, Chantal	ML15154A339
Detert, Judith	ML15154A133
Detrick, Mary	ML15159A164
Dettmann, Barbara	ML15156A123
DeVine, Kelly	ML15154A013
Devinney, Claudia	ML15148B336
Devlaeminck, Michelle	ML15159A774
Devlin, III, Neil	ML15159B473
DeWitt, Joel	ML15148A609
Dewitt, Pam	ML15153A884
Dial, Pamela	ML15155A447
Diamante, Nina	ML15156B008
Diamond, Ann	ML15156A002
Diamond, Nicholas	ML15148A264
Diamond, Nichole	ML15155A418
Diana, Patty	ML15155A486
Diaz, Herman	ML15141A760
Diaz, Jose	ML15153B283
Diaz, Lorenzo	ML15148A647
Diaz, Sharyn	ML15148A625
Diaz, Tony	ML15156A159
Dicarlo, Leigh Ann	ML15148A632
Dick, Ruth	ML15154C306
Dickel, Geraldine	ML15159A793
Dickens, Marcay	ML15156A515
Dickey, Helen	ML15159A129
Dickey, Kim	ML15155A404
Dickey, Laura	ML15156B507
Dickinson, Richard	ML15148B373
Dickinson, Robert	ML15148B038
Dickinson, Vicki	ML15154A714
Dickinson-Adams, Emily	ML15156A989
Dicks, Carol	ML15159A027
Dicks, Rodger	ML15155B657
Dickstein, Stephen	ML15162A106
DiDonato, Toni	ML15154B783
Diedrich, Martin	ML15154A111
Diener, B. Thomas	ML15158A063
Diener, B. Thomas	ML15158A070

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Diephouse, Roberta	ML15153A555
Dietrich, Chris OMeara	ML15142A224
Dietrich, Janet	ML15155A756
Digiannantoni, Theresa	ML15154A069
Digiovanni Jr., Robert	ML15155C006
Dillard, Gavin	ML15148B064
Dillman, Michael	ML15158A040
Dillon, Errol	ML15155B301
Dimitri, Lindsay	ML15153A988
Dimock, Donald	ML15154A300
Dimondstein, Carla	ML15153A491
Dingeman, Christine	ML15155A977
Dingman, Amy	ML15153A851
Dipaola, Marisa	ML15156A133
Dippre, Dawn	ML15158A169
Dire, Tonette	ML15154B499
Dirrenberger, Jonathan	ML15148A193
Disbro, Jonathan	ML15140A003
Dishion, Diane	ML15155A742
Dishman, Patricia	ML15155A359
Dispenza, Salvatore	ML15162A256
Divens, Alicia	ML15155A903
Dixon, Joyce	ML15154A283
Dixon, Matthew	ML15153A459
Dixon, Nicole	ML15159B391
Dixon, Vernon	ML15154A616
Dixson, Cynthia	ML15147A754
Doane, Anne	ML15154A354
Dobbelaere, Susan	ML15159A459
Dobronski, Irene	ML15154B266
Dobson, Bruce	ML15156B326
Dobson, Melissa	ML15148B319
Dobson, Michael	ML15148B114
Dockter, Richard	ML15154B500
Dodge, Dana	ML15154C088
Dodge, Joan	ML15148A205
Dodge, Morris	ML15159A892
Dodson, Sara	ML15161A690
Doerring, Beth Ann	ML15154A379
Doesserich, Diane	ML15156A686
Doherty, Helen	ML15162A593
Doherty, Jeanne	ML15156A840
Dokos, Kara	ML15155A893
Dolbear, Robin	ML15148A614
Doles, Robert	ML15156A679
Dolgin, Gary W.	ML15155A053
Dolin, Joy	ML15161A672
Dollar, Ellen	ML15162A464
Dollar, Robert	ML15154C256
Domb, Doreen	ML15155A225
Domingos, Lori	ML15159B263
Domingue, Christine	ML15162A412
Dominguez, Laura	ML15155B261
Domke, Ellen	ML15154B615
Domowicz, Artur	ML15155A151
Donaghy, Rita	ML15155A752
Donahue, Mary	ML15154A207
Donald, Cooke	ML15162A519
Donaldson, Karen	ML15153B128
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Donnell, Bruce	ML15162B079
Donnell, Bruce	ML15162B120
Donnelly, Debbie	ML15159A606
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Donnelly, Russell	ML15154A061
Donnelly, Stephen	ML15156A030
Donnelly, Thos	ML15155B360
Donovan, Elaine	ML15153A539
Dooley, Maryann	ML15154A159
Dormont, Mitchell	ML15155B340
Dorn, Valerie	ML15159A924
Dorraugh, Tami	ML15148A127
Dorsey, James	ML15153A853
Dorsey, Jill	ML15142A097
Dortch, Pam	ML15154B260
Dosky, Pat	ML15155B001
Dostalek, Patricia	ML15156B369
Doster, Patty	ML15159B461
Dotson, Mike	ML15154C105
Doty, Carol	ML15153A727
Doty, David	ML15156B228
Doty, Jimmy	ML15153A487
Doucet, Barbara	ML15154C068
Dougher, Marilyn	ML15155B884
Dougherty, Janet	ML15155C005
Dougherty, Kate	ML15154B076
Douglas, Carolyn	ML15154A285
Douglas, Diana	ML15155A314
Douglas, Dianne	ML15161A640
Douglas, Donna	ML15155B699
Doust, Jim	ML15156B223
Dowd, Therese	ML15154A462
Dowell, Joanne	ML15162A397
Dowling, Deborah	ML15141A606
Dowling, Jay	ML15155B232
Downum, Monte L.	ML15159A757
Dowty, Amy	ML15162A710
Dragavon, Linda	ML15155C111
Dragavon, Linda	ML15155C117
Drager, Luranne	ML15156B338
Dragona, Danielle	ML15148A711
Drahos, Ronald	ML15153B003
Drake, Mercy	ML15159B511
Drake, Tracy	ML15148B258
Dratch, Sam	ML15154A538
Drevicky, John	ML15156A438
Drew, Craig	ML15147A778
Drew, Janet	ML15155A705

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Drew, Virginia	ML15154B284
Dreyer, Sharyn	ML15148B153
Driessen, Lynn	ML15153B066
Driggers, Judy	ML15159A560
Driscoll, Marie	ML15154A224
Driskell, Shelley	ML15155A064
Drissell, Eric	ML15159A832
Drivas, Linda	ML15153B031
Drobny, Edith	ML15159A825
Droll, Francesca	ML15159A844
Drullard, Claire	ML15158A217
Drumright, Chris	ML15147A706
Dryden, Marlie	ML15156A254
Du Rivage, Robert	ML15159B249
Dubasik, Valentina	ML15160A518
DuCharme, Christy	ML15162A684
Duckson, Robert	ML15156A076
Duckwall, Karen	ML15156B103
Duckworth, Ronald	ML15154A209
Dudley, Gregory	ML15159A431
Dudley, Gwen	ML15155A477
Dufel, Laura	ML15153A332
Dufel, Laura	ML15154A265
Dugaw, Anne	ML15154A206
Duggan, Bill	ML15141A633
Dukes, Aaron	ML15155A282
Dulas, Scott	ML15159B222
Dulicai, Linda	ML15156A029
Duman, Bonnie	ML15140A031
Dumford, Karen	ML15141A551
Dummerauf, Carla-Maria	ML15154A021
Dunaway, Susan	ML15142A089
Dunbar, Betty	ML15148B313
Duncan, Bruce and Wendla	ML15159A222
Duncan, Bryan	ML15158A274
Duncan, Kim	ML15141A784
Duncan, Renee	ML15160A949
Duncan, Sylvia	ML15154A764
Dunham, Janet	ML15154A797
Dunham, Kathryn	ML15159A836
Dunham, Moneca	ML15154A651
Dunham, Moneca	ML15155C237
Dunlap, Anne	ML15154C075
Dunlop, Jean	ML15154B104
Dunn, Charles and June	ML15156B420
Dunn, Elmo	ML15154B341
Dunn, Linda	ML15161A670
Dunn, Sara	ML15159A280
Dunn, Sherry	ML15156A478
Dunn, Timothy	ML15154C258
Dunne, Linda	ML15148B019
Duppstadt, Eileen	ML15159A636
Dupree, Donna	ML15158A106
DuPree, M.	ML15159B153
Duran, Wesley	ML15153A967
Durden, Lynda	ML15156B127
Durfee, Evelyn	ML15162A060
Durham, Desiree	ML15158A133
Durham, Eric	ML15141A775
Durieux, P.	ML15158A046
Durkin, Samuel	ML15155A804
Dust, Michelle	ML15158A095
Dutka, Cindy	ML15156B152
Dutschke, Stephen	ML15156A996
Dyakon, Douglas	ML15154C016
Dybel, Donald	ML15154A944
Dybel, Sandra	ML15142A352
Dycus, Terry	ML15156A102
Dyer, Paul	ML15156A441
Dygas, Dorothy	ML15156A881
Dym, Harvey	ML15154A080
Dzikowski, David	ML15148B344
Dzubak, Cheryl	ML15154B875
E., Sherry	ML15155B066
Eagle, Chief Grey	ML15154A531
Earle, Susan	ML15154A066
Earle, Susan	ML15154A428
Earnshaw, Shinann	ML15155C194
East, Jen	ML15154B740
East, Lawrence	ML15148B396
Easterday, Roger	ML15153A871
Easterling, Anne	ML15155B485
Easterling, Kermit	ML15158A008
Eastlake, Linda	ML15159A872
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Eaton, Alexandra	ML15154A608
Eaton, James	ML15154A278
Eaton, Sandy	ML15156A124
Eberg, Nancy	ML15156A182
Eberhardt, Steven	ML15155A208
Eberle, Melvin	ML15153B231
Ebersole, Jan	ML15155B228
Eck, Jj	ML15154B117
Eckard, Roberta	ML15159B528
Eckardt, Gerhard	ML15155C124
Ecker, Christopher	ML15155B637
Eckerline, Mckenna	ML15142A096
Eckert, Angela	ML15155C203
Eckert, Brenda	ML15154B325
Eckler, John	ML15160A909
Eckles, Sabrina	ML15154A942
Ecklund, John	ML15154B929
Eckstein, Susan	ML15159A160
Edell, Elaine	ML15154B795
Edelman, Ellen	ML15156B485
Edens, Teresa	ML15148A733
Edfast, Roy	ML15148A636

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Edgar, Lynn	ML15154B064
Edmondson, Nancy	ML15153A418
Edmonston, Pandora	ML15155A317
Edridge, Michael	ML15156A967
Edson, Patricia	ML15148B170
Edwards, B.	ML15148B288
Edwards, Bita	ML15162B044
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Edwards, Carlene	ML15159A765
Edwards, Cynthia	ML15154C031
Edwards, Eric	ML15154A470
Edwards, Jane	ML15155A169
Edwards, Joe	ML15162A608
Edwards, Mary	ML15148A938
Edwards, Monique	ML15154A359
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Edwards, Willie	ML15141A714
Eeds, Bill	ML15148A868
Eells, Margaret	ML15155A864
Efron, Deborah	ML15155A809
Efstration, George	ML15162A540
Egan, June	ML15156A312
Eggan, Emily	ML15148B282
Egger, Kathleen	ML15159B209
Eggers, Michael	ML15154B279
Egolf, Nancy	ML15148A935
Ehmke, Jessica	ML15153A905
Ehren, Aviva	ML15154B647
Ehrlich, Annette	ML15154A771
Ehrlich, Marion	ML15154B288
Ehrmann, Nancy	ML15158A154
Ei, Jen	ML15155B933
Eichler, Nancy	ML15154C015
Eicholtz, Dennis	ML15159B551
Eielson, Olivia	ML15159B096
Eiffler, Jeff	ML15141A593
Eikenbary, Susan	ML15154B939
Eisenberg, Howard	ML15159B150
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Eisenberg, Paul	ML15148B263
Eisenberg, Roberta	ML15155B190
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Eitelman, Andrea	ML15159B463
Eklund, Steve	ML15155A915
Elamon, Heather	ML15148B369
Elder, Dave	ML15155A595
Elder, Shonti	ML15156B035
Eldridge, Robyn	ML15156A707
Eley, Janet	ML15154C217
Elias, Ralph	ML15159A627
Elisberg, Cynthia	ML15148B287
Elkin, Susan	ML15153A912
Elkins, Judy	ML15159B582
Ell, Christopher	ML15155A229
Ellefson, Colin	ML15155A866
Ellenberger, Charles	ML15156B143
Elliott, Allen	ML15155B953
Elliott, Judith	ML15154C266
Elliott, Lynn	ML15160A914
Elliott, Terry	ML15155B784
Ellis, Susan	ML15153A946
Ellison, David	ML15156A307
Ellison, Richard	ML15158A114
Elllis, Michael	ML15140A109
Elly, Karen	ML15147A719
Elm, Carole	ML15155C070
Elman, Mark	ML15148B334
Elness, Barbara	ML15154C111
Elson, Adam	ML15155B017
Elton, Wallace	ML15160A802
Elwell, Herbert	ML15158A002
Emmanuele, Kurt	ML15148A742
Emmerik, Christina	ML15160A532
Emond, Lise	ML15159A268
Emrick, Carol	ML15142A301
Encomenderos, Gayle	ML15154B836
Enderlein, Andreas	ML15147A759
Endress, Daphne	ML15155A300
Eng, Koney	ML15155A500
Engel, Sabrina	ML15153A846
Engelhart, Marylee	ML15140A263
Engels, Angelika	ML15159A890
Enger, Carolyn	ML15159A094
England, Roy	ML15141A428
Engle, I.	ML15148B154
Engler, Pam	ML15159B272
Englerth, Charlene	ML15153A479
Ennor, Kenneth	ML15148A236
Epstein, Barbara	ML15159A096
Epstein, Kelly	ML15142A225
Epstein, Sarah	ML15159B513
Erbs, Lori	ML15155A329
Ercole, Steven	ML15159A445
Ergueta, Taia	ML15153A815
Erickson, Charles	ML15154A033
Ericson, Del	ML15142A256
Ericson, Gretchen	ML15153A432
Erikson, Anne	ML15141A527
Erlander, Daniel	ML15154B577
Ernst, Cathie	ML15159B155
Ernst, Cathie	ML15160A598
Ernst, Kathleen	ML15155A204
Erpel, Julia	ML15153B188
Erskine, Mark	ML15142A040
Erskine, Michael	ML15161A676
Ervin, Heather	ML15159A958
Erwin, Lee	ML15155C222

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Escobar, Victor	ML15153A838
Eskew, Eve	ML15153B068
Espinaco, Esmeralda	ML15154A225
Espinoza, Yaraly	ML15154B594
Esposito, Amanda	ML15155B136
Esposito, Dan	ML15141A614
Essenmacher, Barbara	ML15155C129
Estes, Donna	ML15154C043
Estes, John	ML15154C099
Estes, Julia	ML15154B033
Estrella, Andrea	ML15156A673
Ethridge, Diane	ML15154B355
Etris, Caveman	ML15156B365
Eudy, Elaine	ML15153A978
Eurs, Albert	ML15153A766
Evans, Bronwen	ML15154C159
Evans, Chad	ML15155A697
Evans, Debbie	ML15148A928
Evans, Geoffrey	ML15153A939
Evans, John	ML15154A875
Evans, Pamela	ML15154A475
Evert, Herb	ML15154B758
Evilsizer, Susan	ML15142A250
Ewert, Henry	ML15160A967
Ewing, Tracy	ML15153A697
Eyclesheimer, Susan	ML15154B233
Ezerman, Elizabeth	ML15162A692
F., Amy	ML15162A054
F., Jennifer	ML15155B814
Faber, Megan	ML15156A642
Facey, Laurel	ML15154B013
Faegre, Dirk	ML15159A043
Fahlstrom, Marylee	ML15153A827
Fahy, Kevin	ML15148A963
Fain, R.	ML15155A211
Fairchild-Ehm, Audrey	ML15160A970
Faircloth, Diane	ML15156B167
Fairfield, Richard	ML15154A777
Fairless, Judy	ML15153A609
Fairley, Peter	ML15162A263
Fairlie, Mary	ML15159A514
Fait, Lawrence	ML15156A595
Falcone, Janet	ML15154B887
Falink, Norma	ML15155A382
Fallon, Ellen	ML15154A282
Falsken, James	ML15154A290
Fanelli, Mary	ML15154B372
Farenkopf, Nathan	ML15141A599
Faris, Dan	ML15155B315
Farkas, Midge	ML15154C205
Farley, Chanda	ML15155C085
Farlow, Joy	ML15140A035
Farmer, Bonnie	ML15156A654
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Farmoon, William	ML15141A582
Farneth, Sara	ML15154C059
Farnham, Charlene	ML15154B831
Farnor, Shane	ML15140A018
Farnsworth, Stu	ML15148A586
Farrell, Bob	ML15154A146
Farrington, Raymond	ML15153A336
Farris, Nancy	ML15148B216
Fary, Jim	ML15155B640
Fass, Amy	ML15160A803
Fassman, Dennis	ML15154B657
Fast, Wendy	ML15154B172
Fast, Yvonne	ML15156B355
Fastuca, Joy	ML15148A275
Fastuca, Meagan	ML15159B291
Fath, Vernon	ML15161A691
Faucett, Carol	ML15156A724
Faucett, Carol	ML15156A775
Faucett, Steven	ML15154A746
Faucher, Selma	ML15156B394
Faust, Malcolm and Carol	ML15155A114
Fayollat, Gloria	ML15155B854
Fear, Patricia	ML15155C247
Fecko, Albert	ML15156B308
Fedele, Lori	ML15154C064
Feder, Howard	ML15155B753
Feder, Melanie	ML15140A123
Federico, Kellie	ML15159A470
Fegan, Mike	ML15148A171
Fehr, Angelique	ML15148A885
Fehr, Richard	ML15153B254
Fehr, Stephen	ML15142A178
Fehrmann, Gail	ML15154B515
Feichtinger, Dennis	ML15155A770
Feider, John	ML15153B022
Feissel, John	ML15153B008
Felch, Shelley	ML15156A857
Feld, Ellin	ML15155A097
Feldman, Dee	ML15154C227
Feldman, Paul	ML15158A252
Feldmann, Grace	ML15142A248
Feldmann, Heike	ML15155C195
Feldmann, Michaela	ML15162A129
Fell, Cynthia	ML15162A243
Fellabaum, Wayne	ML15148B400
Feller, Penney	ML15155A199
Fellion, Karyn	ML15142A090
Feltham, Bette	ML15154A858
Felton, John	ML15162A715
Fenley, Bette-Burr	ML15154B201
Fenster, Fraidell	ML15158A187
Fenster, Steven	ML15159A276
Feran, Michael	ML15140A045

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Ferguson, Charlene	ML15160A740
Ferguson, J.	ML15155C251
Ferguson, Mike	ML15148B211
Ferland, Linda	ML15141A542
Ferland, Linda	ML15141A602
Ferman, Pam	ML15154A869
Fernandes, Ana-Paula	ML15159A874
Fernandez, Daniel	ML15153B213
Fernandez, Sandra	ML15154A713
Fernandez-Reyes, Ynez	ML15154A112
Ferrar, Kristen	ML15140A186
Ferrara, Dawn	ML15142A217
Ferraro, Mary	ML15160A833
Ferrera, Ernesto	ML15154A064
Ferri, Vincent	ML15159B364
Ferro, Frank	ML15153B097
Ferron, Chadd	ML15161A688
Fers, Alda	ML15148A633
Fetch, Elena Marie	ML15156A207
Fetchko, Kathleen	ML15156B370
Fetter, Sharon	ML15159B026
Fetting, Joanne	ML15141A464
Feuchter, Robert H.	ML15142A186
Feuille, Leslie	ML15155A406
Fiallos, Rebecca	ML15156B477
Fickling, Karl	ML15154A442
Fidler, Vicki	ML15142A050
Fiedler, Patricia	ML15153A933
Field, Fran	ML15146A228
Field, Michael	ML15154A071
Fielder, Aixa	ML15154A410
Fielder, Aixa	ML15154A610
Fielder, Linda	ML15155B049
Fieno, Debbie	ML15155A393
Fifer, Nancy	ML15159A326
Figge, Donald	ML15155A502
Figman, Janice	ML15160A540
Figueroa, Alfredo	ML15155C133
Figueroa, Daphne	ML15162A581
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Finamore, Scott	ML15159A072
Findley, Gail	ML15156A986
Findley, Helen	ML15156A289
Fine, Cindy	ML15154A728
Fine, Michael	ML15155C101
Fine, Michael	ML15159B088
Fingerhut, Ronnie	ML15160A688
Fingerman, Robert	ML15156A139
Fink, Brian	ML15155A212
Fink, Brian	ML15162A456
Finkbeiner, Theresa	ML15159A091
Finkel, Allyson	ML15160A974
Finley, Joel	ML15155A364
Finley, Sharon	ML15154A406
Finn, Linda	ML15141A704
Finnegan, Pam	ML15158A097
Finnerty, Kathleen	ML15156A517
Finney, Pam	ML15156A214
Fiore, Janet	ML15155A373
Fiorentino, Doris	ML15155B063
Firman, Douglas	ML15154A697
First, Mary Beth	ML15159A212
Firth, Shawn	ML15148B084
Fisch, Greg	ML15154C129
Fischer, Quentin	ML15161A652
Fischman, Lawrence	ML15160A810
Fischoff, Robert	ML15142A034
Fish, David	ML15159B398
Fish, Margaret	ML15154B811
Fish, Richard	ML15159B440
Fisher, Cheryl	ML15155B747
Fisher, Chuck	ML15153A580
Fisher, Karen	ML15154C135
Fisher, Myrna	ML15154B291
Fisher, Sarah	ML15156B012
Fisher, Sharon	ML15162A553
Fisher, Yvonne	ML15160A953
Fishman, Ted	ML15148B191
Fishman, Zelma	ML15154B087
Fisk, Todd	ML15153A340
Fiske, Constance	ML15148A256
Fissinger, Julie	ML15154A348
Fite, Austin	ML15158A176
Fite, Barbara	ML15155A130
Fite, Emily	ML15155A802
Fithian, Joel	ML15155C000
Fittipaldi, Silvio	ML15153A334
Fitzpatrick, Deirdre	ML15148B206
Fix, M.	ML15158A267
Flagg, Yvonne	ML15156B518
Flanagan, John	ML15154B042
Flannery, Marcia	ML15156A835
Fleener, Teresa	ML15154C293
Fleetwood, Patricia	ML15154C003
Fleming, Laura	ML15148B303
Fleming, Tami	ML15141A601
Fleming, Tami	ML15141A712
Fletcher, Bonnie	ML15158A271
Fletcher, Carol	ML15156A046
Fletcher, Jeanne	ML15156A118
Fletcher, Karen	ML15159B538
Flick, Pamela	ML15156A020
Floersch, Elizabeth	ML15155A339
Florell, Tina	ML15148B308
Florio, Dawn	ML15154B021
Florio, Kathryn	ML15154A514
Floyd, Debra	ML15155B009

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Fluker, Richard	ML15154C237
Fly, Carol	ML15142A230
Fogel, Byron	ML15156A174
Foley, Catherine	ML15155B223
Foley, Jane	ML15159A320
Foley, Jr., Robert	ML15153B095
Folger, Jessica	ML15155C097
Fonda, Thomas	ML15154C265
Fong, Melissa	ML15148B160
Fontaine, Anna Louise	ML15155B724
Fontana, Mike	ML15155B909
Fontana, Sandy	ML15155B905
Fonte, Jeri	ML15158A137
Foote, Thomas	ML15159A665
Foran, Rochelle	ML15159B420
Forbes, J.	ML15159B307
Forbes, Reese	ML15154A105
Ford, Michael	ML15159A447
Ford, Peggy	ML15155A671
Forgacs, Nora	ML15154C181
Forgues, David	ML15153B298
Forkish, Jo	ML15155A281
Fornari, Arthur	ML15155A910
Forney, Kathy	ML15155A606
Forrest, Mariah	ML15155B868
Forschner, Jillian	ML15156A853
Forte, Robert	ML15156A491
Fortgang, Mindye	ML15140A044
Forwand, Arlene	ML15155C164
Fosburgh, Eric	ML15155B104
Foscherari, Dolores	ML15142A052
Foskett, Maryanna	ML15155A201
Foss, Maryann	ML15155A644
Foster, Beverly	ML15154B337
Foster, Delaina	ML15159B066
Foster, Frances	ML15159A163
Foster, Jacqui	ML15156B492
Foster, Leah	ML15160A791
Foster, Patricia	ML15148A144
Foster, Robin	ML15155B011
Foster, Stephanie	ML15159B273
Foster, Tracy	ML15156B385
Fotos, Janet	ML15159A267
Fouche, David	ML15148B376
Foulk, Jennifer	ML15142A221
Fouts, Shannon	ML15156B447
Fowler, Elizabeth	ML15148A912
Fowler, Kim	ML15159A044
Fowler, Rachel	ML15141A568
Fowlkes, Richard	ML15153A999
Fox, Carole	ML15156B262
Fox, Delphia	ML15153A949
Fox, H.	ML15154C231
Fox, Kathleen	ML15159A467
Fox, Larry	ML15148A990
Fox, R.	ML15156A934
Foxworth, George	ML15154B069
Frale, Darren	ML15155C180
France, Catherine	ML15155B672
Franceil, Sondra	ML15159A986
Franchi, Irena	ML15158A163
Francis, Lorri	ML15140A015
Francis-Swayze, Carole	ML15141A713
Franck, Irene	ML15142A114
Franck, Matthew	ML15148B281
Franco, Diana	ML15148B408
Frangakis, Nicholas	ML15155A137
Frank, Andrea	ML15154A668
Frank, Patti	ML15154B690
Frank, Robert	ML15148A802
Frank, Sharon	ML15153A642
Frankenfield, Pat	ML15153B092
Franklin, Courtney	ML15154B910
Franklyn, Rex	ML15156A990
Franks, Scott	ML15154C297
Franz, Sandra	ML15154A093
Franzmann, Paul	ML15156A298
Fraser, Evelyn	ML15154B282
Fraser, Mark	ML15141A770
Fraser, Suzy	ML15156A556
Frasieur, Forest	ML15155A254
Fray, Antje	ML15155B775
Frazee, Cary	ML15158A145
Frazier, Madelynn	ML15153A480
Frazier, Shelley	ML15160A585
Fredenburg, Frank	ML15153A708
Frederick, Anne	ML15154B741
Fredrickson, Karen	ML15148A610
Freed, Hannah	ML15159A135
Freedman, Peter	ML15153B215
Freel, Susan	ML15159A079
Freeman, Amy	ML15154B956
Freeman, Carolyn	ML15154B509
Freeman, Myrna	ML15155A010
Freeman, Tyler	ML15159A224
Freestone, Mack	ML15148B355
Frega, Doreen	ML15142A347
Fregin, N. J.	ML15148A140
Freiler, Kyle	ML15162A656
Freitas, Frank	ML15155C007
French, A.	ML15156A859
French, Larry	ML15159A092
French, Nina	ML15148A271
French, Stephen	ML15155A099
Frerker, Ronald	ML15159A821
Freson, Neil	ML15153B154
Frey, Adrienne	ML15148B159

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Frey, Patricia	ML15154A357
Friar, Beth	ML15160A955
Frick, Dean	ML15153A957
Frick, Patricia	ML15154A147
Frickel, Scott	ML15155B739
Fried, Marc	ML15158A035
Friederichsen, Jacqueline	ML15141A436
Friedland, Monique	ML15159B255
Friedman, Alan	ML15153A644
Friedman, Cherryl	ML15159A771
Friedman, Fredrica	ML15148A213
Friedman, Terry	ML15160A933
Friedman, Valerie	ML15160A784
Fries, Jeb	ML15155C148
Fritzler, Cyndi	ML15158A277
Froehle, Virginia	ML15153A775
Fromberg, Jeff	ML15154B845
Frost, Keith	ML15159A424
Fruchter, Rosalie	ML15141A717
Fruchter, Rosalie	ML15148A235
Fruge, Aaron	ML15155B116
Frush, Mary	ML15155A887
Frusteri, Biagio	ML15155B600
Frye, Donna	ML15158A129
Frymoyer, Allison	ML15156A043
Fues, Lisa	ML15153B293
Fuessel, Chere	ML15153A819
Fugate, Karl	ML15156A230
Fugit, Sherri	ML15155A377
Fukuman, Thomas	ML15156A863
Fuller, Astrid	ML15148B309
Fuller, Dustian	ML15153A325
Fuller, Lisa	ML15153A818
Fuller, Roy	ML15148A904
Fullerton, Richard	ML15154C283
Fumarola, Aaron	ML15140A030
Fundby, Lone	ML15153A460
Funk, Ilse	ML15156A281
Fura, David	ML15155B632
Furberg, Sven	ML15159B449
Furlan, Sophia	ML15155A363
Furlong, John	ML15155C163
Furr, Carolyn	ML15156A226
Fusco, Carol	ML15159A644
Fuss, Joanne	ML15148A725
Futrell, Sherrill	ML15158A144
Futrovsky, Rosemary	ML15159B340
G., G .	ML15148B016
G., Jan	ML15153B235
G., K.	ML15140A120
G., Steven	ML15160A052
Gaal, Tiffany	ML15148A755
Gabbert, Tim	ML15161A700
Gabel, Eileen	ML15159A228
Gable, Derrelle	ML15159A616
Gabriel, Candace	ML15154B775
Gabriel, Robert	ML15153B296
Gaddy, Lisa	ML15153A376
Gage, Karen	ML15160A695
Gainer, Beverly	ML15148A789
Galante, Nicholas	ML15156A592
Galbreath, Jerry	ML15146A368
Gall, Gary	ML15156B349
Gall, Ronald	ML15153A996
Gallagher, E.	ML15154C120
Gallagher, Glenn	ML15154B333
Gallagher, Jim	ML15148A787
Gallagher, Julie	ML15158A201
Gallegos, Mark	ML15154A454
Gallo, Patricia	ML15159A962
Galloway, Adele	ML15155A876
Galst, Liz	ML15154A054
Gambriel, John	ML15154A935
Gandhi, Dipal	ML15154A694
Gandolfo, Laura	ML15153A934
Gangi, Melanie	ML15155A410
Ganter, Steven	ML15154C079
Garber, Lisa	ML15156B378
Garcia, Armando A.	ML15156A547
Garcia, Dena	ML15159B097
Garcia, Erik	ML15155B799
Garcia, Erin	ML15155B590
Garcia, Evette	ML15154C276
Garcia, Jeffery	ML15156B088
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Garcia, Manny	ML15161A654
Garcia, Mark	ML15154A010
Garcia, Olaya	ML15153A701
Garcia, Susan	ML15160A829
Garcialuna, Edgar	ML15156B418
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Garescher, Marie	ML15154A403
Garetz, Diane	ML15148B188
Garey, Jenne	ML15142A273
Garfield, Andrea	ML15142A109
Garfinkel, Nina	ML15156A640
Garland, Carole	ML15154A742
Garland, Robert	ML15154B869
Garlit, Donald	ML15148B371
Garmon, Toni	ML15154A221
Garnant, Gregory	ML15153B162
Garoutte, Claudia	ML15153A788
Garoutte, Debra	ML15159A654

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Garrett, Benjamin	ML15154A543
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Garrett, Larry	ML15153B297
Garrett, Lory	ML15153A541
Garrett, Mary	ML15162A089
Garrett, Robert	ML15154B972
Garrison, Ron	ML15154A236
Garrison, Susan	ML15158A188
Garritson, David	ML15140A113
Garside, Kim	ML15160A709
Garvey, Lydia	ML15154A733
Garvy, Vanessa	ML15154B202
Gasal, David	ML15154B704
Gasco, Christine	ML15155A244
Gaspar, Stephanie	ML15155A256
Gasperino, Maria	ML15159A697
Gasperoni, John	ML15147A744
Gast, Richard	ML15159B390
Gaster, Valerie	ML15155A147
Gately, Daniel	ML15154A099
Gates, Nancy	ML15156A197
Gathing, Nancy	ML15148A664
Gatling, Gayla	ML15161A656
Gaudin, Gerard F.	ML15154B943
Gault, Carol	ML15159A883
Gause, Jackie	ML15154A693
Gauthier, Lorraine	ML15153A843
Gawron, Katarzyna	ML15153B118
Gawryszewski, Nancy	ML15154A550
Gay, Larry	ML15148B380
Gayken, Aaron	ML15148B231
Gaylin, Rita	ML15155B231
Gaylor, Linda	ML15154B757
Gazzola, Linda	ML15161A621
Geary, Jonny	ML15155A132
Gebhard, Eric	ML15155C252
Gebhart, Leroy	ML15153B198
Gee, Lisa	ML15142A313
Geer, Matt	ML15156A930
Gehrig, Judy	ML15148A706
Geiger, Marcia	ML15156A978
Geiges, Marion	ML15156A217
Geiler, Janet	ML15155A272
Gelfand, Carol	ML15148A749
Gellar, Michael	ML15160A956
Geller, Phyliss	ML15142A359
Gemmill, Robert	ML15159B236
Genasci, Elaine	ML15154B932
Gendvil, Derek	ML15153A643
Gennarelli, Michael	ML15159A468
Gensler, Donna	ML15155A251
Gentili-Lloyd, Mika	ML15159A051
George, Catherine	ML15141A792
George, Kim Sanders	ML15154A954
George, Mark	ML15159A903
Gerber, Eric	ML15156A972
Gerbitz, Gordon	ML15154A675
Gergely, Katrina	ML15159B124
Gerhard, Dan	ML15153A874
Gerke, David	ML15155B160
Germain, Mary	ML15162A643
German, Bonnie	ML15158A105
Germann, Lawrence	ML15158A015
Gertig, Kt	ML15160A868
Gertler, Edward	ML15155A451
Gerwens, Shana	ML15155A023
Gesland, Genelle	ML15159A621
Ghannadi, Nazlee	ML15140A180
Gherardi, Lisa	ML15153A891
Ghiggia, Michelle	ML15155B972
Gianikos, Cathy	ML15159A539
Gibbs, Donna	ML15148A239
Gibbs, Susan	ML15158A245
Giblin, Thomas	ML15148B214
Gibson, Irene	ML15153B115
Gibson, John	ML15153B196
Gibson, Raymond	ML15142A285
Gibson, Scott	ML15154A378
Gibson, Susan	ML15155C242
Gicela, Raymond	ML15159A324
Giddings, Ron	ML15154A115
Gideon, Barbara	ML15159A111
Gierlachowski, Alexandra	ML15159A921
Giese-Zimmer, Astrid	ML15155C074
Gifford, Teresa	ML15155A071
Gilardi, Gary	ML15154C173
Gilbert, Camille	ML15153B267
Gilbert, Jo Ann	ML15154A302
Gilbert, Pat	ML15148B046
Gilbert, Tracy	ML15141A674
Gilbreath, J. Michael	ML15155C176
Gilchrist, Amber	ML15155B316
Gilchrist, Cheryl	ML15140A006
Giles, Warren	ML15154A308
Gill, Juliana	ML15155B702
Gill, Raymond	ML15155A146
Gill, Stephanie	ML15153B177
Gillard, Charles	ML15159A652
Gillespie, Thomas	ML15155A284
Gillespy, Nicole	ML15161A667
Gillette, Shereen	ML15155B735
Gilliland, Charles	ML15156A473
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Gillono, Mark	ML15155A596
Gilmore, Joyce	ML15155C201
Gilmore, Naomi	ML15158A244

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Gingery, Suze	ML15154C139
Ginn, Kenneth	ML15142A315
Gioia, Linda	ML15154B984
Gioielli, Lawrence	ML15155A323
Girvin, Darrylin	ML15156A850
Gitto, Ruth	ML15156A470
Givens, Roger	ML15154A006
Glancy, Joann	ML15156B404
Glandon, Clarice	ML15154A252
Glaser, Helene	ML15159B029
Glaser, Patsy	ML15154A690
Glass, Jordan	ML15141A611
Glass, Malcolm	ML15141A544
Glass, Rachel	ML15159B572
Glasscock, Rita	ML15159A869
Glasser, Karen	ML15141A722
Glasser, Mark	ML15153A854
Glasser, Mark	ML15153B182
Glasser, Tanya	ML15154A466
Glasshof, Wendy	ML15155B196
Glazer, Gertrude	ML15154A783
Gleason, Barbara Lafaver	ML15148B377
Gleason, Debra	ML15153B061
Gleason, Melinda	ML15153A428
Glenn, Alice Ann	ML15148B098
Gley, Debra	ML15153A931
Glick, Art	ML15140A265
Glick, Edward	ML15159A785
Glier, Ingeborg	ML15155A397
Gliva, Stephen	ML15148B280
Gloe, Janice	ML15148A962
Glover, Tim	ML15155A655
Glover, Robert	ML15155B359
Gluchman, Matt	ML15148A634
Gmaz, Mary	ML15154A049
Gobely, Michelle	ML15159A103
Godbee, Allycia	ML15154A356
Godbey, Stella	ML15159A155
Goddard, Simon	ML15156A567
Goden, Gay Marie	ML15155A815
Goding, Larry	ML15153A902
Goebel, Fred	ML15155A078
Goecke, Linda	ML15162A569
Goeckermann, John	ML15154B770
Goehring, Dan	ML15153A847
Goetinck, Jean	ML15155C185
Goff, Karyn	ML15155C239
Goff, Thomas	ML15156A961
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Gold, Carol	ML15153A794
Gold, Ellen	ML15153A414
Gold, Jeff	ML15153A566
Gold, Warren	ML15153A699
Goldberg, Anne	ML15148A651
Goldberg, Laura	ML15155B050
Goldberg, Rosalyn	ML15154B700
Goldberg, Susan	ML15153A451
Golden, Tim	ML15154C067
Goldin, Martha	ML15156B396
Golding, John	ML15154B189
Goldman, Linda	ML15154A268
Goldmark, Leila	ML15159B552
Goldstein, Carol Ann	ML15155C077
Goldstein, Helen	ML15160A530
Goldstein, Louis	ML15154B561
Goldwater, Glenda	ML15156A252
Golembeski, Michael	ML15153A954
Gollobin-Basta, Ruth	ML15148B087
Gomez, Chris	ML15154B221
Gomez, Toni Thoman	ML15155A442
Gomez, Unai Fuente	ML15159A383
Gondos, Nina	ML15155C175
Gonzales, Bernie	ML15154C225
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Gonzalez, Jose Luis	ML15156B192
Gonzalez, Raul	ML15155C174
Gonzalez, Veronica	ML15156B425
Gooden, Anne	ML15141A781
Goodin, Dale	ML15156B266
Goodman, Ellen	ML15153A530
Goodman, Margaret	ML15153A554
Goodrich, Darcy	ML15156B092
Goodrich, Rebecca	ML15159A221
Goodspeed, Helen	ML15155B171
Goodwin, Jill	ML15154A245
Gorden, Gay	ML15158A159
Gordon, Alexandra	ML15142A060
Gordon, Carol	ML15153A683
Gordon, J. B.	ML15148A143
Gordon, Janet	ML15159A063
Gordon, Michael	ML15148B201
Gore, Jesse	ML15148B137
Gorecki, Carole	ML15159A522
Gorina, Maya	ML15153B266
Gorlicki, Coralyn	ML15142A074
Gorn, Scott	ML15141A759
Gorra, Brian	ML15142A304
Gorsetman, Mark	ML15156B133
Gorton, Michelle	ML15159B301
Gosnell, Lisa	ML15155B709
Gossett, Gene	ML15153A919
Gotesky, Stephen	ML15140A292
Gotlib, Eva	ML15148A768
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Goto, Matthew	ML15159B467

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Gottschalk, Pat	ML15155A350
Gotvald, Mark	ML15148A179
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Gould, Ed	ML15153B024
Gould, Julianne	ML15158A118
Goulet, Christine	ML15142A125
Gover, Pat	ML15156B020
Gowani, Nancy	ML15155B970
Gowens, Edward	ML15162B079
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Grace, Joel	ML15148B150
Grady, Pat	ML15147A731
Graffagnino, Mary Ann and Frank	ML15154B434
Graffell, Jess	ML15140A256
Graham, Dan	ML15156A195
Graham, Danielle	ML15160A848
Graham, Guy	ML15162A081
Graham, Lynn	ML15155A519
Graham, Sidney	ML15148A989
Grames, Patricia	ML15154B808
Gramza, Amy	ML15153A515
Granchi, Donald	ML15158A259
Granias, Susan	ML15148A661
Granofsky, Gabrielle	ML15154A736
Grant, Nancy	ML15140A163
Grasso, J.	ML15159A015
Graube, Davids	ML15159A446
Graul, Kara	ML15161A622
Gravelle, Willis	ML15154A098
Graver, Chuck	ML15153B279
Graves, Caryn	ML15141A744
Gray, Alison	ML15156A154
Gray, Debra	ML15155A902
Gray, Jennifer	ML15155A103
Gray, Joe	ML15153A738
Gray, Marissa	ML15155B730
Gray, Sylvia	ML15154A192
Gray, Tony	ML15159A633
Greaves, Leeann	ML15158A077
Green, Alice	ML15142A054
Green, Carol	ML15154A702
Green, Jamie	ML15156A937
Green, Jesse	ML15148B351
Green, July	ML15155C095
Green, June	ML15156A290
Green, Ken	ML15154A337
Green, Kerstin	ML15156B406
Green, Kristin	ML15153A616
Green, Martha	ML15142A151
Green, Mary Catherine	ML15156A974
Green, Meredith	ML15155C245
Green, Natasha	ML15155B615
Green, Pamela	ML15148A913
Greenberg, Jason	ML15154A029
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Greene, Carole	ML15156B438
Greenhalgh, Diana	ML15153A502
Greenhalgh, Karen	ML15154A304
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Greenwald, Ken	ML15155C084
Greenway, Lumina	ML15148B202
Greer, Amy	ML15147A747
Greer, Helen	ML15155A425
Greer, Tom	ML15153B174
Greger, Sabine	ML15155B821
Gregersen, David	ML15155A716
Gregoire, Andre	ML15156B261
Gregory, Gregory B.	ML15154A125
Gregory, Maria	ML15154A383
Gregson, Wright	ML15154B216
Greig, Joan	ML15142A200
Greig, Joe	ML15148B316
Greil, Judith	ML15155B501
Greinke, Pamylle	ML15148B278
Gribosky, Philip	ML15154C178
Grice, Royce	ML15159A380
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Grieves, Kathy	ML15154A145
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Griffith, Carolynn	ML15154B866
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Griffy, Kathleen	ML15155A941
Grillo, John	ML15154A176
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Grimley, Chris	ML15159A334
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Gross, Anne	ML15155A381

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Gross, Jim	ML15160A938
Gross, Kurt	ML15153A369
Gross, Linda	ML15148A886
Gross, Sister James Marie	ML15156A256
Grossman, Bonnie	ML15141A669
Grossman, Kathleen	ML15148B187
Grossman, Kathleen	ML15156B407
Grotzke, Mark	ML15154C294
Grounds, Shari	ML15148B090
Grove, Earl	ML15156A010
Grove, Paul	ML15156B298
Grove, Stephen	ML15154B936
Grovenstein, Elizabeth	ML15160A924
Grover, Justin	ML15148B301
Groves, Linda	ML15154A698
Grubb, Harold	ML15159A009
Grubbs, Lisa	ML15153A710
Grubbs, Victoria	ML15158A030
Gruenau, Douglas	ML15147A764
Grush, Melissa	ML15156B476
Gruver, Chere	ML15155A044
Gualario, Lascinda	ML15155B186
Guallar, Santi	ML15147A749
Gualtieri, Kate	ML15159B008
Gucciardo, Kaye	ML15159A230
Guh, H.	ML15147A717
Guier, Richard	ML15159B083
Guilbault, Aubrey	ML15159B395
Guilliams, Karen	ML15156B415
Guinnup, David	ML15154B810
Guise, Elizabeth	ML15148B180
Gulla, Audrey	ML15148A705
Gullerud, Lois	ML15153A741
Gullo, Paula	ML15159B459
Gumpert, Michael	ML15159A696
Gunn, Amy	ML15155B937
Gunter, Karlene	ML15159A082
Gunther, Peter	ML15147A771
Gupta, Dave	ML15147A781
Guram, Monjit	ML15141A771
Gurdin, J. Barry	ML15153B227
Gurley, Marianne	ML15153B051
Gurvey, Jenna	ML15153B238
Guss, Elisabeth	ML15155A494
Gustafson, Heidi	ML15158A260
Gustafson, Marcy	ML15156B007
Gustafson, Owen	ML15154B942
Gustafson, Susan	ML15155A280
Guthrie, Amber	ML15154B604
Guthrie, Elizabeth	ML15159B074
Gutierrez, Emmylou	ML15155C008
Gutierrez, Nancy	ML15154B453
Gutierrez, Oscar	ML15155B226
Gutman, Ruth	ML15154A323
Guttridge, Laura	ML15153A475
Guyon, Pamela	ML15148B163
Guyot, Jack	ML15156A742
Guyot, Jack	ML15156A777
Gwinn, Carol	ML15148B399
H., Jen	ML15154A212
H., Littlewolf	ML15155C205
Haage, L.	ML15141A452
Haas, Evelyn	ML15153A463
Habegger, Sue	ML15154B339
Habick, William	ML15154A186
Hacker, Sue	ML15153B284
Hackney, Stephen	ML15156A178
Hade, Michaeline	ML15148A200
Hadley, Shela	ML15153A538
Hadlock, Kevin	ML15154B478
Haegele, William	ML15153A676
Haertel, Melissa	ML15153B145
Hafer, Sarah	ML15153A960
Haffner, Barbara	ML15161A637
Haga, Martha	ML15159B507
Hagen, Cleo	ML15155A439
Hager, Jon	ML15156A785
Hagood, Hap	ML15153A765
Haig, Brenda	ML15154A369
Haine, R.	ML15155C057
Haines, Thomas	ML15141A623
Hair, Karla	ML15154B950
Hait, Gordon	ML15155A537
Hajduk, Kelly	ML15156A299
Hajek, Jim	ML15148A274
Hakkinen, Kari	ML15155B097
Hale, Sharon	ML15154B121
Hale, Susan	ML15160A599
Halem, Robert	ML15141A705
Hall, Dennis	ML15160A828
Hall, Emily	ML15154B381
Hall, George	ML15141A743
Hall, Heather	ML15155A501
Hall, Jan	ML15153A768
Hall, Janice	ML15148B320
Hall, Jennifer	ML15142A117
Hall, Keith	ML15155B923
Hall, Linnea M. Fronce Thomas	ML15160A853
Hall, Marian	ML15160A880
Hall, Shawn	ML15148B368
Hall, Silvia	ML15156A527
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Halligan, Melody	ML15154A377
Halligan, Sue	ML15154B204
Hallman, Hollie	ML15159A421
Hallman, Janice	ML15156B511

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Haltom, D.	ML15159A025
Halvorson, Heather	ML15155A334
Hamann, Susan	ML15148B285
Hamilton, Cheryl	ML15160A759
Hamilton, Colleen	ML15148A792
Hamilton, Janet	ML15156A722
Hamilton, Judy	ML15155A108
Hamilton, Pamela	ML15155A079
Hamilton, Ted	ML15156A324
Hamm, Bill	ML15155B595
Hammer, Dorothy	ML15154A864
Hammer, F.	ML15159A239
Hammer, Lisa	ML15156B455
Hammer, Randy	ML15153B144
Hammer, Randy	ML15160A707
Hammerly, Jimi	ML15160A856
Hammond, Bob	ML15155B770
Hammond, Robert	ML15160A983
Hammond, Todd	ML15154A102
Han, Richard	ML15156A703
Hance, Judith	ML15156A638
Hancock, Lynne	ML15160A990
Hancock, Rebecca	ML15147A773
Handford, Janet	ML15154A042
Handwerker, Steven	ML15154C032
Hanff, Jean	ML15154B507
Hanisee, Mark	ML15159B010
Hanks, Douglas	ML15154A109
Hanley, Lindsay	ML15158A033
Hanlon, Jessica	ML15162B108
Hanlon, Jessica	ML15162B064
Hanly, Heather	ML15153A464
Hanna, Jeff	ML15148B062
Hannan, Susan	ML15162A055
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Hansen, Anna	ML15153B070
Hansen, Arthur	ML15158A175
Hansen, Claudia	ML15155A002
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Hansen, Jan	ML15154A968
Hansen, Kathy-Jo	ML15156A229
Hansen, Marc	ML15156B040
Hansen, Neil	ML15159B574
Hansen, Yvonne	ML15154C148
Hanson, Craig	ML15154A023
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Hanson, Kristin	ML15155C094
Hanson, Naomi	ML15155B509
Hanson, Richard	ML15155B894
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Happer, Marty	ML15153A737
Haraoui, Samira	ML15148B032
Harbison, G. B.	ML15148B127
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Hardin, Judith	ML15140A139
Hardin, Lillian	ML15158A172
Harding, Janilyn	ML15153A752
Hardt, Jerry	ML15155C243
Hardt, Vincent	ML15153B216
Hardy, Linda	ML15154A267
Hardyman, Leslie	ML15155C103
Harish, Anavai	ML15154A786
Harl, Melissa	ML15159A985
Harlan, Ann	ML15142A020
Harlan, Melissa	ML15155B612
Harland, Donald	ML15159A594
Harmon, Terry	ML15154C298
Harper, Alan	ML15153B262
Harper, Diane	ML15153A722
Harper, K.	ML15156B419
Harper, Leslie	ML15154C084
Harper, Marilynn	ML15148A603
Harper, Rebecca	ML15159B523
Harper, Thomas	ML15142A167
Harper, Tom	ML15155B198
Harrell, Marlene	ML15155A662
Harrington, Lonnie	ML15159A339
Harrington, Michelle	ML15159A382
Harrington, Sue	ML15153A569
Harris, Rosemary	ML15148A975
Harris, Susan	ML15148B030
Harris, Brooke	ML15142A220
Harris, Christine	ML15141A517
Harris, Harry	ML15156A652
Harris, J.	ML15154A134
Harris, Jamie	ML15159B103
Harris, Jan	ML15148B089
Harris, Julie	ML15154C133
Harris, Kymberlee	ML15153A850
Harrison, Catherine	ML15154A320
Harrison, Colleen	ML15154A287
Harrison, David	ML15159B127
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Harrison, Jeane	ML15155B940
Harrison, Marie	ML15160A884
Harrison, Norma J. F.	ML15155B823
Harrison, T. Hamboyan	ML15153A381
Harris-Richardson, Annette	ML15159B359
Harrod, Dawn	ML15153B136
Harsin, Linda	ML15156A171
Hart, Barbara	ML15162B154

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Hart, Jamie	ML15159A949
Hart, Jessica	ML15155B125
Hart, Kathy	ML15153A989
Hart, Ruth	ML15155B788
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Hartleb, Carole	ML15148B158
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Hartley, James	ML15141A567
Hartman, Jenny	ML15154B548
Hartman, Nancy	ML15158A089
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Hartman, Richard	ML15156A283
Hartman, Sue	ML15154C176
Hartman, Todd	ML15154A298
Hartshorne, Annette	ML15155B247
Hartz, Liz	ML15154B903
Harvey, Kathy	ML15153A550
Harvey, Shea	ML15155A784
Harvey, Terry Greene	ML15148B168
Harwell, Janet	ML15155B825
Harwell, Mary Ann	ML15159A646
Hasbach, Corinna	ML15156B386
Haseltine, Amber	ML15142A316
Haskell, Michael	ML15142A266
Hasselbrink, Robert	ML15142A095
Hassig, William	ML15154C100
Hastings, Melissa	ML15159A781
Hastings, William	ML15153B278
Hatch, Gari	ML15141A607
Hatch, Susan	ML15155A665
Hatfield, Eugene	ML15154A280
Hathaway, Christsopher	ML15156A765
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Hattendorf, Ethan	ML15148A695
Hauber, Barclay	ML15148B007
Hauenstein, Cathleen	ML15159A422
Haugen, Bob	ML15162A255
Haugen, Bob	ML15162A633
Haupt, Carolyn	ML15140A111
Haussner, Norman	ML15154A181
Havens, Judith	ML15155A512
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Hawkins, Patricia	ML15159A238
Hayasaka, Kiyo	ML15153A574
Hayes, Christine	ML15154B188
Hayes, Linda	ML15156A712
Hayes, Mary	ML15142A345
Hayes-Budgen, Shawndra	ML15153A702
Haymans, Deanna	ML15156A482
Hayne, Jan	ML15153A476
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Hays, Helen Logan	ML15156A666
Hayward, Michelle	ML15155C081
Hayward, Susan	ML15154A315
Hazard, Evan	ML15153B288
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Hazelton, Judith	ML15162A082
Hazen, Alona	ML15155B794
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Head, Ashley	ML15141A715
Head, Kris	ML15158A272
Headley, Kimberley	ML15155B207
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Heagy-Len, Linda	ML15159B230
Heald, Mark	ML15154A015
Heaning, Richard	ML15140A188
Hearthstone, Bonnie	ML15159B036
Heartsong, Judith	ML15160A814
Heath, Mary	ML15155A645
Hebberger, Jo Anna	ML15154A294
Hedges, Ken	ML15159B304
Heffron, Joshua	ML15141A677
Hegarty, Elizabeth	ML15154A256
Hegedus, Barbara	ML15159B564
Heide, Andra	ML15156B334
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Heiks, Kristina	ML15155A769
Heininger, Joseph	ML15154B911
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Heinly, Bridgett	ML15153A802
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Heist, Roberta	ML15154C255
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Helenchild, Liz	ML15148B086
Helget, Linda	ML15156A278
Helmer, Kathleen	ML15153A607
Helmholz, Sharron	ML15154C071
Helsel, Daniel	ML15159B415
Hemberger, Jade	ML15160A062
Hemingway-Proia, Georgeann	ML15153A961
Hemming, Michele	ML15154B839
Hendershot, Tamara	ML15148A655
Henderson, David	ML15156B183

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Henderson, Rachelle	ML15140A259
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Henderson, Steven	ML15155A808
Henderson, Suzy	ML15159B370
Hendler, Carol	ML15154A083
Hendricks, Richard	ML15156B025
Hendrix, Alice	ML15158A223
Hendrix, Dana	ML15158A037
Hendry, Dawn	ML15159A052
Hennemann, W. W.	ML15141A750
Henning, Linda	ML15154B703
Henninger, Melissa	ML15156B175
Henriksen, Deb	ML15160A088
Henriksen, James	ML15154A051
Henry, Anne	ML15148B024
Henry, Harold	ML15142A223
Henry, Martha	ML15155B908
Henry, Robert	ML15153A972
Henry, Sheri	ML15153A615
Hensel, Charles	ML15153B147
Hensgen, Eric	ML15140A237
Hensley, Kim	ML15154B222
Henson, Joey	ML15154C304
Henson, Theresa	ML15155C179
Henzel, William	ML15148B047
Hepburn, Elizabeth	ML15155A488
Herbert, Annabelle	ML15153B270
Herbert, Wendy	ML15154B506
Herbruck, Janet	ML15154B063
Herbst, Daniel	ML15141A716
Herda, Frank	ML15154B454
Herlihy, Peggy	ML15155A542
Herman, Lon	ML15156A035
Hermann, Birgit	ML15155A443
Hermanson, Kristina	ML15161A698
Hernandez, Maria	ML15154B192
Hernandez, Noemi	ML15159A012
Hernandez, Robin	ML15148A197
Hernandez, Steven	ML15156B446
Herndobler, Beth	ML15142A027
Heron, Robert	ML15154C226
Herr, Richard and Marietta	ML15140A223
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Herrera, Bill	ML15141A485
Herrera, Bill	ML15148B432
Herring, Kathleen	ML15155A131
Herron, Andria	ML15153B125
Herschler, Faith	ML15153B121
Hershey, June	ML15154C062
Herten, Margaret	ML15148B113
Hertz, Albert and Marcia	ML15155B154
Herwig, Gary	ML15140A067
Herwig, Karen	ML15155A158
Herzog, Elaine	ML15159B001
Hess, Carolyn	ML15154A274
Hess, John	ML15154B060
Hess, Joseph	ML15148B291
Hess, Karin	ML15156B452
Hess, Paul	ML15155A088
Hesse, Susanne	ML15148A737
Hester, Sally	ML15142A078
Hesterberg, William	ML15142A302
Heuman, Chris	ML15155A072
Heuman, Rachel	ML15154A575
Heuman, Tachel	ML15155A221
Hewelt, Karen	ML15148B195
Hewes, WIlliam	ML15154C022
Hewett, Rosemary	ML15156A842
Hewgley, Joseph	ML15154B085
Hewitt, Anne-Marie	ML15155C224
Hewitt, Cheryl	ML15156A155
Hewitt, Sheri	ML15141A794
Hey, Lisa	ML15154B976
Heydemann, Paul	ML15142A076
Heyden, Neil	ML15155A109
Heyneman, Amy	ML15155B786
Hi, Jacki	ML15153A338
Hibbard, Jeff	ML15148A247
Hibben, Tresa	ML15155B860
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Hicklin, Mary	ML15154B949
Hickox, Ann	ML15155B846
Hicks, Robert	ML15155B243
Hidde, John	ML15154B273
Hiestand, Nancy	ML15140A268
Higbee, Susan	ML15142A137
Higgins, Barbara	ML15156A248
Higgins, Susi	ML15155A006
Hightower, Keith	ML15159B416
Hilbert, Pamela	ML15155C229
Hildebrand, James	ML15153A753
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Hildebrandt, Todd	ML15155B158
Hildner, Ellen	ML15155A124
Hill, Bobbi	ML15148B272
Hill, Carol	ML15156A950
Hill, Frank	ML15159A214
Hill, Ginger	ML15154B331
Hill, Jennifer	ML15155A532
Hill, Jessica	ML15142A147
Hill, Joy	ML15162A544
Hill, Lois	ML15162A705
Hill, Michael	ML15156B468
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Hill, Sally	ML15140A119

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Hilliard, Jenn	ML15162A498
Hills, Sally	ML15156A330
Hillstrom, Cindee	ML15159A236
Hilpman, Dwight	ML15159A772
Hiltz, Dan	ML15155B859
Himmelman, Carol	ML15159A688
Hinds, Elenita	ML15159A031
Hinerman, Michele	ML15153A333
Hines, Allison	ML15154C284
Hines, Lanier	ML15155A257
Hines, Nancy	ML15155B737
Hinson, Kathy	ML15153B027
Hinton, Eugene C.	ML15142A300
Hinze, Willie	ML15153A740
Hipp, James	ML15155B743
Hipsher, Linda	ML15156A192
Hirano, Kim	ML15154C182
Hird, Lindsey	ML15159B399
Hirsch, Catherine	ML15155B508
Hirsch, Harriet	ML15140A032
Hirsh, Ethan	ML15154B737
Hiseley, Michelle	ML15155A940
Hitchcock, Erik	ML15156A717
Hitchins, John	ML15148B335
Hite, Richard	ML15154C128
Hittle, Mike	ML15159A749
Hix, Hildegard	ML15153A835
Hix, Katherine	ML15155B209
Hlat, Mike	ML15160A918
Hlodnicki, Bruce	ML15162B064
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Hoaglin, Dianne	ML15154C097
Hoats, John	ML15141A583
Hobbs, Joan	ML15162A667
Hobson, Kelvin	ML15154A184
Hochendoner, Bernard	ML15155A507
Hodge, Sonya	ML15155B584
Hodges, Andrea	ML15154C216
Hodges, Christina	ML15142A310
Hodie, Jake	ML15159B366
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Hodson, Sally	ML15156A101
Hoegler, Jean	ML15154C117
Hoernig, Paul	ML15155B379
Hoesel, Walter	ML15155A661
Hoess, Joseph	ML15155B253
Hofacker, Keith	ML15141A702
Hoff, Mary	ML15156A083
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Hoffman, Brenda	ML15155C043
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Hoffman, Nancy	ML15162A294
Hoffman, Tom	ML15154B761
Hoffmann, James	ML15156A484
Hofheins, Paul	ML15155A712
Hofing, Amy	ML15156A653
Hogan, Cynthia	ML15154A722
Hogan, Jack	ML15154B086
Hogan, Michael	ML15154A171
Hogan, Randolph	ML15155B863
Hogle, Dick	ML15142A185
Hogue, Kelly	ML15154B682
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Hojda, Debora	ML15160A087
Holden, Grace	ML15158A220
Holguin, George	ML15156A804
Holland, Brett	ML15159B246
Holland, Fern	ML15154B905
Holland, Lovice	ML15154A248
Hollenbeck, Margaret	ML15148A222
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Holliday, T.	ML15148B074
Hollington, Jason	ML15155A106
Hollinrake, Mark	ML15154B987
Hollis, Bonnie	ML15142A153
Hollis, Kathleen	ML15153A745
Hollis, Nancy	ML15148B347
Hollis-Franklyn, Candace	ML15155B516
Hollister, David	ML15156A186
Hollon, Leanna	ML15159B433
Holloway, Elizabeth	ML15148A744
Holm, Samantha	ML15140A269
Holman, Clarisse	ML15162A362
Holmdahl, K.	ML15155C092
Holmes, Andre	ML15155B622
Holmes, Beate	ML15159B054
Holmes, Brad	ML15159A992
Holmes, Debbie	ML15141A735
Holmes, Phyllis	ML15156A243
Holmgren, Jeanette	ML15159A449
Holoduek, John	ML15156B085
Holsten-Coleman, Karen	ML15156A246
Holt, Amy	ML15154A752
Holt, Bill	ML15148A901
Holt, Kendra	ML15154B937
Holt, Mary	ML15142A367
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Holthaus, Tracy	ML15158A253
Holtrop, Holly	ML15159A358
Holtzclaw, John	ML15142A286
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Holtzman, Jed	ML15154B001
Holtzman, Lawrence	ML15140A125

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Hon, Don	ML15155A295
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Honigsblum, Alexander	ML15155B093
Honore, Stephanie	ML15159A839
Hoobing, Stan	ML15153A974
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Hoodwin, Marcia	ML15154C109
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Hooks, David	ML15160A903
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Hooven, Betty	ML15155B797
Hoover, Linda	ML15156A588
Hope, Holly	ML15154A364
Hope, Katherine	ML15156A204
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Hopkins, James	ML15148A137
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Horiwitz, Laura	ML15155A379
Horn, Roger	ML15156A311
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Horne, Mike	ML15155A149
Horne, Paul	ML15153A925
Horstman, Kara	ML15159A344
Horton, Christine	ML15154B556
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Horwitz, Martin	ML15153B062
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Hosek, Ruth	ML15156A988
Hotchkiss, Jay	ML15153A969
Hottenstein, Tara	ML15142A299
Houchin, John F.	ML15155A005
Hough, Susan	ML15148A601
Houghton, Francis	ML15159B565
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House, Robert	ML15154C006
Houseworth, Bradley	ML15160A891
Houston, Annie	ML15153A694
Houston, Meghan	ML15159A440
Hovekamp, Larry	ML15142A362
Hovey, Roseanne	ML15154B044
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Howden, John	ML15154A050
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Howie, Linda	ML15158A109
Howlett, Ariel	ML15156A474
Howry, Marita	ML15155A139
Hoyle, Lester and Judy	ML15154C229
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Hubbard, Dan	ML15154A352
Hubbell, Sharon	ML15153B218
Huber, Anne	ML15155B904
Huckaba-Paiz, Sharol	ML15162A236
Hudak, Lesley	ML15159A277
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Huerta, Juan	ML15154A060
Huffman, Russell	ML15162A078
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Hughes, Angela	ML15148B315
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Hughes, Curtis	ML15155C052
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Hughes, Jessica	ML15162A586
Hughes, Karan	ML15155C169
Hughes, Kathryn	ML15155A343
Hughes, Kevin	ML15156A297
Hughes, Laurel	ML15156B345
Hughes, Lisa	ML15142A278
Hughes, Richard	ML15153A877
Hui, Sng	ML15159A517
Hulbert, Susi	ML15154C119
Hull, Cynthia	ML15159A034
Hull, Gary	ML15153A790
Hull, Juanita	ML15156B038
Hull, Lise	ML15148B437
Hull, Ronald	ML15153B287
Humane Society South Brevar	ML15159A037
Hummell, Annette	ML15159A401
Humphrey, Carol	ML15158A112
Humphrey, Thomas	ML15148A266

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Humphries, Roberta	ML15142A237
Humrich, Gilia	ML15153A372
Hung, Patricia	ML15148A134
Hunrichs, Paul	ML15156B301
Hunt, Jill	ML15162A064
Hunter, Jan	ML15153A887
Hunter, Susan	ML15153B261
Hunter, Suzanne	ML15140A190
Huntington, Stephanie	ML15142A218
Huntley, Cheryl	ML15142A364
Huntley, Heather	ML15159A147
Huntley, William	ML15154B652
Hurley, Brady	ML15155A233
Hurley, Mark	ML15155A538
Hurst, June	ML15154C153
Hurtt, Kimberly	ML15159A956
Hurwitz, Jeffrey	ML15141A592
Husby, Jason	ML15155C059
Hutchens, Jr., John	ML15148A620
Hutchings, William	ML15153B007
Hutchins, David	ML15153B094
Hutchins, Katherine	ML15153A805
Hutchins, Leslie	ML15155B043
Hutchinson, Jerry	ML15159B338
Hutchison, Dwight	ML15141A491
Huth, Graciela	ML15155A436
Huttinger, Roberta	ML15156B129
Huttner, Elodie	ML15153A430
Hutton, Craig	ML15154B114
Hvozda, Tammi	ML15154A361
Hwad, Monoe	ML15148A640
Hyche, Kenneth	ML15155A360
Hyde, Lynda	ML15160A531
Hynd, J.	ML15155A399
Ibbotson, David	ML15154A072
Idone, Carol	ML15147A709
Iffland, Lisa	ML15148A747
Ihne, Merle	ML15142A360
Ihrig, Janis	ML15158A285
Ii, Keith Rick	ML15148B213
Ii, Riley Canada	ML15159B342
Ilowiecki, John	ML15142A037
Iltis, Michael	ML15153A447
Iltzsche, William	ML15155A517
Iluna, Mana	ML15142A121
Imada, F.	ML15154A449
Imberton, Marie-France	ML15156B409
Imel, Arjuna	ML15159B500
Imker, Susan	ML15148A650
Immasche, Sonia	ML15156A865
Immel, Amy	ML15156A265
Indrelie, Kenneth	ML15160A745
Infante, Neil	ML15141A723
Ingraham, E.	ML15155A113
Ingram, Taylor	ML15155A027
Insurriaga, Aurora	ML15155B721
Ionina, Kate	ML15162A352
Ireland, Victoria	ML15159B090
Irvine, Gael	ML15155B059
Isaac, David	ML15153A723
Iseri, Martin	ML15148B379
Ishii-Kiefer, Takako	ML15141A758
Ismail, Hildy	ML15154A193
Israel, Miriam	ML15154A813
Israil, S.	ML15148B050
Ivankovic, Anthony	ML15154A139
Iversen, Sheryl	ML15154B307
Iverson, Steve	ML15155B268
Iverson, Susan	ML15160A920
Ivey, Cheryl	ML15154A229
Ivy, Rebecca	ML15148A257
Iwankiw, Pilar	ML15156A469
Izzo, Martha	ML15154A624
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Jaakola, Julia	ML15156B093
Jablonski, Margaret	ML15154C055
Jacinto, Paloma	ML15162A722
Jackimiak, Jim	ML15141A685
Jackson, Carol	ML15141A642
Jackson, David	ML15156B131
Jackson, Ginny	ML15154C096
Jackson, James	ML15154A634
Jackson, Judy	ML15155A089
Jackson, Lael	ML15154A089
Jackson, Phyllis	ML15148A225
Jackson, Richard	ML15154A198
Jackson, Sasha	ML15141A718
Jackson, Warren	ML15148B055
Jacob, Sheena	ML15159A158
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Jacobs, Judy	ML15159A142
Jacobs, qJohn	ML15155A324
Jacobsen, Kathleen	ML15153B081
Jacobson, Lawrence	ML15153B205
Jacobson, Martin	ML15153A914
Jacobson, Paul	ML15155A672
Jacobs-Pollez, Rebecca	ML15162A171
Jacque, Carol	ML15154A277
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Jacques, Karen	ML15153B006
Jacques, Sally	ML15148A971
Jadczak, Andrew	ML15148B085
Jaeger, Pam	ML15141A789
Jaegers, Martha	ML15154A231
Jahos, Ellen	ML15142A308
Jakubowska-Cook, Ewa	ML15156B346
Jalbert, Diane	ML15155A074
Jamal, Kate	ML15141A665

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James, Damian	ML15154A191
James, Ilona	ML15142A242
James, Kristine	ML15155A015
James, Nancy	ML15141A584
James, R. Dean	ML15153B234
James, Robert	ML15158A049
James, Russell	ML15154C204
Jamison, L.	ML15148A942
Jamison, Sara	ML15154A153
Jamsheed, Ghazale	ML15155B947
Jamvolds, Shunko	ML15159B270
Janczuk, Stan	ML15154A520
Jandourek, Alexia	ML15158A197
Janowsky, Margaret	ML15155A193
Jarvis, J. R.	ML15155A722
Jastromb, Virginia	ML15154B855
Jatinen, Jane	ML15154A082
Jaye, Abigail	ML15142A283
Jean, Patrick	ML15160A815
Jeavons, John	ML15156B041
Jenisio, Kurt	ML15141A546
Jenkin, Rob	ML15155A094
Jenkins, Cheryl	ML15156A787
Jenkins, Eugenie	ML15148B209
Jenkins, Janell	ML15155B090
Jenkins, Lynn	ML15154A374
Jenks, Robert	ML15159A269
Jenne, Karen	ML15155A939
Jennings, Erin Stuart	ML15148B350
Jennings, Linda	ML15155A432
Jennings, Scott	ML15155B843
Jennings, Sid	ML15156B199
Jensen, Brett	ML15159A054
Jensen, Catherine	ML15153A896
Jensen, Cornelia	ML15156A720
Jensen, Donna	ML15155A586
Jensen, Jan	ML15148B002
Jensen, S.	ML15153B078
Jensen, Victoria	ML15142A355
Jernquist, Harriet	ML15155A875
Jeschke, Herbert	ML15142A047
Jessee, Judy	ML15153B221
Jessop, D.	ML15142A059
Jessup, Nicole	ML15141A763
Jeude, Shirley	ML15148A917
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Jezierski, Elisabeth	ML15156A651
Ji, J.	ML15158A081
Jimenez, Lawrence	ML15156A646
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Joas, Chris	ML15154A824
Jobe, Laura	ML15159A001
John, Oda	ML15155B334
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Johnson, Gordon	ML15159A148
Johnson, Arnold	ML15156B469
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Johnson, Don	ML15158A206
Johnson, Edward	ML15156A664
Johnson, Esther	ML15153A842
Johnson, Gregg	ML15162A603
Johnson, Janice	ML15153B150
Johnson, Jim	ML15159A496
Johnson, Joel	ML15161A625
Johnson, Jona	ML15154B242
Johnson, Julie	ML15155A145
Johnson, Kay	ML15161A638
Johnson, Larry	ML15159A022
Johnson, Laura	ML15154A326
Johnson, Leslie Austin	ML15156A744
Johnson, Lorraine	ML15154B765
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Johnson, Mary	ML15148B439
Johnson, Maxwell	ML15154B907
Johnson, Michael	ML15148A644
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Johnson, Michele	ML15154B256
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Johnson, Pat	ML15159A047
Johnson, Paula	ML15155B407
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Johnson, Robert	ML15159B352
Johnson, Sally	ML15153B212
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Johnson, Susan	ML15141A612
Johnson, Suzy	ML15159B435
Johnson, Thomas	ML15158A019
Johnson, Tracy	ML15148B093
Johnson, Vicki	ML15153A746
Johnson-Hamerman, Lois	ML15154B518
Johnson-Hamerman, Lois	ML15158A108
Johnston, Allan	ML15156A085
Johnston, James	ML15148B014
Johnston, Judy	ML15156A529
Johnston, Susan	ML15140A028
Johnstone, Lizette	ML15159A211
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Jolly, John	ML15154B676
Joly, Frederique	ML15159B000
Jonaitis, Charles	ML15155A024
Joncus, Andrew	ML15159B411
Jones, Alice	ML15155C191

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Jones, Avianna	ML15154A828
Jones, Carol	ML15159B375
Jones, Charles	ML15160A065
Jones, Dylan	ML15155B960
Jones, Gary	ML15156B302
Jones, Ingrid	ML15159A509
Jones, Joshua	ML15154B095
Jones, Leah	ML15159A473
Jones, Libby	ML15155A727
Jones, Marie	ML15141A680
Jones, Ronald	ML15154A647
Jones, Roslyn	ML15154A782
Jones, V. and B.	ML15155A730
Jordan, Archer	ML15154A097
Jordan, Lois	ML15162B111
Jordan, Lois	ML15162B064
Jordan, Mark	ML15154B899
Jordan, Scharley	ML15155A715
Jorgensen, Alena	ML15155A087
Jorgenson, Linda	ML15140A276
Jorz, Martha	ML15153A387
Joseph, Ann	ML15153A811
Josselyn, Susan	ML15160A551
Jourdenais, Richard	ML15154A866
Joy, Deborah	ML15156B107
Joy, Krista	ML15154A376
Joyce, Joy	ML15155C166
Joym, Kat	ML15162A568
Joyner, Jerry	ML15154A780
Joyner, Marjorie	ML15156B380
Juba, Anne	ML15156A548
Judge, Patrick	ML15153B153
Juelich, Clarence	ML15155A456
Juhl, Esther	ML15159A333
Julian, Alexis	ML15154A380
Jumet, Pamela	ML15159B077
Jumonville, J.	ML15141A786
June, Doris S.	ML15155A390
June, Taylor	ML15156A196
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Jun-Morris, Mary Anna	ML15156A798
Juras, Randy	ML15154B691
Jurczewski, Carol	ML15147A727
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Jurgensen, Catherine	ML15155A167
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Justice, Kimberly	ML15159B098
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K., C.	ML15155A352
K., J.	ML15155B648
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Kahigian, Peter	ML15159A915
Kahnemundt, Martin	ML15156A119
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Kaler, Jason	ML15148A793
Kalinowski, Catherine	ML15155A641
Kalinski, Ray	ML15154C094
Kalka, Paul	ML15156A761
Kalvesmaki, Andrea	ML15153B104
Kameon, Kitty	ML15153B014
Kaminski, Marcia	ML15155B696
Kampa, Jan	ML15154B859
Kamrath, Henry	ML15148A221
Kane, Brooke	ML15148A920
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Kane, Linda	ML15155A378
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Kanee, Shirley	ML15153A517
Kanzer, Michaelain	ML15156B176
Kaplan, Kay	ML15148A767
Kapphahn, Gregory	ML15154B963
Kapustka, Franklin	ML15155A189
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Karlow, Edwin	ML15160A657
Karls, Kristi	ML15159A860
Karlson, Fred	ML15156A919
Karpel, Janice	ML15156B510
Karpel, Ruth	ML15155A041
Karst, Richard	ML15154C165
Karsten, Annetta	ML15158A072
Kasey, C.	ML15154B678
Kask, Pat	ML15159B363
Kasper, Sandy	ML15156A994
Kast, Kathy	ML15140A037
Kast, Kenneth	ML15154A464
Kastner, Margean	ML15155B915
Katerinsky, Bess	ML15142A172
Kates, Barbara	ML15158A021
Katterson, Melissa	ML15155B720
Katz, Alissa	ML15155C106
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Kautz, Katherine	ML15154B695

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Kaye, Jackie	ML15162A588
Kea, Ruth	ML15154A485
Keast, Alix	ML15153A845
Keats, James	ML15156A535
Keegan, Helen	ML15159B451
Keener, Arlene	ML15156B172
Keeton, Hank	ML15155A096
Kegelman, Julia	ML15154C065
Kegler, Carol	ML15155B424
Kehl, David	ML15154A670
Keim, Steve	ML15155B491
Keiner, Kathryn	ML15153B306
Keiser, John	ML15147A751
Keiser, Peter	ML15155A296
Keiter, Nancy	ML15156A979
Keitz, Jennifer	ML15155A687
Keller, Brandon	ML15155A243
Kellermann, Thomasin	ML15140A197
Kelley, Marci	ML15156B379
Kelley, Pat	ML15148B097
Kelley, Ruth	ML15160A524
Kellndorfer, Emily	ML15140A291
Kelly, Bev	ML15142A023
Kelly, Brian	ML15160A651
Kelly, Gordon	ML15153B259
Kelly, Joe	ML15148B357
Kelly, Kevin	ML15142A358
Kelly, Kevin	ML15154C112
Kelly, Lisa Ann	ML15154C013
Kelly, Lisa Ann	ML15155A269
Kelly, Lucy	ML15159A906
Kelly, Stephen	ML15148B378
Kelly, Theresa	ML15153B105
Kelly, Theresa	ML15154A814
Kelman, Barry	ML15154C243
Kelsheimer, Elise	ML15155A527
Kelso, Carolyn	ML15156B196
Kemnitzer, David	ML15155A736
Kempf, William	ML15162A732
Kemple, Jason	ML15153A521
Kenagy, David	ML15155B399
Kendall, Donna	ML15154A180
Kendy, Arthur	ML15155A383
Kenion, Lisa	ML15155B831
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Kennedy, Sara	ML15155B193
Kennedy, Sarah	ML15142A194
Kenney, Pat	ML15156A455
Kennington, Janet	ML15155A813
Kenny, Bonnie	ML15156B453
Kenny, Paula	ML15155C213
Keough, Maurene	ML15159A144
Kepley, Janna	ML15159A119
Kerman, Paul	ML15156A732
Kern, Carol	ML15142A246
Kern, Cynthia	ML15153A613
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Kersey, Donna	ML15153B291
Kersting, Pamela	ML15155B675
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Kestell, Kathleen	ML15156A212
Keup, Astrid	ML15156A564
Keylin, Margaret	ML15156B464
Keys, Tom	ML15162A216
Keyser, Donald	ML15141A730
Khan, Zohal	ML15140A150
Khoury, Donna	ML15153B273
Khoury, Valentina	ML15160A561
Kibbe, Carolyn	ML15153B059
Kibbel, Kathi	ML15140A122
Kiel, G. Kendall	ML15155A760
Kielman, Laura	ML15140A185
Kienzle, Sandy	ML15156A714
Killion-Mottola, Brittani	ML15142A187
Kimatian, III, George	ML15156A285
Kimball, Larry	ML15148B248
Kimmel, Gailmarie	ML15155A336
Kincaid, Karen	ML15162B089
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Kindel, Karen	ML15158A279
King, Alex	ML15155C108
King, Barbara	ML15140A002
King, Ben	ML15156B337
King, Carol	ML15142A046
King, Christine	ML15161A630
King, Judith	ML15155A648
King, Justine	ML15158A062
King, Kathleen	ML15155B205
King, Kim	ML15154A645
King, Ryan	ML15153A514
King, Terry	ML15154B130
King, Tiffany	ML15155A081
King, Travis	ML15159B495
Kinkaid, David	ML15142A162
Kinney, Douglas	ML15159A235
Kinzer, Thelma	ML15155A476
Kirby, Yvonne	ML15154A613
Kirchner, John	ML15154C300
Kirk, Brian	ML15153A504
Kirk, Dorothy	ML15142A135
Kirk-Leach, Cheryl	ML15156A042
Kirkpatrick, Jim	ML15148B224
Kirschbaum, Saran	ML15148A753

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Kish, Betty	ML15140A107
Kisinger, Ed	ML15154C072
Kisner, Al	ML15159A708
Kiss, Suzanne	ML15141A659
Kisselburg, Desiree	ML15148B021
Kistler, Andrew	ML15156A715
Kite, Richard	ML15154B878
Kittle, Pat	ML15140A014
Kitzinger, Jana	ML15159B522
Kiva, Jo Ann	ML15159A223
Kiver, Eugene	ML15154A022
Klasey, Janet	ML15154B091
Klausing, Michael	ML15141A710
Klauss, Mike	ML15159B254
Klebl, Susan	ML15142A143
Kleckler, Jan	ML15160A832
Klefbeck, Randal	ML15155B693
Klein, Chuck	ML15148A991
Klein, Daniel	ML15155B964
Klein, J.	ML15141A790
Klein, Linda	ML15160A831
Klein, M.	ML15147A723
Klein, M.	ML15153A331
Klein, Reinhard	ML15148B386
Klein, Robert	ML15155C002
Klein, William	ML15153A734
Klemm, Marcine	ML15155A326
Klemm, Marcine	ML15155B263
Klemm, Marcine	ML15159B121
Klempin, Serena	ML15155B406
Klepek, Lisa	ML15140A232
Klerer, Leona	ML15148A167
Klessig, Young	ML15158A028
Kliche, Diana	ML15148A961
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Klimovitz, Joseph	ML15154B671
Kline, Danny	ML15154C277
Klingston, Karen	ML15156A677
Klinkovskaya, Irina	ML15148A994
Klipfel, George	ML15156B332
Klock, William	ML15153A751
Klohck, George and Margaret	ML15155A514
Klubek, Vic	ML15155B325
Klugiewicz, Mark	ML15155B748
Kluhsman, Holly	ML15155B573
Klump, Ted	ML15162A658
Knapton, Alex	ML15154B102
Kneedler, William	ML15155B726
Kneeland, Leslie	ML15156A602
Kneibert, Walter	ML15155A711
Kniffin, Margaret	ML15154B656
Knight, Bobbie	ML15148B365
Knight, David	ML15155B005
Knight, E. M.	ML15155C042
Knight, Haven	ML15156B459
Knight, Julia	ML15142A268
Knight, Tina	ML15155B469
Knights, Lindsay	ML15154B790
Kniola, Marjorie	ML15153B086
Knoblock, Glenn	ML15140A247
Knodel, Henry	ML15154B931
Knoll, Carolyn	ML15155A670
Knoll, Julie	ML15155B072
Knorr, Carl	ML15142A198
Knuteson, Mary	ML15155A401
Knutson, Dana	ML15156A695
Kobayashi, Hugo	ML15154C155
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Kobayashi, Kate	ML15155A795
Kobylarz, Denise	ML15153B170
Kocer, John	ML15154C162
Koch, Aaron	ML15155A372
Koch, Joann	ML15148A918
Koch, John	ML15140A154
Koch, Peter	ML15160A075
Koch, Veronica R.	ML15162A708
Koeller, David	ML15154A130
Koenig, Georgia	ML15154A706
Koeninger, Laura	ML15155C087
Koessel, Karl	ML15153A812
Kofler, Michelle	ML15156A051
Kogan, Richelle	ML15153A795
Kohlenburg, Lindsey	ML15159B409
Kohlet, Robin	ML15155A316
Kohn, Carolyn	ML15156B489
Kohn, Laura	ML15154C158
Koiv, Ulle	ML15142A312
Koivisto, Ellen	ML15155B494
Kokaly, Atheer	ML15148A269
Kokett, Kim	ML15153A756
Kokkonen, Donald	ML15155B068
Kolakosky, Linda	ML15156B248
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Komin, Tatyana	ML15148B252
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Kopp, Isabel	ML15162A546
Kordes, Maria	ML15159B498
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Korn, Sandra	ML15148B185
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Kostis, Steven	ML15156A011
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Kouba, Nadine	ML15160A520
Kouzel, Lynn	ML15155B943
Kovac, Charles	ML15155A472
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Kovacs, Natalie	ML15158A085
Koven, Thomas	ML15160A086
Kovich, Jenni	ML15142A064
Kowalewski, Douglas	ML15159A167
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Kral, Suzanne	ML15142A317
Kramer, Andrew	ML15155B362
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Kramer, Kelly	ML15153A424
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Kramer-Smith, Lara	ML15153B210
Krasnoff, Joshua	ML15148A776
Krause, Al	ML15148B120
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Krause, William	ML15155B608
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Kreutzjans, Viv	ML15154A601
Krewson, Caroline	ML15160A741
Krider, Sherry	ML15153B187
Kring, Juli	ML15156A538
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Kroeger-Mappes, Joy	ML15158A131
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Krouse, Mike	ML15153A834
Krueger, David	ML15160A582
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Krueger-Cunningham, Cosima	ML15155C065
Kruggel, Thomas	ML15162A133
Krupinski, K.	ML15154B861
Kruppa, Muriel	ML15155B324
Kruszynski, Yasiu	ML15155B256
Krygowski, Richard	ML15141A508
Kryshak, Walter	ML15141A756
Ku, Michelle	ML15154A491
Kubik, Jerry	ML15155A286
Kubik, Jerry	ML15156A872
Kubzdela, Kashka	ML15148B388
Kucewicz, Leo	ML15159A541
Kuchera, Steve	ML15160A898
Kuckel, Charles	ML15148A996
Kucynski, Ron	ML15155A025
Kuczynski, Kathleen	ML15155B920
Kuestner, William	ML15142A165
Kugler, Terri	ML15154C046
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Kuhlman, Lewis	ML15155A818
Kuhn, Gerald	ML15153A390
Kuhn, Kerry	ML15155A626
Kuhn, Marty	ML15159A132
Kuhnel, Kathie	ML15148B179
Kuhns, Doris	ML15158A050
Kukkonen, Holly	ML15153B176
Kuncl, Janet	ML15155B065
Kundrot, Kenneth	ML15154B566
Kunkler, Scott	ML15153A433
Kunz, Darleen	ML15148B389
Kunz, James	ML15162A104
Kunz, Ray	ML15141A532
Kuppler, Curtis	ML15159B283
Kuri, Joseph	ML15155A349
Kurowski, Lois	ML15153B074
Kurtz, Christy	ML15141A627
Kurtz, Kevin	ML15160A838
Kurtz, Maya	ML15162B042
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Kurucz, Laszlo	ML15162A429
Kurz, Richard	ML15159A064
Kurzweil, Andrew	ML15155A255
Kusick, Paul	ML15153B276
Kuykendall, Ron	ML15148A649
Kuznier, Janys	ML15154B990
Kwitt, Michael	ML15154B747
Kyse, Barbara	ML15154C219
L., Candace	ML15142A024
La Fleur, Gloria	ML15154A121
La Forgia, Tony	ML15159A555
La Lone, Darrell	ML15153A870
La Mont, Sandra	ML15159A557

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La Paglia, Claudia	ML15160A056
La Pointe, Drena	ML15154B802
La Pointe, Keith	ML15155A589
La Rocca, Isabella	ML15142A322
La Serra, Stephen	ML15148B332
Lab, Michael	ML15159A463
Labb, Deborah	ML15153A729
Labrie, Michele	ML15141A615
Lacas, Turner	ML15154B677
Lacey, Pamela	ML15155B836
Laclair, Gary	ML15154A055
Lacognata, Dale	ML15154B110
Lacroix, Catherine	ML15148B307
Ladd, Karen	ML15154B270
Ladouceur, Alain	ML15155C056
Lafleur, Steven	ML15159A851
Lafond, David J.	ML15156B191
Lafrance, Roberta	ML15156B246
LaGasse, Jeffrey Paul	ML15154B980
Lagerberg, Rose	ML15154B848
Lagrone, Amy	ML15141A711
Laieski, Caleb	ML15198A122
Laieski, Caleb	ML15162A099
Laik, Judith	ML15155B080
Laine, Alexis	ML15156A202
Laird, Jim	ML15156A899
Laitinen, Carol	ML15158A032
Lake, Daphne	ML15156A843
Lakebrink, Joan	ML15154B749
Lakin, Charles	ML15155B579
Lakosil, Joanne	ML15154B135
Laliberte, Kevin	ML15155A820
Lam, Ofelia	ML15141A733
Lamadrid, Irina Golda	ML15148A612
Lamaster, Gary	ML15155B988
Lamb, Diane	ML15141A511
Lamb, Leslie	ML15148A981
Lambert, John	ML15159A348
Lambert, Leanna	ML15154C122
Lambert, Mark	ML15154A533
Lambert, Rene	ML15154B476
Lambert, Rob	ML15140A115
Lamerton, Cathleen	ML15159B349
Lammers, Jon	ML15155B864
Lamond, Camas	ML15160A593
Lamont, Juliet	ML15141A490
Lampkin, Olga	ML15158A038
Lamson, Gary	ML15148A937
Lanagan, Pamela	ML15154A250
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Land, David	ML15154B813
Land, Martha	ML15154C206
Landau, Douglas	ML15156A044
Landau, Larry	ML15156A015
Landeo, Eva	ML15155B707
Landess, Michael	ML15142A161
Landgrebe, Gary	ML15155C049
Landi, Barbara	ML15155B159
Landry, Connie	ML15159A314
Landskron, David	ML15156A531
Lane, N. Jo	ML15155B103
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Lanehart, Rheta	ML15148B238
LaNew, Maryann	ML15155A181
Lang, Lynn C.	ML15162A639
Lange, Charles	ML15160A877
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Langelan, M.	ML15154C030
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Langford, Lora	ML15154C251
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Langston, Michele	ML15159A849
Lanni, Phil	ML15155A234
Lanus, Howard	ML15156A945
Lanzl, Catherine	ML15153B133
LaPorte, Candace	ML15155A882
Large, Daniel	ML15148B401
Large, Kenneth	ML15159A668
Larkin, Timothy	ML15141A560
Larmee, Kimberly	ML15155A693
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Larrick, Margaret	ML15160A959
Larrison, Elizabeth	ML15155A827
Larsen, Karen	ML15155A481
Larson, Fran	ML15159A813
Larson, Al	ML15156A017
Larson, Brian	ML15140A148
Larson, Dan	ML15142A053
Larson, Dene	ML15142A146
Larson, Marguerite	ML15156B269
Larson, R. A.	ML15153A486
Larson, Wendy	ML15155B170
Lash, Cal	ML15141A768
Lashinski, Amy	ML15141A686
Laskas, Carol	ML15155A059
Lasley, Barbara	ML15141A726
Lasorsa, Maria	ML15156A237
Lastra, Irene	ML15148A891
Latch, Steve	ML15155B792
Lattanzia, Patricia	ML15153B102
Lau, E.	ML15162A386
Laube, Susan	ML15154A141
Laubert, Jon	ML15155B769
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Lavin, Chris	ML15159A076
Lawler, John	ML15154A546
Lawler, Karen	ML15154C262
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Lawrence, Andrew	ML15158A101
Lawrence, Betty	ML15156A481
Lawrence, David A.	ML15141A507
Lawrence, Geoffrey	ML15141A708
Lawrence, Rhett	ML15159A920
Lawrence, Robert	ML15154B870
Lawrence, Vinnedge	ML15154B596
Lawson, Ken	ML15160A577
Lawyer, Julie	ML15141A766
Laxier, Scott	ML15153A583
Layfield, Elizabeth	ML15162A725
Layman, William	ML15154B295
Lazio, Rochelle	ML15154C163
Leach, Brandi	ML15155B745
Leach, Jason	ML15154B807
Leahy, Susan	ML15148B205
Leake, Barbara	ML15155B682
Leatto, Renne	ML15142A126
Lebaron, Pat	ML15162A636
Lebert, Mary	ML15154B978
LeBlanc, Candy	ML15155C114
Leclair, Peg	ML15162A268
Ledbetter, Carolyn	ML15156B255
Ledden, Dennis	ML15156A156
Ledder, Janet	ML15154B625
Lederman, Jessica	ML15159B563
Lee, Aldora	ML15154C051
Lee, Audrey	ML15154A448
Lee, Barb	ML15159A837
Lee, Brenda	ML15153B260
Lee, Christopher	ML15154C130
Lee, Cynthia	ML15156B441
Lee, David	ML15156A866
Lee, E. R.	ML15156A264
Lee, Jerry	ML15154C160
Lee, Madeleine	ML15142A376
Lee, Richard	ML15148A278
Lee, Robert	ML15154B582
Lee, Virginia	ML15154A346
Leeman, Cavin	ML15154B348
Leeuw, Lyn	ML15159A127
Leff, Michele	ML15142A057
Leffler, Scott	ML15154C026
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Legaroff, Kyra	ML15153B044
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Leggett, Robert	ML15160A806
Lehman, Loretta	ML15154C296
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Leidig, Charles	ML15156A158
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Leihy, Susan	ML15159A864
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Leiva, Miranda	ML15155A120
Leland, Lora	ML15156B484
Lemire, Mary	ML15155A448
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Lemoine, Kathryn	ML15141A585
Lenchner, Nicholas	ML15153B299
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Lensenmayer, Kathleen	ML15148B058
Lensi, Philip	ML15159A720
Lent, Kelli	ML15141A626
Lentini, Tony	ML15148A905
Lenz, Andrew	ML15154A104
Lenz, Carolyn	ML15155B098
Lenzen, Pat	ML15156A780
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Leo, Carlos	ML15154B902
Leod, Lea Mac	ML15158A193
Leon, Elizabeth	ML15160A783
Leonard, Cami	ML15159B368
Leonard, Esther	ML15156A951
Leonard, Fred	ML15156B482
Leonard, Joan	ML15154B774
Leonardo, Sherry	ML15154A213
LePere, Renee	ML15148A952
Leppo, Bob	ML15156A498
Lepre, Brenda	ML15159B238
Lerner, Pauline	ML15155C083
Lesem, Ken	ML15159A315
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Leslie, J. Allen	ML15158A043
Leslie, Jane	ML15140A117
Leslie-Dennis, Donna	ML15154C028
Lester, Lisa	ML15153B300
Leszczynski, M.	ML15160A045
Leto, Bogdana	ML15156B187
Leton, Sharon	ML15154B688
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Levecchia, Naomi	ML15153A968

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Levine, Adam	ML15155B998
Levine, Beth	ML15154B317
Levine, Christy	ML15158A177
Levine, Lynn	ML15154C271
Levine, Rhoda	ML15158A013
Levine, Sandy	ML15154A413
Levine, Susan	ML15153A774
Levinzon, Paulina	ML15159A021
Levy, Robert Brian	ML15148B218
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Lewandoski, Nancy	ML15155A122
Lewandowski, Michael	ML15156A907
Lewis, Andrea	ML15156B397
Lewis, Brenda	ML15155B302
Lewis, Daniel	ML15154A436
Lewis, Deborah	ML15155B911
Lewis, Debra	ML15148B321
Lewis, George	ML15141A639
Lewis, Jan	ML15140A175
Lewis, Joan	ML15155A337
Lewis, Jordan	ML15153B028
Lewis, Kathleen	ML15148A233
Lewis, Larry	ML15155A040
Lewis, Marvin	ML15155B835
Lewis, Melia	ML15159A347
Lewis, Paul	ML15156A135
Lewis, Pravin	ML15154A324
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Lewis, S.	ML15142A211
Lewis, Shawn	ML15155A037
Lewis, Sherman	ML15153A958
Lewis, Sherry	ML15155B351
Lewis, Verlene	ML15155B809
Leyendecker, Billie	ML15154B041
Lezotte, Eric	ML15155A625
Libansky, Dada	ML15156A060
Libbares, Georgia	ML15155A757
Libby, Dominic	ML15154C107
Libengood, Patricia	ML15156B457
Libson, Aaron	ML15155C088
Lichtenberg, Don	ML15153B122
Lidicker, Naomi	ML15154B643
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Liebowitz, Virginia	ML15156A096
Liedike, Robert	ML15153B123
Lieme, Patricia	ML15162A543
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Liesemer, Kirk	ML15154A789
Liess, L. M.	ML15148A648
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Lightfoot, Paul	ML15162A591
Lighthall, Tim	ML15155B432
Likens, Jessica	ML15158A222
Liles, Ben	ML15141A761
Lilienkamp, Bryan	ML15140A187
Lillard, Cecelia	ML15153B058
Lilli, Joseph	ML15154A938
Lillian, Michael	ML15141A700
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Lim, Yee Yean	ML15162A363
Limpert, Rosanna	ML15158A287
Linarez, Kj	ML15156B094
Lincoln, Deb	ML15156A792
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Lincoln, Sarah	ML15154B906
Lind, Gordon	ML15148B040
Linden, Steven	ML15158A273
Linden, Susan	ML15154A878
Linden, Susanne	ML15148A860
Lindenbacher, Dany	ML15155B281
Lindenberger, Stewart	ML15154A353
Lindhard, Peter	ML15154A387
Lindhorst, Gerald	ML15154B210
Lindquist, Erin	ML15155B841
Linell, Tom	ML15159A742
Lines, Nancy	ML15155B410
Linhart, June	ML15162A734
Lininger, Betty	ML15155B392
Linsky, Richard	ML15155B540
Linzmeier, Robert	ML15141A512
Lipari, Philip	ML15154A695
Lipcsey, Todd	ML15154B862
Lipman, Elizabeth	ML15155B673
Lippert, Amy	ML15160A882
Lippert, Tim	ML15140A118
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Lippold, Earl	ML15141A698
Lipscomb, Emmett	ML15153A725
Lipsky, Carol	ML15155B430
Lira, Stefon	ML15154B731
Lis, Vera	ML15159A220
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Liss, Mary	ML15147A772
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Liszeo, Barbara	ML15153A970
Litteken, Sister Clare Ann	ML15159B302
Little, Judith	ML15148A169
Little, Robyn	ML15155C045
Liu, Mini	ML15155A265
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Livingston, C. J.	ML15154C069
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Livingston, Elaine	ML15154A392
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Lizer, Deja	ML15156A875
Lloyd, B.	ML15155A303
Lloyd, Janet	ML15153A711
Lochner, Kathy	ML15154C269
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Lockett, Jennifer	ML15155B815
Lockwood, Brian	ML15156A218
Lockwood, Michael	ML15153A655
Lockwood, Ronald	ML15148B324
Loe, Steve	ML15156A175
Loeber, Charles	ML15148A837
Loeblich, Elizabeth	ML15156A671
Loewy, Cynthia	ML15155A387
Loftin, Nancy	ML15156A018
Lofton, Saab	ML15159B014
Lofurno, Susan	ML15153B124
Lohman, James	ML15148B096
Lohr, Krista	ML15155A136
Loizides, Thomas	ML15156B324
Lombardi, R.	ML15155B642
Long, Deborah	ML15154B123
Long, Jared	ML15153A986
Long, Jennie	ML15153B240
Long, Laura	ML15159B383
Long, Leland	ML15162B079
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Long, Nancy	ML15156A845
Long, Robert	ML15148B056
Loomis, Adam	ML15154C052
Loomis, Gregry	ML15153A899
Loomis, Margaret	ML15154C123
Loomis, Rea Ann	ML15156B017
Loomis, Virpi	ML15155A069
Looney, Ernie	ML15140A038
Looney, Hannah	ML15155B978
Loosli, Edward	ML15155A810
Lopez, Josie	ML15162A389
Lopez, Laura	ML15148A700
Lopez, Maria Sune	ML15155A598
Lopez, Ralph	ML15153B257
Lopez, Randy	ML15140A104
Lopez, Vince	ML15162A092
Lopez-Hagan, Nicole	ML15154A427
Loquvam, Mary	ML15148A727
Lorber, Deadre	ML15159A113
Lorenz, Gerald	ML15153A836
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Lottes, Ilsa	ML15153B065
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Loughlin, Mary	ML15141A724
Louis, Jamie	ML15155B271
Lovely, Michael	ML15155C011
Lovitch, Derek	ML15154B890
Low, Sammy	ML15154C215
Lowans, Jennifer	ML15155B695
Lowden, Barbara	ML15155C063
Lowe, David	ML15155A093
Lowe, Jacklyn	ML15159A518
Lowe, James	ML15148B404
Lowe, Margot	ML15160A816
Lowe, Rob	ML15159B382
Lowell, Meryl	ML15155B774
Lowenthal, Steven	ML15155C096
Lowery, Candice	ML15159A006
Lowery, Chuck	ML15148B078
Lowery, Joanne	ML15154B713
Lowes, Jane	ML15156A689
Lowney, Kathleen	ML15148B124
Lowther, Joni	ML15156A960
Lowther, Larry	ML15156A706
Luban, Holly	ML15148B140
Lubin, Stephen	ML15153A720
Lubonovich, D. J.	ML15154A117
Luca, Joe	ML15161A687
Lucas, Adeline	ML15154B516
Lucas, Janie	ML15154A309
Luck, Patricia	ML15156A460
Luckett, Rosemary	ML15153A779
Ludington, Byron	ML15154B003
Ludwick, Russ	ML15155A594
Lueck, Donna	ML15159B239
Lukas, James	ML15156A136
Lulias, Eva	ML15156A740
Lunceford, Diana	ML15154B432
Lund, Deva	ML15159A761
Lundgren, Mike	ML15159B348
Lundgren, Roger	ML15155A541
Lundholm, Mark	ML15156A896
Lundin, Anne	ML15148A992
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Lupenko, Andy	ML15160A680
Lupo, Jack	ML15160A537
Lupori, Stacy	ML15159A650
Lusch, Mark	ML15154C131
Lustgarten, Annette	ML15155B239
Lutes, Stephen	ML15159B581
Lutman, Jeri	ML15155A427
Luttmann, Rick	ML15154C185
Lydy, Theresa	ML15154B214
Lyles, Lori	ML15154A426

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Lynch, Tifni	ML15154A447
Lynch, W.	ML15148B069
Lynn, Andy	ML15154B650
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Lynn, Sandra	ML15154B220
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Lyon, Angela	ML15155A083
Lyon, Marsha	ML15153B241
Lyons, Pamela	ML15155A768
Lyons, Tracy	ML15142A222
Lyson, Valerie	ML15162A515
Lytle, Denise	ML15162A674
M., Ann	ML15154A662
M., N.	ML15155A914
Maar, Sandra	ML15156B502
Mac Cormick, Margarida	ML15142A128
Macarthur, Jacquelyn	ML15155A597
Macbride, David	ML15153A917
Macconaugha-Snyder, Morgan	ML15162B064
Macconaugha-Snyder, Morgan	ML15162B109
Macdonald, Angus M.	ML15156A605
Macdonald, David	ML15153A953
Macdonald, Ethel	ML15158A270
Macdonald, John	ML15156A109
MacDonald, John	ML15159A807
Macdonald, Leo	ML15160A738
MacGregor, Mary	ML15154A047
Mack, Joanne	ML15155B058
Mackelvie, Elizabeth	ML15156A206
Mackenzie, Michelle	ML15156A921
Mackie, Judie	ML15155B459
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Mackison, George	ML15156B391
Mackrell, Chris	ML15154B707
Maclaren, Malcolm	ML15154A703
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Macomber, Paul	ML15155A060
Macquarrie, Robert	ML15154B326
Macraith, Bonnie	ML15142A031
Macy, Michelle	ML15156B180
Macy, Rene	ML15154A062
Maddlone, Claire	ML15162A100
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Madeco-Smith, Mary	ML15158A275
Madera, Christina	ML15155C178
Madero, Mario	ML15160A074
Madole, Richard	ML15153B197
Madoshi, Diana	ML15148B219
Madrid, Jade	ML15161A633
Madruga, Philip	ML15148B072
Madson, Erin	ML15159B084
Maestro, Betsy	ML15148A945
Magalas, Marie Christina	ML15155B357
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Magana, Maria	ML15155B203
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Magdalene, Lilithe	ML15153A621
Magee, Dan	ML15153A584
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Magill, Bob	ML15141A769
Magliola, Lawrence	ML15159B422
Mahaux, Sylviane	ML15154A004
Maher, Timothy	ML15159A110
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Maher, Therese	ML15141A434
Mahnken, Jody	ML15160A743
Mahoney, Mary	ML15153A382
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Mahoney, Robert S.	ML15155A210
Mahood-Jose, Eileen	ML15159A310
Maida, Cecilia	ML15156B400
Maier, Patricia	ML15154B961
Maijala, Ann	ML15159A984
Maitre, Florian	ML15154A322
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Malcher, Luiz	ML15156A077
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Maldonado, Emily	ML15159B535
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Malerman, Rina	ML15153B067
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Malinauskas, Helen	ML15155B114
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Mancini, Jayme	ML15159B419
Mancuso, Erica	ML15159B294
Mandeville, Helen	ML15154A471
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Mangrum, Deborah	ML15155A224
Mangus, Tracey	ML15154A626

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Manley, Marjorie	ML15154B844
Mann, C.	ML15155B930
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Marivn, Cindy	ML15154A333
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Maron-Friend, Judie	ML15142A184
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Marquis, Luke	ML15142A030
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Marsden, Jim	ML15155A121
Marsh, Dorothy	ML15159A596
Marsh, Susan	ML15159A755
Marsh, Heather	ML15153A505
Marsh, William	ML15154C212
Marshak, Judy	ML15154B883
Marshall, Ann	ML15148B167
Marshall, Cynthia	ML15153A549
Marshall, Edna	ML15153A622
Marshall, Laurie	ML15159A425
Marshall, LaVern	ML15155C121
Marshall, Lisa	ML15159A225
Marshall, Rich	ML15154C201
Marshall, Sally	ML15159A168
Martens, Bill	ML15154A188
Martin, Barbara	ML15154A829
Martin, Ben	ML15162A659
Martin, Candice	ML15156B351
Martin, Drew	ML15154C257
Martin, Elisabeth	ML15142A243
Martin, Emilie	ML15153A789
Martin, Gerry	ML15155B890
Martin, Gregory	ML15154B805
Martin, Helen	ML15155B626
Martin, Jeanne	ML15153B201
Martin, Julie	ML15141A502
Martin, Linda	ML15153A759
Martin, Marsha	ML15155C161
Martin, Melissa	ML15155C046
Martin, Melodie	ML15140A250
Martin, Patrick	ML15156B347
Martin, Raymomd	ML15154A235
Martin, Sherri	ML15160A586
Martin, Sue	ML15141A603
Martine, Gurinet	ML15159A838
Martinez, Claudia	ML15153A915
Martinez, Janie	ML15159B217
Martinez, Keiko	ML15159B290
Martinez, Lorraine	ML15158A242
Martinez, Michele	ML15155A365
Martinez, Priscilla	ML15155B975
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Martini, Denise	ML15155C038
Martinotti, Silvia	ML15160A846
Martinson, Patsy	ML15154B973
Marton, Dennis	ML15162A623
Maryanski, Joseph	ML15155A709
Mascarin, Paula	ML15159B303
Maseduca, Heidi	ML15148A594
Maselli, June	ML15154A793
Masi, Janie	ML15155A958
Maslanek, Michael	ML15154A540
Mason, Elliot	ML15155A855
Mason, Jackie	ML15156B508
Massa, Alison	ML15140A235
Massar, Marc	ML15153A728
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Massey, Carolyn	ML15155B609
Massey, Linda	ML15154B882
Massman, John	ML15159A010
Masters, Stanley	ML15155A287
Mastri, Francis	ML15155C218
Masurat, Gerry	ML15154A433
Matheny, Kent	ML15158A087
Matheny, Vicki	ML15153B236
Mather, Elizabeth	ML15148B217
Mather, Natalie	ML15148A864
Matheson, Jen	ML15153A348
Mathews, Holger	ML15142A239
Mathews, L.	ML15159A628
Mathews, Mary	ML15159A877
Mathews, Peter	ML15154B917
Mathews, William	ML15153A936
Mathis, Barbara	ML15142A262
Mathis, Rebecca	ML15162A108
Matlock, Kevin	ML15142A229
Matos, Milagros	ML15158A157
Matso, Margo	ML15159A355
Matson, Leila	ML15153A758
Matsui, Vicky	ML15154A818
Mattes, Dale	ML15156B154
Matteucci, Gina	ML15153B149
Matthews, Larissa	ML15159B396
Matthews, Marilyn	ML15154A484
Matthews, Phillip	ML15156A335
Mattingly, Georgia	ML15141A462
Mattingly, Gloria	ML15154A169
Mattis, Albert	ML15155A503
Mattson, Sandra	ML15148B207
Mattson, Virginia	ML15159B545
Matwichuk, Gail	ML15160A752
Matwiejko, Anton	ML15153A945
Matych, Teresa	ML15154B200
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Maurelia, Kristin	ML15154B586
Maurer, Dorothy	ML15160A934
Maurer, Timothy	ML15159A866
Mawhorter, Jerry	ML15156A122
Maxwell, Steven	ML15159A413
May, Hildy	ML15160A694
May, Jim	ML15148B003
May, Julie	ML15153B230
May, Sarah	ML15156A534
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Mazhnyy, Mark	ML15148A748
Mazuca, Frank	ML15148B253
Mazuji, Nasrin	ML15153B134
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Mazzuca, Dale	ML15142A319
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Mc Dermott, Ethna	ML15156A125
Mc Intyre, Nancy	ML15154A123
Mc Neill, Norma	ML15156B517
Mcafee, Al	ML15159B333
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Mcarrell, Bianca	ML15159B533
McBride, Timothy	ML15153A355
Mccabe, Elaine	ML15147A725
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Mccalister, Janet	ML15154B136
Mccall, Ann	ML15159A083
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Mccall, Kaye	ML15154B058
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Mccard, Jennifer	ML15154B796
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Mccauley, Brandi	ML15155B115
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McClendon, Linda	ML15155A850
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Mccloskey, William	ML15158A203
Mcclung, Judy	ML15148B392
Mcclure, Kate	ML15155B069
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Mcclurg, Daviann	ML15153B111
McCollim, Jeffrey	ML15159A525
McComb, Sandy	ML15155B233
Mccomb, Tf	ML15159A712
Mccombs, Robert	ML15162A297
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McCray, Toni	ML15162A663
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Mccready, Tamara	ML15148A936
Mccreary, Jan	ML15154A144
Mccredie, Gail	ML15153A553
Mccroskey, Carol	ML15154A835
Mcculloch, Samuel	ML15162A111
Mccullough, Justin	ML15159A543
McCullough, Justin	ML15160A785
Mccullough, Maureen	ML15154A779
Mccumber, Peter	ML15156B238
Mccurdy, Dassi	ML15154C000
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McDaniel, Diana	ML15159B554
Mcdermott, Jeff	ML15155B983
Mcdonald, A.	ML15156A568
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McDonald, Norma	ML15155C134
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Mcdonell, Alexander	ML15154A417
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Mcdonough, Brenda	ML15154A079
Mcdonough, Kimberly	ML15142A232
McEachron-Taylor, Linda	ML15153B050
McElhaney, Thomas	ML15159B334
Mcelhone, Mary	ML15159B339
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McFadden, Arlene	ML15156A086
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McFarland, John	ML15162A585
Mcgaha, Patricia	ML15158A167
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Mcglone, Colleen	ML15148A669
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Mckee, Eileen	ML15148B043
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Mckeever, Mary	ML15153A994
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Mckye, Christina	ML15154A423
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Mcmahon, Nicholas	ML15156A273
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Mcmullen, Colleen	ML15159B556
Mcmurray, Kendel	ML15160A948
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Mcnamara, Catherine	ML15141A693
Mcnaught, Anna	ML15154A483
Mcneil, Kerry	ML15154A994
Mcneil, Sherry	ML15156A306
Mcneill, Katherine	ML15154A092
Mcnitt, Doris	ML15154A827
Mcpherson, Tracy	ML15154B977
Mcqueen, Neil	ML15159A876
McQuown, Michael	ML15155C001
Mcrill, Susan	ML15153B275
Mcvey, Earl	ML15154A074
Mcvey, Harry	ML15158A007
Mcvey, Kelly	ML15155B921
McVicker, Micah	ML15159A875
Mcwhirter, Carol	ML15156B408
Mead, Kathleen	ML15153A335
Mead, Melody	ML15159A336
Means, Jessica	ML15147A735
Meaux, Andre	ML15160A907
Mechanick, Jarred	ML15160A643
Mecke, Ernst	ML15154A441
Medeiros, Linda	ML15155B037
Medina, Daniel	ML15154A945
Medina, Kathleen	ML15159B479
Medlin, Barry	ML15156A952
Medlin, Nellie	ML15156A900
Medlin, Tony	ML15156B465

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Meier, D.	ML15156B118
Meier, Ron	ML15156B344
Meigs, Karen	ML15155C119
Mejia, Esperanza	ML15162A590
Mejia, Marianna	ML15153A462
Mejides, Andres	ML15155A489
Melby, George M.	ML15154B109
Meldahl, Deborah	ML15153A443
Mele, Frank	ML15159B289
Melius, Bruce	ML15158A265
Mellen, Linda	ML15155A231
Mello, Dawn	ML15142A136
Meltzer, Iris	ML15160A084
Menard, Rose Marie	ML15158A150
Menasian, Helen	ML15155A311
Mendel, Chris	ML15154A534
Mendelsohn, Alex	ML15158A082
Mendelson, Robert	ML15140A206
Mendez, Tatiana	ML15148A174
Mendez, Virginia	ML15148A761
Mendez-Alvarez, Javier	ML15154A554
Mendousa, Anthony	ML15155A042
Mendoza, Redelisa	ML15160A969
Mennel-Bell, Mari	ML15153B085
Mensforth, Elizabeth	ML15156A733
Mensing, Max	ML15154B913
Menyuk, Paula	ML15154A070
Mercer, Michele	ML15162A208
Mercer, Rory	ML15160A712
Mercure, Joan	ML15156A067
Merino, Aimee	ML15159A105
Merino, Margaret	ML15155B876
Merkel, Jane	ML15142A361
Merkel, Karynn	ML15148A834
Merl, Steve	ML15153A544
Merle, Lynn	ML15153A883
Merljak, Julija	ML15159A241
Merritt, Courtney	ML15154B083
Merritt, Jean	ML15156A995
Merz, Robert	ML15156A560
Meslar, Gerald	ML15155B758
Mesler, Corey	ML15155C232
Messling, Gordon	ML15142A174
Metas, Nicole	ML15159A381
Metcalf, A.	ML15160A634
Methven, Bernadette	ML15154A709
Metje, Melodie	ML15153B020
Mettler, Joan	ML15162B079
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Metz, Nancy	ML15153B141
Metzger, Harvey	ML15155A082
Meyer, Christina	ML15156A725
Meyer, Emily	ML15155B000
Meyer, Eric	ML15140A183
Meyer, Harold	ML15155A077
Meyer, Joan	ML15159B205
Meyer, Joe	ML15155A913
Meyer, Marita	ML15155A239
Meyer, Scott	ML15156B501
Meyer, Stephan	ML15155A739
Meyer, Tanya	ML15153B207
Meyer, Twyla	ML15148A899
Meyers, Sarah	ML15147A713
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Meza, Joel	ML15155A583
Mican, Frances	ML15162A142
Michael, Joe	ML15155B754
Michael, Mary	ML15155A016
Michael-Dahlmann, Tina	ML15159A118
Michaels, Traven	ML15162A080
Michaud, Noreen	ML15153A893
Michener, Jr., Robert	ML15153B110
Middleditch, Ellen	ML15156A885
Midkiff, Michael	ML15140A161
Mietzner, Natalie	ML15156B203
Migliore, Eleanor	ML15142A138
Mikan, Edward	ML15148B348
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Mikulin, Kathleen	ML15142A204
Milam, Tim	ML15159A099
Milano, Barbara	ML15142A192
Milanowski, Tanya	ML15153B290
Miles, Joseph	ML15154A025
Milford, Joan	ML15159A692
Milhaupt, Shannon	ML15153A404
Milione, Regina	ML15155A340
Milkowski, George	ML15142A377
Millensifer, Aimee	ML15156A228
Miller, Alexis Wray Negele	ML15148B438
Miller, Betty	ML15156A752
Miller, Bob	ML15148A228
Miller, Bobbi	ML15155B662
Miller, Brad	ML15158A023
Miller, Carole	ML15159A138
Miller, Charles	ML15155B925
Miller, D. Rex	ML15142A062
Miller, Danielle	ML15148B352
Miller, Dennis	ML15154B553
Miller, Diana	ML15148A842
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Miller, Donna	ML15142A258
Miller, Genevieve	ML15158A132
Miller, J.	ML15154B846
Miller, Janet	ML15154B097

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Miller, Jennifer	ML15160A545
Miller, Jerry	ML15148A192
Miller, Joan	ML15155A111
Miller, K. N.	ML15156A106
Miller, Karen	ML15155A070
Miller, Kenneth	ML15155C009
Miller, Lesley	ML15160A980
Miller, Lester	ML15154A260
Miller, Libba	ML15155A301
Miller, Madge	ML15155A105
Miller, Mary	ML15148B027
Miller, Nancy	ML15148B274
Miller, Nena	ML15156A282
Miller, Patricia	ML15156B029
Miller, Robert	ML15153A940
Miller, Robert R.	ML15156B037
Miller, Sandi	ML15156A676
Miller, Sara	ML15155B352
Miller, Tia	ML15159A298
Miller, Timothy	ML15153A824
Miller, Tracey	ML15154B920
Miller, Valerie	ML15159A040
Miller, Victoria	ML15148B383
Miller, William	ML15154A579
Millhoff, Faythe	ML15155A826
Milligan, Keith	ML15156A939
Milligan, Rosanne	ML15148A927
Milliken, Elizabeth	ML15154B621
Millman, Mia	ML15153A648
Mills, Krista	ML15155A714
Mills, Marianne	ML15156A263
Milonas, Nikolaos	ML15148B228
Milkowski, George	ML15142A377
Milster, Amanda	ML15158A090
Mims, Pat	ML15156A973
Minacheili, Susanna	ML15160A578
Mindar, Richard	ML15154B927
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Miner, Dan	ML15155B078
Miner, Rev Curt	ML15154B673
Minglis, Erica	ML15155A335
Minich, Chris	ML15154C290
Minicucci, Dianne	ML15154A163
Minor, Shannon	ML15153A839
Minto, Arthur	ML15153A903
Mintz, Phillip	ML15154C295
Mirabella, Judith	ML15155C183
Misero, Jamie	ML15159B322
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Misra, Praveen	ML15148A210
Mistretta, Jill	ML15154A375
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Mitsuda, Michael	ML15162A071
Mitsuka, Joan	ML15141A649
Mittig, William	ML15155A724
Mitts, Karen	ML15159B577
Mitts, Yolanda	ML15156A241
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Mizell, Michael	ML15154A194
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Mock, Tim	ML15155C113
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Moe, Helen	ML15156A805
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Moglowsky, Myra	ML15155B623
Mohanty, Lopamudra	ML15154B320
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Moland, Janice	ML15156A784
Molder, Michael	ML15155A351
Moldoveanu, Carol	ML15160A563
Molessa, Leslie	ML15155A767
Molgora, Bianca	ML15148B268
Molina, Julimar Castro	ML15156A575
Molinero, Cynthia	ML15148B023
Moller, Richard	ML15153A413
Möllersten, Björn	ML15158A142
Mollo, Elizabeth	ML15158A196
Monaco, Carol	ML15142A077
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Monson, Christie	ML15148B360
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Montero, Deborah	ML15159B474
Mont-Eton, Elaine	ML15156A305
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Moore, Linda	ML15159B529
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Moore, Pauline	ML15148B057
Moore, Richard	ML15156A152
Moore, Robert	ML15158A211
Moore, Tammy	ML15156A058
Moore, Thomas	ML15140A228
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Moore, Toni	ML15140A253
Moore, Trois	ML15159A605
Moore, Valerie	ML15140A252
Mora, Lauren	ML15153A353
Mora, Sharon	ML15159A305
Morales, Margaret	ML15155A947
Morales, Marisa	ML15159A758
Moran, Judy	ML15153B195
Moreira, J.	ML15162A085
Moreira, Rui	ML15142A173
Morel, Will	ML15148A229
Moreland, Tom	ML15159B526
Morell, Dario	ML15153A561
Morello, Phyl	ML15160A690
Moreno-Davis, Phaedra	ML15159B212
Morey, Kathy	ML15154A843
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Morgan, Carol	ML15155C150
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Morrison, N.	ML15155B052.
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Motz, Mary	ML15153A857
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Mount, Cheryl	ML15153B052
Mourant, Wanda	ML15154A345
Mouzourakis, Kathy	ML15142A296
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Mowbray, Robert	ML15153B019
Mower, Amy	ML15162A618
Mowry, Vickie	ML15155A473
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Moyer, Ken	ML15160A942
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Mueller, Johanna	ML15155B245
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Mueser, Karen	ML15156A985
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Mulas, Enzo	ML15159B514
Mulcahy, Susan	ML15156A963
Mulder, James	ML15155B425

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Mulshine, Peter	ML15154C002
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Mumford, Andrew	ML15155A313
Mumma, Harlan	ML15155A492
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Mundy, Jaye Anna	ML15159A003
Munger, Anthony	ML15155B889
Munn, J.	ML15148A245
Munoz, Alejandro	ML15154A271
Munoz, Alma	ML15158A219
Munoz, Angela	ML15147A734
Munro, Karen	ML15141A580
Munroe, Gary	ML15154A926
Munroe, Mj	ML15154A126
Murdock, Lauren	ML15155A203
Murin, Assiren	ML15156B516
Murnane, Susan	ML15148A898
Murphy, Amanda	ML15159A465
Murphy, Brian	ML15155A859
Murphy, Donald	ML15159A820
Murphy, Eileen	ML15154B763
Murphy, Garrett	ML15155A683
Murphy, Jane	ML15141A489
Murphy, Janelle	ML15156B491
Murphy, Joe	ML15154B769
Murphy, Michael	ML15154A370
Murphy, Tim	ML15154A131
Murray, Edward	ML15155A435
Murray, James	ML15155A890
Murray, Mark	ML15148B011
Murray, Sandra	ML15153A558
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Muse, Dyan	ML15155B057
Musgrove, Tracy	ML15154C098
Musialowski, Monique	ML15156A164
Music, Barbra	ML15142A314
Mutchler, Ruth	ML15154A351
Muther, Wilhelmina	ML15154A776
Myers, B. J.	ML15156B026
Myers, David	ML15141A692
Myers, Glenn	ML15156B487
Myers, Kristy	ML15160A944
Myers, Linda	ML15154B146
Myers, Rob	ML15158A178
Myers, Sonya	ML15155B862
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N., J.	ML15154C092
Nachtsheijm, Henry	ML15154C077
Nagel, Dennis	ML15154C210
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Nagy, Mary Jo	ML15158A249
Nagyfy, Desi	ML15155C120
Nahay, Paul	ML15156A922
Nahill, Brad	ML15160A807
Naidich, Sandra	ML15154B924
Nakos, Judith	ML15155C149
Nall, James	ML15159A304
Napoleon, Alexandra	ML15155A376
Nappe, Judith	ML15155B785
Nardell, Jason	ML15155A331
Nardella, Nancy	ML15153A454
Narva, Adele	ML15148A997
Nash, Charlene	ML15155C230
Nasuti, Paul	ML15155C135
Nathan, Janice	ML15158A189
Nathan, Jessica	ML15162A083
Nau, Eric	ML15155C027
Naue, Judi	ML15156A933
Naujokas, Deborah	ML15154A934
Navarro, Eleanor	ML15153B043
Naversen, Ronald	ML15154B672
Navidad, Susan	ML15159B243
Naylor, Alan	ML15161A694
Naylor, Brent	ML15142A129
Naylor, John	ML15155B993
Nazzaro, Patricia	ML15154A717
Nearing, Sue	ML15156A541
Necas, Al	ML15160A818
Nedeau, E. James	ML15155C033
Needham, Christina	ML15148B257
Neff, Miriam	ML15159B003
Neff, Victoria	ML15155C228
Negri, Angela	ML15142A182
Neiberger, David	ML15162A617
Neihart, Janet	ML15156A329
Neihart, Joanne	ML15159B478
Neil, Carol	ML15156A184
Neiman, E.	ML15159A629
Neimark, D.	ML15142A018
Neis, Derek	ML15162A651
Nelmes, Beverly	ML15159A631
Nelson, Brenda	ML15160A904

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Nelson, Carol	ML15159A794
Nelson, Cyndi	ML15154A100
Nelson, David	ML15156B292
Nelson, David	ML15156A520
Nelson, Donna	ML15159B287
Nelson, Helen	ML15148B346
Nelson, J.	ML15154B726
Nelson, Jonathan	ML15154B780
Nelson, Joseph	ML15155A422
Nelson, Joy	ML15155B250
Nelson, Kristine	ML15156B253
Nelson, L. B.	ML15141A778
Nelson, M. Janet	ML15158A162
Nelson, Marianne	ML15156A597
Nelson, Nanci	ML15160A697
Nelson, Paul	ML15153A888
Nelson, Wendy	ML15154A040
Nemeth, Stevin	ML15155A013
Neral, David	ML15155C076
Nerwick, Randall	ML15153A920
Nesline, Rebecca	ML15156A439
Nesmith, Robert	ML15153A771
Neste, George	ML15162B044
Neste, George	ML15162B098
Nettesheim, Catherine	ML15154B871
Netusil, Paul	ML15154B502
Neubert, Lisa	ML15154B849
Neuenschwander, Betty	ML15141A429
Neuhauser, Alice	ML15142A036
Neuman, Margaret	ML15148A600
Neumann, Nancy	ML15159A351
Neumeister, John	ML15154B346
Neus, Marleen	ML15162A652
Neville, Janice	ML15155A475
Neville, Paula	ML15156A701
Nevins, Laura	ML15156A948
Newbeck, Phyl	ML15153A529
Newbegin, Gisela	ML15156A097
Newberg, Rosalie	ML15159A484
Newell, Barrie	ML15148A226
Newfield, Madeleine	ML15155B763
Newman, Anita	ML15147A761
Newman, Donna	ML15141A737
Newman, Kathy	ML15154A445
Newman, Ricki	ML15155B092
Newman, Ricki	ML15155B597
Newman, Suzanne	ML15159B536
Newton, Ann	ML15154B709
Newton, Carol	ML15153A703
Newton, Elizabeth	ML15148B018
Newton, Scurry Judy	ML15140A273
Ng, Carol	ML15160A837
Nghe, Keefe	ML15154B818
Nguyen, Tu-Quyen	ML15159B285
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Niccolini, Dianora	ML15155B387
Nichols, Anna	ML15154B817
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Nichols, David S.	ML15153A591
Nichols, Laurie	ML15154A257
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Nicholson, Kaitlyn	ML15159A916
Nicholson, Lisa	ML15140A128
Nickerson, Albert	ML15154A439
Nickerson, Nancy	ML15155B708
Nicodemus, Sharon	ML15148A882
Nicol, Tiffany	ML15153B099
Nicolini, Elizabeth	ML15155A997
Nicoud, John	ML15155C086
Nielsen, Don-Martin	ML15154B140
Nielsen, Ruth	ML15154A767
Nielson, Greg	ML15154B315
Nienaber, Rachel	ML15156A238
Nieters, Lenore	ML15154B212
Nietzold, William	ML15155A819
Nieves, Maria	ML15155B636
Nieves, Robert	ML15154A429
Night, Melody	ML15153A780
Niksic, Joyce	ML15142A120
Nilsen, Jeffrey	ML15159B002
Nix, Debra	ML15148A244
Nix, John	ML15142A019
Nix, John	ML15148A209
Nix, Kathy	ML15159B468
Noack, Michael	ML15162A398
Nobile, Stefania	ML15153B127
Noble, Katherine	ML15156A253
Noble, Vida	ML15155B678
Noble, W. F.	ML15155B044
Nobrega, Robert	ML15159B460
Noellert, Sunnie	ML15148B260
Noga, Kathie	ML15142A170
Nohava, Charles	ML15148A589
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Nolan, Dennis	ML15162A727
Nolan, Nancy	ML15153A670
Nolan, Stephen	ML15140A142
Nolan, Timothy	ML15154B889
Nolan, Tracy	ML15162A059
Noll, Frederick	ML15154A769
Noordyk, James	ML15142A029
Nord, Randall	ML15148A984
Norden, Michael	ML15156A272
Nordenskiold, Mette	ML15154A063
Nordhof, Pamela	ML15148A859
Norkus, Edward	ML15156A262

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Norris, Brenda	ML15141A703
Norris, James	ML15142A106
Norton, Jennifer	ML15162A611
Norton, Kathey	ML15159A686
Novack, Aaron	ML15148A919
Novak, Paul	ML15153A852
Novak, Trina	ML15154A922
Novkov, Russell	ML15155B166
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Novotne, Holly	ML15155A374
Novstrup, Ginger	ML15155C047
Nowack, James	ML15148A595
Nowak, Diane	ML15154A228
Nowak, Joseph	ML15162A596
Nowicki, Ann	ML15148A249
Nowicki, Judith	ML15159A649
Noyes, Carol	ML15153A964
Nuesch, Raymond	ML15142A282
Nuesch, Raymond	ML15148B138
Nulty, Tom	ML15141A655
Nunez, Carlos	ML15155A703
Nutini, Michael	ML15155A073
Nutter, Mary	ML15162A691
Nye, Janet	ML15160A887
Nylen, E.	ML15154A143
Oba, Peggy Seo	ML15155A194
O'Bara, Carina	ML15153A872
Obeid, Robert	ML15154A770
Oberdorf, Robert	ML15155A423
Oberline, Beverly	ML15155A811
Obershaw, Lynda	ML15155C130
Obert, Leonard	ML15154C288
Obr, Brooks	ML15140A029
O'Brien, Beth	ML15153A661
Obrien, Cecille	ML15154A073
O'Brien, Dennis	ML15153A719
O'Brien, Kathy	ML15154B766
Obrien, Lauren	ML15160A836
O'Brien, Sara	ML15154C136
Ocean, Chris	ML15155C115
Och, Evelyn	ML15158A146
Ochoa, Chemen	ML15153B035
Ockenden, Lynn	ML15153B025
Oconnell, Kate	ML15155C182
O'Connell, Kathleen	ML15155A585
O'Connell, Michael	ML15159A887
O'Connor, John	ML15148B331
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Oda, Christine	ML15155B701
Odear, Elizabeth	ML15156A142
O'Donahoo, Roger & Gayle	ML15156A031
O'Donnell, Dawn	ML15156A148
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Oerke, Jr., Carl	ML15154B236
Oetter, Rae	ML15159B107
Ogella, Edith	ML15156A831
Ogle, Emily	ML15159B569
O'Grady, Darlene	ML15154C018
Ogren, Linda	ML15140A210
O'Hara, Kathy	ML15148B341
O'Hara, Kathy	ML15154A517
Ohlanda, Andreas	ML15148B037
Ohlendorf, Carol	ML15153A420
Ohlson, Ken	ML15142A085
Ohlsson, Aase	ML15155C105
O'Keefe, Tammie	ML15142A206
O'Kelley, Celia	ML15159B022
Okulewicz, Katherine	ML15142A108
O'Laughlin, Kay	ML15158A258
Oldani, Julie	ML15162A621
Oldfather, Jeremiah	ML15156B483
O'Leary, Daniel	ML15140A027
O'Leary-Chen, Jennifer	ML15148A973
Olenjack, Michael	ML15154A438
Olivares, Yvonne	ML15158A147
Oliver, Nancy	ML15140A008
Oliver, Niles	ML15155A218
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Olmstead, Michaelan	ML15156A869
Olmsted, Charles	ML15148B295
Olsen, Charles	ML15155B829
Olsen, Kathy	ML15159A545
Olson, Beth	ML15156A495
Olson, Bruce	ML15154A321
Olson, Diane	ML15154B971
Olson, Francis	ML15154A544
Olson, Jane	ML15159A868
Olson, Linda	ML15155A034
Olson, Mary	ML15156B383
Olson, Steve	ML15156B486
Oman, Barbara	ML15159A797
O'Nan, Kathleen	ML15153A389
O'Neal, Nancy	ML15156A104
Oneil, Julie	ML15148A230
O'Neill, Cynthia	ML15159A429
Oneill, Den	ML15156B462
O'Neill, Frances	ML15155C246
Onesti, Frances	ML15155A356
Onorato, Stephanie	ML15155A725
Onufer, Mary	ML15153A984
Oothoudt, Sylvia	ML15153B012
Oppenheim, Benjamin	ML15154B466
Oppenhuizen, Kathy	ML15155B671
O'Rafferty, Eric	ML15155A262
Orcholski, Gerald	ML15153A860

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Orlich, Mary	ML15155B666
Orlinski, Patricia	ML15154A216
Orlowski, Eva	ML15162A499
Orndorff, Robert	ML15154B605
Ornee, Mary	ML15148B045
Ornelas, Karen	ML15148B001
Orons, Nancy	ML15154B884
O'Rourke, Dawn	ML15148B302
O'Rourke, Jake	ML15154A398
Orozco, Angela	ML15160A550
Orr, Barbara	ML15154A648
Orsetti, Rosa	ML15162A688
Ortega, Dalyn	ML15155A852
Ortega, Victor	ML15158A280
Ortiz, Frank	ML15153B083
Ortiz, Kathy	ML15156B042
Ortiz, Keren	ML15155B827
Ortiz, Nina	ML15154B745
Osada, Susan	ML15162A733
Osborn, Carole	ML15156A895
Osborn, Thomas	ML15159A896
Osborne, Amanda	ML15147A736
Osborne, Colin	ML15155C025
Osborne, Deborah	ML15162A049
Osborne, Denise	ML15154C146
Osborne, Pamela	ML15156A100
Osgood, Pamela	ML15154B008
Oshiro, Alex	ML15153B112
Oskamp, Stuart	ML15162A102
Osmond, Ronlyn	ML15155A495
Osnes, Linda	ML15159A161
Ossipov, Simone	ML15154B005
Ostapow, Judith	ML15160A835
Ostlie, Susan	ML15159B033
Ostoich, Julie	ML15155B877
Ostopoff, Christine	ML15156A057
Ostrander, Jr., William P.	ML15154A317
Ostrow, Hillary	ML15153B152
O'Sullivan, Joseph	ML15156A665
O'Sullivan, Katherine	ML15148B289
Oswald, Keith	ML15155A469
Oswald, Timothy	ML15155A832
Ott, Michael	ML15156B096
Otter, J. Den	ML15159B541
Otto, Brian	ML15142A253
Otzel, Margaret	ML15159B378
Ouai, Dalila	ML15141A673
Ouellette, Tracy	ML15156B241
Overdier, Ruth	ML15156A061
Overlock, Trina	ML15156A261
Overmann, Laura	ML15148A902
Overstreet, Romy	ML15159A417
Owen, Stephen	ML15159B336
Oxley, Rhonda	ML15153B190
Ozkan, Dogan	ML15155B225
P., C.	ML15155C240
P., Jaz	ML15154C308
P., W.	ML15156A522
Pace, Ann	ML15153A380
Pace, Lisa	ML15154B308
Packman, Zola	ML15154A238
Padalino, Gail	ML15154A924
Padelford, Grace	ML15141A749
Paden, Donna	ML15153B073
Padilla, Melania	ML15159B057
Padilla, Sergio	ML15160A991
Padmanabhan, Urmila	ML15153A713
Paganuzzi, Cinzia	ML15154B827
Pagni, Jean	ML15153A840
Painter, Joanne	ML15160A906
Pairan, Josh	ML15160A543
Palacky, Tami	ML15142A159
Palazzini, Louis	ML15148B449
Palder, Evelyn	ML15154A556
Paley, Leon	ML15141A752
Paling, Scott	ML15154A795
Palladine, Michelle	ML15155A177
Pallanes, Beatriz	ML15154A035
Palmer, Marilyn	ML15156B297
Palmquist, Wendy	ML15159B557
Palo, Jason	ML15154A355
Paluck, Ilene	ML15160A827
Pandit, Sudhir	ML15159B418
Pandolfi, Sara	ML15156B463
Panei, Maryann	ML15148A743
Pankhurst, Heather	ML15155A227
Pannaman, Stanley	ML15155C013
Pannell, Destiny	ML15141A631
Panter, Lisanne	ML15155A426
Panza, Mike	ML15155B779
Papandrea, John	ML15142A160
Pappas, Carole	ML15153B157
Pappas, Melissa	ML15156A039
Papscun, Alan	ML15153A950
Parcell, Ruth	ML15142A155
Parcells, Julie	ML15155A603
Parcou, Julien Kaven	ML15154B793
Pardi, Marco	ML15142A133
Pardington, Akura	ML15158A221
Parent, Amy	ML15158A227
Parigi, Robin	ML15156A430
Park, Gregory	ML15156A579
Park, Laura	ML15153B178
Park, Phyllis	ML15154B294
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Parker, Corey	ML15162B091

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Parker, Janice	ML15158A240
Parker, Jin Adams	ML15156A433
Parker, Joannie	ML15153A402
Parker, Louise	ML15148A892
Parker, Patricia	ML15142A193
Parker, Richard	ML15161A645
Parker, Robert	ML15156A001
Parker, Sarah	ML15156A062
Parker, Sheri Dotson	ML15160A947
Parkhurst, Terrence	ML15142A183
Parkins, Janet	ML15160A519
Parks, Joan	ML15156A194
Parlee, Rodney	ML15158A003
Parmenter, Annmarie	ML15153A916
Parolini, Maura	ML15141A613
Parrish, Cynthia	ML15141A689
Parrish, Jessica	ML15156A093
Parrone, Cindy	ML15148A980
Parrott, Pamela	ML15154A059
Parsons, Michael	ML15148B354
Partsch, Michael	ML15154B991
Parzick, Anne	ML15154A303
Pascale, Alice	ML15155B628
Pascoe, Susan	ML15141A475
Pascual, Pat	ML15154B965
Pash, Eric	ML15156A980
Pasholk, Robin	ML15162B102
Pasholk, Robin	ML15162B042
Pasichnyk, Richard	ML15148A903
Pasqua, John	ML15155A485
Pasqueal, Adam	ML15155B917
Passmore, Judith	ML15153B129
Passoff, Dave	ML15156A056
Patel, Kaushik	ML15159A595
Patel, Sarosh	ML15148A863
Paterno, Ellen	ML15160A528
Patoray, Arlene	ML15153A564
Patrick, Jane	ML15159A104
Patrick, Dale	ML15148B292
Patrick, Duane	ML15154B503
Patrick, Leslie	ML15154B473
Patrizzi, Lee	ML15154C220
Patterson, Carol Joan	ML15162A735
Patterson, Dixie	ML15156A829
Patterson, Katherine	ML15154B224
Patterson, Kevin	ML15154B791
Patterson, Pam	ML15161A660
Patterson, Robin	ML15140A217
Pattison, Janet	ML15155B629
Patton, Lesley	ML15155B892
Patton, Todd	ML15155B664
Patty, Shannon	ML15153B203
Paul, Adrian	ML15142A252
Pauley, Marcia	ML15148A605
Pauline, Jean	ML15155C030
Pauls, Terry	ML15158A198
Paulson, Melony	ML15159A666
Pavcovich, Michelle	ML15159A159
Paverman, Adriana	ML15159A289
Pavlova, Karina	ML15159A796
Paxson, Michele	ML15159A278
Paxton, Greg	ML15159A743
Paxton, Bobbie	ML15155A837
Payne, Geneine	ML15159A552
Payne, Grace	ML15154B261
Payne, Heather	ML15153A777
Peale, Mike	ML15154C154
Pearce, Harold	ML15159A524
Pearce, J. B.	ML15155A219
Pearson, B.	ML15158A255
Pearson, Kiesha	ML15156A731
Pearson, Tia	ML15154B825
Pearthree, Pippa	ML15158A034
Pecararo, Dawn	ML15148A801
Pech, Jim	ML15141A638
Pecha, III, Anton F.	ML15159B143
Peck, M.	ML15162A375
Peck, Sarah	ML15154B025
Peckham, Theresa	ML15154B269
Pedersen, Ashley	ML15156B293
Pedler, Stephanie	ML15154B141
Peeples, Ruth	ML15154B443
Peerman, Dean	ML15153A512
Pelausa, Enrico	ML15159A511
Pelleg, Josh	ML15155B902
Pelletier, Joel	ML15153A646
Pellett, Ocean	ML15155B619
Pelosi, Carol	ML15154A276
Peloza, Amy	ML15159A857
Peltan, Mark	ML15156B445
Pelzer, Ann	ML15155A970
Pena, Deanna	ML15154C228
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Penchoen, Gregory	ML15154B940
Pender, Jacqueline	ML15160A896
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Penn, Gigi	ML15162B079
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Pennell, Joyce	ML15155A412
Pennell, Sherry	ML15154B022
Pepitone, Michelle	ML15154A243
Pepper, Mark	ML15154A701
Perales, Tarasa Masia	ML15141A719
Percy, Patrick	ML15158A204
Perednik, Daniela	ML15141A641
Pereira, Sheila	ML15158A170
Perenich, Theresa	ML15153A907

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Perkins, E.	ML15148A957
Perkins, Guy	ML15140A001
Perkins, Jean	ML15159B019
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Perkins, Sandra	ML15154C179
Perkins, V.	ML15154A458
Perkowski, Richard	ML15154A313
Perlmutter, Martha	ML15154B347
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Perrett, Jody	ML15154B680
Perricelli, Claire	ML15153A721
Perrin, Amy	ML15158A076
Perron, Patricia	ML15154A237
Perruccio, Frank J.	ML15155C116
Perry, Ed	ML15156B151
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Persky, Jerry	ML15155C044
Petel, Amanda	ML15155B918
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Peters, Ray	ML15155A290
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Petersman, Mary Jo	ML15159B343
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Peterson, Kim	ML15155B526
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Peterson, Mary	ML15154B036
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Peterson, Trayce	ML15153B161
Petitpas, Bethanie	ML15155A738
Petkiewicz, Margaret	ML15148A836
Petrisko, George	ML15142A033
Petrova, Dobrinka	ML15159B450
Petry, Gabor	ML15155B706
Petsco, John	ML15159A700
Pettis, Carolyn	ML15159A847
Pettway, Beverly	ML15159A862
Petty, Mark	ML15156B004
Pew, Don	ML15154A680
Pfeifer, Nezka	ML15155A156
Pfeiffer, Steven	ML15159A995
Pfitzner, James	ML15154A128
Pflug, Carl	ML15156A544
Phelps, Amy	ML15159A947
Phelps, Tami	ML15155C010
Phenicie, Deb	ML15142A164
Philips, Nancy	ML15159B056
Phillips, Bob	ML15156B382
Phillips, Charles	ML15162B104
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Phillips, E. Lehuanani	ML15155B834
Phillips, George	ML15148B387
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Phillips, Jean	ML15154B238
Phillips, Jeffrey	ML15156A113
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Phillips, Richard	ML15148A875
Phillis, Ashley	ML15156A944
Piazza, Joseph	ML15155C241
Piazza, Kerri	ML15159B296
Picchetti, Gloria	ML15155A673
Picchioni, George	ML15148B035
Picciani, Laureen	ML15154A619
Piccione, Maryann	ML15140A110
Pick, Thomas	ML15155A187
Pickering, Lori	ML15147A714
Pickworth-Campbell, Carole	ML15148B155
Picot, John Brian	ML15162A740
Pielke, Janet	ML15154B824
Pier, Mollie	ML15154B296
Pierce, Betty	ML15159A065
Pierce, Brian	ML15154C058
Pierce, Ernest	ML15153B274
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Pikaart, Philip	ML15155A533
Pikala, Christine	ML15154C035
Pike, Evette	ML15154C125
Pikus, Barbara	ML15156A935
Pileggi, Peter	ML15155A247
Pilz, Mila	ML15156B505
Pinder, Paige	ML15148A950
Pinneau, Janet	ML15155B725
Pinneo, Guy	ML15154B966
Pinneo, Janet	ML15154B627

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Pinque, Meryl	ML15156A144
Pintagro, Thomas	ML15154B762
Piper, Cynthia	ML15159B028
Piper, Janna	ML15154C115
Pirrone, Annette	ML15154A088
Piser, Corey	ML15155A246
Pistor, Christiane	ML15153B251
Pitt, Jon	ML15153A859
Pixley, Elizabeth	ML15156A315
Pizarro, Vanesaa	ML15154A310
Pizzo, Sherrie	ML15159A130
Place, Robert and Mary	ML15155A480
Plaehn, Dave	ML15154B933
Plagge, Angela	ML15142A261
Plant, Eleanor	ML15154A187
Platt, David	ML15141A604
Plaza, Minette	ML15148B099
Plecko, Emil	ML15154C042
Plemons, Viktoria	ML15154A730
Pliner, Elliot	ML15147A741
Plitt, Kathryn	ML15148A668
Ploenzke, Laura	ML15148A703
Plonski, Heidi	ML15159B118
Plubell, Susan	ML15141A501
Poe, Susan	ML15156B360
Poese, David	ML15156A861
Poessel, Sharon	ML15153A956
Pogell, Sarah	ML15142A303
Poist, Ellen	ML15148B005
Poland, Dianne	ML15148B314
Polczynski, Eric	ML15154A906
Polesky, Alice	ML15148B427
Polidori, Marguerite	ML15159B245
Polifroni, Josephine	ML15159A957
Polis, Rose	ML15156A277
Polito, Gene	ML15156A308
Politzer, Andrew	ML15154B768
Polk, James	ML15148B008
Polk, Linda	ML15158A165
Polk, Nora	ML15154C301
Pollack, Gary	ML15159A050
Pollak, Jeannie	ML15155A484
Pollina, Ron	ML15159B566
Pollock, Jeri	ML15154B782
Pollock, Renee	ML15148A258
Polsky, Mark	ML15148A183
Poock, Patty	ML15156A503
Pool, Ed	ML15155B259
Pool, Roxann	ML15141A645
Poole, Diane	ML15148A951
Poole, Jai	ML15155A846
Poole, Marcia	ML15154C254
Poole, Richard	ML15153B255
Pooler, Carole	ML15154B681
Poolos, Hazel	ML15153A938
Pope, Angela	ML15159A227
Popoff, Dave	ML15161A693
Popp, Joseph P.	ML15141A747
Poppe, Dorothy	ML15154B998
Porcelli, Maureen	ML15148B071
Porcher, Janeene	ML15148B382
Porreca, Audrey	ML15155A144
Porrello, Christine	ML15159A301
Porsch, Angela	ML15154A536
Porter, Barbara	ML15154B030
Porter, Betsey	ML15141A690
Porter, Jan	ML15156B259
Porter, Thomas	ML15141A423
Porter-Keisner, Cheri	ML15155B750
Poskiene, Lina	ML15155C220
Post, Mike	ML15155C202
Postel, Rus	ML15155A444
Poston, Cindy	ML15155A450
Potter, Doris	ML15159B024
Potter, Eric	ML15148A959
Potter, Meredith	ML15148A796
Potter, Penny	ML15154C235
Pottinger, Catherine	ML15153A698
Poulsen, Barbara	ML15153A929
Poulsen, Sabrina	ML15159B013
Povill, Jon	ML15155B511
Powell, Jessie	ML15156A071
Powell, Michael	ML15141A738
Powell, Peggy	ML15154C183
Powell, Shirley	ML15159A038
Power, Philip W.	ML15153A732
Powers, Jeri	ML15154B947
Powers, Paula	ML15154A775
Powers, Sheila	ML15154A553
Pratt, David	ML15148B297
Pratt, Frederick	ML15156B193
Pratt, Ted	ML15155B973
Preece, Kelly	ML15159B020
Presetti, Joan	ML15154B935
Preston, Dee	ML15155A870
Preston, J.	ML15159B423
Pribanic, Carl	ML15155B746
Price, Carolyn	ML15160A603
Price, Elisabeth	ML15155B757
Price, Joyce	ML15155C151
Price, Joyce	ML15155C186
Price, Joyce	ML15158A261
Price, Mary	ML15156A266
Price, Nicole	ML15141A588
Price, Tyler	ML15158A103
Priest, Dave	ML15141A533
Priest, Donald	ML15155C146
Priest, Ruth Ann	ML15148B261

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Primrose, John	ML15155B999
Prince, Noelle	ML15154C089
Priskich, Fiona	ML15155B258
Pritchard, Jennifer	ML15142A195
Pritchett, William	ML15161A647
Prochazka, Penelope	ML15155A994
Proctor, M.	ML15154B699
Profant, Michelle	ML15159A861
Proietta, Susan	ML15154B597
Proteau, Mary	ML15158A231
Prouty, Leslie	ML15156A008
Provost, Clifford	ML15156B316
Pruet, Mary	ML15160A826
Prunko, Thomas	ML15154A437
Prystauk, William D.	ML15153A781
Psaras, Brenda	ML15154A453
Public, Jean	ML15156A953
Puca, Laurie	ML15161A673
Puchalski, Holly	ML15156A303
Puchli, Robert	ML15154B822
Puckett, Peggy Smith	ML15156A576
Puddy, Michelle	ML15160A085
Puentes, Felena	ML15154A734
Puerta, Jeanne	ML15158A047
Pullen, Sher	ML15148B203
Punneo, Sheryll	ML15159B218
Purbrick-Illek, Sally	ML15154A468
Purcell, Douglas	ML15154B901
Purdy, Patty	ML15154B089
Purnell, Til	ML15155A786
Purucker, Susanna	ML15155B507
Purvis, Barbara	ML15159B262
Puscheck, Susan/Robert	ML15154A148
Pusey, John	ML15154A018
Putman, Eileen	ML15156A585
Putnam, Elizabeth	ML15148B197
Putnam, Gary	ML15153A975
Putnam, Lynn	ML15155C028
Puza, A.	ML15158A200
Pyle, Cathy	ML15159A999
Pysher, Paul	ML15154B723
Quaggan, Nancy	ML15154A057
Quaintance, Joel	ML15154B640
Quasha, George	ML15156B173
Quezada, Marin	ML15148A149
Quigley, Jennifer	ML15162A428
Quillian, P.	ML15153A392
Quillin, Michael	ML15156A542
Quimby, Michal	ML15156A099
Quinlan, Lola	ML15154A185
Quinlan, Lola	ML15154A986
Quinn, Anne	ML15155B731
Quinn, George	ML15148A881
Quinn, Patrick	ML15160A534
Quinn, Zoe	ML15160A857
Quota, Ann Bainchi	ML15148B009
R., Leslie	ML15159B034
Raab, Frances	ML15154A991
Raabe, Karen	ML15156A325
Rabenold, Paul	ML15154A629
Rabin, Pat	ML15158A048
Rabinowitz, Rebecca	ML15140A108
Raby, Elizabeth	ML15158A052
Raby, Kevin	ML15156A293
Raccio, Karen	ML15154B815
Rachal, Terese	ML15154A316
Racine, Robert	ML15162A680
Raczka, Alan	ML15155B251
Radcliffe, Steve	ML15154C223
Radecki, Jennifer	ML15156A997
Rader, D. L.	ML15154B205
Radke, William	ML15154A455
Radko, Danuta	ML15154B777
Radov, Lisa	ML15153A327
Rae, B.	ML15153A770
Rae, Brad	ML15159A061
Raftery, Rita	ML15154B441
Ragan, Kate	ML15162A566
Raggio, Wendy	ML15148A597
Ragsdale, Kelly	ML15160A912
Rahav, Maritte (Mara)	ML15155C226
Raite, Sarah	ML15154B957
Ralph, Cecil	ML15156B136
Ramirez, David	ML15155A289
Ramlow, Bob	ML15156A675
Rammel, Vicki	ML15154B164
Ramo, Carol	ML15141A505
Ramos, Joann	ML15156B393
Ramos, Paul	ML15148B036
Ramos, Reyna Garcia	ML15154B800
Ramos, Sigrid	ML15153A865
Ramos, Tatianna	ML15155B249
Ramsey, Betty	ML15153A419
Ramsey, Elizabeth	ML15141A660
Ramsey, Kerry and Beth	ML15154A419
Ramsey, Philip	ML15155C035
Ramsey, Sylvia	ML15155C221
Ramstrom, Eric G.	ML15153B013
Rand, Mary	ML15159A261
Randall, Michael	ML15158A228
Randall, Victoria	ML15153A785
Randalll, Kay	ML15155A680
Randolph, Peter	ML15154A880
Raney, Gary	ML15154B312
Rankin, Jennifer	ML15140A284
Ranly, Don	ML15159A098
Ranney, Myrne	ML15156A832
Ransom, Judy	ML15154A833

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Rantala, Mervi	ML15160A047
Ranz, Lauren	ML15142A093
Rapp, Julia	ML15142A044
Rapp, Kathy	ML15148B183
Rapp, Lauren	ML15160A767
Rappaport, Alexandra	ML15153A814
Rappaport, Ann	ML15153A733
Rappe, Leonard	ML15154B786
Rarick, Karen	ML15148B192
Rascati, Barbara	ML15153A882
Rasche, Sandra	ML15155A971
Rasmussen, David	ML15153B208
Rasmussen, Nancy	ML15156A249
Rater, Virginia	ML15148B141
Rattman, Joseph	ML15159B145
Ratzlaff, Karen	ML15155A719
Raub, Ann	ML15154A342
Raupp, Christopher	ML15148B200
Rauscher, Janet	ML15153B114
Ray, Billie	ML15148A887
Ray, Glynda	ML15154B359
Ray, Glynda	ML15155A743
Ray, Kristy	ML15155A049
Ray, Leslie	ML15159A430
Raychaudhuri, Sumana	ML15159A066
Rayhill, Ashley	ML15155B498
Rayle, Steven	ML15153A930
Raymond, P. J.	ML15147A762
Raynis, Beth	ML15159A058
Rea, Corde	ML15156A580
Rea, Linda	ML15155B575
Read, Seth	ML15156B219
Reader, Charlene	ML15153B075
Ream, Donna	ML15156A231
Reback, Mark	ML15160A554
Reckers, Pamela	ML15154B226
Rector, Crystal	ML15141A772
Rector, Teresa	ML15148A966
Redding, Carmen	ML15156A075
Redish, Maryellen	ML15159A895
Redman, Sandi	ML15156B194
Redwine, Laura	ML15155A154
Redwing, Liz	ML15154B809
Reed, Avis	ML15154A001
Reed, Jason	ML15154B024
Reed, Jennifer	ML15154A658
Reed, Lucia	ML15158A186
Reed, Mary	ML15159A426
Reed, Michael B.	ML15153A677
Reed, Michele	ML15148B059
Reed, Pamela	ML15154C029
Reed, Patrick	ML15162A246
Reed, Robert	ML15155A588
Reed, Rodger	ML15154A179
Reel, Joseph	ML15140A203
Rees, Judy	ML15155B962
Rees, Les	ML15156A108
Rees, Michael	ML15155A403
Reese, Elizabeth	ML15155A250
Reese, Sarah	ML15153A582
Reeves, Diana	ML15153A686
Reeves, Ella	ML15159A842
Reeves, Lenore	ML15155A901
Reeves, Linda	ML15148A237
Reeves, Sheila	ML15154A838
Regan, Evelyn	ML15148B102
Regan, Marilyn	ML15155B008
Regan, Nora	ML15153B106
Reichel, Tom	ML15141A787
Reichter, Susan	ML15148A871
Reid, Nina	ML15156A052
Reid, Patricia	ML15156B024
Reid, Ruth	ML15160A919
Reid, Sarah	ML15159B539
Reid, Susan	ML15153A627
Reiff, Mary	ML15148A889
Reifke, Kathleen	ML15154C083
Reiher, Linda	ML15156A327
Reilly, Marnee	ML15159A778
Reilly, Michael	ML15155C173
Reiman, Lynn	ML15154A478
Reinfried, Kay	ML15147A784
Reinhart, Robin	ML15154B781
Reinik, Bruce	ML15159B048
Reisenbichler, Reg	ML15158A044
Reisman, Emil	ML15148B010
Reiter, Doris	ML15154B960
Reiter, Doris	ML15154C209
Remkus, Ann	ML15159A783
Remy, Deborah	ML15154C073
Rendon, Renate	ML15154C253
Renee, Locks	ML15153A807
Rennacker, Ann	ML15154C078
Rennie, Edwyna	ML15160A054
Renno, Gerd	ML15142A212
Renno, Kathy	ML15156A507
Renton, Kristen	ML15155A886
Repiquet, Sandra	ML15153B080
Resh, Brian	ML15155A779
Resseguie, William	ML15155C126
Rettig, William	ML15155C132
Revesz, Bruce	ML15154C196
Revord, Michael	ML15154B712
Rexrode, Earl	ML15148A831
Reyes, Kimberly	ML15155A807
Reynolds, Alan	ML15159A088
Reynolds, Britain	ML15154A039
Reynolds, Daniel	ML15154B078

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Reynolds, Jeff	ML15154A314
Reynolds, K.	ML15156A176
Reynolds, Lloyd	ML15156B432
Reynolds, Michele	ML15155C162
Reynolds, Renee	ML15155B722
Reynolds, Ruth	ML15140A034
Reynolds, Thomas	ML15155B073
Rhein, Herman	ML15154B646
Rhoades, John	ML15155A216
Rhoads, Donald	ML15156A138
Rhode, Christina	ML15159A830
Rhodes, Ira	ML15160A698
Rhodes, Janet	ML15156B422
Rhodes, Marilyn	ML15154B052
Rhodes, Michael	ML15148A956
Rhodes, Steven	ML15159B372
Rhymer, Joseph	ML15154B841
Rials, Jennifer	ML15154A273
Ricci, Gail	ML15156A893
Ricci, Scott	ML15148B149
Ricciardi, Anthony	ML15140A068
Rice, Everett	ML15154A175
Rice, Gina	ML15154B610
Rice, Jima	ML15160A817
Rice, Kyra	ML15155A123
Rice, Michael	ML15148A985
Rich, Laura	ML15154C150
Richard, Laree	ML15156B472
Richards, Leslie	ML15142A236
Richards, John	ML15156A856
Richards, Margie	ML15156A134
Richards, Sarah	ML15147A770
Richards, William	ML15148A643
Richardson, Aleda	ML15156A864
Richardson, Danielle	ML15162A048
Richardson, Dianne	ML15148B148
Richardson, Don	ML15142A227
Richardson, Gail	ML15155A652
Richardson, K.	ML15158A036
Richardson, Katherine	ML15153A471
Richcreek, Geoff	ML15155A119
Richey, Paul	ML15148A629
Richey, Sharon	ML15153B252
Richie, Lauren	ML15154A281
Richmond, Lonna	ML15148B333
Richmond, Michael	ML15155A721
Richter, Caleb	ML15153A735
Richter, Marthie	ML15159B448
Rickenbach, Deborah	ML15155A267
Riddell, Brian	ML15159A293
Ridder, Lynette	ML15140A023
Riddle, Carolyn	ML15155A508
Rider, Dara	ML15154B736
Ridgeway, William	ML15153A373
Ridgley, Patricia	ML15159B510
Ridgway, K.	ML15153A923
Riehart, Dale	ML15140A278
Rietzel, Marilyn	ML15155B969
Riff, Christopher	ML15156A461
Riggins, Thomas	ML15154C221
Riggs, Richard	ML15154A266
Rigney, J.	ML15158A207
Rigney, Jane	ML15158A208
Riley, Diane	ML15155A223
Riley, Kathleen	ML15162B044
Riley, Kathleen	ML15162B116
Riley, Kelly	ML15155A055
Riley, Michael	ML15140A069
Rinaldi, Debbie	ML15155C144
Rincon, Tanya	ML15156A027
Rindler, Joseph	ML15153A483
Ringgaard, Line	ML15141A454
Ringler, Thomasin	ML15154A796
Ringquist, Rodd	ML15153B160
Rinner, Timothy	ML15155A608
Rios, Jen	ML15159A131
Rios, Susan	ML15154A202
Ripley, John	ML15141A732
Ripple, Martha Jane	ML15158A254
Ripplinger, George	ML15158A053
Rise, William	ML15155A497
Ritola, Donna	ML15148B106
Rittenhouse, Calvin	ML15147A755
Rittenhouse, Nancy	ML15153A499
Rivard, Kris	ML15148A803
Rivas, Cecilia	ML15159B429
Rivenburg, Russell	ML15155B323
Rivera, C.	ML15156A300
Rivera, Javier	ML15154B463
Rivera, Sergio	ML15154B850
Rizzo, Barbara	ML15153A391
Rizzo, Paul	ML15154C040
Rizzuto, Angela M.	ML15156A163
Roach, Edward	ML15154A299
Robbins, Elizabeth	ML15155C188
Robbins, Eloise	ML15140A198
Robbins, Mary	ML15148A934
Roberson, Steven	ML15162A723
Roberto, Robert	ML15154A577
Roberts, Rodney	ML15142A257
Roberts, Amy	ML15148B240
Roberts, Blake	ML15153A808
Roberts, Brock	ML15154A773
Roberts, Chuck	ML15153A441
Roberts, Fiona	ML15156B424
Roberts, Judith	ML15154C004
Roberts, Julie	ML15162A711
Roberts, Laney	ML15154B227

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Roberts, Phyllis	ML15148A261
Roberts, Sally	ML15154A654
Robertshaw, K. K.	ML15155A530
Robertson, Destine	ML15160A893
Robertson, Kathryn	ML15142A235
Robey, Eddy	ML15154C275
Robideau, Elizabeth	ML15142A219
Robin, Etta	ML15153B173
Robinson, Angel	ML15155A118
Robinson, Dameta	ML15156B050
Robinson, James	ML15148A130
Robinson, Janet	ML15154B651
Robinson, Jeanne	ML15160A796
Robinson, Julianna	ML15158A125
Robinson, Juneko	ML15154C057
Robinson, Khristine	ML15155A761
Robinson, Lee	ML15148B110
Robinson, Patricia	ML15153A993
Robinson, Rory	ML15154A686
Robinson, Saliane	ML15153B163
Robson, Eric	ML15141A550
Rocco, Evelyn	ML15159A285
Rocco, Y.	ML15156A023
Rocco, Y.	ML15156B358
Rocha, Nidia	ML15160A660
Roche, Chris	ML15158A128
Roche, Peter	ML15140A047
Rocheleau, Jessica	ML15147A733
Rocke, Janice	ML15154B764
Rockers, Kay	ML15155C019
Rodack, Soretta	ML15156A783
Rodgers, Ron	ML15155B182
Rodman, Shirley	ML15159A495
Rodoff, Lennie	ML15156B181
Rodrigue, Gracinda	ML15155A353
Rodriguez, Angela	ML15148B270
Rodriguez, Betsy	ML15155A749
Rodriguez, Ste Ven	ML15156A716
Rodriguez, Sylvia	ML15154C034
Roe, Christina	ML15154A017
Roegner, Debby	ML15156A140
Rogers, Belinda	ML15141A497
Rogers, Dave	ML15159A250
Rogers, David	ML15154A405
Rogers, Dennis	ML15154A056
Rogers, Jennifer	ML15142A021
Rogers, Susan	ML15148A840
Rogers, William	ML15158A151
Rohloff, Rosalyn	ML15155A188
Rohm, Lisa	ML15159A023
Rohr, Michaela	ML15155B813
Rol, Anna Natalie	ML15154A158
Roland, Jelica	ML15156B161
Rolbeck, Kathi	ML15154B482
Roll, Greg	ML15156A288
Rolland, Lane	ML15154B989
Rollings, Rusty	ML15154A293
Rollo, P.	ML15162A417
Rolston, Patricia	ML15153A810
Roma, Michele	ML15154B710
Romani, Gwen	ML15156A940
Rome, Abigail	ML15154B921
Romesburg, Denise	ML15161A635
Romine, Janet	ML15156A301
Romine, Janet Holly	ML15153A867
Rominger, Nancy	ML15159B464
Ronco, Philip	ML15154A710
Rooney, Diane	ML15153B268
Root, Charlene	ML15154C023
Root, Sharon	ML15154A521
Rosa-Re, Samantha	ML15154B964
Rosasco, Stephen	ML15155A643
Roscher, Miles	ML15162A144
Rose, Aaron	ML15156A887
Rose, Amanda	ML15148B435
Rose, B.	ML15158A247
Rose, Jay	ML15148B448
Rose, Shannon	ML15158A250
Rose, Timothy	ML15160A684
Roseberry, Bill	ML15159A882
Rosen, Susan	ML15155B025
Rosen, Helene	ML15148A930
Rosen, Natalie	ML15159A810
Rosen, Paul	ML15154A009
Rosenblood, Jamie	ML15153A718
Rosenblum, Stephen	ML15148B326
Rosencrans, Matt	ML15158A182
Rosenfeld, Alice	ML15155A909
Rosengrant, Deb	ML15159A831
Rosenkrantz, Bruce	ML15159A850
Rosenthal, Rima	ML15154A822
Rosier, Amy	ML15153A730
Roske, Adam	ML15142A293
Ross, Audrey	ML15155B502
Ross, Barry	ML15140A162
Ross, Carolyn	ML15155A276
Ross, Elliot	ML15153A363
Ross, J.	ML15148B443
Ross, Jean	ML15148A751
Ross, Kay	ML15148B296
Ross, Patricia	ML15154A058
Rossetti, Pamela	ML15154A027
Rossi, Daniela	ML15159B247
Rossi, Ray	ML15155B919
Rossini, J.	ML15141A569
Rosso, Brit	ML15156A904
Rosson, Rebecca	ML15154B258
Roth, Augustine	ML15156B498

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Roth, Gaby	ML15153A508
Roth, Jerome	ML15148A667
Roth, Lu	ML15153A880
Roth, Steve	ML15154A606
Rothauser, S.	ML15159A651
Rothman, Emily	ML15154B092
Rothschild, Blake	ML15160A825
Rothschild, Eileen	ML15155A019
Rothstein, Debbie	ML15142A158
Roulston-Doty, Suzanne	ML15141A441
Rouse, Framk	ML15159A483
Rousseau, Claudia	ML15156B307
Rousseau, Nicole	ML15154B472
Rove, Frances	ML15156A295
Rovnak, William	ML15154A718
Rowden, Tanya	ML15162A259
Rowe, Jeannette	ML15154A792
Rowell, Edward	ML15155B327
Rowinski, Wojciech	ML15159A288
Rowles, Trina	ML15160A981
Rowlingson, John	ML15154B742
Rowlingson, John	ML15160A958
Roy, Joe	ML15156A112
Roy, Randy	ML15156B244
Royer, Alice	ML15154A332
Royer, Alice	ML15155A157
Royer, Allen	ML15155A496
Ru, De	ML15156A180
Ru, Stephanie	ML15154C241
Ruben, Martha	ML15154A150
Rubesch, Erick	ML15154A404
Rubin, Bill	ML15159A604
Rubino, Karen	ML15147A750
Rubio, Maria	ML15156A258
Ruby, Jacki	ML15154C060
Ruby, Theresa	ML15155B572
Rudd, Vickie	ML15147A732
Rudisill, Amanda Sue	ML15156A591
Rudolph, Linda	ML15148A794
Ruggiero, Linda	ML15155C159
Ruiz, Antonio	ML15154C086
Ruiz, Arnold	ML15159A216
Ruiz, Arnold	ML15159A218
Ruiz, Nelida	ML15159B571
Ruiz, Osiel	ML15156A485
Ruiz, Susan	ML15153B063
Rule, Juliann	ML15154A201
Rullmann, Gale	ML15153A822
Rumiantseva, Elena	ML15148B198
Rummel, Thomas	ML15148A168
Rusell, Jessica	ML15142A213
Rush, Charlene	ML15156B496
Rushing, Dora	ML15153A837
Rushlau, Mary Anne	ML15156A566
Rusian, Andrzej	ML15155C204
Rusiniak, Karen	ML15155B633
Russell, Claire	ML15148A869
Russell, Katherine Blum	ML15156B071
Russell, Lela	ML15154A900
Russell, Nathan	ML15160A536
Russell, Nathaniel	ML15153B264
Russell, Rick	ML15154B207
Russo, Bob	ML15159A482
Russo, Carl	ML15156A506
Rutherford, Helen	ML15155A150
Rutkowski, Robert	ML15148A947
Ryan, Mary	ML15154B724
Ryan, Terrance	ML15156B028
Ryan, Thomas	ML15154B743
Ryan, Thomas	ML15154B982
Rycheck, Kevin	ML15153B079
Ryder, Gigi	ML15154A399
Rysavy, Robin	ML15155C062
S., D.	ML15155B683
S., Jennifer	ML15155B596
S., R.	ML15159A505
Saavedra, Yvonne	ML15159A955
Sabatini, Kathy	ML15155B812
Sachs, Jean	ML15155B254
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Sacks, Cindy	ML15161A663
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Salatino, Freda	ML15148B144
Salazar, Joe	ML15155B881
Salgado, Jane	ML15155A877
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Sall, Frederick	ML15153A356
Sallah, Maggie	ML15147A774
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Salter, Andrew	ML15141A557
Saltzman, Barry	ML15154C193
Saltzman, Susan	ML15154A240
Salvat, Melanie	ML15160A082
Salvner, Amanda	ML15162A476
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San Cartier, Terry	ML15155A327
San Socie, Robert Glenn	ML15159A888
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Sanchez, Paul	ML15156B479
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Sanchez, Saul	ML15155B869
Sand, Margaret	ML15148B372
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Sanders, Carrie	ML15155A330
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Sanderson, Sandy	ML15154A116
Sandgrund, Robert	ML15156A559
Sandoval, Lily	ML15155A763
Sandow, Chris	ML15148B259
Sandritter, Ann	ML15141A721
Sanford, Ken	ML15162A105
Sanford, Timothy	ML15148A976
Santangelo, Elaine	ML15154B439
Santiago, Jr., Raymond	ML15159A384
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Santopietro, Michael	ML15154A425
Santora, Mark	ML15155A038
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Santto, Aldana	ML15159B154
Sapiro, Claire	ML15153A744
Sarkisian, George	ML15156A165
Sarraille, Marijeanne	ML15153A932
Sarramia, Christian	ML15154A408
Sasaoka, Julie	ML15153B305
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Satijn, Pascalle	ML15155C098
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Sauer, Marlene	ML15153A436
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Savitch, Steve	ML15153A935
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Schas, Bill	ML15156A269
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Schira, Jane	ML15159A290
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Schmeichel, Nicollette	ML15156A153
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Schnebel, Sherry	ML15161A651
Schnee, Jane	ML15141A675
Schneewind, Jon	ML15159A014
Schneider, Annette	ML15155B344
Schneider, Barbara	ML15156B461
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Schochet, Gordon	ML15156A691
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Scott, J. David	ML15147A711
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Scott, Peter	ML15159B058
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Seeman, Paul	ML15159B584
Seff, Joshua	ML15154A673
Segal, Gussie	ML15156A215
Selby, Lisa	ML15142A025
Selig, Ronald	ML15158A283
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Sells, Greg	ML15159A846
Seltzer, Elizabeth	ML15155A505
Seltzer, Rob	ML15153B056
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Semienko, Brenda	ML15154A367
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Sennert, Gloria	ML15156A091
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September, P. J.	ML15155B871
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Serazio, Sandra	ML15156A650
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Shivers, Dennis	ML15155A801
Shocair, Abla	ML15159A134
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Shoham, Amit	ML15155A540
Shook, James	ML15148A248
Shook, Philip	ML15153A924
Short, John	ML15162B145
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Shotwell, Andreia	ML15148B267
Shoup, Wendy	ML15154B551
Showell, Sada	ML15141A734
Shreve, Rick	ML15153B172
Shuben, Jeffrey	ML15155A263
Shubert, Stephen	ML15153B219
Shuler, Margaret	ML15142A149
Shult, Donald	ML15154B285
Shultz, Betty Jane	ML15148B190
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Shumaker, H. Dennis	ML15155A717
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Shutkin, Sara	ML15155A075
Shutt, John	ML15155A127
Siano, Christiaan	ML15141A780
Sibelman, Grae	ML15155A366
Siddiqi, Marilyn	ML15156A839
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Silvers, Margaret	ML15153B211
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Slater, Ruth	ML15141A586
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Slawinski, Katherine	ML15159A352
Sleeth, Janet	ML15158A185
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Smith and Hill, Lynn and EdwRd	ML15154B342
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Smith, Anita	ML15154B719
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Spanogle, Vicki	ML15154A704
Sparks, Dana	ML15142A307
Sparlin, Shauna	ML15156A128
Spaulding, Stephen	ML15148B105
Spears, Harvey	ML15154C124
Speciale, Samuel	ML15153A610
Species, Scott	ML15155A462
Speed, Janice	ML15159A553
Speer, Cheryl	ML15155A357
Speicher, Sandra	ML15156A432
Speidel, Kurt	ML15155A441
Spencer, Carole	ML15155A249
Spencer, Jeremy	ML15148B222
Spencer, Kathleen	ML15156A954
Spencer, Martha	ML15160A876
Spencer, Sheila	ML15153A360
Spengler, Jennifer	ML15162A657
Speno, Charlie	ML15148A180
Spera, Kathy	ML15154A881
Spevak, Edward	ML15142A099
Spiegel, Edwyna	ML15154A226
Spiegel, Kimberly	ML15159B041
Spielmann, Edda	ML15148B407
Spillman, Aileen	ML15142A343
Spitzer, Laura	ML15154B860
Spivack, Susan	ML15161A634
Spohn, Dena	ML15156A781
Spokony, Irving	ML15142A176
Spong, Timothy	ML15156A846
Spradlin, Karen	ML15153B093
Spragins, John	ML15148A800
Sprague, Jeanne	ML15159B151
Sprano, Barbara	ML15162B147
Spreitzer, Francis	ML15153A495
Springer, Cynthia	ML15154A011
Springer, Steven	ML15153A809
Spry, Tom	ML15156A582
Squires, Emma	ML15153B042
St. Angelo, R.	ML15154C287
St. Clair, Sharyn	ML15154A244
St. Germaine, Gerald	ML15155B566
Staats, Jean	ML15155A521
Stabler, Jessica	ML15155A307
Stachnik, Holly	ML15156A053
Stadler, Debra	ML15155B187
Staff, George	ML15159B524
Stall, John	ML15156A847
Stallings, Kenneth	ML15142A181
Stalter, Marlene	ML15153A377
Stamer, Lou	ML15155B848
Stamm, Karen	ML15142A275
Stamm, Nancy	ML15148A136
Stamps, Gail	ML15155B183

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Stan, Talila	ML15148B243
Stanberry, Beth	ML15159A074
Standley, Dawn	ML15153A947
Standley, Ron	ML15153B272
Stanley, Norm	ML15154C279
Stanley, Richard	ML15155B694
Stansbury, Angelica	ML15156B189
Stansfield, Jack	ML15155B056
Stansill, Sally	ML15155B437
Stantial, Linda	ML15154B872
Stanton, Liana	ML15154B898
Stanton, Lisa	ML15156A526
Stapelfeldt, Horst	ML15155C071
Stapler, Carl	ML15155B554
Stapp, Laci	ML15155C123
Star, Star	ML15158A184
Starbuck, Stanley	ML15148B446
Stark, Katharine	ML15153A466
Stark, William	ML15153A568
Starling, Richard	ML15158A088
Starr, David	ML15140A012
Starr, Joan	ML15156B089
Starrett, Nancy	ML15142A081
Starz, Mary	ML15147A783
Stasey, Joseph	ML15154B843
Stassinopoulas, George	ML15154A234
Staton, Janiece	ML15154B031
Statts, Jeffrey	ML15162A661
Stauber, Michael	ML15153B164
Stavis, Alex	ML15155A862
Stawinoga, Greg	ML15148B444
Stay, Chris	ML15162B079
Stay, Chris	ML15162B128
Steadmon, Jason	ML15154C021
Stearney, Fern	ML15159A529
Stedman, Matt	ML15148A993
Steele, Cheryle	ML15155B604
Steele, Mary	ML15162A225
Steele, William	ML15148A638
Steers, Sandra	ML15153A653
Steets, Diane	ML15156A130
Steeves, Charleen	ML15156A914
Stefacek, Laura	ML15154A876
Stefanich, Rosalie	ML15154C005
Stefano, Courtney	ML15155B512
Steffen, Heidi	ML15142A228
Steffen, Melanie	ML15161A641
Stehle, Alice	ML15154B246
Steiger, Bonnie	ML15162B106
Steiger, Bonnie	ML15162B064
Steil, Ashleigh	ML15159B345
Stein, Dennis	ML15153B064
Stein, Herbert	ML15156A778
Stein, Renee	ML15155C127
Steinauer, Kay	ML15154B173
Steinberg, Jack	ML15154C203
Steinberg, Tara	ML15142A022
Steinbrecher, Klaus	ML15155C136
Steinbrink, Nancy	ML15153A941
Steiner, A. L.	ML15154A254
Steinfeld, Naomi	ML15158A066
Steinhardt, Helene	ML15153B023
Steinhart, Carol	ML15142A115
Steininger, Lorenz	ML15148B054
Steininger, Robert	ML15159A823
Steinle, Sandra	ML15154A735
Steinmetz, Cindy	ML15154C264
Stellato, Pat	ML15155C160
Stenflo, Jahnavi	ML15154B289
Stenseth, Carolyn	ML15155A828
Stephan, Elise	ML15148A953
Stephens, Chandra	ML15155B989
Stephens, John	ML15153A359
Stephens, Robert	ML15154A867
Steppan, Linda	ML15160A922
Sterling, Keir	ML15154B842
Stern, Les	ML15155A291
Stern, Richard	ML15141A654
Sternberg, Karin	ML15142A043
Sterner, Jim	ML15154C268
Sterzing, H. Keith Mephodie	ML15155B635
Stetser, Ann	ML15155A004
Steva, Megan	ML15155A091
Stevens, Dennis	ML15154A929
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Stevens, Eugenia	ML15160A885
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Stevens, Lisa	ML15156A898
Stevens, M.	ML15158A213
Stevens, Wendy	ML15156A477
Stevenson, Kenneth	ML15155A414
Stevenson, Nadine	ML15140A144
Stevenson, Timothy	ML15162A730
Stewart, Berkeley	ML15155A990
Stewart, Betty	ML15156A006
Stewart, Jack	ML15155A236
Stewart, Margie	ML15156A513
Stewart, Michael	ML15159B389
Stewart, Rebecca	ML15159A937
Stewart, Ruth	ML15155B015
Stewart, Sharron	ML15154B125
Stewart, Shelli	ML15146A369
Stewart, Stephanie	ML15154B622
Stickel, Ann	ML15153A651
Stickney, John	ML15155A057
Stickney, Karen	ML15154B559

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Stiehl, Joanna	ML15159A664
Stierlen, Lorelei	ML15155B398
Stierli, Edward	ML15148A232
Stiff, Gina	ML15148A921
Stiff, Gina	ML15154B243
Stiles, Sarah	ML15156B003
Stime, Denise	ML15159B407
Stimmer, Sonja	ML15153A695
Stimpson, Lisa	ML15142A231
Sting, Gloria	ML15156B034
Stinson, Georgia	ML15156A962
Stinson, Loree	ML15154A679
Stiteler, Ellin	ML15141A443
Stocker, Nancy	ML15162B105
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Stocker, Thomas J.	ML15155B580
Stockman, Sharon	ML15160A946
Stocks, Lawrence	ML15158A262
Stoddard, Eric	ML15155C145
Stoddard, Wade	ML15141A577
Stoffel, Patrick	ML15156B263
Stokes, Bettina	ML15154A118
Stoltenberg, John	ML15154A114
Stone, James	ML15148A627
Stone, Jane	ML15154B771
Stone, Kelly	ML15159A782
Stone, Lisa	ML15141A539
Stone, Mary	ML15159A282
Stone, William	ML15153B101
Stoneback, Sharon	ML15159A345
Stoneburner, Barb	ML15148A196
Stonehawk, Mikerra	ML15148A925
Stoner, Dorothy	ML15162A224
Stonier, Polly	ML15155B980
Stonington, Louise	ML15140A238
Stoops, William	ML15159A841
Story, Shirley	ML15156B427
Story, Tiffany	ML15155B178
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Stout, Karen	ML15155C104
Stout, Keri	ML15154C074
Stout, Kristen	ML15156A137
Stowers, Carol	ML15148B079
Strack, Daniel	ML15155B669
Strahan, Estha	ML15155A112
Strailey, Faith	ML15148A718
Strain, Darren	ML15156A199
Strand, Emmorette	ML15154A325
Stransky, Charles	ML15155B795
Strate, Kris	ML15158A113
Strauss, John	ML15162A426
Strauss, Nancy	ML15155A911
Strawn, Mike	ML15159B298
Strayer, Rosa	ML15148A822
Strear, Nancy	ML15154B072
Street, Diena	ML15142A100
Street, Patty	ML15159A374
Strehlow, Jennifer	ML15160A897
Streur, Devin	ML15154B329
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Stril, Jean	ML15156A317
Stringer, David Allen	ML15159A300
Strom, Theresa	ML15156A239
Stromberg, Patricia	ML15155B384
Stromfeld, Andrew	ML15155C156
Strong, Ann	ML15155A474
Strong, Daniel	ML15156B209
Strong, Grace	ML15154A078
Strouble, Jackie	ML15156B019
Stroupe, Kerri	ML15154C273
Strowd, Carl	ML15156A310
Strowd, Richard	ML15154B090
Strum, Cathy	ML15154B334
Strzesak, Jacqueline	ML15159A029
Stuart, Connie	ML15155A036
Stuart, Michael	ML15155B621
Stucker, Melinda	ML15148A780
Stuckey, Richard	ML15142A179
Stuebben, Angela	ML15156A316
Stulb, Jeanne	ML15141A741
Stulman, Esther	ML15154B191
Stumpf, Lawrence	ML15155B436
Sturek, Doshia	ML15155B266
Sturm, Sabine	ML15153B090
Stutes, Earl	ML15160A600
Stutz, Susan	ML15155A787
Styles, Ronda	ML15159A455
Su, Donna	ML15153A784
Suarez, Moraima	ML15155B704
Suchenicz, Carolyn	ML15159A272
Suda, Maryska	ML15155A659
Suess, Gillian	ML15155A116
Suggs, Magdaline	ML15160A731
Suit, Karen	ML15155A368
Sullenberger, Nathan	ML15155A908
Sullivan, Barbara	ML15155A299
Sullivan, Carol	ML15156B335
Sullivan, Denise	ML15155A978
Sullivan, Diane	ML15156A793
Sullivan, Molly	ML15160A055
Sullivan, Tad	ML15153B304
Sullivan, Teresa	ML15153A329
Sullivan, Tom	ML15156A639
Sumida, Kaytee	ML15141A798

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Sunada, Kristin	ML15156B030
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Sundarajan, Aditi	ML15154B851
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Sunderland, Violet	ML15154A119
Sundquist, W.	ML15153B033
Sutherland, John	ML15158A210
Sutkowski, John	ML15154B297
Sutliff, Leslie	ML15148B108
Sutphin, Madelaine	ML15156A838
Suyehara, Erin	ML15155B855
Svare, Marlys	ML15153A821
Svec, Bonnie	ML15154B218
Svensson, Bo	ML15154A242
Swaim, Lauren	ML15155B138
Swaim, Lenore	ML15141A767
Swain, Aimee	ML15147A753
Swain, Robert and Mary	ML15159B128
Swall, Don	ML15156A210
Swan, Cate	ML15159A035
Swan, Susan	ML15160A878
Swaney, Sharon	ML15155A186
Swank, Carrie	ML15141A518
Swank, Phyllis	ML15148B186
Swanson, Lesllie	ML15140A255
Swanson, Lorraine	ML15156A647
Swanson, Michael	ML15142A306
Swanson, Ricki	ML15159B220
Swanson, S.	ML15140A033
Sweazea, Alan	ML15155B085
Sweeney, John Gideon	ML15154B477
Sweeney, Wesa-Asgaya	ML15156A511
Sweet, Kirsten	ML15155A969
Sweet, Timothy	ML15160A881
Sweetland, Daisy	ML15154B252
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Swem, Earl Gregg	ML15159B130
Swendrowski, Mike	ML15154B353
Swensen, Harry	ML15159A731
Swenson, Keith	ML15155B490
Swenson-Zakula, Kimberly	ML15159A619
Swick, Chelsea	ML15155B656
Swiencicki, John	ML15154B823
Swimsaway, Crow	ML15153A485
Swindell, Elak	ML15154B054
Swindle, Terri	ML15156B230
Swinehart, Lorin	ML15148A593
Swoffer, Tom	ML15153A864
Sydor, Oleh	ML15153A762
Syed, Mushtaq	ML15155A431
Symcox, Geoffrey & Linda	ML15156B033
Symonds, Allen	ML15154C142
Symonds, Russell	ML15162B079
Symonds, Russell	ML15162B122
Sytzko, Victor	ML15153A863
Syverson, Janelle	ML15154B163
Szabo, Joseph	ML15160A845
Szabo, Liz	ML15155A298
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Szumal, Raymond	ML15156A105
Szymanowski, Paul	ML15156B341
Szymczak, Nancy	ML15153A898
Szymczyk, Mary	ML15154A444
Szyszka, Lawrence	ML15159A586
T., C.	ML15155B832
T., Randy	ML15153A943
Taber, Gloria	ML15162A097
Tabor, Kris	ML15154B880
Taffany, Laura	ML15155C184
Taft, Robert	ML15155A979
Tagawa, Ann	ML15158A286
Taggart, Carol	ML15155B522
Tait, Ann	ML15148A214
Takatsch, Julie	ML15153A804
Talbot, James	ML15142A087
Taliano, Ronald	ML15155A192
Talkington, Wendy	ML15148A645
Tallant, Deenie	ML15156A074
Talleagle, David	ML15155B887
Tamargo, Jorge J.	ML15154A542
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Taniwaki, Marge	ML15162A726
Tankersley, Janice	ML15141A797
Tann, Rosemary	ML15159A004
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Tanner, Marjorie	ML15155B638
Tanner, Phillip	ML15148A182
Tansey, Paulette	ML15154A156
Tapiero, Abel	ML15142A049
Taplin, Helen	ML15155A853
Tapp, Elizabeth	ML15162A241
Tappen, Amy	ML15154B981
Tarallo, Mary	ML15154C095
Tarantino, Ethel	ML15156B010
Tarkington, Victoria	ML15154B300
Tarkowski, Brenda	ML15160A667
Taroli, Garry	ML15141A510
Tarpley, Matthew	ML15153B091
Tasker, David	ML15153A551
Tassell, Bruce Van	ML15154A200
Tate, Nancy	ML15148A982
Tatom, Andy	ML15159A097
Tatum, Elizabeth	ML15141A630
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Taylor, Audrey	ML15156A208
Taylor, Barbara	ML15155A226
Taylor, Jackie	ML15153B223
Taylor, Kelly	ML15159B308
Taylor, Kirk	ML15155B906
Taylor, Nancy	ML15159B431
Taylor, Robyn	ML15160A860
Taylor, Stephen	ML15155C141
Taylor, Tim	ML15160A793
Tays, Shawn	ML15153B181
Teasley, Regi	ML15162A061
Teason, Christine	ML15159A806
Tedesco, Frances	ML15155B631
Tedesco, Terry	ML15155B601
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Tedesco-Kerrick, Terry	ML15159B402
Teel, Shannon	ML15148B173
Teeter, Keith	ML15154B838
Teevan, John	ML15154C126
Tefertiller, Staci	ML15153B253
Tegtmeier, Diane	ML15153A757
Tehan, Patricia	ML15158A098
Teibloom, Joel	ML15155A737
Telfair, II, Ray C.	ML15148B299
Teli, Ann Marie	ML15153A971
Telleen, Melany	ML15153B217
Tempelman, Steven	ML15158A004
Temple, Michele	ML15148A763
Templeton, Todd	ML15153A990
Tenaglia, Carol	ML15156A757
Tenerelli, Brenda	ML15142A141
Tennant, Allie	ML15153A416
Tennen, Laura	ML15153A817
Tennen, Sylvia	ML15153A855
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Tenney, Joanne	ML15155A633
Teresi, Fran	ML15154B430
Tergesen, Ron	ML15155A713
Terleski, Margaret	ML15155A362
Terriault, Michelle	ML15154A660
Terrock, Jennifer	ML15141A652
Terry, Clifford	ML15148A657
Terry, Michael	ML15155B124
Tesch, Charlie	ML15156B001
Tetarenko, Pamela	ML15154A479
Tetro, Barbara	ML15155A823
Teunissen, Christina	ML15147A708
Tevelow, Carla	ML15155C143
Tevis, Eleanora	ML15156B310
Thackrey, Gale	ML15153B103
Tharp, Reynold	ML15154C087
Thayer, Mostyn	ML15155B844
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Theard, Lauren Pacheco	ML15148A968
Theroux, Rosemary	ML15159A614
Therrien, Theresa	ML15154B118
Thibault, Gail	ML15140A226
Thiel, Mary Martha	ML15154B354
Thiess, Fred	ML15159A115
Thing, Susan	ML15155B027
Thomas, John	ML15154B785
Thomas, Bev	ML15153A873
Thomas, Caren Crronk	ML15148A666
Thomas, Denise	ML15159A858
Thomas, Eva	ML15154A873
Thomas, Gina	ML15154A993
Thomas, Helen	ML15158A022
Thomas, James	ML15148A708
Thomas, Jeffrey	ML15148B077
Thomas, Kimberly	ML15156A322
Thomas, Lisa	ML15161A620
Thomas, P.	ML15155A318
Thomas, Patte	ML15154B944
Thomas, Robert	ML15154C195
Thomas, Rochelle	ML15155B404
Thomas, Toni	ML15156B195
Thomas-Hill, Pam	ML15155A237
Thomason, Anita	ML15154B776
Thomason, Sharon	ML15159A349
Thomas-Virnig, Christina	ML15155A086
Thompson, Beverly	ML15160A525
Thompson, Dave	ML15162A237
Thompson, Douglas	ML15153A690
Thompson, Jackie	ML15148B428
Thompson, Jeremy	ML15161A674
Thompson, Keith	ML15148A769
Thompson, Mark	ML15162A423
Thompson, Muhammad	ML15156A270
Thompson, Robert	ML15154B255
Thompson, Roberta	ML15154C194
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Thorington, Helen	ML15153A536
Thornburg, Merrie	ML15156A127
Thorne, Eugene	ML15155A338
Thornell, Nigel	ML15155A511
Thornsbury, Jean	ML15141A624
Thornton, Laura	ML15142A245
Thornton, Robyn	ML15159B550
Thorsen, Einar	ML15154A460
Thrailkill, Jim	ML15154C199
Thrower, Michelle	ML15155A180
Thrush, J.	ML15155A245
Thurman, Anna	ML15156B504
Thurn, Clement	ML15161A702

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Tiaven, Marilyn	ML15154A135
Tibbets, Linda	ML15153A866
Tice, Janet	ML15158A183
Tichman, Nadya	ML15154A830
Tidwell, Marion	ML15155A312
Tieso, Jovita	ML15162A244
Tiessen, Grace	ML15156A771
Tildes, Katherine	ML15156B429
Till, Mary Ann	ML15154C244
Tilley, Justine	ML15148A709
Tillinghast, Audrey	ML15156A599
Timberlake, Ralph	ML15160A889
Timm, Jill	ML15155A098
Timm, Richard	ML15155B109
Timmerman, Don	ML15159B521
Tindol, Lolly	ML15155C060
Tine', Tina	ML15156A169
Tingle, Brian	ML15142A321
Tinsley, Brenna	ML15159A766
Tisdell, Jennifer	ML15153B151
Tizard, Thomas	ML15154A043
Tobias, Alice	ML15159A371
Tobias, Christopher	ML15155C200
Tobin, Ralph	ML15155A230
Tobolski, Kelly	ML15159B332
Todaro, Tom	ML15153B010
Todd, Miranda	ML15158A148
Todd, Nic	ML15154B834
Todd, Victoria	ML15155B457
Todisco, Michael	ML15156A304
Toelle, Sherry	ML15155A160
Toft, Carolyn	ML15156B125
Toigo, Joe	ML15155B627
Tokunaga, Barb	ML15156A445
Toledo, Justin	ML15155B982
Tolerico, Joseph	ML15154B753
Tollefson/Conard, Margot	ML15154A251
Tolley, Mark	ML15154B959
Tomaselli, Susan	ML15156B231
Tomasello, Pela	ML15155C093
Tomlinson, Michael	ML15153B120
Tompetrini, Phil	ML15159B113
Tompkins, Greg	ML15159B573
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Tonkin, Gary	ML15156A189
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Toone, James	ML15153A742
Tootell, Joan	ML15158A051
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Torres, Andrea	ML15148A873
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Torrette, Ron	ML15159A108
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Toth, James	ML15154B946
Tousley, Kay	ML15156B454
Tovar, John	ML15158A152
Towers, Gloria	ML15154A142
Towner, Erline	ML15146A237
Townsend, Carlos	ML15159A932
Townsend, Darlene	ML15153A700
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Townsend, Peter	ML15153B146
Townshend, Elisa	ML15141A647
Toy, James	ML15156B475
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Tozzi, Sharon	ML15141A594
Tracy, Anne	ML15155B222
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Trafficante, Michelle	ML15148B284
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Trauth, Beti	ML15159A859
Traveler, Calum	ML15140A281
Travis, Judi	ML15153A321
Travis-Morgan, Donna Mae	ML15154B997
Trawitzki, Tony	ML15153A901
Treadwell, Phyllis	ML15153B053
Tredinnick, Catherine	ML15153B158
Tregidgo, Richard	ML15154B617
Trela, Christine	ML15154B730
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Trevillian, Linda	ML15153A959
Trevillion-Hill, Mary Ann	ML15153B194
Triana, Antonio	ML15155A090
Trice, Tina	ML15155C157
Trico, Sher	ML15159A925
Trilles, Tangi	ML15159A824
Trimm, James	ML15156A114
Trinque, Eric	ML15155B016
Trotta, Anthony	ML15162A600
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Trudeau, Christine	ML15154A382

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True, Mary	ML15159A085
Truland, David	ML15154B948
Trumann, C.	ML15158A230
Trumbull, Ramon	ML15155B200
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Tryggeseth, Jackie	ML15155A861
Trykowski, Denay	ML15154B702
Trykowski, Lonni	ML15155B997
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Turner, Thomas	ML15148B244
Tutihasi, R-Laurraine	ML15159A120
Tuxen, Ardelle	ML15159A089
Twickler, Carrie	ML15155A398
Twist, Shannon	ML15155B006
Twombly, Glen A.	ML15155A191
Tyler, Steve	ML15155B793
Tyler, Theresa	ML15142A214
Tyler, Wesley	ML15160A902
Tyre, Michael	ML15154B213
Tyrrell, Larry	ML15154A582
Tzelil, Canan	ML15159B253
Uchno, Lisa	ML15158A264
Ucko, Aaron	ML15155A104
Udelson, Donald	ML15154B182
Uecker, Robert	ML15159B414
Ulness, James	ML15141A628
Umbricht, Annie	ML15148B164
Underwood, Dennis	ML15154A628
Underwood, John	ML15154B521
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Unruh, Jerry	ML15156A168
Urban, Richard	ML15155C192
Urbanek, Gail	ML15155A278
Urik, J. Alan	ML15155B703
Utigaard, Nina	ML15155B852
Utt, Charles	ML15159A171
Utterback, Pamela	ML15154B265
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V., Barbara	ML15153A645
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Vail, Cameron	ML15155A840
Vairo, Gina	ML15153A588
Valencia, Rio	ML15154B134
Valencour, Sandy	ML15160A945
Valenti, Scott	ML15153A985
Valentic, Nerma	ML15156A034
Valentine, J.	ML15162B113
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Valentine, Karen	ML15159A997
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Valle, Jacqueline	ML15154B801
Valluzzi, Jim	ML15154B581
Valney, Shirley	ML15159A534
Van Bergen, Jo Ann	ML15148A160
Van Burg, Chera	ML15154B733
Van Buskirk, Richard	ML15155A860
Van Dam, Chad	ML15153A352
Van Den Blink, Kieren	ML15140A283
Van Hise, James	ML15158A251
Van Huijkelom, Hans	ML15154B599
Van Lear, Tom	ML15148B397
Van Leekwijck, Natalie	ML15154A609
Van Leuven, Phyllis	ML15155B992
Van Ormer, Diana	ML15155B244
Van Pelt, Jason	ML15153A518
Van Petten, Melani	ML15155A955
Van Riper, Michael	ML15154C066
Van Velson, Nathan	ML15156A333
Vanbuskirk, Paula	ML15142A079
Vance, Christoper	ML15155C152
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Vance, Richard	ML15142A131
Vance, Samuel L.	ML15155B994
Vander Stoep, Dorothea	ML15154A120
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Vanderhill, Margo	ML15154A749
Vandermark, Barbara	ML15155B405

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Vandivere, Stephen	ML15155B031
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Vanhoy, Rick	ML15153A633
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Vanino, Susan	ML15154B002
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Vanruff-Howden, Susann	ML15141A791
Vantilborgh, Tony	ML15162A716
Varanitsa, Oleg	ML15156B211
Varcoe, Donna D.	ML15154A041
Vargas, Christopher	ML15148B226
Varner, Miles	ML15153B206
Varney, Karen	ML15154C208
Vartenuk, Cynthia	ML15148B256
Vasily, Karen	ML15147A742
Vatter, Sherry	ML15153B055
Vaughan, Carolyn	ML15154A166
Vaughan, Lisa	ML15156B091
Vaught, Kevin	ML15148B339
Vaulx-Smith, Wilford	ML15154A820
Vayda, Karen Ziomek	ML15154B558
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Vearling, June	ML15154A630
Vecchiotti, Dorothea	ML15156B147
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Vee, Ordell	ML15148A852
Vegan, Rift	ML15155B653
Veijalainen, Pertti	ML15148A825
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Veirs, Mary	ML15159A840
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Veit, Eberhard	ML15153B029
Velez, Francisco	ML15160A973
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Velez, Sue	ML15154C053
Velloo, Samara Hanson	ML15155B644
Veltkamp, Robert	ML15160A559
Vena, Skip	ML15156A200
Venable, Sylvia	ML15154B010
Venezia, Sherri	ML15148A740
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Veralli, Robert	ML15141A444
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Verhagen, Marianne	ML15154C121
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Vermeulen, Mary	ML15154B979
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Verzosa, Paul	ML15158A096
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Vickers, Margaret	ML15154C014
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Vlah, M.	ML15154B828
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Volpatti, Dan	ML15153A803
Volpe, Joe	ML15154C020
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von Sacher-Masoch, Michael	ML15159A165
Vorachek, Mary	ML15142A152
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Vorse, Stephanie	ML15155B984
Voss, Barbara	ML15159B585
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W., Kevin	ML15148B436
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Wade, Gf	ML15160A813
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Wade, Pat	ML15153A704
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Wadland, Sue	ML15159A912

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Wagner, Joanne	ML15161A627
Wagner, Sandra	ML15153B000
Wagner, Vickie	ML15141A480
Wagner-Westbrook, Bonnie	ML15156A233
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Wahosi, Mare	ML15162A683
Wait, Cheryl	ML15153B135
Waite, Libby	ML15154B727
Walch, Mark	ML15159A634
Wales, Melissa	ML15159B293
Waleski, Melanie	ML15155A708
Walishko, Mary	ML15155C109
Walker, Christine	ML15159B256
Walker, David	ML15155A732
Walker, Donald and Charlotte	ML15156B166
Walker, Herman	ML15154A005
Walker, Jason	ML15160A048
Walker, Joan	ML15158A014
Walker, John	ML15154C144
Walker, Kathryn	ML15160A916
Walker, Kathy	ML15153A417
Walker, Leo	ML15154A000
Walker, Lynn	ML15140A011
Walker, Madonna	ML15154A808
Walker, Margret	ML15155A590
Walker, Matt	ML15154B788
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Walker, Verla D.	ML15140A245
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Walker-Dale, Heather	ML15140A244
Wall, Nancy	ML15156A837
Wallace, Linda	ML15141A430
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Waller, Russell	ML15159B237
Wallin, Willaim	ML15153A868
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Walsh, Kristin	ML15154A259
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Walton, Mark	ML15159B401
Ward, Aurelie	ML15162A433
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Ward, Joan	ML15155A197
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Ward, Lonnie	ML15153B220
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Ward, Whitney	ML15156A320
Warfle, Jamee	ML15155A452
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Warren, Barbara	ML15148A189
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Warzalla, Jim	ML15155B847
Wasgatt, Ann	ML15154B479
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Waterhouse, Ann Marie	ML15159B438
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Waterworth, Pamela	ML15156A166
Watkinson, Carolyn	ML15155A684

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Watson, John	ML15154B986
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Watters, Whitney	ML15156B137
Waugh, Wendy	ML15156B490
Waygren, Ed	ML15155A491
Wayne, Vicki	ML15153A764
Wear, Dennis	ML15155C039
Weatherwax, Nancy	ML15162A395
Weaver, Andrea	ML15156A975
Weaver, Carol	ML15155B517
Weaver, Esther	ML15153B069
Weaver, Gary	ML15155B804
Weaver, Joan S.	ML15142A177
Weaver, Judy	ML15153A995
Weaver, Mike	ML15159B497
Weaver, Wes	ML15154C234
Webb, Jane	ML15156B325
Webb, Kimberly	ML15153A977
Webb, Michelle	ML15148B130
Webb, Shannon	ML15148A914
Webber, Gary	ML15155B521
Weber, Marsita	ML15153A552
Weber, Zorina	ML15154A103
Weberg, Melanie	ML15154A801
Webster, Ellen	ML15148A617
Wecker, Judith	ML15160A070
Wedoff, Margaret	ML15140A129
Wedow, Nancy	ML15148A220
Weeks, Chris	ML15154A204
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Weikert, J.	ML15156A287
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Weiman, C. David	ML15154B302
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Weiner, Linda	ML15154A002
Weinrich, John	ML15155B220
Weinstein, Diane	ML15155B214
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Weisel, Jef	ML15148B095
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Weitz, Stephen	ML15148B091
Weitzman, Anna	ML15154A930
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Welch, Joanna	ML15154A393
Welde, Logan	ML15160A594
Weldon, Wendy	ML15148B310
Welkowitz, William	ML15148B262
Welling, John	ML15159A274
Wells, Janette	ML15154A253
Wells, Michael	ML15155A528
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Wells, Susan	ML15141A684
Welton, John	ML15156A314
Wemer, Kimberly	ML15155A206
Wendt, Rosamund	ML15159B030
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Wenning, Judy	ML15158A161
Wentz, Shari	ML15159A125
Weprin, Andrew	ML15153A411
Werner, Katherine	ML15142A098
Werner, Ryvonne	ML15154B970
Wersinger, Sara	ML15159B126
Wertz, Jennifer	ML15153A685
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West, John	ML15155A222
West, Reiven	ML15155B032
West, Diane	ML15159B534
West, Eric	ML15154C041
West, Kenneth	ML15154B711
West, Meredith	ML15148B112
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Westfall, Rob	ML15155A152
Westmoreland, Henry H.	ML15155B563
Westra, Jennifer	ML15155A938
Wettersten, Jill	ML15155A252
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Weyandt, Debbie	ML15159A835
Weyer, Diane	ML15154A956
Whalen, Patricia	ML15159B148
Wharton, Becky	ML15154A689
Wheeler, Al	ML15160A937
Wheeler, Ken	ML15155A848
Wheeler, Mark	ML15160A072
Wheeler, Maureen	ML15158A091
Whelan, V.	ML15156A193
Wheller, Noreen	ML15155A143
Whetsell, Frank	ML15148B175
Whetstine, Linda	ML15153A998
Whipple, Dave	ML15154A921
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Whitaker, Howard	ML15162B044
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White, Bruce	ML15155A794
White, Charmaine	ML15159A444
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White, Gisele	ML15148B171
White, Howard	ML15154A486
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White, Linda Michel	ML15154A599
White, Liz	ML15155A302
White, Maria	ML15156B467
White, Marianne	ML15162A697
White, Mark	ML15160A703
White, Mary	ML15160A542
White, Mindi	ML15155B800
White, Ronda	ML15155B670
White, Scott	ML15162A295
White, Terri	ML15142A208
White, William P.	ML15153B171
Whitehead, Lissette	ML15154A136
Whitehorn, C.	ML15154A318
Whitener, Shari	ML15159A008
Whiteside, Catherine	ML15153B017
Whitford, Kirstina	ML15162A110
Whiting, Carolyn	ML15155A235
Whitman, Rick	ML15159A988
Whitson, Helene	ML15154A247
Whitten, Robin	ML15158A067
Whybrew, Michael	ML15154A685
Wiant, Jean	ML15154A872
Wichar, Den Mark	ML15154A269
Wicht, Dan	ML15156A578
Wick, Jodi	ML15147A776
Widell, Janet	ML15156A450
Widera, Debra	ML15154B272
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Wiedemann, Janna	ML15160A892
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Wieder, Anna	ML15156A235
Wiederhold, Joe	ML15155A322
Wiegand, Suzanne	ML15155C244
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Wieland, Chuck	ML15148A596
Wienert, John	ML15154B455
Wiesner, Joseph	ML15153A878
Wiesner, Mary Ann	ML15147A746
Wightman, Richard	ML15142A148
Wikette, Michelle	ML15154A541
Wilberding, Ron	ML15159A884
Wilbur, Lynn	ML15141A664
Wilby, Margaret	ML15159A537
Wilcox, C.	ML15142A051
Wilcox, Robert	ML15158A026
Wilde, Deena	ML15154A239
Wilde, Kathy	ML15141A591
Wildman, Teena	ML15148A591
Wiles, Kristin	ML15159A266
Wiley, Kimberly	ML15162A599
Wiley, Patricia	ML15155B153
Wilgus, Kathleen	ML15154B367
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Wilkes, James	ML15154A046
Wilkin, Sue	ML15154B018
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Wilkinson, Dorothy	ML15162A248
Wilkinson, Maryann	ML15155A022
Wilks, Debra	ML15148A173
Will, Leona	ML15153A693
Willard, D.	ML15154A272
Willer, Benjamin	ML15148A880
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Williams, Billie	ML15148B304
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Williams, Glen	ML15156B215
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Williams, Kathleen	ML15153B084
Williams, Linda	ML15155B165
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Williams, Marni	ML15140A145
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Williams, R. J.	ML15156A181
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Williams, Terrie	ML15156A693
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Wilson, Susan	ML15142A341
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Wilson-Hopkins, Lori	ML15154B584
Windham, Dallas	ML15158A263
Windus, Jared	ML15161A623
Wine, Jordann	ML15154B755
Wines, R.	ML15154A860
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Wingerd, Mala	ML15154B820
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Winne, Patricia	ML15154A972
Winner, Angelika	ML15142A156
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Winograd, Deborah	ML15160A579
Winstead, A.	ML15154B467
Winston, Leslie	ML15156A510
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Wisch, Anita	ML15154B537
Wise, Carol	ML15153B189
Wise, David	ML15155B723
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Wood, Gordon	ML15154C156
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Woods, Roth	ML15159B061

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Wordlaw, Christine	ML15162A631
Workman, Mary	ML15153A473
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Wotton, Bernard	ML15154C280
Wozniak, Rachel	ML15156B495
Wozniak, Rhonda	ML15155B110
Wright, Abigail	ML15154B985
Wright, Carolyne	ML15155B851
Wright, Carrie	ML15162A614
Wright, Charles	ML15155A437
Wright, Gay	ML15153B045
Wright, Glenn	ML15155A428
Wright, Marilyn	ML15155A101
Wright, Michael	ML15141A777
Wright, Michelle	ML15148B162
Wright, Nancy	ML15156A867
Wright, Sandra	ML15159B374
Wright, Shannon	ML15159A905
Wright, Susan	ML15153A801
Wright, Sydney	ML15159A121
Wright, Tammy	ML15154A075
Writz, Gina	ML15159A485
Wry, Ellen	ML15142A132
Wulf, Laurie	ML15156A187
Wulf, Maureen	ML15159A281
Wurtz, Jacob	ML15160A069
Wushensky, Sharon	ML15155B354
Wyatt, Aimee	ML15161A632
Wyatt, Cathy	ML15156A440
Wyatt, John	ML15153B229
Wyckoff, Dana	ML15148A830
Wyman, Elizabeth	ML15155A288
Wyman, Tom	ML15158A009
Wyse, Margo	ML15153B199
Wyse, Sheila	ML15148B000
Wyss, Jon	ML15153B295
Xavier, Marjorie	ML15159B517
Xhilone, Lynne	ML15156A905
Xiberras, Paula	ML15155C223
Y., Nancy	ML15159A101
Yaffee, Steve	ML15141A610
Yancey, Robert	ML15154A177
Yanke, Brian	ML15154A197
Yantselovskiy, Alexandr	ML15154A669
Yarger, Andrea	ML15155B979
Yarter, E. C.	ML15148B034
Yazbek, Daniel	ML15141A525
Yazell, Jeremy	ML15154B867
Yeager, Jerry	ML15160A733
Yelenick, Lisa	ML15159A353
Yellis, Stefanie	ML15148B325
Yerena, Jr., Julian	ML15159A909
Yoder, Amanda	ML15154B171
Yokoyama, Holly	ML15156B123
Yost, Carol	ML15155B483
Yost, Gaylord	ML15154B918
You, Sam	ML15154C076
Youd, Mark	ML15162B091
Youd, Mark	ML15162B152
Young, Allan	ML15159B491
Young, Anne	ML15148A900
Young, Cecilia	ML15156B412
Young, Cheryl	ML15154A435
Young, Doug	ML15154A472
Young, Douglas	ML15160A527
Young, Jo Ellen	ML15154A085
Young, Karen	ML15159B125
Young, Katherine	ML15160A548
Young, Katie	ML15160A581
Young, Kim	ML15155B916
Young, Leslie	ML15155A935
Young, Nancy	ML15154B281
Young, Patricia	ML15142A329
Young, Philip	ML15153A691
Young, Rachel	ML15155A408
Young, Raymond	ML15141A549
Young, Rosanne	ML15159A363
Young, Sheila	ML15156A271
Young, Spencer	ML15153A572
Yount, Madeline	ML15154B744
Yovella, Debra	ML15159A260
Yun, Allen	ML15148B022
Yurchuck, Ruth	ML15154A469
Zachritz, Todd	ML15153A477
Zack, Mary	ML15148A978
Zagaris, Michael	ML15153A980
Zagone, Michael	ML15154C138
Zalesak, Margie	ML15158A115
Zambie, Dave	ML15159B140
Zammarano, Vittorio Tedesco	ML15154A132
Zampini, Cassandra	ML15142A249
Zand, June	ML15162A051
Zanders, Marya	ML15153A861
Zarek, Elizabeth	ML15153A717
Zarkhosh, Helia	ML15159A068
Zarsky, Terry	ML15153B098
Zatz-Diaz, Ivan	ML15148A948
Zavaro, Mario	ML15156B411
Zawada, Dave	ML15160A765

Commenter	ADAMS Accession #
Zawadzki, C.	ML15159A070
Zawaski, Joan	ML15140A017
Zebracki, Nancy	ML15156A489
Zegledi, Dawn	ML15154C249
Zehm, Carmen	ML15156A203
Zeilenga, Jack	ML15141A476
Zeilenga, Jack	ML15141A609
Zelazny, Bernie	ML15156A788
Zelinski, Dawn	ML15160A725
Zeller, Jennifer Kim	ML15148A987
Zellmer, Kevin	ML15154B955
Zelmanovich, Silvana	ML15155A205
Zeman, James	ML15148B406
Zendzian, Paul	ML15159A983
Zepeda, Robert	ML15158A060
Zerr, Laura	ML15154B648
Zetley, Herb	ML15156A536
Ziama, Kristin	ML15159A275
Zibordi, Barbara	ML15140A261
Zibordi, Barbara	ML15153B089
Ziegler, David	ML15159A546
Ziegler, Herbert	ML15154A422
Ziegler, Russ	ML15153B041
Ziegler, Russell	ML15141A651
Ziehler-Martin, Paige	ML15155B957
Zielke, David	ML15148B327
Ziencina, Terra	ML15154A688
Zierikzee, R.	ML15148B053
Zillhardt, Matt	ML15155A067
Zimanova, Emilia	ML15148A188
Zimbelmann, Merrilyn	ML15155B438
Zimmer, Louise	ML15153A440
Zimmer, Susan	ML15155A200
Zimmerer, Mary Beth	ML15159B492
Zimmerman, Craig	ML15156A965
Zimmerman, Marcus	ML15148B015
Zimmermann, John	ML15156A789
Zimmermann, John	ML15154A715
Zimny, Gloria	ML15148A757
Zinn, Andrea	ML15159B380
Zinn, Cari	ML15155B242
Zinn, Robert	ML15142A111
Zinn, William	ML15148A862
Zirasri, Ran	ML15147A757
Zissu, Thoams	ML15156A284
Zoldak, Loretta	ML15153A429
Zoro, Piero	ML15148B245
Zschaler, Clara	ML15154A989
Zuber, Margaret	ML15142A342
Zuber, Margaret	ML15154A020
Zuckerman, Michael	ML15154C161
Zudell, Keith	ML15156A280
Zukoski, Katie	ML15159A434
Zwick, Larry	ML15154A618
Zywan, Katherine Barrett	ML15155A796
Zyzda, Marilyn	ML15156B434

Table E-9. Individuals Submitting the Form with Subject "No New Reactors at Turkey Point" with Correspondence ID TURK-COL6&7-DR-00103 and Representative ADAMS Accession No. ML15139A729 (Multiple Authors 2015-TN4721**)**

Commenter	ADAMS Accession #
Abal, Ramiro	ML15142A340
Abbondante, Jim	ML15156A663
Abraham, D. L.	ML15142A340
Abraham, Karin	ML15140A051
Abraham, Karin	ML15140A052
Acquino, Mary	ML15139A936
Adams, Chardae	ML15156B364
Aghayan, Veronic	ML15156A291
Ahuja, Neha	ML15162A484
Alabiso, Marie	ML15159A354
Albani, R.	ML15139A829
Alden, Susan	ML15162A802
Alexander, Larry	ML15162A682
Alexander, Natalie	ML15162A382
Alexander, Tiffany	ML15142A013
Alfimow, Beverly	ML15148B423
Alfimow, Beverly	ML15153A662
Ali, Rozina	ML15142A340
Allan, Larry	ML15139A944
Allan, Linda	ML15156B388
Alverson, David	ML15161A689
Amann, Marianne	ML15142A340
Ammon, Cara	ML15162A788
Andersen, Peggu	ML15162A148
Anderson, Valda	ML15158A059
Anderton, Phillip	ML15142A340
Andrade, Abigail	ML15162A041
Andreacchio, Tonya	ML15139A964
Andrews, Laquitta	ML15162A564
Andrews, Renee	ML15142A340
Andrews, Thomas	ML15142A340
Angelo, Marjorie	ML15139A845
Ankiel, Summer	ML15142A340
Apple, Karla	ML15142A340

Commenter	ADAMS Accession #
Apple, Karla	ML15162A186
Arana, Josefa	ML15159A369
Arana, Josefa	ML15159A369
Arana, Josefa	ML15162A773
Araskog, Julie	ML15139A860
Arfin, Danielle	ML15142A340
Armm, Edward	ML15142A340
Armstrong, Brooks	ML15155C210
Artigas, Jose	ML15142A340
Arvidsson, Rikard	ML15142A340
Atkinson, Deborah	ML15142A340
Atkinson, Joan	ML15139A819
Atler, Neil	ML15139A871
Auld, Denise	ML15139A848
Auster, Evan	ML15160A895
B., Donna	ML15142A340
B., V.	ML15142A340
B., V.	ML15162A238
Bahos, Miguel	ML15139A909
Bailar, Tami	ML15156A222
Bailey, Marcia	ML15139A779
Baker, Mary Sue	ML15159A826
Balfour, Michele	ML15160A929
Balkan-Litowitz, Donna	ML15139A951
Balogh, Daniel R.	ML15142A371
Bangerter, Jim	ML15142A340
Banks, Janice	ML15142A340
Bannon, Richard	ML15139A858
Baracca, Marco	ML15142A340
Barhoum, Tawfik	ML15139A804
Baridon, Flavia	ML15142A340
Barlow, Jeffrey	ML15139A974
Barmann, Adriene	ML15155A833
Barron, Marie	ML15139A826
Barroso, Mario	ML15158A094
Barry, Mina	ML15155C207
Bartlett, Ellen	ML15139A773
Bassett, Roy	ML15158A268
Bastian, Mark	ML15142A340
Batchelder, Jan	ML15142A340
Bate, Jo Ellen	ML15162A744
Bateman, Cheryl	ML15142A340
Bauer, Lynda	ML15162A772
Beam, Stephanie	ML15142A340
Beattie, Gordon	ML15139A867
Beauchamp, Beryl	ML15142A340
Beaupre, R.	ML15142A340
Bechmann, Elisabeth	ML15142A340
Bechmann, Elisabeth	ML15161A683
Bechtel, William	ML15139A945
Becker, Lauren	ML15161A643
Bedat, Suzanne	ML15154B412
Begley, Kathleen	ML15162A190
Behl-Whiting, Kathy	ML15155C153
Bekkers, Anne	ML15142A340
Bekkers, Anne	ML15162A827
Bell, Lindsey	ML15155C211
Bellamy, Ray	ML15139A803
Belt, Dana	ML15162A842
Bendure, Ellie	ML15139A796
Benito, Alejandra	ML15142A071
Benkert, Cynthia	ML15139A990
Bentsur, Eyal	ML15155C021
Berger, Barbara	ML15160A591
Berger, Keith	ML15142A340
Bergman, Ingrid	ML15142A340
Bernabei, Kaatje	ML15159A848
Bernatis, Jenn	ML15142A340
Best, Rudy	ML15162A790
Bielski, Michele	ML15159A640
Biemuller, Eric	ML15142A340
Biermaier, Jennifer	ML15159A477
Bigas, Michelle	ML15155C208
Bilek, Heidrun	ML15142A340
Bischoff, Carol	ML15142A340
Bitnar, Patricia	ML15159A464
Bittner, Jill	ML15142A340
Bittner, Jill	ML15162A594
Bittner, Michael	ML15142A340
Black, Meaghan	ML15162A812
Blair, Libby	ML15161A685
Blais, Sonia	ML15142A340
Blake, Dale	ML15142A340
Blakestad, Nancy	ML15162A819
Blanton, Cricket	ML15159A577
Blauer, Sara	ML15148A805
Blessing, Anna	ML15139A800
Blue, Julie	ML15148B424
Boczkowski, Diane	ML15142A340
Bodine, Frank	ML15142A340
Boeckman, Evelyn	ML15162A848
Boehl, Ingrid	ML15162A063
Bogle, Tim	ML15142A340
Bolen, D. K.	ML15155A173
Booras, Cyndee	ML15139A806
Bornejko, Trina	ML15142A340
Bouilland, Stacy	ML15142A340
Bousquet, Bob	ML15142A340
Bow, Leslie	ML15162A219
Bowers, Mary	ML15142A340
Boyce, Sheila	ML15139A781
Boyce, Thomas	ML15142A340
Boylston, Sandra	ML15142A340
Bracciotti, Federica	ML15162A793
Brachman, Phyllis	ML15142A340
Bracken, Fay	ML15142A340
Bradley-Johnson, Carol	ML15139A835
Brady, Carl	ML15142A339
Branch, Pat	ML15142A340

Commenter	ADAMS Accession #
Brand, Barbara	ML15142A340
Braswell, A.	ML15142A340
Bredda, Marina	ML15142A340
Brewer, Kelly	ML15142A340
Brien, Ray	ML15142A340
Brienza, Zachary	ML15139A920
Briggle, Ryan	ML15139A895
Briggs, Lois	ML15156B235
Brigner, Liberty	ML15142A340
Brimer, Richard	ML15160A716
Britz, Barbara	ML15162A719
Broad, Elisa	ML15162A114
Broughton, Alyssa	ML15148A804
Brower, Amanda	ML15156A571
Brown, Arlene	ML15142A009
Brown, Deborah	ML15153B038
Brown, Howard	ML15142A340
Brown, Ilean	ML15162A209
Brown, Judith	ML15162A281
Brown, Lillian	ML15142A340
Brown, Taylor	ML15154A529
Browne, Judy	ML15139A973
Browning, Tina	ML15139A866
Browning, Tina	ML15139A930
Brubaker, Dawn	ML15139A975
Brush, Johnnie	ML15140A062
Bruton, Babette	ML15160A926
Bruton, Darlene	ML15160A927
Bryer, Loree	ML15159A252
Buchwald, Marla	ML15139A731
Buchwald, Marla	ML15142A340
Buck, Michelle	ML15156B202
Bugbee, Michael	ML15142A340
Bullock, Elizabeth	ML15142A340
Burdine, Laura	ML15142A171
Burns, Georgina	ML15142A340
Burton, Martha	ML15142A340
Bush, Sandra	ML15162A168
Bushway, Cindy	ML15148B419
Butler, Amber	ML15139A883
Butterfield, Doris	ML15162A350
Byrne, Matthew	ML15139A840
Byrnes, Richard	ML15139A934
Byron, Lee	ML15142A340
C., N.	ML15159B282
Cabala, John	ML15142A340
Cadieux, Monique	ML15142A340
Caisse, C.	ML15154A530
Call, Cynthia	ML15142A070
Calo, Joan	ML15142A340
Campbell, Anne	ML15139A880
Campbell, Jacqueline	ML15142A340
Campbell, Jacqueline	ML15162A728
Campbell, John	ML15159A641
Campbell, Sean	ML15153B037

Commenter	ADAMS Accession #
Canas, Yisel	ML15155C250
Capasso, Celeste	ML15142A340
Capstick, Hilary	ML15142A340
Caracci, Gina	ML15139A901
Carbia, Vanessa	ML15162A630
Card, Kevin	ML15142A340
Cardoso, Toby	ML15142A340
Cardoso, Toby	ML15162A762
Carr, Marcus	ML15142A068
Carroll, Donna	ML15142A340
Carter, Cindy	ML15142A340
Carvajal, Mauricio	ML15142A340
Caserrta, Kimberly	ML15142A340
Caskey, Sally	ML15142A340
Cassens, Susie	ML15142A340
Caton, Elizabeth	ML15142A340
Cecil, Jon	ML15162A251
Celandine, Anna	ML15162A800
Cellette, Richard	ML15156A247
Chapman, Kevin	ML15159A855
Chi, AniMae	ML15142A340
Chin, Trevor	ML15142A340
Chirino, Miguel	ML15142A369
Chisari, Andrea	ML15155C023
Christoff, Stephanie	ML15142A340
Christoplos, Florence	ML15162A786
Chu, Sandra	ML15162A536
Chulock, Jan	ML15156B321
Chynoweth, Iris	ML15142A340
Ciardello, Elaine	ML15142A340
Ciesielski, J.	ML15139A770
Ciftci, Oscar	ML15139A900
Claiborn, William	ML15139A836
Clark, Jeff	ML15139A812
Clark-Alexander, Barbara	ML15139A935
Claudine, Bos	ML15142A340
Clay, Cynthia	ML15139A986
Clement, Kevin	ML15162A811
Cleveland, Joel	ML15159A370
Clifford, Susan	ML15156A089
Clutter, Marcie	ML15139A948
Clutter, Marcie	ML15139A970
Coffey, Rotraud	ML15142A340
Colby, Helen	ML15156A120
Cole, 3rd, Lincoln P.	ML15139A863
Coleman, Laura	ML15156A224
Collins, Kathy	ML15139A853
Collins, Larry	ML15142A340
Collins, Larry	ML15139A733
Collins, Trevor	ML15139A969
Combes, Steven	ML15139A764
Comella, John	ML15142A340
Connelly, Sally	ML15142A340
Connolly, Makenna	ML15162A572

Commenter	ADAMS Accession #
Contreras, Constance	ML15162A619
Cook, Debra	ML15142A340
Cook, Steven	ML15162A660
Copeland, Damon	ML15162A750
Corby, Kathleen	ML15142A340
Corby, Kathleen	ML15162A288
Cortes, Juan	ML15159B502
Corzo, Cara	ML15156B320
Corzo, Hector	ML15156B361
Cosentino, Debra	ML15142A340
Cotz, Elina	ML15142A340
Cotz, Elina	ML15139A734
Courtney, Susan	ML15142A012
Coyle, N.	ML15142A340
Crabtree, Summer	ML15142A340
Craciun, George	ML15139A742
Craft, Katie	ML15142A340
Cranford, Connie	ML15159A658
Creech, Jeff	ML15142A340
Crowley, Joyce	ML15162A200
Crum, Bill	ML15162A250
Csanyi, Cheryl	ML15139A785
D., L.	ML15162A839
Daab, Antoinette	ML15139A926
Dace, Letitia	ML15153A664
Dace, Letitia	ML15162A116
Daen, L.	ML15142A340
Dahl, Thomas	ML15142A340
Daly, Erik	ML15162A805
D'amour, Roland	ML15162A074
Danios, Tea	ML15156A049
D'Annunzio, Patrick	ML15142A340
D'Antonio, Lisa	ML15155A479
Dascotte, Melinda	ML15142A331
Davis, Joan	ML15142A340
Davis, John	ML15160A951
Davis, Liora	ML15139B006
Davis, Liora	ML15139B007
Davis, Robin	ML15139A915
Day, C.	ML15142A340
Day, Edward	ML15142A340
de Buzon, Sylvie	ML15142A340
De Voy, Christy	ML15139A954
Deacy, Bob	ML15142A340
Deane, Triciat	ML15139A813
DeBias, Anita	ML15154B399
DeFauw, Rachel	ML15139B001
Dehler, Patricia	ML15148B421
Delgado, Alejandro Ceruelo	ML15162A121
Delgado, Barbara	ML15160A863
DeLia, Tony	ML15139A922
DeLuca, Patricia	ML15142A340
Demello, Christine	ML15155C024
Demers, Ralph	ML15159A744
Deneault, Donna	ML15162A610
Dengel, Pat	ML15162A487
Densmore, Teresa	ML15159B443
DePante, Michael	ML15139A783
Desharnais, Jodi	ML15142A340
Destefano, Robert	ML15154B403
Detrick, Mary	ML15159A157
Devine, Lauren	ML15142A340
Devine, Lauren	ML15139A730
Diaz, Mayra	ML15142A340
Diaz, Mayra	ML15139A755
Diaz, Yelina	ML15140A021
DiFilippo, Robert	ML15142A340
Dillon, Sheila	ML15162A779
Dillon, Sheila	ML15142A340
DiVicino, Roseann	ML15159B486
DiVicino, Roseann	ML15159B487
Dobereiner, Trish	ML15139A907
Dobos, Robert	ML15159A215
Dodd, Belinda	ML15162A273
Dolly, William	ML15159A500
Domino, Michael	ML15142A340
Donis, Bea	ML15139B009
Donovan, Patrick M.	ML15142A340
Dorchin, Susan R.	ML15142A340
Dorn, Kathryn	ML15155B897
Dorsey, Tara	ML15154B404
Downey, Noel	ML15139A757
Dresser, Connie	ML15139A828
Driver, Monica	ML15162A629
Drummond, Willa	ML15162A131
du Brin, Jane	ML15154C168
Dührkopf, Manja	ML15142A340
Dunbar, Laura	ML15162A062
Duncan, Jane	ML15139A997
Duncan, Renee	ML15160A952
Duncan, Sue	ML15155A174
Dungee, Adrienne	ML15159A150
Dunn, Melissa	ML15142A340
Dunn, Timothy	ML15162A202
Durrer, Mary	ML15142A340
Düsterwald, Manuela	ML15142A340
Dutton, Matthew	ML15161A669
DuVerger, Roy	ML15159B299
Dyck, Cheryl	ML15154B424
E., Cheryl	ML15162A595
Easter, Jeff	ML15142A340
Easter, Tara	ML15162A803
Eaton, Rick	ML15142A340
Eckert, Jacqueline	ML15139B008
Edelman-Tolchin, Gayle	ML15159A019
Edelman-Tolchin, Gayle	ML15160A734
Edmonds, Steven	ML15142A340

Commenter	ADAMS Accession #
Edmonson, Michele	ML15139A771
Egan, Marilyn	ML15142A340
Ehrenberger, Jennifer	ML15142A340
Eiser, Tina	ML15142A340
Elbirt, Diana	ML15162A825
Elferdink, Luann	ML15162A743
Eller, Dennis & Martha	ML15142A340
Eller, Dennis & Martha	ML15139A748
Eller, Dennis & Martha	ML15139A751
Eller, Dennis & Martha	ML15139A756
Eller, Dennis & Martha	ML15139A761
Ellicott, Barbara	ML15142A340
Elliott, Jan	ML15162A296
Elliott, Jan	ML15162A299
Elliott, Judith	ML15154B408
Enfield, Martie	ML15139A887
England, II, Roy	ML15139A894
Epstein, Philip	ML15160A627
Escobar, Hector	ML15155A164
Escobar, Melissa	ML15142A340
Esterly, A.	ML15139A978
Estrin, Mildred	ML15142A340
Eubank, Marana	ML15142A340
Evans, Janet	ML15159A136
Eyclesheimer, Susan	ML15142A340
Faison, Sandy	ML15139A775
Farrell, Roberta	ML15162A774
Faulkner-Uriarte, Elisa	ML15142A340
Faulks, Lea	ML15162A783
Fazio, Kristina	ML15142A340
Feder, Melanie	ML15162A752
Feder, Melanie	ML15142A340
Feeney, John	ML15142A340
Feeney, John	ML15162A801
Feldman, Dee	ML15139A897
Felicione, Felicia	ML15155B808
Fell, Cynthia	ML15162A215
Fell, Cynthia	ML15162A548
Fell, Cynthia	ML15162A741
Fera, Kristen	ML15162A747
Ferguson, Anisa	ML15162A625
Ferguson, Heather	ML15161A661
Fernandez, Beth	ML15142A340
Fielder, Linda	ML15142A340
Fige, Patti	ML15154B401
Finamore, Scott	ML15158A243
Firth, Walter	ML15142A340
Fischer, Quentin	ML15162A781
Fisher, Jack	ML15139A837
Fisher, Sarah	ML15139A888
Fisler, Mill	ML15139A911
Fitzgerald, Gerry	ML15159A149
Fitzke, Marion	ML15142A340
Fitzpatrick, Deirdre	ML15139A940
Fitzpatrick, Louis and Patricia	ML15154A527
Flaherty, Jill	ML15142A340
Flanders, Gail	ML15142A340
Fletcher, Louise	ML15159A284
Flint, Vally	ML15156A661
Floersch, Elizabeth	ML15162A792
Floyd, Melanie	ML15142A340
Foley, Patricia	ML15142A005
Foster, Debbie	ML15162A837
Fowler, Luci	ML15148B422
Fox, Joyce	ML15142A340
Fox, Justin	ML15142A340
Fragela, Elizabeth	ML15139A972
Frank, Andrew	ML15159B501
Frederickson, Kelly Elizabeth	ML15155B676
Frelli, Gianfranco	ML15142A340
French, Lee Ann	ML15156A660
Friedman, Donna	ML15160A940
Fuchsman, Douglas	ML15159A880
Fullmer, Mark	ML15158A056
Fulwiler, Fran	ML15142A337
Fulwiler, Fran	ML15142A340
Fundby, Lone	ML15142A340
Futch, Patrick	ML15142A340
Gaal, Stephanie	ML15142A340
Gaarlandt, Jonathan	ML15139A767
Gaff, Mal	ML15142A340
Gaff, Mal	ML15161A678
Gagliardi, Michael	ML15139A896
Gallegos, Mark	ML15142A340
Galloway, Nancy	ML15162A813
Galvina, Inguna	ML15162A093
Garcia, Haydee	ML15142A340
Garcia, Joanna	ML15142A340
Garcia, Maria	ML15162A231
Garcia, Mary	ML15142A340
Garsson, Jane	ML15162A820
Gasco, Christine	ML15155A161
Gaskins, Melissa	ML15142A335
Gasser-Sanz, Eva	ML15159B053
Gaudry, Rita	ML15142A340
Geisheim, Roswitha	ML15139A917
Genn, Oliver	ML15142A340
Gentry, Kahla	ML15139A865
Gerosa, Robert	ML15142A340
Gerosa, Robert	ML15162A748
Gerwens, Shana	ML15142A069
Gestro, Patrizia	ML15154A525
Gibb, Bianca	ML15139A869
Gibson, Raymond	ML15139A904
Gibson, Sara	ML15162A253
Gideon, Barbara	ML15158A269
Gifford, Deborah	ML15160A979
Gilmore, Susanna	ML15140A057

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Giraldo, Gladys	ML15142A340
Glenn, Julie	ML15161A677
Glidewell, Marie	ML15139A809
Glorioso, Ellinor	ML15162A414
Gloyd, Susan	ML15139A818
Goetz, Janet	ML15142A340
Goldman, Eve	ML15139A847
Gonzalez, Iara	ML15139A906
Goodman, Ellen	ML15162A794
Goodman, Margaret	ML15159A210
Gordon, Alexandra	ML15139A872
Gordon, Amanda	ML15156A225
Gordon, Megan	ML15142A340
Gorges, Nadine	ML15142A340
Gould, Catherine	ML15162A780
Grage, Janina	ML15142A340
Graham, Guy	ML15142A340
Graham, Guy	ML15162A073
Graniello, Domenico	ML15142A340
Graniello, Domenico	ML15162A512
Graniello, Luciano	ML15142A340
Grasmugg, Franziska	ML15142A340
Grassi, Catherine	ML15162A266
Grassi, Catherine	ML15162A266
Gravuer, Elizabeth	ML15139A884
Grawunder, Marc	ML15142A340
Greene, Vaughan	ML15142A340
Grguric, Jackie	ML15142A340
Gries, Sylvia	ML15142A340
Griffin, Jr., Henry W.	ML15142A340
Griffin, Vivian	ML15142A340
Griffith, Randy	ML15142A340
Grill, Brock	ML15142A340
Grimes, Tara	ML15139A814
Grobler, Mariette	ML15142A340
Groh, Paul	ML15142A008
Gronemeyer, Kimberly	ML15162A615
Grossenbacher, John	ML15139A921
Grushko, Olga	ML15162A291
Guennar, K.	ML15154C291
Guggino, Monique	ML15142A340
Guzman, Tessi	ML15142A340
H., Manuel	ML15142A340
Habben, Nicholas	ML15142A004
Hager, Beverly	ML15162A775
Hague, Joy	ML15160A917
Haguel, Jane	ML15155C131
Haile, Randall	ML15162A201
Halkewycz, Ryan	ML15155C154
Hall, Dennis	ML15139A732
Hall, Dennis	ML15142A340
Hamilton, Dianna	ML15142A340
Hammock, Richard	ML15142A340
Hammond, Todd	ML15159A502
Hampton, S.	ML15142A001

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Hancock, Karen	ML15142A340
Handy, Erin	ML15139A977
Hankins, Judith	ML15162A650
Hanrahan, Mary	ML15162A810
Hansen, Bev	ML15140A059
Hanson, Laura	ML15159A879
Happenny, Peter	ML15139A984
Harker, Kathy	ML15142A340
Harney, Kathy	ML15139A955
Harper, Jim	ML15142A340
Harper, Rebecca	ML15162A381
Harris, Freya	ML15142A340
Hart, Terry	ML15139A868
Hartley, Cynthia	ML15142A370
Harvey, Geraldine	ML15154B406
Havener, Alice	ML15140A048
Havlik, Charles	ML15154B395
Havlik, Hugh	ML15148B420
Hawks, Whitney	ML15162A632
Hawlik, John	ML15139A929
Hay, Peter	ML15139A765
Hays, P.	ML15156B157
Hays, P.	ML15156B444
Hays, P.	ML15159B091
Hazen, Gail	ML15142A340
Headley, Linda	ML15142A340
Heinlein, Richard	ML15142A340
Hellmold, Harr	ML15161A679
Henao, Adela	ML15139A931
Hendershot, Tamara	ML15148A810
Hendry, Dawn	ML15142A340
Henize, Tina	ML15142A340
Hensgen, Eric	ML15140A055
Hermida, Daniela	ML15140A054
Hernandez, Amanda	ML15156A219
Hernandez, Dannette	ML15139A794
Herrera, Briseida	ML15139A810
Hickman, James	ML15139A995
Hicks, Barbara	ML15155A294
Hicks, Barbara	ML15155A460
Hicks, Connie	ML15162A797
Hill, Michael	ML15159A804
Hoang, Xuandai	ML15139A992
Hoeksema, Bruce	ML15158A180
Hoffman, Sue	ML15142A011
Hogan, Dennise	ML15159A926
Hogan, Dennise	ML15159A929
Hogan, Jack	ML15148B410
Hoin, Brigitte	ML15142A340
Holliday, Tricia	ML15142A340
Hollier, Fiona	ML15142A340
Hollon, Hollie	ML15148A483
Holmquist, Laurel	ML15154C187
Holton, John	ML15142A340
Holtzman, Lawrence	ML15142A340

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Holy, Kate	ML15159B549
Honore, Stephanie	ML15162A640
Hoodwin, Marcia	ML15156B114
Hope, Jane	ML15142A340
Hornaday, Sherral	ML15142A340
Horne, Paul	ML15142A340
Horvath, Elizabeth	ML15142A340
Horwath, Pamela	ML15142A340
Houde, Cathy	ML15139A937
House, Mark	ML15142A340
Houston, Meghan	ML15159A395
Hris, Angie	ML15142A340
Hubbard, Robin	ML15156A048
Hubbard, Ron L.	ML15142A340
Huey, Patrick	ML15142A340
Hughes, Karen	ML15162A720
Hughes, William	ML15142A340
Humphrey, Bente	ML15160A964
Hundemer, Sarah	ML15142A333
Hunkler, Lisa	ML15139A821
Hunt, Evan	ML15142A375
Hurley, Fredrika	ML15142A340
Hyland, Lillian	ML15159A828
Hylton, Marion W.	ML15139A778
Ibarra, Isabel	ML15159A639
Idesawa, Naoko	ML15142A340
Ierubino, Mary	ML15142A340
Inman, Linda	ML15142A340
Itzoe, Francis	ML15139A842
Jacobs, Celia	ML15139B004
Jacobs, Jenny	ML15156B083
Jacobs, Renee	ML15162A678
Jacobson, Ann	ML15139A947
Jakubzik, Petra	ML15142A340
James, Brenda	ML15142A340
James, Sarada	ML15142A340
Jankowski, Corinne	ML15139A833
Jannicelli, Barbara	ML15153A668
Janota, Linda	ML15156A220
Jaques, Diana	ML15162A199
Jarrett, Vera	ML15142A340
Jarvis, Michele	ML15142A340
Jennings, Jan	ML15142A340
Jensen, Norman	ML15148B409
Jett, Rachel	ML15160A870
Joannou, Jr., Benjamin	ML15139A949
Johansen, Matt	ML15142A340
Johnson, Darlene	ML15155B850
Johnson, Esther	ML15153A987
Johnson, Jacqueline	ML15162A279
Johnson, Libia	ML15139A786
Johnson, Richard	ML15139A881
Johnson, Shannan	ML15148B413
Johnson, Terry	ML15148B426
Jones, Christopher	ML15140A065
Jones, Janice	ML15162A549
Jones, Jason	ML15142A067
Jones, Jeff	ML15139A839
Jordan-Vilanova, Hettie	ML15142A340
Juges, Jonathan	ML15156A121
Jungers, Carolann	ML15160A850
Kain, Laura	ML15154B563
Kalinová, Markéta	ML15162A742
Karkruff, Lee	ML15142A340
Karrmann, Dave	ML15154A526
Kawa, Sandra	ML15159A283
Kayser, Joan	ML15162A401
Kayyali, Susanne	ML15142A202
Keaney, John B.	ML15139A938
Keaton, Rebecca	ML15155A438
Keim, Mary	ML15142A340
Keisling, George	ML15139A807
Keller, Diann	ML15142A340
Kelley, Jeannette	ML15158A121
Kelly, Jean	ML15142A340
Kelly-Banks, Patricia	ML15139A913
Kemp, Tasha	ML15142A340
Kemperle, Esther	ML15142A340
Kendall, Donna	ML15148B414
Kennedy, Tania	ML15139A923
Kerr, Anne	ML15162A799
Key, Laurence	ML15142A340
Khan, Rani	ML15155A162
Kibbe, Carolyn	ML15162A768
Kidd, Lori Beth	ML15159A478
Kiedis, Denise	ML15139A893
Killay, Sharon	ML15139A864
King, Charles	ML15139A769
King, Eileen	ML15158A181
King, Eileen	ML15160A649
King, John	ML15142A340
King, Marsha	ML15139A859
King, Roy I.	ML15142A340
Kirchner, Brooke	ML15139A772
Kirn, Steven	ML15142A340
Kiss, Carolyn	ML15139A824
Klayman, Joel	ML15142A340
Klien, Gabriele	ML15142A340
Knappman, Tanya	ML15139A899
Knight, Tina	ML15154B397
Knowles, Jerell	ML15142A340
Koch, Robin	ML15142A336
Kolbe, Daniela	ML15142A340
Kom, Willem	ML15142A340
Komin, Dmitriy	ML15162A404
Konigsberger, Kathryn	ML15148B412
Kovacs, Robert	ML15139A942
Kraut, Arthur	ML15142A201
Kraut, Michelle	ML15139A797

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Kreiner, Dennis	ML15155A175
Krieger, Barbara	ML15142A340
Krolick, Brian	ML15139A952
Kronholm, Linda	ML15142A340
Kropf, Keith	ML15139A957
Krygowski, Richard	ML15140A019
Kumar, Rahul	ML15162A539
Kuzina, Maria	ML15153A667
Kwetian, John	ML15142A340
LaBow, Charles	ML15139A994
LaChatte, Savanna	ML15142A340
Lagasca, Jeana	ML15162A826
Laieski, Caleb	ML15162A675
Lampka, Joseph	ML15142A340
Lanehart, Rheta	ML15139A762
Langdon, John	ML15148A484
Langford, Bob	ML15139A885
Laprade, Kenneth	ML15139A908
Lario, Rocio	ML15139A991
Larson, Cynthia	ML15142A340
Larson, June	ML15162A189
Lasahn, J.	ML15162A392
Laslie, Mary Lou	ML15142A340
Latham, Cathy	ML15142A340
Lawler, Ruth E.	ML15142A340
Lawrence, Clifford	ML15154C171
Lawrence, Diane	ML15155C249
Lazzarino, Carol	ML15139A795
Learch, Lynn	ML15156B389
Leavitt, Meaghan	ML15142A340
Leclerc, Marc	ML15162A698
LeDent, Jamie	ML15142A340
Lee, Jean	ML15139A993
Lefkowitz, Jill	ML15139A749
Leisey, Tamara	ML15159A107
Lemoine, Lizzie	ML15162A769
Lepikkö, Tanja	ML15142A340
Levi, Anna-Lina	ML15142A015
Levitt, Michael	ML15142A340
Levitt, Michael	ML15162A254
Levy, B.	ML15142A340
Lewis, JoAnn	ML15156B442
Lewis, Larry	ML15142A340
Lewis, Mary	ML15142A340
Lewis, Nita	ML15139A855
Lewis, Norman	ML15142A340
Lieberman, Marah	ML15156A047
Lieurance, Cynthia	ML15139A793
Lillich, Anthony	ML15155A171
Lillywhite, Harvey	ML15142A340
Lindner, Diane	ML15142A340
Lindsay, David	ML15142A340
Lindsay, Marion	ML15142A340
Lindsay, Marion	ML15162A191

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Link, Diana	ML15162A042
Lintner, Lawrence	ML15142A340
Linton, Brandy	ML15142A000
Lippincott, John	ML15162A838
Lippner, Linda	ML15148B418
Livingston, Nancy	ML15159A827
Lockard, Donald	ML15142A340
Loftus, William	ML15139A918
Lomascolo, Suzanne	ML15154B417
Long, Jacquelyn	ML15142A340
Lopes, Ana	ML15142A340
Lopez, Yahaira	ML15158A179
Lorenzo, Carlos	ML15159B579
Love, Dee	ML15139A890
Lovett, Kirsten	ML15156A088
Lowell, Jen	ML15139A870
Lucas, Addie	ML15154B414
Lucas, Mark	ML15155A172
Lucido, Angela	ML15159A397
Lujan, Crystal	ML15142A340
Lunde, Lauren	ML15142A340
Lympius, Frauke	ML15142A340
Lynley, Lauren	ML15142A340
Lynn, Pam	ML15159A396
M., Lynda	ML15140A058
M., Pino	ML15142A340
MacFarlane, Adrienne	ML15156A657
MacFarlane, Shari	ML15139A823
MacInnes, Brenda	ML15155C072
Mack, Jean	ML15159A263
Maddock, June	ML15142A340
Maene, Sylvia	ML15142A340
Magaña, Kenneth	ML15162A745
Maher, M.	ML15139A953
Maji, Rosanne	ML15142A340
Malagon, Leticia	ML15158A238
Malott, Randy	ML15142A340
Maltbie, Anne Marie	ML15142A340
Manes, Regina	ML15142A340
Maness, Barbara	ML15142A210
Marie, Shari	ML15156A467
Marinelli, Antonella	ML15142A340
Marinelli, Antonella	ML15162A486
Marques, Jorge	ML15142A340
Marsh, Sherry	ML15162A164
Marsh, Suzanne	ML15139A777
Marshall, David	ML15142A072
Martin, Ashley	ML15148B416
Martin, Gayle	ML15142A340
Martin, Robin	ML15142A340
Martin, Samuel	ML15142A340
Martin, Timothy	ML15139A841
Martinez, Fay	ML15158A120
Martins, Claudia	ML15139A956
Masarati, Piero	ML15142A340

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Massar, Marc	ML15139A831
Massar, Marc	ML15139A832
Masse, Kierstin	ML15142A340
Massetti, J.	ML15162A349
Massey, Linda	ML15142A340
Mastrototaro, Domenico	ML15162A293
Mathews, Mary	ML15162A830
Matthews, Wade and Betty	ML15159A578
Mattison, Stephen	ML15139A820
Mayer, Ramona	ML15139A802
Mays, Constance	ML15139A882
Mazzarella, Rebecca	ML15142A007
Mc vay, Margaret	ML15162A161
Mcalister, Suzann	ML15139A850
McAlpine, Tracy	ML15160A718
Mccallin, Marissa	ML15142A340
McCarthy, Louise	ML15160A965
McCarty, Valerie	ML15139A844
McClasky, Stephen	ML15159A667
McCray, Toni	ML15162A672
Mcdow, Derek	ML15142A340
McGinn, Keven	ML15162A038
McGinty, Jacquelyn	ML15162A174
Mcgovern, L.	ML15142A002
McKenna, Sarah	ML15142A340
McMillan, Douglas	ML15159A585
McMillan, Joanne	ML15139A941
McMillan, Katherine	ML15142A340
McNeil, Kerry	ML15139A736
McNeil, Kerry	ML15142A340
McNicol, Lottie	ML15159B484
McPherson, Andrew	ML15142A340
Mcquade, Linda	ML15156A221
Medders, Melissa	ML15160A855
Meegan, Colleen	ML15142A340
Melegari, David	ML15139A768
Mercer, John & Saundra	ML15162A157
Merino, Aimee	ML15162A160
Merrick, Thomas	ML15162A204
Mes, Ferry	ML15142A340
Metzger, Harvey	ML15160A851
Meyer, Dawn	ML15148A485
Michel, Paul	ML15154B394
Mick, Rick	ML15142A340
Mickler, Walt	ML15139A745
Milian, Yosniel	ML15158A058
Miller, Ann	ML15142A340
Miller, Caroline	ML15158A209
Miller, Christopher	ML15142A340
Miller, Diane	ML15139A849
Miller, Dianne	ML15159A331
Miller, J.	ML15139A902
Miller, Mary	ML15142A340
Miller, Meghan	ML15139A854
Miller, Robin	ML15139A862
Miller, Stacie	ML15161A675
Millett, Cheryl	ML15154C169
Minacheili, Susanna	ML15142A340
Minor, Shannon	ML15139A792
Mira, Mark	ML15142A340
Misicka, Ed	ML15139A789
Mitchell, Marilynn	ML15142A340
Mitts, Karen	ML15159B562
Mizrachi, Robyn	ML15142A340
Moats, Paula	ML15162A090
Mohseni, Leila	ML15162A758
Mollberg, W.	ML15142A340
Monroe, Katrina	ML15139A782
Moore, Mercedes	ML15142A340
Morais, Bonnie	ML15162A162
Morgan, Paula	ML15139A966
Morgan, Paula	ML15142A340
Moriarty, Karen	ML15159A253
Morrison, Barb	ML15139A747
Morse, Kathryn	ML15142A340
Moser, Prairie	ML15162A579
Moss, Vickie	ML15162A096
Mothley, Drucilla	ML15139A928
Moyers, Michele	ML15154B405
Mulcare, James S.	ML15142A340
Mumaw, John	ML15154C247
Munn, Enid	ML15162A677
Munoz, Alejandro	ML15142A340
Murphy-Larronde, Suzanne	ML15142A340
Myers, David Russell	ML15142A373
Myers, Michelle	ML15142A340
Nafarrate, Nancy	ML15142A340
Natali, Nts	ML15142A340
Navarro, Matilde	ML15162A561
Nece, Melissa	ML15161A655
Neckes, Shannon	ML15154B398
Neimark, Debbie	ML15140A137
Nelson, Emily	ML15142A340
Nelson, Jeena	ML15156A466
Nelson, Peggy	ML15139A791
Nersesian, Colleen	ML15162A502
Ness, Chris	ML15162A046
Neste, Lisa	ML15142A340
Newsom, Glenda	ML15139A776
Nguyen, Michelle	ML15162A270
Nicklas, Andrea	ML15142A338
Nierenberg, Susan	ML15162A709
Nixon, Peter	ML15159A583
Noble, Amanda	ML15139A861
Norsworthy, Julie	ML15159A264
Nualchawee,	ML15142A340

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Rungruedee	
Nyerick, Gary	ML15139A774
Obenchain, Helen	ML15148A821
Oberdorf, Robert	ML15139A933
O'Brien, Shannon	ML15142A340
Oelman, Robert	ML15142A340
Ohland, Andreas	ML15142A003
O'Laughlin, Elizabeth	ML15162A700
O'Leary, Suzanne	ML15142A340
Oliver Smith, Jennifer	ML15139A927
Olivia, Ana	ML15159B341
Olmstead, Daniel	ML15162A823
Oppenhuizen, Kathy	ML15142A340
Ornee, Mary	ML15139B002
Ornee, Mary	ML15162A846
Osborne, Diana	ML15139A846
Osborne, Martin	ML15139A939
Osorno, Juan	ML15153B040
Osterhoudt, Bettie	ML15160A736
Oswald, Allan	ML15139A784
Ott, Michael	ML15142A340
Ott, Michael	ML15139A735
P., T.	ML15142A340
P., Victoria	ML15142A340
Pachina, Maria	ML15162A378
Pachios, Darlene	ML15142A340
Palladine, Michelle	ML15162A669
Pallatino, Mary	ML15162A503
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Papaioannou, Kostis	ML15162A761
Papworth, Carol	ML15156B113
Parker, Julianne	ML15142A340
Parkinaon, Robert	ML15139A743
Parra, Dolores	ML15142A203
Patch, Frances	ML15158A239
Paul, John	ML15139A910
Paul, Laura	ML15142A340
Paulet, Virginia	ML15156A656
Pe, Dani	ML15139A805
Pearlman, Marie	ML15154C166
Pearlmutter, Nancy	ML15154C167
Pecha, Richard	ML15162A372
Peranio-Paz, Giana	ML15142A340
Percy, Leo	ML15139A808
Perry, Marian	ML15156A821
Peter, Judith	ML15142A340
Peterson, Patricia	ML15156A823
Petlack, Howard	ML15142A340
Petrus, Veronica	ML15156A292
Petty, Kevin	ML15142A340
Phelps, Ellen	ML15139B003
Phillips, Jennifer	ML15159A247
Phillips, Jim	ML15162A127
Pickard, Alexandria	ML15159A966
Pierce, Tanya	ML15139A878
Pike, Evette	ML15142A010
Piner, George	ML15142A340
Piper, Janna	ML15161A650
Pirotte, Danielle	ML15142A340
Pirotte, Danielle	ML15162A601
Pitchford, Victoria	ML15142A340
Pittea, Chetna	ML15162A556
Plisko, Vladimir	ML15156B111
Poiani, Maria	ML15139A889
Poindexter, Tawnee'	ML15159A270
Pomeroy, Linda	ML15155C206
Pond, Christopher	ML15142A340
Pond, Christopher	ML15162A537
Pope, Alexine	ML15140A020
Pope, Donna	ML15160A988
Porcelli, Angela	ML15156A572
Porter, Donald J.	ML15139A780
Porter, Mark	ML15162A132
Posch, Robert	ML15142A340
Posner, Jessica Jean	ML15162A185
Prada, Francesca	ML15161A662
Pratt, Fred	ML15139A980
Preston, Apryl	ML15139A968
Preston, Apryl	ML15139A985
Preston, Dee	ML15142A340
Preston, Robin	ML15142A340
Printz, Jackie	ML15139A801
Pritchett, Ellouise	ML15140A063
Pritchett, William	ML15139A892
Proulx, Michelle	ML15142A340
Provchy, Gregory	ML15162A232
Prunhuber, Carol	ML15142A368
Pullaro, Barbara	ML15139A788
Pusek, Jasminka	ML15142A340
Quaintance, Charles	ML15142A340
Quaritius, Karen	ML15142A340
Quillen, River	ML15159A499
Raab, Elizabeth	ML15142A340
Rabin, Patr	ML15142A340
Rader, Kyle	ML15142A340
Raganato, Alessandro	ML15162A689
Rainey, Ann	ML15156A464
Ralph, Kathy	ML15159B560
Ramage, Jennifer	ML15140A146
Ramirez, Sally	ML15162A796
Ramon, Laura	ML15159A501
Ramos, Jaime	ML15142A340
Randler, John	ML15142A340
Rapp, Daniel	ML15159A106
Rausher, Hilary	ML15139A950
Ravine, Devon	ML15156A223
Rayburn, Tammie	ML15153B039
Reed, Alaina	ML15139A967
Reeves, Diana	ML15148B415
Rego, Sonia	ML15156B078

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Reilly, Mary	ML15141A484
Reilly, Mary	ML15162A203
Reining, Francis	ML15148A808
Remington, L.	ML15161A628
Reynolds, Helen	ML15153A665
Rhein, Brenton	ML15142A340
Ribokas, Robert	ML15162A782
Rich, Laura	ML15142A340
Richardson, K.	ML15158A016
Richmond, Michael	ML15142A340
Ridgway, Kathi	ML15162A751
Rindler, Joseph	ML15142A340
Ripple, Jeff	ML15159A271
Rivera, Ed	ML15142A340
Rivera, Emma	ML15162A756
Rivera, Hilda	ML15139A754
Rivera, Hilda	ML15142A340
Roberts, Phil	ML15139A790
Robinett, Margaret Christine	ML15162A156
Robins, Michael	ML15142A340
Robinson, Darlene	ML15140A053
Robinson, Janet	ML15142A340
Robledo, Olga	ML15139A838
Roderigues, Mr. & Mrs. Dennis	ML15142A340
Rodrigues, Snndra	ML15139A919
Rodriguez, L.	ML15142A340
Roehl, Richard Ralph	ML15142A340
Roffe, Jessica	ML15139A903
Rogers, Carrie	ML15160A854
Rogers, Dirk	ML15142A340
Rollings, Rusty	ML15142A372
Roman, Christina	ML15142A065
Romero, Cristy	ML15162A508
Rosa, Sam	ML15139A873
Rosado, Val	ML15142A340
Rose, Lawrence	ML15140A060
Rose, Mary	ML15139A999
Ross, Kathy	ML15142A340
Ross, Rachel	ML15162A685
Rothman, Mitzi	ML15142A340
Rothstein, Richard	ML15155B899
Routh, Jeffrey	ML15142A340
Routh, Jeffrey	ML15139A750
Rowell, Edward	ML15139A965
Rozo, Carolina	ML15142A340
Rubin, Joan	ML15139A976
Rudner, Patricia	ML15162A380
Rudolph, John	ML15139A996
Ruhl, Geri	ML15142A340
Rusinko, Stephen	ML15139A787
Russo, Andy	ML15139A759
Russo, M. R.	ML15142A340

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Ryan, Marian	ML15139A746
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Sadiq, Tracey	ML15139A827
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Sagovac, Emily	ML15140A050
Salgado, Natasha	ML15142A340
Saluja, Virginia	ML15139A932
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San Socie, Robert	ML15142A340
Sander, Susan	ML15162A784
Sandulovic, Desanka	ML15142A340
Santiago, Rebeca	ML15142A340
Satiro, Cathy	ML15142A340
Savopoulos, Paskalini	ML15162A303
Scarbeck, Christopher	ML15162A785
Schaaf, William	ML15142A340
Schackney, Stephanie	ML15142A340
Scheffley, Helen	ML15159B425
Schildwachter, Steve	ML15142A340
Schloss, Morley	ML15142A340
Schnabel, Arthur	ML15142A340
Schnee, Jane	ML15142A340
Schneider, Cheryl	ML15162A153
Scholl, Linda	ML15162A809
Schollhorn, Maria Teresa	ML15142A340
Schultes, Yolanda	ML15142A340
Schultze, Patti	ML15142A340
Schwarz, Robin	ML15142A340
Scott, Joan	ML15162A707
Scott, Judith E.	ML15142A340
Scott, Lorrie	ML15142A340
Scott, Robin	ML15142A340
Scott, Wenona	ML15142A340
Scott, Wenona	ML15162A560
Scully, Rosemary	ML15142A340
Sebesta, Doyle	ML15142A340
Semmelhaack, Carl	ML15162A052
Sequeira, Kathleen	ML15142A014
Serne, S.	ML15154C170
Serra, Ruth	ML15142A340
Serrano, Tahimi	ML15140A064
Severino, Susan	ML15160A928
Shamis, Elliot	ML15139A912
Shank, Nancy	ML15139A857
Sharbaugh, Thomas	ML15139A763
Sharkeu, Bradley	ML15142A340
Sharrer, Brian	ML15139A875
Sheard, Sue	ML15162A832
Sheets, Aida	ML15139A752
Sheets, Aida	ML15142A340
Shero, Dale	ML15155B022
Shifflett, Jr., James E.	ML15156A090
Shultis, Bob	ML15142A340

Commenter	ADAMS Accession #
Siano, Kelly	ML15161A680
Siegel, Ruth	ML15162A354
Sierchio, Debbie	ML15142A340
Sierra, Juan Carlos	ML15139A960
Sill, K.	ML15139A987
Simkins, Dave	ML15139A959
Simmons, Haley	ML15142A340
Simontacchi, Alexis	ML15162A835
Sims, Nancy	ML15142A340
Sinclair, David	ML15139A961
Skelton, Laura	ML15142A340
Slowey-Thomas, Dianna	ML15162A276
Smith, A.	ML15139A811
Smith, Angela	ML15155B020
Smith, Betsy D.	ML15162A125
Smith, Donna	ML15159B335
Smith, Greg	ML15142A340
Smith, Janet	ML15162A721
Smith, Jr., William M.	ML15142A340
Smith, Karen	ML15139A891
Smith, Karen	ML15139A914
Smith, Kenneth	ML15142A340
Smith, Linda	ML15139A817
Smith, Melissa	ML15162A841
Smith, Wendy	ML15142A340
Smyth, Teri	ML15142A340
Snowe, Sandy	ML15139A851
Snyder, Lynn	ML15139A798
Soden, Mary	ML15139A989
Sokol, Abbey	ML15155B900
Solomon, Laura	ML15142A340
Sophie, Grosbois	ML15139A766
Soteropoulos, Patricia	ML15142A340
Sotomayor, Nora	ML15162A149
Sowden, Bruce	ML15162A439
Spencer, Susan	ML15162A648
Spigel, Sue	ML15139B000
Spotts, Richard	ML15142A340
Sprano, Barbara	ML15162B091
Sprecher, Cindy	ML15142A340
Sprecher, Cindy	ML15162A145
Sprecher, Cindy	ML15162A746
Squire, Julie	ML15162A764
Srivastava, Suneet	ML15142A340
Stafford, Heather	ML15142A334
Stahl, James and Kay	ML15139A852
Standing, Barbara	ML15162A228
Stapelfeldt, Horst	ML15155C073
Stapleton, Judy	ML15142A340
Starr, Lawrence	ML15139A916
Stefanova, Silviya	ML15162A220
Steffen, Shirley	ML15142A340
Steigerwaldt, Samantha	ML15154B416
Stevens, Patricia	ML15142A340
Stevens, Robert	ML15142A340
Stevenson, Richard	ML15139A962
Stevenson, Richard	ML15139A963
Stewart, Jacqueline	ML15162B091
Stewart, Jacqueline	ML15162B148
Stewart, Marlin	ML15139A856
Stickel, Gary	ML15159A492
Stickel, Gary	ML15159A494
Stone, James	ML15139A830
Stone, Susan	ML15158A119
Strack, Daniel	ML15155B807
Strader, Helen	ML15142A340
Strobel, Sabine	ML15139A760
Struck, Caroline	ML15142A340
Suchy, Robin	ML15142A340
Sullivan, Gretchen	ML15162A829
Sullivan, Susan	ML15142A340
Sulprizio, Karen	ML15142A340
Summers, Janine	ML15139A825
Summers, Sandi	ML15142A340
Sunde, Lill-Jeanette	ML15162A771
Sunderland, Felicia	ML15156B390
Sunfire, Michael	ML15148A812
Sweeten, Brittany	ML15160A939
Swoboda, Lois	ML15139A729
Swoboda, Lois	ML15142A340
Swystun, Lydia	ML15139A753
Swystun, Lydia	ML15142A340
T., Mandi	ML15142A340
Tainio, Coe	ML15140A056
Tairova, Olga	ML15159A231
Tamborello, Isidoro	ML15142A340
Tardif, Mark	ML15142A340
Tarpinian, Karina	ML15142A340
Tatgenhorst, Joy N.	ML15159A246
Taylor, Kay	ML15148B425
Taylor, Walter	ML15158A017
Temple, Laurel	ML15162A192
Tempone, Antonio	ML15142A340
Tenhouten, Warren	ML15162A194
Terrier, Bernard	ML15162A770
Thayer, Mostyn	ML15139A843
The U. family,	ML15139A925
The U. family,	ML15161A684
The U. family,	ML15162A394
The U. family,	ML15162A399
The U. family,	ML15162A844
The U. family,	ML15162A845
Thollaug, Julia	ML15139A946
Thomas, Carrie	ML15142A340
Thompson, Brenda	ML15162A787
Thompson, Kate	ML15162A368
Thuline, James	ML15139A799
Tirado, Luis	ML15156A826

Commenter	ADAMS Accession #
Titilah, Jennifer	ML15162A789
Togati, Joanne	ML15142A340
Tomkins, Cassandra	ML15159A479
Tompetrini, Phil	ML15139A905
Torquato, Bruno	ML15139A924
Torres, Marcos	ML15159A965
Totan, Dan	ML15142A340
Tran, Dat	ML15162A135
Traub, Susan	ML15142A340
Travers, L. J.	ML15162A834
Travis, Michael	ML15154A522
Tremblay, Nancy	ML15142A340
Trent, Sharon	ML15142A340
Triana, Jennifer	ML15156B443
Triff, Asdur	ML15142A374
Trudeau, Stephanie	ML15142A332
Tucker, Barbara	ML15155A478
Tudorache, Lynette	ML15162A367
Turner, Ted	ML15154B413
Turney, Lynda	ML15156B387
Tutko, Jackie	ML15142A340
Tweedy, Mary	ML15211A055
Updike, Carl	ML15142A340
Urbanek, Adele	ML15142A340
Valencia, Suzanne	ML15159A016
Valencia, Suzanne	ML15159A017
Valencia, Suzanne	ML15159A018
Valero, Maudie	ML15162A039
Vallender, Andrew	ML15142A340
Van Vleet, Rodney	ML15142A340
Vandal, Lise	ML15142A340
Varanitsa, Oleg	ML15156B474
Vargo, Gabriel	ML15139A898
Vartanian, Carol	ML15142A340
Vaughn, Matt	ML15139A822
Veach, Deb	ML15142A066
Veltkamp, Robert	ML15142A330
Vennett, Sean	ML15139A982
Vessicchio, Susan P.	ML15162A755
Vieira, Barbara	ML15142A340
Vieira, Ed	ML15142A340
Villanueva, Vivian	ML15154C172
Villar, Michelle	ML15139A971
Villarnovo, Victoria	ML15162A057
Villaverde, Kristina	ML15158A057
Vines, Jimmy	ML15139B005
Vivero, Daniel	ML15156A468
Voris, Stephanie	ML15142A340
Voss, Skyler	ML15162A265
Vries, M.	ML15142A340
Vuotto, Karla	ML15142A340
W., C.	ML15162A514
Wachowiak, Mark	ML15156A658
Wade, Karen	ML15159A519
Walker, John	ML15142A340
Walker, Leanne	ML15159A255
Walker, Leanne	ML15159A257
Walker, Lynne	ML15162A547
Walker, Terry	ML15158A093
Walker, William	ML15139A758
Wall, James	ML15155A836
Wall, Regina	ML15142A340
Wallace, Larry	ML15139A815
Wallace, Steve	ML15156B322
Walper-Taylor, James	ML15142A340
Walsh, Ellen	ML15158A092
Walters, Kenneth	ML15142A340
Walters, M.	ML15142A073
Walters, Sandra	ML15142A340
Waltrip, Laura	ML15142A340
Ward, Diana	ML15139A983
Warrington, Thomas	ML15139A879
Wasko, Tara	ML15139A874
Watson, Chris	ML15162A760
Watts, Cynthia	ML15139A876
Watts, Cynthia	ML15139A877
Way, Karen	ML15162A808
Weaver, George	ML15140A173
Weber, Gae	ML15142A006
Weber, Steve	ML15142A340
Weckering, Daniel	ML15142A340
Weinkle, Gary	ML15139A816
Weisberg, Edmund	ML15162A766
Weisman, Milt	ML15142A340
Weiss, Arwen	ML15142A340
Weisser-Lee, Melinda	ML15148A806
Welles, Diane	ML15160A648
Wentz, Pat	ML15142A340
Wenzel, Tom	ML15162A850
Wheeler, Cynthia	ML15159B561
Widdowson, John	ML15139A886
Wiechec, Christina	ML15162A822
Wiehemeijer, Robert	ML15142A340
Wieland, Martin	ML15155C022
Wildner, Andrea	ML15142A340
Wilkinson, Ian	ML15155A753
Williams, Alek	ML15155C090
Williams, Brigida	ML15162A694
Williams, Caroline	ML15159A172
Williams, Celia	ML15156A659
Williams, Dodie	ML15142A340
Williams, Freddie	ML15142A340
Williams, Linda	ML15142A340
Williams, Marjorie J.	ML15142A340
Williams, Stephen L.	ML15142A340
Williamson, Judith	ML15142A340
Willis, Jennifer	ML15142A340
Wilson, Kerri	ML15142A340
Wilson, L.	ML15139A998
Wilson, Winn	ML15142A340

Commenter	ADAMS Accession #
Wilson, Winn	ML15162A687
Windle, A.	ML15142A340
Winick, Dorothy	ML15139A834
Winicki, Anne	ML15142A340
Winters, Margueritta	ML15142A340
Wolf, Chantal	ML15142A340
Wolf, Darlene	ML15139A979
Wolf, Davis	ML15139A981
Wolle, Heather	ML15142A340
Wolter, Manuela	ML15142A340
Woo, Regina	ML15154B407
Wood, Ruby	ML15142A340
Woodard, Bennie	ML15142A340
Woodlief, Ann	ML15162A815
Woods, Sherry	ML15142A340
Woods, Teresa	ML15154A807
Workman, Mary	ML15142A340
Workman, Wickard	ML15142A340
Wortham, Michael	ML15142A340
Worthington, Nathalie	ML15142A340
Wu, Miki	ML15142A340
Yaffee, Steve	ML15162A817
Yanez, Mario	ML15156A462
Yantselovskiy, Alexandr	ML15142A340
Yashirin, Nick	ML15139A744
Yazdi, T.	ML15162A184
Yoo, Sunnah	ML15148B411
Youd, Mark	ML15139A988
Young, Karen	ML15156B080
Young, Mary	ML15156B158
Zagar, Virginia	ML15155A170
Zarzycka, Alexandra	ML15162A424
Zebracki, Nancy	ML15142A340
Zella, Donna	ML15139A943
Zimmermann, Karin	ML15142A340
Zintel, Angelika	ML15142A340
Ziring, Sidney	ML15156B117
Zuckerman, Arlene	ML15142A340
Zuckerman, Barry	ML15140A061

Table E-10. Individuals Submitting with Subject "Support the 'No Action' Alternative" with Correspondence ID TURK-COL6&7-DR-00104 and Representative ADAMS Accession No. ML15140A141 (Multiple Authors 2015-TN4720**)**

Commenter	ADAMS Accession #
achtung@znaut.com	ML15162A926
Aghayan, Veronic	ML15196A484
Albrecht, Lonnie	ML15196A072
Anderson, Kelley	ML15195A030
Anderson, Vaughn	ML15141A262
Anderson, Vaughn	ML15195A631
Anderson, Vaughn	ML15162A942
Anderson, William	ML15160A702
Aponte, Jonathan	ML15201A468
Ayers, Randall	ML15196A496
Baird, Melissa	ML15195A630
Balfour, Joan	ML15195A046
Balfour, Joan	ML15195A589
Barnes, Janice	ML15195A188
Battin, John	ML15198A547
Bell, Angela	ML15162A923
Bellamy, Ray	ML15198A545
Bolen, D. K.	ML15162A924
Bolen, D. K.	ML15195A170
Bordonaro, Jo	ML15195A597
Born, Deborah L.	ML15159B483
Bowden, Deanna	ML15162A405
Bowman, Kenneth	ML15195A611
Bowman, Kenneth	ML15196A060
Brady, Meaghan	ML15195A638
Braley, Brian	ML15197A044
Brexel, Sr., Charles	ML15197A051
Bromley, Gary	ML15201A470
Broughton, Janet	ML15162A418
Brown, Allie	ML15198A533
Bucolo, James	ML15195A159
Burgess, Candice	ML15162A496
Burns, Mary	ML15196A467
Byars, Rain	ML15162A917
Campbell, Grant	ML15160A078
Campbell, Linda	ML15198A517
Campbell, Susan	ML15195A562
Carver, Pat	ML15198A503
Catalina, Janet	ML15196A071
Colby, Helen	ML15196A154
Collins, Denise	ML15201A471
Constantino-Martin, Patti	ML15160A521
Cook, Kevin	ML15201A465
Corbin, Randy	ML15160A538
Craciun, George	ML15196A054
Curci, James	ML15195A646
De Nolf, Susan	ML15195A717
de Sart, Marci	ML15198A515
Debus, John	ML15198A532
Deddy, John	ML15195A650
Detrick, Mary	ML15161A649
Detrick, Mary	ML15195A033

Commenter	ADAMS Accession #
dsinclair2013@hotmail.com	ML15196A477
Dunn, Elmo	ML15195A652
Dunn, Wendy	ML15195A640
Dunn, Wendy	ML15196A075
Duval, Ruthann	ML15196A124
Easter, Jeffrey	ML15195A591
Enfield, David	ML15142A383
Family, Manzi	ML15198A509
Fernandez, Maria	ML15160A553
Foster, Winnie	ML15159B548
Frederick, Diana	ML15141A264
Friedman, Donna	ML15198A506
Frotscher, H. David	ML15160A668
Frotscher, H. David	ML15160A679
Fults, Jason	ML15140A141
Fults, Jason	ML15196A165
Gibson, David	ML15162A490
Gifford, Bonnie	ML15162A409
Glenn, Martha	ML15195A627
Glickman, Susan	ML15198A530
Gutierrez, Kim	ML15159B503
Hall, Dennis	ML15195A567
Hallman, Janice	ML15196A052
Hamilton, Dianna	ML15196A055
Harsin, Linda	ML15195A124
Haun, Pamela	ML15162A493
Headley, Linda	ML15162A928
Henderson, Maria	ML15159B516
Henderson, Maria	ML15162A856
Henderson, Maria	ML15195A137
Hendrix, Kia	ML15160A049
Hensgen, Eric	ML15160A701
Hensgen, Eric	ML15196A253
Hollister, David	ML15162A494
Hollister, David	ML15197A050
Hoodwin, Marcia	ML15198A571
Howard, Karen	ML15196A085
Hung, Shiu	ML15195A621
Jennings, Cara	ML15162A489
Jennings, Sid	ML15195A709
Johnson, Diane	ML15196A475
Jones, Susan	ML15159B456
Kahn, Nancy	ML15198A546
Kapp, Bill	ML15195A584
Kasenow, Lisa	ML15159B532
Keeley, Robert	ML15195A636
Kerkhoff, Joyce	ML15162A497
Kerkhoff, Joyce	ML15162A889
Kerkhoff, Joyce	ML15196A092
Kerr, Earl	ML15162A862
Khajeh-Noori, Jeri	ML15196A128
Khajeh-Noori, Jeri	ML15162A951
King, Michele	ML15196A497
Kluson, Forrest	ML15160A589
Knight, David	ML15195A174
Kollbach, Anja	ML15197A048
Kramer, Richard	ML15196A255
Kwo, Ken	ML15160A735
Levin, Monnie	ML15195A579
Lightfoot, Martha	ML15201A469
Linden, Susan	ML15160A059
Luke, Keth	ML15195A564
Marchand, Babs	ML15196A086
Marder, Karen	ML15196A471
Margeson, Don	ML15195A120
Maricque, Mitchell	ML15196A252
Mariotte, Michael	ML15196A095
Marold, Doran	ML15195A144
Marold, Doran	ML15195A614
Martin, Drew	ML15160A719
Martinez, Judith	ML15195A707
Massar, Marc	ML15195A573
Mawhinney, John	ML15195A625
Mayotte, Monica	ML15159B458
Mazuca, Frank	ML15196A074
McClasky, Stephen	ML15197A041
McGlone, Colleen	ML15160A692
McGlone, Colleen	ML15195A574
Mejides, Andres	ML15197A045
Meyer, Colonel	ML15195A172
Meyer, Colonel	ML15195A590
Meyer, Colonel	ML15195A653
Michel, Paul	ML15195A639
Miller, Michele	ML15198A524
Milne, Martha	ML15196A134
Minniss, Regina	ML15162A501
Montesi, Toni	ML15159B453
Moore, Jeannine	ML15159B547
Moore, Jeannine	ML15162A935
Moore, Jeannine	ML15195A713
Moss, Eric	ML15162A940
Mumaw, John	ML15196A468
Nelson, Toni	ML15162A419
Nicholson, Carol	ML15195A705
Novotny, Jan	ML15196A076
O'Brien, Robert	ML15196A485
Oster, Teresa	ML15160A552
Paleias, Linda	ML15162A910
Paleias, Linda	ML15196A499
Patten, Elaine	ML15162A425
Pattison, Janet	ML15195A578
Pellegrini, Robert	ML15196A149
Peter, Judith	ML15195A063
Plockelman, Cynthia	ML15160A077
Porretto, Nick	ML15162A915
Pratt, Richard	ML15162A907
Prexl, Esther	ML15195A647
Price, Sue	ML15196A166

Commenter	ADAMS Accession #
Riley, Russell	ML15195A184
Rilling, Fred	ML15162A943
Rilling, Fred	ML15195A601
Rilling, Fred	ML15198A525
Robbin, Valerie	ML15160A050
Roberts, J. P.	ML15196A155
Rock, Andrew	ML15198A542
Rogers, Maureen	ML15195A629
Rowell, Edward	ML15196A146
Rowell, Edward	ML15196A147
S., C.	ML15195A603
S., J.	ML15196A465
Sabol, Barbara	ML15162A899
Saunders, Suzanne	ML15195A582
Scionti, Cynthia	ML15197A052
Scott, Jennifer	ML15204A734
Scott, Jennifer	ML15162A072
Scott, Jennifer	ML15195A561
Sechrist, Linda	ML15195A167
Shafchuk, Patsy	ML15195A571
Shaw, Donald	ML15195A047
Shetler, Terry	ML15195A587
Smith, Brenda	ML15162A903
Smith, Jody	ML15189A035
Smith, Leigh Emerson	ML15162A432
Sockloff, Judith	ML15162A906
Southern, Tom	ML15198A513
Stallworth, Alicia	ML15198A572
Stansbery, Mark	ML15195A605
Stokes, Bill	ML15162A893
Stoll, Maria	ML15195A181
Stone, James	ML15196A073
Storino, Michael	ML15195A642
Stuchly, Ryan	ML15196A103
Tatum, James	ML15198A518
Thomas, John	ML15162A941
Tiano, Michael	ML15160A060
Tomi, Joseph	ML15159B454
Truesdell, Terrence L.	ML15159B480
Upchurch, Sandra	ML15159B482
Upchurch, Sandra	ML15162A950
Usinger, Gary	ML15159B580
Usinger, Gary	ML15195A166
Vennett, Sean	ML15196A131
Ward, Diana	ML15195A022
Ward, Diana	ML15196A091
Whetstone, Joe	ML15195A641
Williams, Alek	ML15198A541
Yll, Judy	ML15196A068
Zambrano, Ota	ML15160A522
Zook, Caryl	ML15196A256

Table E-11. Individuals Submitting with Subject "Support the 'No Action' Alternative" with Correspondence ID TURK-COL6&7-DR-00379 and Representative ADAMS Accession No. ML15141A259 (Multiple Authors 2015-TN4719**)**

Commenter	ADAMS Accession #
Albrecht, Lonnie	ML15196A139
Andreacchio, Tonya	ML15195A635
Arthur, Barbara	ML15196A474
Axelrod, Andrea	ML15198A516
Benjamin, Christopher	ML15195A157
Benjamin, Christopher	ML15196A478
Bernabei, Kaatje	ML15196A156
Bills, Kathleen	ML15196A126
Boda, Andrew	ML15195A710
Brenner, Barbara	ML15198A520
Breslin, Gail	ML15195A044
Brizard, Irene	ML15195A711
Brunke, Richard	ML15195A704
Cabral, Edgar	ML15162A921
Cameron, Erin	ML15198A531
Cammardella, Neil	ML15196A498
Campbell, Frank	ML15197A042
Campbell, Grant	ML15198A504
Cargille, Frances	ML15196A466
Carroll, Glenn	ML15196A121
Cherubin, Elizabeth	ML15195A020
Claiborn, William	ML15162A857
Claiborn, William	ML15195A721
Clever, Sonnett	ML15162A495
Colon, Yamarie	ML15159B387
Colson, Clay G.	ML15162A913
Colson, Clay G.	ML15195A566
Covington, Laurel	ML15196A062
Cox, Lesley	ML15162A390
Craciun, George	ML15198A523
Cummins, Lynne	ML15195A593
Datz, Amy	ML15198A512
Davidson, Maggie	ML15162A895
Davidson, Maggie	ML15196A144
De Nolf, Susan	ML15195A176
De Parny, Sylvie	ML15195A712
Debus, John	ML15198A505
Delson, Dave	ML15196A058
Detrick, Mary	ML15196A251
Dietz, Noella	ML15198A537
Doenmez, Sarah	ML15196A247
Doyle, Brian	ML15195A720

Commenter	ADAMS Accession #
Duffey, Michael	ML15195A568
Dunn, Elmo	ML15195A576
Dunn, Marybeth	ML15198A540
Duval, Ruthann	ML15195A143
Eberly, Kenneth	ML15195A703
Edmondson, John	ML15159B426
Elizey, Georgia	ML15159B485
Elizey, Georgia	ML15162A949
Evelyn, Patty	ML15195A177
Fahrenkopf, Gladys	ML15195A608
Felice, Kathleen R.	ML15196A481
Felice, Kathleen R.	ML15196A483
Frotscher, H. David	ML15195A622
G., J.	ML15159B404
Gale, Michelle	ML15196A161
Gerster, Edward	ML15159B455
Gibbs, Covelo	ML15196A094
Glenn, Martha	ML15195A031
Glover, Tim	ML15196A487
Gould, Mark	ML15196A493
Grannon, Salima	ML15196A463
Guay, Mary	ML15159B445
Guidry, Ashley	ML15162A365
Gulden, Dale	ML15162A562
Gulden, Dale	ML15162A890
Gulden, Dale	ML15195A722
Hall, Dennis	ML15196A168
Hamilton, Dianna	ML15195A606
Hamilton, Kathleen	ML15195A613
Hancock, Guy	ML15198A534
Harrison, J. M. M.	ML15195A715
Hauck, Barbara	ML15195A141
Haun, Pamela	ML15162A853
Headley, Linda	ML15195A594
Hendrix, Kia	ML15162A912
Hendrix, Kia	ML15196A480
Hensgen, Eric	ML15162A939
Hertzman, Ron	ML15196A164
Hill, Ann	ML15195A587
Hill, Catherine	ML15196A261
Hoffman, Ace	ML15198A536
Hohenshelt, Felicity	ML15196A057
Hohenshelt, Felicity	ML15196A158
Howard, Barbara	ML15195A719
Hudon, Karen	ML15198A511
Hughes, Barbara	ML15159B442
Hughes, Curtis	ML15159B441
Hunt, Jim	ML15160A978
Jennings, Sid	ML15196A064
Kerr, Earl	ML15195A612
Kimbrough, Mecca	ML15162A952
King, Michele	ML15195A168
Kirkland, Kathy	ML15162A151
Kramer, Richard	ML15195A563
Kwo, Ken	ML15195A714
Landau, Doug	ML15195A127
Landau, Doug	ML15196A492
Lange, Barbara	ML15197A046
Laxon, Barbara	ML15196A122
Leary, James	ML15195A610
Leavengood, Dena	
Gross	ML15195A565
Leone, Pakita	ML15198A510
Lettieri, Tammy	ML15195A570
Lewis, John	ML15162A393
Linden, Susan	ML15195A045
Linden, Susan	ML15195A648
Losen, Willy Karl the	ML15195A624
Lux, Sharon	ML15198A548
Mack, Heathe	ML15195A596
Marra, Tony	ML15198A521
Marra, Tony	ML15195A633
Martinez, Natalie	ML15159B481
McDonald, Patricia	ML15195A165
McGrath, Marcela	ML15196A259
Mercado, Monica	ML15166A030
Merritt, Mandy	ML15159B384
Merritt, Mandy	ML15159B385
Mesches, Arnold	ML15195A164
Miller, Lynn	ML15198A514
Milne, Martha	ML15196A059
Minniss, Regina	ML15162A500
Montesi, Toni	ML15162A884
Mora, Christian	ML15162A492
Morrison, Marc	ML15162A897
Natilson, Nancy	ML15196A473
Navarra, Rudi	ML15198A543
Nayer, Cyndy	ML15198A519
Nayer, Stuart	ML15198A570
Newton, Michael D.	ML15197A047
Novotny, Jan	ML15196A153
O'Brien, Robert	ML15159B424
Olson, Mary	ML15188A201
O'Meara, Patrick	ML15195A644
Osborne, Martin	ML15198A544
Owen, Cheryl	ML15161A642
Paleias, Linda	ML15141A261
Pannaman, Stanley	ML15141A259
Pannaman, Stanley	ML15196A157
Paradise, Brian	ML15162A902
Paul, Stephen	ML15159B457
Perez, Jose	ML15195A131
Perez, Letty	ML15195A135
Peter, Judith	ML15195A651
Pontones, Steven	ML15195A604
Pottinger, Brandon	ML15141A266
Pritchard, Alvera	ML15195A716
Quillen, Carter	ML15195A706
Raby, Joyce	ML15195A162
Rapuano, Shannon	ML15198A522

Commenter	ADAMS Accession #
Rehbit, La	ML15196A143
Rilling, Fred	ML15159B446
Rilling, Fred	ML15159B447
Rinaldi, Elaine	ML15196A490
Roderigues, Abel	ML15195A599
Rose, Pat	ML15195A042
Rowell, Edward	ML15195A037
San Pedro, Patricia	ML15159B354
San Pedro, Patricia	ML15198A529
Satori, Linda Sartori	ML15196A097
Schlumpf, Sebastian	ML15196A133
Scott, Jennifer	ML15162A909
Scott, Jennifer	ML15195A602
Sharifi, Yasamin	ML15201A464
Shetler, Terry	ML15196A084
Silvey, Kevin	ML15195A708
Sisco, D.	ML15198A527
Smith, Brenda	ML15159B386
Spencer, Patrick	ML15196A127
St. Martin, Darlene	ML15196A491
Stephan, Carole	ML15162A410
Stephenson, James	ML15195A138
Stone, James	ML15195A718
Sullivan, Viola	ML15162A407
Tann, Rosemary	ML15195A146
Thomas, John	ML15159B444
Tirey, Sheila	ML15159B504
Torres, Victor	ML15198A535
Treuer, Galen	ML15190A271
Truesdale, John	ML15196A069
Tweeton, Tanya	ML15162A955
Vennett, Sean	ML15195A580
Waitkevicz, H. Joan	ML15195A160
Wallace, Christine	ML15162A223
Washburn, Thomas	ML15196A088
Whetstone, Joe	ML15159B427
Whetstone, Joe	ML15162A888
Whitfield, Isabelle	ML15162A953
Williams, Penelope	ML15196A067
Williamson, Barbara	ML15196A486
Wright, Edmund	ML15195A038
Yambor, Arthur	ML15196A145

Table E-12. Individuals Submitting the Form with Subject "Reject permits to build new nuclear reactors at Turkey Point" with Correspondence ID TURK-COL6&7-DR-00240 and Representative ADAMS Accession No. ML15146A110 (Multiple Authors 2015-TN4718**)**

Commenter	ADAMS Accession #
Agler, Mindy	ML15141A397
Anonymous, Anonymous	ML15211A041
Anonymous, Anonymous	ML15201A044
Anonymous, Anonymous	ML15211A058
Anonymous, Anonymous	ML15146A232
Barnidge, Virginia	ML15201A041
Bofill, Beatriz	ML15211A034
Bofill, Beatriz	ML15142A382
Colby, Helen	ML15146A126
Dwyer, John P.	ML15201A045
Dwyer, Karen	ML15201A048
Dwyer, Karen	ML15141A398
Ferro, Colleen	ML15146A231
Fielding, Ed	ML15142A379
Gallart, Frank	ML15198A141
Greene, Lisa	ML15225A088
Griswold, Dave	ML15198A134
Hoffmeyer, Lisa	ML15211A036
Holland, Karen	ML15211A044
James, Denise	ML15141A321
Key, Laurence W.	ML15198A131
Mahoney, Robert S.	ML15201A062
Montalvo, Stephanie	ML15198A133
Paleias, Linda	ML15201A040
Siegel, Ellen	ML15201A053
Smoller, Merry Sue	ML15198A142
Smoller, Merry Sue	ML15141A254
Sweetay, Lynn	ML15201A058
Umpierre, Diana	ML15160A316
Umpierre, Diana	ML15162A271
Younger, Sarah	ML15146A110

Table E-13. Individuals Submitting the Form with Subject "Re: NRC-2009-0337 Turkey Point Expansion" with Correspondence ID TURK-COL6&7-DR-00679 and Representative ADAMS Accession No. ML15191A341 (Multiple Authors 2015-TN4717

Commenter	ADAMS Accession #
??, unnreadable	ML15191A341
??, unnreadable	ML15191A341
??, unreadable	ML15191A341
??, unreadable	ML15191A341
??, Corey Lopez	ML15191A341
Bara, Sharon	ML15191A341
Benson, Linda	ML15191A341
Bonnell, Elizabeth	ML15191A341
Chiszar, Benjamin J.	ML15191A341
Cleland, Noel	ML15160A314
Garcia, Dany	ML15191A341
Jacobs, Lee	ML15191A341
Kerr, Karen	ML15191A341
Klopfer, Carol	ML15191A341

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11. ABSTRACT (200 words or less)

This environmental impact statement (EIS) has been prepared in response to an application submitted to the U.S. Nuclear Regulatory Commission (NRC) by Florida Power and Light Company (FPL) for two combined construction permits and operating licenses) combined licenses or COLs). The proposed actions related to the FPL application are (1) NRC issuance of COLs for two new power reactor units (Units 6 & 7) at the Turkey Point Nuclear Power Plant site in Miami-Dade County, Florida, and (2) U.S. Army Corps of Engineers (USACE) decision to issue, deny, or issue with modifications a Department of the Army (DA) permit to perform certain dredge and fill activities in waters of the United States and to construct structures in navigable waters of the United States related to the project.

This EIS documents the review team's analysis, which considers and weighs the environmental impacts of constructing and operating two new nuclear units at the Turkey Point site and at alternative sites, including measures potentially available for reducing or avoiding adverse impacts.

After considering the environmental aspects of the proposed action before the NRC, the NRC staff's recommendation to the Commission is that the COLs be issued as proposed. This recommendation is based on (1) the application, including the Environmental Report (ER), submitted by FPL; (2) consultation with Federal, State, Tribal, and local agencies; (3) the review team's independent review; (4) the consideration of public comments received on the environmental review; and (5) the assessments summarized in this EIS, including the potential mitigation measures identified in the ER and this EIS.

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