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PLAN AMENDMENT/FINAL EIS FOR THE PALEN SOLAR POWER PROJECT

Volume 1 of 2

May 2011

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United States Department of the Interior
Bureau of Land Management

Plan Amendment / Final EIS for the Palen Solar Power Project

For the

Palm Springs – South Coast Field Office
Palm Springs, California

May 2011

John R. Kalish
John R. Kalish
Field Manager

May 6, 2011
Date

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United States Department of the Interior

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http://www.blm.gov/ca/palmsprings/

In reply refer to:
CACA 048810

May 6, 2011

Dear Reader:

Enclosed is the Proposed Resource Management Plan Amendment/Final Environmental Impact Statement (PA/FEIS) for the California Desert Conservation Area (CDCA) Plan and right-of-way grant application of Palen Solar I, LLC, a wholly owned subsidiary of Solar Millennium for the Palen Solar Power Project (PSPP). The Bureau of Land Management (BLM) prepared the PA/FEIS in consultation with cooperating agencies, taking into account public comments received during the National Environmental Policy Act (NEPA) process. The proposed decision on the plan amendment would add the PSPP site to those identified in the current CDCA Plan, 1980 as amended, for solar energy production. The proposed decision on the PSPP is whether to approve the right-of-way grant applied for on behalf of Palen Solar I, LLC.

This PA/FEIS for the PSPP has been developed in accordance with NEPA and the Federal Land Policy and Management Act of 1976 (FLPMA). The PA is based largely on the preferred alternative in the Draft Resource Management Plan Amendment/Draft Environmental Impact Statement (PA/DEIS), which was released on March 18, 2010. The PA/FEIS for the PSPP contains the proposed plan and project decisions, a summary of changes made between the PA/DEIS and PA/FEIS, an analysis of the impacts of the decisions, a summary of written comments received during the public review period for the PA/DEIS and responses to comments.

The BLM will accept additional public comment on the PA/FEIS for 30 days after the Environmental Protection Agency publishes the Notice of Availability in the Federal Register. Comments can be sent to Allison Shaffer, Project Manager, by mail: 1201 Bird Center Drive, Palm Springs, CA, 92262; phone: (760) 833-7100; or email CAPSSolarPalen@blm.gov. All substantive comments will be reviewed and responded to in the Record of Decision.

Pursuant to BLM's planning regulations (43 CFR 1610.5-2), any person who participated in the planning process for the proposed resource management plan amendment and has an interest that is or may be adversely affected by the proposed amendment may protest such amendment within 30 days from the date the Environmental Protection Agency publishes its notice of availability for the PA/FEIS in the *Federal Register*. Unlike the planning decision, issuance of the proposed right-of-way grant is an implementation decision that is not subject to protest under the BLM planning regulations.

For further information on filing a protest, please see the accompanying protest regulations in the pages that follow (Attachment 1). The regulations specify the required elements in a protest. Protesting parties should take care to document all relevant facts and, as much as possible, reference or cite the planning documents or available planning records (e.g., meeting minutes or summaries, correspondence, etc.). To aid in ensuring the completeness of the protest, a protest checklist is attached to this letter (labeled as Attachment 2). All protests must be in writing and mailed to one of the following addresses:

Regular Mail:
Director (210)
Attention: Brenda Hudgens-Williams
BLM Protest Coordinator
P.O. Box 71383
Washington, D.C. 20024-1383

Overnight Mail or Other Delivery:
Director (210)
Attention: Brenda Hudgens-Williams
BLM Protest Coordinator
20 M Street, S.E., Room 2134LM
Washington, DC 20003

Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Emailed and faxed protests will not be accepted as valid protests unless the protesting party also provides the original letter by either regular or overnight mail postmarked by the close of the protest period. Under these conditions, the BLM will consider the emailed or faxed protest as an advance copy and will afford it full consideration. If you wish to provide the BLM with such advance notification, please direct faxed protests to the attention of Brenda Hudgens-Williams - BLM Protest Expeditor at 202-912-7129, and emailed protests to Brenda_Hudgens-Williams@blm.gov.

The BLM Director will make every attempt to promptly render a decision on each valid protest. The decision will be in writing and will be sent to the protesting party by certified mail, return receipt requested. The decision of the BLM Director shall be the final decision of the Department of the Interior. Responses to protest issues will be compiled in a Director's Protest Resolution Report that will be made available to the public following issuance of the decisions.

Upon resolution of all protests, the BLM may issue a Record of Decision (ROD) adopting the Approved PA and making a decision regarding issuance of the right-of-way grant for the PSPP. Copies of the ROD will be mailed or made available electronically to all who participated in this NEPA process and will be available to all parties through the "Planning" page of the BLM national website (*http://www.blm.gov/planning*), or by mail upon request.

Unlike land use planning decisions, implementation decisions included in this PA/FEIS are not subject to protest under the BLM planning regulations, but are subject to an administrative review process, through appeals to the Office of Hearings and Appeals (OHA), Interior Board of Land Appeals (IBLA) pursuant to 43 CFR, Part 4 Subpart E. Implementation decisions generally constitute the BLM's final approval allowing on-the-ground actions to proceed. Where implementation decisions are made as part of the land use planning process, they are still subject to the appeals process or other administrative review as prescribed by specific resource program regulations once the BLM resolves the protests to land use planning decisions and issues an Approved PA and ROD. The Approved PA and ROD therefore will identify the implementation decisions made in the plan that may be appealed to the Office of Hearing and Appeals.

Sincerely,

John R. Kalish

John R. Kalish
Field Manager

Attachment 1

Protest Regulations

[CITE: 43CFR1610.5-2]

TITLE 43--PUBLIC LANDS: INTERIOR
CHAPTER II--BUREAU OF LAND MANAGEMENT, DEPARTMENT OF THE INTERIOR
PART 1600--PLANNING, PROGRAMMING, BUDGETING--Table of Contents
Subpart 1610--Resource Management Planning
Sec. 1610.5-2 Protest procedures.

(a) Any person who participated in the planning process and has an interest which is or may be adversely affected by the approval or amendment of a resource management plan may protest such approval or amendment. A protest may raise only those issues which were submitted for the record during the planning process.

(1) The protest shall be in writing and shall be filed with the Director. The protest shall be filed within 30 days of the date the Environmental Protection Agency published the notice of receipt of the final environmental impact statement containing the plan or amendment in the Federal Register. For an amendment not requiring the preparation of an environmental impact statement, the protest shall be filed within 30 days of the publication of the notice of its effective date.

(2) The protest shall contain:

(i) The name, mailing address, telephone number and interest of the person filing the protest;
(ii) A statement of the issue or issues being protested;
(iii) A statement of the part or parts of the plan or amendment being protested;
(iv) A copy of all documents addressing the issue or issues that were submitted during the planning process by the protesting party or an indication of the date the issue or issues were discussed for the record; and
(v) A concise statement explaining why the State Director's decision is believed to be wrong.

(3) The Director shall promptly render a decision on the protest. The decision shall be in writing and shall set forth the reasons for the decision. The decision shall be sent to the protesting party by certified mail, return receipt requested.

(b) The decision of the Director shall be the final decision of the Department of the Interior.

Attachment 2

Resource Management Plan Protest
Critical Item Checklist

The following items *must* be included to constitute a valid protest whether using this optional format, or a narrative letter.
(43 CFR 1610.5-2)

BLM's practice is to make comments, including names and home addresses of respondents, available for public review. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, be advised that your entire comment--including your personal identifying information--may be made publicly available at any time. While you can ask us in your comment to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so. All submissions from organizations and businesses, and from individuals identifying themselves as representatives or officials of organizations and businesses, will be available for public inspection in their entirety.

Resource Management Plan (RMP) or Amendment (RMPA) being protested:

Name:
Address:
Phone Number: ( )

Your interest in filing this protest (how will you be adversely affected by the approval or amendment of this plan?):

Issue or issues being protested:

Statement of the part or parts of the plan being protested:

Attach copies of all documents addressing the issue(s) that were submitted during the planning process by the protesting party, <u>OR an indication of the date the issue(s) were discussed for the record</u>.
Date(s):

A concise statement explaining why the State Director's decision is believed to be wrong:

Palm Springs South Coast Field Office
Palen Solar Power Project
Plan Amendment/Final Environmental Impact Statement

Lead Agency: Bureau of Land Management (BLM)
Palm Springs / South Coast Field Office (PSSCFO)
Palm Springs, California

For further information, contact:
Allison Shaffer, Project Manager PSSCFO -
1201 Bird Center Drive, Palm Springs, CA 92262

Abstract

This Plan Amendment/Final Environmental Impact Statement (PA/FEIS) addresses two decisions by the United States Bureau of Land Management (BLM): the possible approval of an amendment to the *California Desert Conservation Area Plan* (CDCA Plan) to recognize the site of the proposed Palen Solar Power Project (PSPP); and the possible approval of a right-of-way (ROW) grant to Palen Solar I[1] for construction, operation and decommissioning of a solar electricity generation facility. The Agency Preferred Alternative is to grant the ROW to Palen Solar I for the PSPP, which covers approximately 4,365 acres, managed primarily by the BLM, and which would generate 500 megawatts (MW) of electricity. The PA/FEIS identifies impacts of the Agency Preferred Alternative, including impacts related to biological resources, cultural resources, land use, visual resources, and hydrology, water quality, and water use. Many of these adverse impacts can be avoided or substantially reduced based on compliance with applicable laws, ordinances, regulations and standards, and compliance with measures provided in this PA/FEIS.

Chapter 2 discusses the various alternatives analyzed by BLM, including: the proposed PSPP (500 MW requiring about 2,970 acres of disturbance within an approximately 5,200 acre ROW); Reconfigured Alternative 1 (500 MW on approximately 2,940 acres); Reconfigured Alternative 2 (500 MW on 4,402 acres or 500 MW on 4,330 acres, depending on whether Option 1 or Option 2 is developed); Reduced Acreage Alternative (375 MW on approximately 2,080 acres); the No Action Alternative (no ROW grant and no CDCA Plan Amendment); and two CDCA Plan Amendment/No Project Alternatives (amend the CDCA Plan for no solar/no ROW grant, and amend the CDCA Plan for solar energy development/no ROW grant, respectively). Chapter 3 describes the existing conditions on and in the vicinity of the project site. Chapter 4 describes the potential environmental consequences expected to result from each of the Alternatives, including the Agency Preferred Alternative. Chapter 5 describes consultation and coordination with federal, state, local, and non-governmental organizations as well as the BLM's responses to comments received on the Staff Assessment/Draft Environmental Impact Statement.

The Field Manager of the Palm Springs South Coast Field Office has the authority for site management of future activities related to the ROW grant and is the BLM Authorized Officer for this PA/FEIS.

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[1] Chevron Energy Solutions and Solar Millennium would be joint developers of the PSPP. Chevron Energy Solutions applied for the ROW grant for the PSPP. To facilitate the permitting of the project, the developers have requested that the BLM issue one ROW grant to a project-specific company. The company for PSPP is Palen Solar I, LLC a wholly owned subsidiary of Solar Millennium and the single Applicant for the PSPP.

Relationship to the Palen Solar Power Project Staff Assessment and Draft Environmental Impact Statement

In accordance with the National Environmental Policy Act (NEPA), Federal Land Policy and Management Act (FLPMA), and California Environmental Quality Act (CEQA), the Bureau of Land Management (BLM) and the California Energy Commission (CEC) cooperatively prepared a Staff Assessment (SA) and Draft Environmental Impact Statement (DEIS) as a joint environmental analysis (SA/DEIS) to evaluate environmental impacts of the right-of-way grant applied for on behalf of Palen Solar I[1] for the Palen Solar Power Project (PSPP) and proposed California Desert Conservation Area (CDCA) Plan Amendment for the project.

The SA/DEIS satisfies NEPA, FLPMA and CEQA requirements. However, the format of the SA/DEIS differs from the format typically used for EISs prepared by the BLM. Therefore, this Plan Amendment/Final EIS (PA/FEIS) has been prepared as a stand-alone document to provide the reader with a more familiar EIS format.

During this process, the Applicant provided information to the CEC (including, but not limited to, the Application for Certification, data responses and other related information) that informed best management practices, applicant proposed measures and mitigation measures that were included in the SA/DEIS. For purposes of this NEPA analysis, due to the evolution of such information throughout the environmental review process, measures initially proposed as "applicant proposed measures" are included as Mitigation Measures where applicable rather than as part of the Project Description.

The SA/DEIS provided the basis for the analysis certified by the California Energy Commission in its CEQA-specific Revised Staff Assessment (RSA) and also provides the basis for the analyses presented in this PA/FEIS. The following table correlates the applicable SA/DEIS chapters to the PA/FEIS chapters provided herein.

1 Chevron Energy Solutions and Solar Millennium are joint developers for the PSPP. Chevron Energy Solutions applied for the right-of-way grant and, to facilitate permitting, the developers have requested that the BLM issue one right-of-way grant to a project- specific company. The company for the PSPP is Palen Solar I, LLC, a wholly-owned subsidiary of Solar Millennium and the single Applicant for the PSPP.

PROPOSED PA/FEIS AND SA/DEIS CORRELATION CHART

PA/FEIS Chapter	SA/DEIS Chapter
Chapter 1 Introduction	A. Introduction
Chapter 2 Proposed Action and Alternatives	B. Description of the Proposed Project and Alternatives D.1 Facility Design D.3 Power Plant Efficiency D.4 Power Plant Reliability D.5 Transmission System Engineering E. General Conditions
Chapter 3: Affected Environment	
3.1 Introduction	C. Environmental Analysis
3.2 Air Resources	C.1 Air Quality
3.3 Global Climate Change	C.1 Air Quality
3.4 Cultural Resources	C.3 Cultural Resources and Native American Values
3.5 Environmental Justice	C.8 Socioeconomic and Environmental Justice
3.6 Lands and Realty	C.6 Land Use, Recreation, and Wilderness
3.7 Livestock and Grazing	Not applicable
3.8 Mineral Resources	D.2 Geology, Paleontology, and Minerals
3.9 Multiple Use Classes	C.6 Land Use, Recreation, and Wilderness
3.10 Noise	C.7 Noise and Vibration
3.11 Paleontological Resources	D.2 Geology, Paleontology, and Minerals
3.12 Public Health Safety	C.4 Hazardous Materials Management C.5 Health and Safety C.11 Transmission Line Safety and Nuisance C.13 Waste Management C.14 Worker Safety and Fire Protection
3.13 Recreation	C.6 Land Use, Recreation, and Wilderness
3.14 Social Economics	C.8 Socioeconomic and Environmental Justice
3.15 Soils Resources	C.9 Soil and Water Resources
3.16 Special Designations	C.6 Land Use, Recreation, and Wilderness
3.17 Transportation and Public Access – OHV	C.10 Traffic and Transportation
3.18 Vegetation Resources	C.2 Biological Resources
3.19 Visual Resources	C.12 Visual Resources
3.20 Water Resources	C.9 Soil and Water Resources
3.21 Wild Horse and Burros	Not applicable
3.22 Wildland and Fire Ecology	C.2 Biological Resources
3.23 Wildlife Resources	C.2 Biological Resources
Chapter 4 Environmental Consequence	C. Environmental Analysis
4.1 Introduction	Not applicable
4.2 Impacts on Air Resources	C.1 Air Quality

PROPOSED PA/FEIS AND SA/DEIS CORRELATION CHART (Continued)

PA/FEIS Chapter	SA/DEIS Chapter
4.3 Impacts to Global Climate Change	C.1 Air Quality
4.4 Impacts on Cultural Resources	C.3 Cultural Resources and Native American Values
4.5 Impacts on Environmental Justice	C.8 Socioeconomic and Environmental Justice
4.6 Impacts on Lands and Realty	C.6 Land Use, Recreation, and Wilderness
4.7 Impacts on Mineral Resources	D.2 Geology, Paleontology, and Minerals
4.8 Impacts on Multiple Use Classes	C.6 Land Use, Recreation, and Wilderness
4.9 Impacts on Noise	C.7 Noise and Vibration
4.10 Impacts on Paleontological Resources	D.2 Geology, Paleontology, and Minerals
4.11 Impacts on Public Health and Safety	C.4 Hazardous Materials Management C.5 Health and Safety C.11 Transmission Line Safety and Nuisance C.13 Waste Management C.14 Worker Safety and Fire Protection
4.12 Impacts on Recreation	C.6 Land Use, Recreation, and Wilderness
4.13 Social and Economic Impacts	C.8 Socioeconomic and Environmental Justice
4.14 Impacts on Soils Resources	C.9 Soil and Water Resources
4.15 Impacts on Special Designations	C.6 Land Use, Recreation, and Wilderness
4.16 Impacts on Transportation and Public Access - Off-Highway Vehicle Resources	C.10 Traffic and Transportation
4.17 Impacts on Vegetation Resources	C.2 Biological Resources
4.18 Impacts on Visual Resources	C.12 Visual Resources
4.19 Impacts on Water Resources	C.9 Soil and Water Resources
4.20 Impacts on Wildland and Fire Ecology	C.2 Biological Resources
4.21 Impacts on Wildlife Resources	C.2 Biological Resources C.14 Worker Safety and Fire Protection
Chapter 5 Consultation Coordination	F. List of Preparers

TABLE OF CONTENTS
Palen Solar Power Project PA/FEIS

Volume 1

Page

Volume 1 (continued)

Page

Volume 1 (continued)

List of Tables

Page

Volume 1 (continued)

List of Tables (continued)

Page

Volume 1 (continued)

List of Tables (continued)

Page

Volume 2 – Appendices

Page

Volume 2 – Appendices (continued)

Page

Volume 2 – Appendices (continued)

CHAPTER 3
Affected Environment

3.1 Introduction

The project site is located in the California inland desert, approximately 0.5 mile north of U.S. Interstate-10 (I-10) approximately 35 miles west of Blythe and approximately 10 miles east of Desert Center, in an unincorporated area of eastern Riverside County, California (see Figure 1-1).[1] The proposed project would consist of two adjacent, independent power block units (Units) of 250 MW nominal capacity each, for a total nominal capacity of 500 MW. A single-circuit 230 kilovolt (kV) overhead transmission line (gen-tie) would connect the project to the regional power grid at Southern California Edison's proposed Red Bluff Substation about 5 miles southwest of the project site. The Applicant has applied for a right-of-way (ROW) grant from BLM for approximately 5,200 acres of flat desert terrain. Acreage not disturbed by the proposed action within the requested ROW would not be part of the ROW grant.

Chapter 3 describes the environmental resources of BLM-administered lands in the action area that could be affected by implementation of the proposed action. Chapter 3 describes resources, resource uses, special designations, and other important topics (e.g., public health and safety, social and economic considerations, and environmental justice conditions) that may be impacted by the proposed action. "Resources" include air, soil, water, vegetation communities, wildlife, wildland fire ecology and management, as well as cultural, paleontological, and visual resources. "Resource uses" include livestock grazing management, minerals, recreation management, transportation and public access, and lands and realty. "Special designations" include, for example, areas of critical environmental concern (ACECs), wilderness areas (WAs), and back-country byways.

Information and data used to prepare this chapter were obtained from the CDCA Plan and various other BLM planning documents. Information and data also were collected from the RSA, SA/DEIS, and research publications prepared by various Federal and State agencies as well as by private sources pertaining to key resource conditions and resource uses found within the project area. The purpose of this chapter is to provide a description of affected resources and BLM program areas within the existing environment of the project area that will be used as a baseline to evaluate and assess the impact of the proposed action and alternatives described in Chapter 2, *Proposed Action and Alternatives*. Descriptions and analyses of the impacts themselves are presented in Chapter 4, *Environmental Consequences*.

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1 All figures referenced are included in Appendix A.

3.2 Air Quality

This section describes air quality conditions for criteria pollutants and the federal and state ambient air quality standards. A discussion regarding global climate change and greenhouse gases can be found in Section 3.3, *Global Climate Change*. The proposed project is within the Mojave Desert Air Basin (MDAB). Relatively high daytime temperatures; large variations in relative humidity; large and rapid diurnal temperature changes; occasional high winds; and sand, dust, and thunderstorms characterize the climate. The aridity of the region is influenced by a sub-tropical high-pressure system typically off the coast of California and topographical barriers that effectively block the flow of moisture to the region. The Colorado Desert experiences two rainy seasons per year. The first occurs during the winter; the second is the summer monsoon.

The monthly average high temperature in Desert Center is 104°F in July. The lowest average monthly temperature is 45°F in January and December (CEC RSA, 2010). Total rainfall in Desert Center averages just less than four inches per year with about 50 percent of the total rainfall occurring from December through March, and about 30 percent occurring during the August/ September summer monsoon season.

Wind data from the Blythe Airport for the years 2003 to 2007 indicate the highest annual wind direction frequencies are from the south through the southwest. Due to local topography, a more westerly wind direction is expected at the site. Calm conditions occur approximately 17 percent of the time, with the annual average wind speed approximately 8.5 miles per hour (mph) (CEC RSA, 2010). Mixing heights in the area, which represent the altitudes where different air masses mix together, are estimated to be on average 230 feet (70 meters) in the morning to as high as 5,250 feet (1,600 meters) above ground level in the afternoon.

3.2.1 Ambient Air Quality

The Federal Clean Air Act and the California Clean Air Act both require the establishment of standards for ambient concentrations of criteria air pollutants for ozone, NO_2, CO, sulfur dioxide (SO_2), particulate matter (i.e., PM10, PM2.5), and lead, called Ambient Air Quality Standards (AAQS). These pollutants are called “criteria” air pollutants because standards have been established for each of them to meet specific public health and welfare criteria. The state standards, established by the California Air Resources Board, typically are more protective than the federal standards, which are established by the United States Environmental Protection Agency (EPA). Federal and state air quality standards are listed in Table 3.2-1. The times over which the various air quality standards are measured range from one hour to an annual average. The standards are read as a concentration, in parts per million (ppm), or as a weighted mass of material per a volume of air, in milligrams or micrograms of pollutant in a cubic meter of air (mg/m^3 or $\mu g/m^3$, respectively).

Currently, the ambient air quality within the MDAB is classified in the nonattainment category for state ozone and fugitive dust particulate matter less than 10 micrometers in diameter (PM10) criteria. According to the Northern & Eastern Colorado Desert Coordinated Management Plan,

TABLE 3.2-1
FEDERAL AND STATE AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	Federal Standard	California Standard
Ozone (O_3)	8 Hour	0.075 ppm[a] (147 μg/m^3)	0.070 ppm (137 μg/m^3)
	1 Hour	—	0.09 ppm (180 μg/m^3)
Carbon Monoxide (CO)	8 Hour	9 ppm (10 mg/m^3)	9.0 ppm (10 mg/m^3)
	1 Hour	35 ppm (40 mg/m^3)	20 ppm (23 mg/m^3)
Nitrogen Dioxide (NO_2)	Annual	0.053 ppm (100 μg/m^3)	0.03 ppm (57 μg/m^3)
	1 Hour	0.100 ppm[b]	0.18 ppm (339 μg/m^3)
Sulfur Dioxide (SO_2)	Annual		—
	24 Hour		0.04 ppm (105 μg/m^3)
	3 Hour	0.5 ppm (1300 μg/m^3)	—
	1 Hour	0.075 ppm (195 μg/m^3)	0.25 ppm (655 μg/m^3)
Particulate Matter (PM10)	Annual	—	20 μg/m^3
	24 Hour	150 μg/m^3	50 μg/m^3
Fine Particulate Matter (PM2.5)	Annual	15 μg/m^3	12 μg/m^3
	24 Hour	35 μg/m^3	—
Sulfates (SO_4)	24 Hour	—	25 μg/m^3
Lead	30 Day Average	—	1.5 μg/m^3
	Rolling 3-Month Average	0.15 μg/m^3	—
	Calendar Quarter	1.5 μg/m^3	—
Hydrogen Sulfide (H_2S)	1 Hour	—	0.03 ppm (42 μg/m^3)
Vinyl Chloride (chloroethene)	24 Hour	—	0.01 ppm (26 μg/m^3)
Visibility Reducing Particulates	8 Hour	—	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.

NOTES:

[a] The 2008 standard is shown above, but as of January 19, 2010 this standard is being reconsidered for revision to between 0.060 and 0.070 ppm. The 1997 8-hour standard is 0.08 ppm.

[b] The U.S. EPA is in the process of implementing this new standard, which became effective April 12, 2010. This standard is based on the 3-year average of the 98th percentile of the yearly distribution of 1-hour daily maximum concentrations.

SOURCES: CEC RSA, 2010 (Air Quality Table 2); CEC Commission Decision (Air Quality Table 1); Federal Register, Vol. 75, No. 11, page 2938.

the ozone standard is exceeded due to long distance transport of pollutants from the Los Angeles Basin, while the PM10 standard is due to natural sources found in a desert environment and various land uses. These uses include off-highway vehicle use, mining, and livestock grazing.

In general, an area is designated as attainment if the concentration of a particular air contaminant does not exceed the standard. Likewise, an area is designated as non-attainment for an air contaminant if that contaminant standard is violated. In circumstances where there is not enough ambient data available to support designation as either attainment or non-attainment, the area can be designated as unclassified. An unclassified area is normally treated by the U.S. EPA the same as an attainment area for regulatory purposes. An area could be attainment for one air contaminant while non-attainment for another, or attainment for the federal standard and non-attainment for the state standard for the same air contaminant.

The project site is within the jurisdiction of the South Coast Air Quality Management District (SCAQMD), which more generally includes the counties of Riverside, San Bernardino, Orange and Los Angeles. The Riverside County portion of the MDAB is designated as non-attainment for the state ozone and PM10 standards. This area is designated as attainment or unclassified for all federal criteria pollutant ambient air quality standards and the state CO, NO_2, SO_2, and particulate matter less than 2.5 micrometers in diameter (PM2.5) standards. Table 3.2-2 summarizes the site area's attainment status for various applicable federal and state standards.

TABLE 3.2-2
FEDERAL AND STATE ATTAINMENT STATUS
PROJECT SITE AREA WITHIN THE MDAB PORTION OF RIVERSIDE COUNTY

Pollutant	Attainment Status[a]	
	Federal	State
Ozone	Attainment[b]	Nonattainment
CO	Attainment	Attainment
NO_2	Attainment[c]	Attainment
SO_2	Attainment	Attainment
PM10	Attainment[b]	Nonattainment
PM2.5	Attainment	Attainment

NOTES:
[a] Attainment = Attainment or Unclassified, where Unclassified is treated the same as Attainment for regulatory purposes.
[b] Attainment status for the site area only, not the entire MDAB.
[c] Nitrogen dioxide attainment status for the new federal 1-hour NO_2 standard is scheduled to be determined by January 2012.

SOURCES: CEC RSA, 2010 (Air Quality Table 3); CEC Commission Decision, 2010 (Air Quality Table 2)

Ambient air quality monitoring data for ozone, PM10, PM2.5, CO, NO_2, and SO_2, compared to most restrictive applicable standards for the years between 2004 through 2009 at the most representative monitoring stations for each pollutant, are shown in Table 3.2-3; and the 1-hour and 8-hour ozone, and 24-hour PM10 and PM2.5 data for the years 1999 through 2009 (2008 for PM10 and PM2.5), collectively “1998-2009 Historical Ozone and PM Air Quality Data,” are shown in Inset 3.2-1, below. Ozone data are from the Blythe-445 West Murphy Street monitoring station, PM10, PM2.5, NO_2, and CO data are from the Palm Springs Fire Station monitoring station, and SO_2 data are from the Victorville-14306 Park Avenue monitoring station.

3.2.2 Ozone

Ozone is not directly emitted from stationary or mobile sources, but is formed as the result of chemical reactions in the atmosphere between directly emitted nitrogen oxides (NOx) and hydrocarbons (Volatile Organic Compounds [VOCs]) in the presence of sunlight. Pollutant

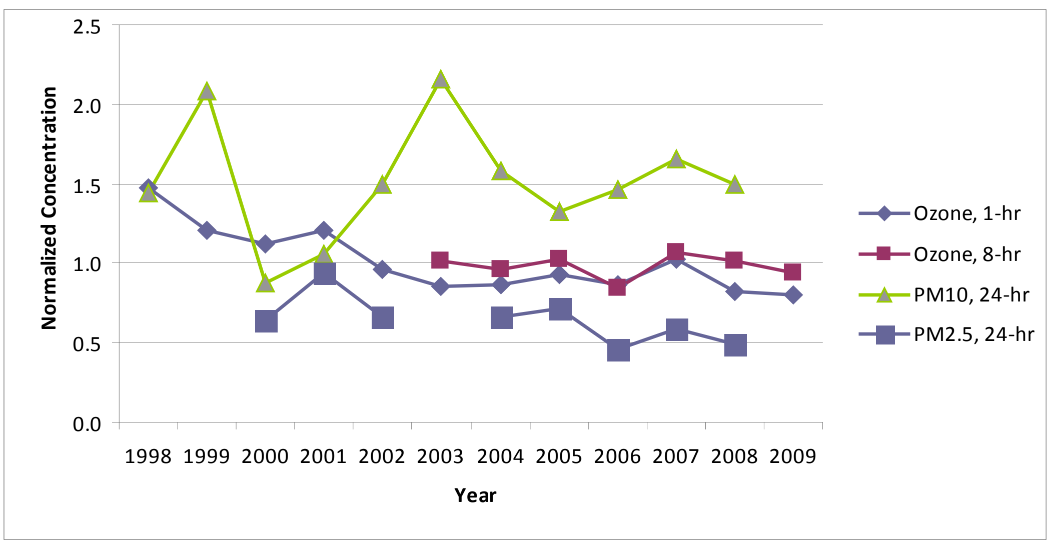
TABLE 3.2-3
CRITERIA POLLUTANT SUMMARY MAXIMUM AMBIENT CONCENTRATIONS (PPM OR µG/M³)

Pollutant	Averaging Period	Units	2004	2005	2006	2007	2008	2009	Limiting AAQS[c]
Ozone	1 hour	ppm	0.078	0.084	0.078	0.092	0.074	0.072	0.09
Ozone	8 hours	ppm	0.067	0.072	0.059	0.075	0.071	0.066	0.07
PM10 [a,b]	24 hours	µg/m³	79	66	73	83	75	--	50
PM10 [a,b]	Annual	µg/m³	26.4	25.9	24.5	30.5	23.2	--	20
PM2.5 [a]	24 hours	µg/m³	23.3	25	15.9	20.5	17.1	--	35
PM2.5 [a]	Annual	µg/m³	9.0	8.4	7.7	8.7	7.2	--	12
CO	1 hour	ppm	2.1	2.1	2.3	1.5	1.3	2.3	20
CO	8 hours	ppm	0.8	0.8	0.85	0.79	0.54	0.67	9.0
NO_2	1 hour	ppm	0.066	0.059	0.093	0.063	0.049	0.048	0.18
NO_2	Annual	ppm	0.013	0.012	0.01	0.01	0.009	0.008	0.03
SO_2	1 hour	ppm	0.011	0.012	0.018	0.009	0.006	0.028	0.25
SO_2	3 hour	ppm	0.007	0.008	0.012	0.005	0.006	0.006	0.5
SO_2	24 hours	ppm	0.003	0.003	0.005	0.005	0.002	0.005	0.04
SO_2	Annual	ppm	0.0013	0.0013	0.0015	0.0013	0.0011	0.000	0.03

NOTES:
[a] Exceptional PM concentration events, such as those caused by wind storms are not shown where excluded by U.S.EPA; however, some exceptional events may still be included in the data presented.
[b] The PM10 data source is in the Coachella Valley that is classified as a serious PM10 nonattainment area.
[c] The limiting AAQS is the most stringent of the CAAQS or NAAQS for that pollutant and averaging period.

SOURCE: CEC RSA, 2010 (Table 4)

INSET 3.2-1
1998-2009 HISTORICAL OZONE AND PM AIR QUALITY DATA
BLYTHE AND PALM SPRINGS MONITORING STATIONS, RIVERSIDE COUNTY[a,b,c]



NOTES:
a The highest measured ambient concentrations of various criteria air contaminants were divided by their applicable standard and provided as a graphical point. Any point on the chart that is greater than one means that the measured concentrations of such air contaminant exceed the standard, and any point that is less than one means that the respective standard is not exceeded for that year. For example the 24-hour PM10 concentration in 2008 is 75 µg/m³/50 µg/m³ standard = 1.5.
b All ozone data are from Blythe–445 West Murphy Street monitoring station. 8-hr ozone data were not available for this station before 2003.
c All PM data are from Palm Springs monitoring station. 24-hr PM2.5 data were not available for this station before 2000 and between 2002 and 2004 and no PM data were available after 2008.

SOURCE: CEC RSA, 2010 (Figure 1)

transport from the Los Angeles area of the South Coast Air Basin is one source of the pollution experienced in the eastern Riverside County portion of the MDAB (SCAQMD 2007 as cited in the CEC RSA, 2010).

The 1-hour and 8-hour ozone concentrations measured at the eastern border of Riverside County have been very slowly decreasing over time. The collected air quality data (not shown) indicate that the ozone violations occurred primarily during the sunny and hot periods typical during May through September. The ozone concentrations in the project area have exceeded state ambient air quality standards.

High ozone concentrations can aggravate respiratory and cardiovascular diseases, irritate eyes, impair cardiopulmonary function, and cause leaf damage.

3.2.3 Nitrogen Dioxide

The entire MDAB is classified as attainment for the state 1-hour and annual and federal annual NO_2 standards. The nitrogen dioxide attainment standard could change due to the new federal 1-hour standard, although a review of the air basin-wide monitoring data suggest this would not occur for the MDAB.

Approximately 90 percent of the NOx emitted from combustion sources is nitric oxide (NO), while the balance is NO_2. NO is oxidized in the atmosphere to NO_2, but some level of photochemical activity is needed for this conversion. The highest concentrations of NO_2 typically occur during the fall. The winter atmospheric conditions can trap emissions near the ground level, but lacking substantial photochemical activity (sun light), NO_2 levels are relatively low. In the summer the conversion rates of NO to NO_2 are high, but the relatively high temperatures and windy conditions disperse pollutants, preventing the accumulation of NO_2. The NO_2 concentrations in the project area are well below the state and federal ambient air quality standards.

NO_2 can aggravate respiratory diseases, reduce visibility, reduce plant growth, and form acid rain.

3.2.4 Carbon Monoxide

MDAB is classified as attainment for the state and federal 1-hour and 8-hour CO standards. The highest concentrations of CO occur when low wind speeds and a stable atmosphere trap the pollution emitted at or near ground level. These conditions occur frequently in the wintertime late in the afternoon, persist during the night and may extend one or two hours after sunrise. The project area has a lack of significant mobile source emissions and has CO concentrations that are well below the state and federal ambient air quality standards.

CO reduces tolerance from exercise can, cause impairment of mental function, cause impairment of fetal development, aggravate some heart dieses (angina), and cause death at high levels of exposure.

3.2.5 Particulate Matter (PM10) and Fine Particulate Matter (PM2.5)

PM10 can be emitted directly or it can be formed many miles downwind from emission sources when various precursor pollutants interact in the atmosphere.

MDAB is classified as non-attainment for state PM10 standards and unclassified for the federal PM10 standard. Table 3.2-3 and Inset 3.2-1 show recent PM10/PM2.5 concentrations. The figures show fluctuating concentrations patterns, and show clear exceedances of the state 24-hour PM10 standard. It should be noted that exceedance does not necessarily mean violation or nonattainment, as exceptional events do occur and some of those events, which do not count as violations, may be included in the data. The MDAB is designated as nonattainment for the state PM10 standard.

Fine particulate matter, or PM2.5, is derived mainly either from the combustion of materials, or from precursor gases (SOx, NOx, and VOC) through complex reactions in the atmosphere. PM2.5 consists mostly of sulfates, nitrates, ammonium, elemental carbon, and a small portion of organic and inorganic compounds.

The entire MDAB is classified as attainment for the federal standard and, in the project area, is designated unclassified for the state PM2.5 standards. This divergence in the PM10 and PM2.5 concentration levels and attainment status indicates that a substantial fraction of the ambient particulate matter levels are most likely due to localized fugitive dust sources, such as vehicle travel on unpaved roads, agricultural operations, or wind-blown dust.[1]

Particulate matter can aggravate respiratory diseases, can result in reduced lung function, it can increase cause and chest discomfort, causes reduced visibility.

3.2.6 Sulfur Dioxide

The entire air basin is classified as attainment for the state and federal SO_2 standards.

Sulfur dioxide is typically emitted as a result of the combustion of a fuel containing sulfur. Sources of SO_2 emissions within the MDAB come from a wide variety of fuels: gaseous, liquid and solid; however, the total SO_2 emissions within the eastern MDAB are limited due to the limited number of major stationary sources and California's and U.S. EPA's substantial reduction in motor vehicle fuel sulfur content. The project area's SO_2 concentrations are well below the state and federal ambient air quality standards.

1 Fugitive dust, unlike combustion source particulate and secondary particulate, is composed of a much higher fraction of larger particles than smaller particles, so the PM2.5 fraction of fugitive dust is much smaller than the PM10 fraction. Therefore, when PM10 ambient concentrations are significantly higher than PM2.5 ambient concentrations this tends to indicate that a large proportion of the PM10 are from fugitive dust emission sources, rather than from combustion particulate or secondary particulate emission sources.

SO_2 can irritate the upper respiratory tract and be injurious to lung tissue causing reduced lung function, including asthma and emphysema. SO_2 can cause plant leaves to be yellow, and be destructive to metals, textiles, leather, finishes, and coatings. SO_2 can limit visibility.

3.3 Global Climate Change

3.3.1 Greenhouse Gases and Climate Change

Climate change refers to any significant change in measures of climate (temperature, precipitation, or wind) that lasts for an extended period (e.g., decades or longer). A number of factors may affect climate change, including: natural cycles (e.g., changes in the sun's intensity or earth's orbit around the sun): natural processes within the climate system (e.g., changes in ocean circulation); and human activities that lead to changes the atmosphere's composition (e.g., burning fossil fuels), land surface (e.g., deforestation, reforestation, urbanization, and desertification), and water bodies (oceanic acidification, sea level rise, and formation of dry lakes).

California is a substantial contributor to global GHG emissions as it is the second largest contributor in the U.S. and the 16th largest in the world (CEC Genesis RSA, 2010). GHGs include:

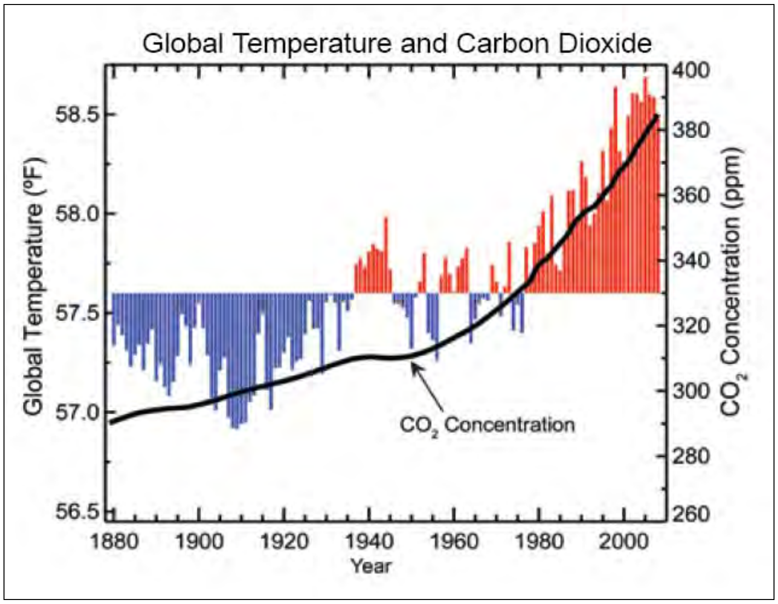
1. Carbon dioxide (CO2)
2. Methane (CH4)
3. Mono-nitrogen oxides (NOx)
4. Hydrofluorocarbons (HFCs)
5. Perfluorocarbons (PFCs)
6. Sulfur hexafluoride (SF6)

Electricity generation can produce GHGs comprised of the criteria air pollutants that traditionally have been regulated under the federal and state Clean Air Acts. For fossil fuel-fired power plants, the GHG emissions include primarily carbon dioxide, with much smaller amounts of nitrous oxide (N_2O), and methane (often from unburned natural gas). Other sources of GHG emissions include sulfur hexafluoride (SF_6) from high voltage equipment and hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) from refrigeration/chiller equipment. GHG emissions from the electricity sector are dominated by CO_2 emissions from carbon-based fuels. Other sources of GHG emissions are small and also are more likely to be easily controlled or reused or recycled, but are nevertheless documented here as some of the compounds have very high global warming potentials.

According to the Intergovernmental Panel on Climate Change (IPCC) Third Assessment Report, increased atmospheric levels of CO_2 correlate with rising temperatures; concentrations of CO_2 have increased by 31 percent above pre-industrial levels since 1750 (Inset 3.3-1). Climate models show that temperatures will probably increase by 1.4 degrees Celsius (°C) to 5.8 °C between 1990 and 2100. Much uncertainty in this increase results from not knowing future CO_2 emissions and inherent uncertainty in the assumptions that frame climate models. The IPCC concluded in a statement released February 2, 2007, that "the widespread warming of the atmosphere and ocean, together with ice-mass loss, support the conclusion that it is extremely unlikely that global climate change of the past 50 years can be explained without external forcing, and very likely that it is not due to known natural causes alone" (IPCC, 2007).

GWP is a measure of how much a given mass of greenhouse gas is estimated to contribute to global warming and is devised to enable comparison of the warming effects of different gases. It is a relative scale that compares the gas in question to that of the same mass of CO_2. CO_2 equivalence (CO_2e) is a measure used to compare the emissions from various GHGs based on

INSET 3.3-1
RELATIONSHIP BETWEEN
GLOBAL TEMPERATURE AND CARBON DIOXIDE (IPCCD 2007)



their GWP, when measured over a specified timescale (generally 100 years). CO_2e is commonly expressed as million metric tons (MMT) of carbon dioxide equivalents ($MMTCO_2e$). The CO_2e for a gas is obtained by multiplying the mass (in tons) by the GWP of the gas. For example, the GWP for CH_4 over 100 years is 25. This means that the emission of one MMT of CH_4 is equivalent to the emission of 25 MMT of CO_2, or 25 $MMTCO_2e$.

3.3.2 EPA Regulatory Initiatives on Greenhouse Gases

On April 2, 2007, in *Massachusetts v. EPA*, 549 U.S. 497 (2007), the U.S. Supreme Court found that greenhouse gases (GHGs)[1] are air pollutants under the federal Clean Air Act. The Court held that the EPA must determine whether emissions of GHGs from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. These decisions require the EPA to follow the language of Section 202(a) of the CAA. The Supreme Court decision resulted from a petition for rulemaking under Section 202(a) filed by more than a dozen environmental and renewable energy organizations and other entities (CEC RSA, 2010).

After a thorough examination of the scientific evidence on the causes and effects of current and future climate change, as well as other effects of GHGs, the EPA concluded that the science compellingly supports a positive endangerment finding for both public health and welfare. The EPA relied heavily upon the major findings and conclusions from recent assessments of the U.S. Climate Change Science Program and the Intergovernmental Panel on Climate Change. The

1 The terms greenhouse gases (GHG) and global climate change (GCC) gases are related. Global climate change is the result of GHGs, or air emissions with global warming potentials and affect the global energy balance, and the climate of the planet. GHGs inherently are a cumulative impacts issue, and are discussed as a cumulative impact in this EIS.

EPA made this endangerment finding after considering both observed and projected future effects of climate change, key uncertainties, and the full range of risks and effects to public health and welfare occurring within the United States (EPA, 2009d; EPA, 2009e; EPA, 2009f).

In response, the EPA issued a final rule on May 13, 2010 to apply Prevention of Significant Deterioration (PSD) requirements to new facilities whose carbon dioxide-equivalent emissions exceed 100,000 tons per year (EPA, 2010). The GHG emissions for the project are expected to fall below this amount. Moreover, GHG reductions will be realized from this project. Electrical power generated by the project would be accepted onto the power grid with priority over electrical power generated from fossil based power plants. Therefore, during operations when the PSPP is actively generating electricity, the project would effectively displace a portion of existing fossil fuel-based energy generation with renewable energy generation, and net GHG production would be reduced. See Section 4.3, *Impacts on Global Climate Change,* for GHG emissions and reductions associated with the proposed action and alternative actions.

In addition to the new PSD requirements, on September 22, 2009, the EPA issued the Final Mandatory Reporting of Greenhouse Gases Rule. Under this rule, suppliers of fossil fuels or industrial GHG, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions are required to submit annual reports to the EPA. The gases covered by the proposed rule are carbon dioxide ($CO_{2)}$, methane ($CH_{4)}$, nitrogen dioxide (N_2O), hydrofluorocarbons (HFC)s, perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and other fluorinated gases, including nitrogen trifluoride (NF_3)and hydrofluorinated ethers (HFEs) (CEC Genesis RSA, 2009). Thus, facilities classified as general stationary fuel combustion sources, including electricity services (North American Industry Classification System [NAICS] Code 221) must report emissions if annual rates equal or exceed 25,000 metric tons of GHG. However, the rule does not set specific reporting requirements for electric power generation from solar resources (NAICS Code 221119).

3.3.3 Other Federal and Major International Guidance on Greenhouse Gases and Climate Change

From the White House, Executive Order (EO) No. 13514 Federal Leadership in Environmental, Energy, and Economic Performance expands national efforts to reduce GHG emissions and establishes environmental performance requirements for Federal agencies identified in EO No. 13423 Federal Leadership in Environmental, Energy, and Economic Performance. EO No. 13514 integrates a strategy for sustainability into the Federal Government and makes reduction of GHG emissions a priority for Federal agencies.

From the Department of the Interior (DOI), Secretarial Orders 3226 (Climate Change and the Department of Interior, as amended) and 3285 (Renewable Energy Development by the Department of Interior) direct bureaus and offices within the Department to respond in a timely manner to climate change issues and make development of renewable energy a priority. On September 14, 2009, Secretary of the Interior, Ken Salazar, issued Order No. 3289(Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources). The Order establishes an approach for increasing understanding of climate change and responding to impacts related to climate change pertaining to tribes and to the natural and cultural resources that the DOI manages. The document specifically identifies potential impacts such as potential changes in flood risk and water supply, sea level rise, changes in wildlife and habitat populations and their migration patterns, new invasions of exotic species and increased threat of wildland fire. The Order includes Climate Change Response Planning Requirements, which require each bureau and office within the DOI (including the BLM) to consider and analyze potential climate change impacts when undertaking long-range planning exercises, setting priorities for scientific research and investigations, developing multi-year management plans, and making major decisions regarding potential use of resources under the DOI's purview.

3.3.4 California State Guidance on Greenhouse Gases and Climate Change

The State of California has addressed global climate change, through regulatory and other actions taken by the California Energy Commission (CEC), the California Air Resources Board (CARB), the Legislature, and the Governor. For example, in 1998, the CEC identified a range of strategies to prepare for an uncertain climate future, including a need to account for the environmental impacts associated with energy production, planning, and procurement (CEC Genesis RSA, 2010). In 2003, the CEC recommended that the state require applicants to report GHG emissions as a condition of state licensing of new electric generating facilities (CEC Genesis RSA, 2010). In 2005, Governor Schwarzenegger issued Executive Order S-3-05, which established a goal of reducing GHG emissions 80 percent below 1990 levels by 2050.

In 2006, California enacted the California Global Warming Solutions Act of 2006 (AB 32). AB 32 mandates that the state report and verify its GHG emissions to document reduced GHG emissions statewide to 1990 levels by the year 2020. To facilitate this, CARB is required to adopt a statewide emissions limit, adopt regulations to reduce the amount of GHG emissions, and monitor compliance. CARB is the lead agency for implementing AB 32, which set the major milestones for establishing the program.

Although CO_2 is the largest contributor to climate change, AB 32 references five additional GHGs: CH_4, N_2O, SF_6, HFCs, and PFCs. Key elements of California's recommendations for reducing its GHG emissions to 1990 levels by 2020 include the following:

1. Setting targets for transportation-related GHG emissions for regions throughout California and pursuing policies and incentives to achieve those targets;
2. Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard;
3. Imposing targeted fees on high global warming potential (GWP) gases;
4. Implementing additional measures to address emissions from industrial sources. These proposed measures would regulate fugitive emissions from oil and gas recovery and transmission activities; and

5. Imposing a high GWP mitigation fee to promote the development of alternatives to GWP chemicals and improve recycling and removal of these substances when older units containing them are dismantled.

In recognition of the critical role that local governments will play in the successful implementation of AB 32, CARB recommended a GHG reduction goal for local governments of 15 percent below current levels by 2020 to ensure that their municipal and community-wide emissions match the state's reduction target. AB 32 establishes a comprehensive program of regulatory and market mechanisms to achieve real, quantifiable, cost-effective reductions of GHGs. It also makes CARB responsible for monitoring and reducing GHG emissions and continues the existing Climate Action Team to coordinate statewide efforts. Additional requirements for CARB include the following:

1. Establishing a statewide GHG emissions cap for 2020 based on 1990 emissions;

2. Adopting mandatory reporting rules for significant sources of GHGs;

3. Adopting a plan that indicates how emission reductions would be achieved from significant GHG sources via regulations, market mechanisms, and other actions;

4. Adopting regulations to achieve the maximum technologically feasible and cost-effective reductions in GHGs, including provisions for using both market mechanisms and alternative compliance mechanisms;

5. Convening an Environmental Justice Advisory Committee and an Economic and Technology Advancement Advisory Committee to advise CARB;

6. Evaluating several factors prior to imposing any mandates or authorizing market mechanisms, including, but not limited to, impacts on California's economy, the environment, and public health; equity between regulated entities; electricity reliability and conformance with other environmental laws, as well as ensuring that the rules do not disproportionately impact low-income communities;

7. Adopting a list of discrete, early action measures to be implemented before January 1, 2010; and

8. Ensuring public notice and opportunity for comment on all CARB actions.

The CARB adopted early action GHG reduction measures in October 2007, mandatory reporting requirements and the 2020 statewide limit in December 2007,[2] and a Statewide scoping plan in December 2008 to identify how emission reductions will be achieved from major sources of GHG via regulations, market mechanisms, and other actions. CARB staff is developing regulatory language to implement its plan and holds ongoing public workshops on key elements of the recommended GHG reduction measures, including market mechanisms (See, e.g., CARB, 2010). The regulations must be effective by January 1, 2011 and mandatory compliance is to commence on January 1, 2012. The mandatory reporting requirements are effective for electric generating

2 The 1990 emissions level, and thus the 2020 emissions limit, adopted by ARB is 427 million metric tonnes of carbon dioxide equivalent (MMTCO2e).

facilities with a nameplate capacity equal or greater than 1 megawatt (MW) if their emissions exceed 2,500 metric tons (MT) per year.

In addition, the Climate Change Scoping Plan, the state's roadmap to reaching GHG reduction goals, considers the following key strategies[3]:

1. **Cap-and-Trade Program:** Broad-based to provide a firm limit on emissions; covers 85 percent of California's emissions: electricity generation, large industrial sources, transportation fuels, and residential and commercial use of natural gas, and provides regional linkage with the Western Climate Initiative, allowing greater environmental and economic benefits.

2. **Transportation:** GHG emission standards for cars, low-carbon fuel standard (10 percent by 2020), better land-use planning (Senate Bill 375), and more efficient delivery trucks, heavy-duty trucks, and goods movement.

3. **Electricity and Energy (imported included):** Improved appliance efficiency standards and other aggressive energy efficiency measures, 33 percent renewables by 2020, increased use of efficient "combined heat and power", million solar roofs, solar hot water heating, green buildings, and water efficiency.

4. **Industry (including cement):** Audit of the 800 largest emission sources in California to identify GHG reduction opportunities; regulations on refinery flaring and fugitive emissions; considerations for cement to address "leakage."

5. **High GWP Gases:** Capture refrigerants and other high GWP gases already in use; reduce future impact through leak-resistant equipment, restrictions on use, and fees.

6. **Forestry:** Preserve forest sequestration and voluntary reductions possible from forestry projects.

7. **Agriculture:** More efficient agricultural equipment, fuel use, and water use through transportation and energy measures; reductions from manure digesters; fewer impacts on productivity of crops and livestock.

8. **Waste and Recycling:** Reduce CH_4 emissions from landfills and move toward high recycling and zero waste.

Also in 2006, the State enacted SB 1368 (Public Utilities Code Section 8340 *et seq*.), which limits California utilities' long-term investments in base load[4] generation to power plants that meet an emissions performance standard (EPS) of 0.500 MT CO_2 per megawatt-hour (1,100 pounds CO_2/MWh). The EPS applies only to carbon dioxide; it does not apply to emissions of other GHGs converted to carbon dioxide equivalent. The Energy Commission and the California Public Utilities Commission (CPUC) jointly established the EPS, which applies to base load power from new power plants, new investments in existing power plants, and new or renewed contracts with

[3] The status of the Climate Change Scoping Plan is currently under question as a result of a Superior Court decision in *Association of Irritated Residents, et al. v. California Air Resources Board* (January 24, 2010). Herein, the court enjoined implementation of the plan because the CARB had adopted it without compliance with CEQA. Additional appeal by the CARB is anticipated.

[4] *Base load* units are defined as units that operate at a capacity factor higher than 60 percent.

terms of five years or more, including contracts with power plants located outside of California.[5] If a project, in-State or out-of-State, plans to sell base load electricity to a California utility, the utility will have to demonstrate that the project meets the EPS. As a renewable electricity generating facility, the project is determined by rule to be compliant with the SB 1368 EPS.[6]

South Coast Air Quality Management District

The South Coast Air Quality Management District (SCAQMD) adopted, in December, 2008, its *Interim CEQA GHG Significance Threshold for Stationary Sources, Rules, and Plans* (Interim Threshold), in order to provide a structure for determining level of impact significance for proposed projects that would result in GHG emissions. The Interim Threshold includes a policy objective to capture 90% of district-wide GHG emissions from industrial sources, and indicates a GHG emissions threshold of 10,000 megatons CO_2e/yr including construction emissions amortized over 30 years, as a significance threshold for GHG emissions (SCAQMD, 2008). Following adoption of the Interim Threshold, additional meetings of the working group charged with producing the Interim Threshold have been ongoing. At the time of publication for this report, finalized threshold values had not yet been adopted by the SCAQMD.

3.3.5 Potential Effects of Climate Change

In November 2004, the California Climate Action Team (CAT) was formed, comprising 14 agencies and 11 subgroups to assist CARB with the Climate Change Scoping Plan. According to the 2006 California CAT Report, the following climate change effects, based on the IPCC trends, can be expected in California over the next century:

1. Increasing temperatures from 0.5 °F to 5.8 °F under the higher emission scenarios, leading to a 25 percent to 35 percent increase in the number of days ozone pollution levels are exceeded in most urban areas;
2. Increased electricity demand, particularly in the hot summer months.
3. Increased vulnerability of forests due to pest infestation and increased temperatures; and
4. A diminishing Sierra snowpack, declining by 70 to 90 percent, threatening the State's water supply;

In addition to these anticipated trends, several additional potential effects of climate change have been identified in recent literature, that are potentially relevant to the project. These include:

1. Changes in flooding regimes and drought, potentially including more frequent extreme weather conditions, such as floods and droughts;
2. Changes in weather patterns that could result in altered drainage patterns and/or increases in erosion and sedimentation;
3. Changes in the availability of water resources to support beneficial use;

5 CPUC 2007
6 See Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903(b)(1).

4. Changes in the distribution of biological species and/or habitats;
5. Increases in wildfire risk and heat waves, which could affect worker safety; and
6. Changes in soil moisture content, including potential for increases in fugitive dust emissions.

Potential effects of climate change, as specifically relevant to the project site and/or its vicinity, are discussed in Section 4.3, *Impacts on Global Climate Change*.

3.3.6 Existing Greenhouse Gas Emissions

Statewide GHG Emission Inventory

Statewide emissions of GHG from relevant source categories in 1990 and later years are summarized in Table 3.3-1. Specific contributions from air basins such as the Mojave Desert Air Basin (MDAB) are not currently specified as part of the State inventory. Emissions of CO_2 occur largely from combustion of fossil fuels. The major categories of fossil fuel combustion CO_2 sources can be broken into sectors for residential, commercial, industrial, transportation, and electricity generation. Other GHG emissions, such as CH_4 and N_2O, are also tracked by State inventories but occur in much smaller quantities.

TABLE 3.3-1
CALIFORNIA GREENHOUSE GAS EMISSIONS (MMTCO$_2$E)

Emission Inventory Category	1990	2000	2001	2002	2003	2004	2005
Residential Fuel Combustion (CO_2)	29.7	30.25	27.21	27.32	26.40	27.86	--
Commercial Fuel Combustion (CO_2)	14.4	15.63	12.04	17.84	15.06	12.1	--
Industrial Fuel Combustion (CO_2)	103.0	76.17	80.48	71.53	65.47	67.2	--
Transportation Fuel Combustion (CO_2)	150.7	181.68	182.49	190.19	180.64	187.95	--
Electricity Generation, in-State (CO_2)	49.0	55.87	61.35	47.78	45.92	55.10	49.0
Methane (all CH_4 shown as CO_2e)	--	26.32	26.62	27.07	27.49	27.80	--
Nitrous Oxide (all N_2O shown as CO_2e)	--	31.43	30.76	34.48	33.85	33.34	--
Electricity Transmission and Distribution (SF_6 shown as CO_2e)	2.6	1.14	1.10	1.04	1.01	1.02	--
Total California GHG Emissions without Electricity Imports	**371.1**	**440.47**	**446.35**	**444.86**	**423.20**	439.19	--
Electricity Imports (CO_2e)	61.6	40.48	47.37	51.73	56.44	60.81	--
Total California GHG Emissions with Electricity Imports	**433.29**	**480.94**	**493.72**	**496.59**	**479.64**	500.00	--

SOURCE: CEC Genesis RSA, 2010

3.3.7 Existing GHG Emissions Occurring at the Project Site

No industrial, residential, or other emitters of carbon dioxide are currently located or operating at the project site. There are no other existing on-site operations that result in the combustion of fossil fuel, or otherwise result in direct anthropogenic emissions of carbon dioxide on site. There is, however, existing vegetation located on site, and this vegetation is expected to provide ongoing natural carbon uptake. Wohlfahrt et al (2008 as cited in the CEC RSA, 2010) completed an evaluation of carbon uptake by natural vegetation in Mojave Desert systems. The study indicates that desert plant communities may result in the uptake of carbon in amounts as high as 100 grams per square meter per year. This would equate to a natural carbon uptake, under existing conditions, of approximately 1.48 MT of CO2 per acre per year. For an evaluation of potential impacts of the project on natural carbon uptake, refer to Section 4.3, *Impacts on Global Climate Change*.

3.4 Cultural Resources

Cultural resources are categorized as buildings, sites, structures, objects, and districts for the purposes of complying with the National Environmental Policy Act (NEPA) and Section 106 of the National Historic Preservation Act (NHPA). Three kinds of cultural resources are considered in this assessment: prehistoric, ethnographic, and historic.

Prehistoric archaeological resources are associated with human occupation and use prior to sustained European contact. These resources may include sites and deposits, structures, artifacts, rock art, trails, and other traces of Native American human behavior. Groupings of prehistoric resources are also recognized as archaeological districts and as cultural landscapes. In California, the prehistoric period began over 12,000 years ago and extended through the eighteenth century until 1769, when the first Europeans permanently settled in California.

Ethnographic resources represent the heritage of a particular ethnic or cultural group, such as Native Americans or African, European, Latino, or Asian immigrants. They may include traditional resource-collecting areas, ceremonial sites, value-imbued landscape features, cemeteries, shrines, or ethnic neighborhoods and structures.

Historic-period resources, both archaeological and architectural, are associated with Euro-American exploration and settlement of an area and the beginning of a written historical record. They may include archaeological deposits, sites, structures, traveled ways, artifacts, or other evidence of human activity. Groupings of historic-period resources are also recognized as historic districts and as cultural vernacular landscapes.

Under federal and state historic preservation law, cultural resources generally must be at least 50 years old to have sufficient historical importance to merit consideration of eligibility for listing in the National Register of Historic Places (NRHP) or in the California Register of Historical Resources (CRHR). A resource less than 50 years of age must be of exceptional historical importance to be considered for listing.

3.4.1 Environmental Setting

Geology

The following discussion is primarily excerpted from Steinkamp (2009 as cited in the CEC RSA, 2010). The project site is located within the geomorphic province known as the Basin and Range, situated in the Chuckwalla Valley between the Chuckwalla Mountains to the south and the Palen and Coxcomb mountains to the north (Jennings 1967as cited in the CEC RSA, 2010). The underlying geology consists of Quaternary alluvial, eolian, and lakebed deposits ranging from Pleistocene (1.8 million years old) to Holocene (8,000 BC to Recent) in age.

Portions of the proposed substation and transmission line route are underlain by Quaternary intermediate alluvium, estimated to be 200,000 and 2,000 years old, consisting variously of gravel, sand, and silt, being situated on top of inactive older alluvial fan surfaces (Stone and Pelka

1989 as cited in the CEC RSA, 2010). The bulk of the project area is comprised of Quaternary younger alluvium, locally dated as AD 1 to present (Stone and Pelka 1989 as cited in the CEC RSA, 2010), composed of silt, sand, and gravel derived from the surrounding mountains.

In contrast, the northeastern portion of the proposed site is blanketed with surficial Quaternary lake bed deposits underlain by both eolian deposits and younger alluvium. These lake bed deposits are weakly consolidated to slightly dissected and in part overlain by modern playa deposits consisting of partly gypsiferous silt and clay (Jennings 1967; Stone and Pelka 1989 as cited in the CEC RSA, 2010). Active sand dunes and sand sheets of recent age also occur in the northeastern portion of the project area (Jennings 1967; Stone and Pelka 1989 as cited in the CEC RSA, 2010). The transition zone between lake bed and dune field is a mix of strongly deflated areas, interspersed with hummocky, linear, dome, and blowout dunes.

From southwest to northeast, the geomorphic landscape consists of a broad bajada (a coalescing of neighboring alluvial fans into a single apron of deposits) with parallel drainages of parallel rills, gullies, and washes that flow northeast toward a dune field in the northeast corner of the project area, bordering Palen Dry Lake bed.

Geoarchaeological Investigations

Geoarchaeological monitoring of a geotechnical investigation within the project site took place July 20–28, 2009 (Steinkamp 2009 as cited in the CEC RSA, 2010). Excavations of 12 boreholes and eight test pits were observed for presence/ absence of paleosols, archaeological artifacts, or other evidence of archaeological deposition. Stratigraphic samples were collected for sedimentological and mineralogical data. Test pits, 1.5–3 meters deep, were placed in locations where deep footings or weight-bearing loads are planned. No cultural resources were found, and no evidence of subsurface paleosols or cultural deposits was noted during the course of monitoring.

Observations of the surface topography and subsurface deposits from the test pits suggest that the site is dominated by a roughly 10–33-centimeter-thick veneer of soil (A horizon)[1] formed in fluvial (re-worked alluvial fan deposits) and eolian (wind-deposited) sands and fluvial gravels originating from the Pleistocene alluvial fans of the surrounding mountain slopes. A-horizon soils consist of olive gray gravelly sand with sparse roots, subangular pebbles, angular blocky structure, and a clear wavy boundary. The C-horizon consists of a C1 horizon of storm couplets overlaying a C2 and C3 horizon of alluvial and dune sands, as well as alluvial gravels. Data from the borings indicate that the deeper subsurface deposits, below three meters, consist of alluvial fan sand and gravels that appear to represent alluvial fan transgression and aggradation, and clay that likely correlates to transgression of early lacustrine (lake) deposits during glacial periods and stable phases of the coalescing alluvial fans.

On the basis of these observations, Steinkamp concludes that the potential for buried shallow archaeological deposits is highest within the northeast quadrant of the project site, where wave-

1 Sedimentologists denote successively deeper soil layers with alphabetical letters, starting at the top with “A.”

cut platforms of paleo-lacustrine and beach deposits were observed beneath dune deposits less than a meter below the surface. Within the remainder of the area, if buried deposits are present, they are more likely to be deeper (up to 20 feet), due to the greater depth of alluvial fan deposition. Archaeological deposits at depth, within the alluvial fan deposits, have the potential to be heavily disturbed by millennia of alluvial fan transgression and erosion processes. Over the last 80 years, however, dikes, constructed on the upslope side of U.S. Route 60/70 in the 1930s, have protected this area by diverting storm water runoff (Steinkamp 2009, pp. 16–18 as cited in the CEC RSA, 2010).

Paleoclimate and Paleoenvironment

Information on paleoclimate and paleoenvironment for the southern Mojave and northern Sonoran (Colorado) deserts are derived from plant macrofossils found in packrat middens (Grayson 1993, pp. 119–128; 139–143; 194–195; 199–202, 215; Spaulding 1990; Tausch et al. 2004; Thompson 1990; Wigand and Rhode 2002, pp. 332–342; Cole 1986; Van Devender 1990; West et al. 2007, pp. 32–33 as cited in the CEC RSA, 2010), and stratigraphic studies of playa and dry lake deposits years (Ezzo et al. 1989, 1992 as cited in the CEC RSA, 2010).

The geologic epoch following the ice age, or Pleistocene, the Holocene, in which humans are known to have occupied North America, began approximately 12,000 years ago. For purposes of this discussion, the Holocene is divided into four periods: Early, Middle, Early Late, and Late Late.

Early Holocene (10,000-6000 BC)

During the Late Pleistocene and Early Holocene, as the climate became warmer and drier, extensive lowland conifer woodlands retreated upslope and were replaced by desert scrub associations. In the northern Sonoran Desert, around 9,500 BC, hot desert plants (pigmy cedar, cat claw acacia) began dispersing into the region. From about 8,400 BC on, creosote bush begins to appear. This warmer drier period, however, is also noted for witnessing episodes of greater precipitation. In the Mojave Desert, three high lake-stands have been identified at Silver Lake playa, dating between 13,000 and 7,300 BC (Ezzo et al. 1989 as cited in the CEC RSA, 2010). Gallegos et al. (1980, p. 93 as cited in the CEC RSA, 2010) postulate that two moister climatic intervals, dating between 10,500 and 9,500 BC, occurred, based on a pair of caliche beds near Cadiz Dry Lake that were found to contain traces of human stone tool use.

Middle Holocene (6000-3500 BC)

The subsequent Middle Holocene was the warmest and driest interval of the entire Holocene. Desert shrub vegetation dominated lowland and mid-level elevation localities. White burrobush and creosote bush increased in abundance. A dearth of vegetation data from the Middle Holocene suggests plant cover was probably very sparse as a consequence of severe drought conditions. Between approximately 4,800 and 3,000 BC, little evidence exists for summer rainfall. Gallegos et al. (1980, p. 93 as cited in the CEC RSA, 2010) postulate that a climatic interval, dating around

6,500 to 6,000 BC, probably resulted in lake filling based on the discovery of a site of that age, found in the fossil dunes near Bristol Dry Lake.

Early Late Holocene (3500 BC–AD 1)

The Early Late Holocene has been characterized as a period of relatively warm and dry conditions (sometimes drought) interspersed with evidence of cooler moister regimes. For example, evidence of peat deposits, dating to 3,000 BC, has been found at various spring localities in the Mojave Desert. Similarly, around 1,800 BC, a significant increase in the density of pinyon-juniper woodland took place in southern Nevada, suggesting cooler temperatures and winter-dominant precipitation. In the Mojave Desert, a high lake-stand at Silver Lake playa occurred approximately 1,620 BC (Ezzo et al. 1989, 1992 as cited in the CEC RSA, 2010). Gallegos et al. (1980, p. 93 as cited in the CEC RSA, 2010) postulate that a climatic interval, about 1,000 BC, probably resulted in lake filling again, based on evidence of shoreline camping at Cadiz Dry Lake.

Late Late Holocene (AD 1–present)

During the Late Late Holocene, temperature and precipitation patterns fluctuated significantly, swinging between periods of drought and relatively warm conditions (Meko et al. 2001; Stine 1994, 1996, 1998, 2000 as cited in the CEC RSA, 2010), with periods of summer-dominant precipitation and milder winters, contrasting with periods of cooler and somewhat drier conditions and increased winter-dominant precipitation, reminiscent of the previous epoch's ice age (Fagan 2000; Grove 1988; Meko et al. 2001; Scuderi 1987a, 1987b, 1990, 1993 as cited in the CEC RSA, 2010). Modern conditions have prevailed over the last 200 years, with increases in the distribution of pinyon pine, at the higher altitudes as well as expansion of saltbush and the creosote bush/white burrobush associations in the desert lowlands.

Gallegos et al. (1980, p. 93 as cited in the CEC RSA, 2010) postulate that a few hundred years ago, during the "Little Ice Age," rains would have maintained a marshy shallow lake in the Palen basin, supporting subsistence resources favorable for lakeshore hunting and gathering. This is based on hunting and processing tools, as well as red/buff pottery found in fossil dunes at the northwest end of the lake (Gallegos et al. 1980, p. 103 as cited in the CEC RSA, 2010). Large areas of residual sediments stand as "witness columns" and eroding plateaus, 1–2 meters higher than the present lakebed, indicating the former presence of an older lake. Rich archaeological deposits, mixed with lag gravel, are exposed near the base of Palen's eroding dunes (Gallegos et al. 1980, p. 106 as cited in the CEC RSA, 2010).

Prehistoric Background

During the 1970s, the BLM undertook a large-scale cultural resources inventory of the Central Mojave and Colorado Desert Regions (Gallegos et al. 1980 as cited in the CEC RSA, 2010). Crabtree (1980 as cited in the CEC RSA, 2010), in an overview of the region, subsequently summarized the history of archaeological study, identified the cultural chronology and common site types observed, and outlined the research topics of interest at that time. Subsequent cultural resources management investigations have contributed additional information to help refine our understanding of the prehistory of this region (Arnold et al. 2002, pp. 46–48; Love and Dahdul 2002; Schaefer 1994; Schaefer and Laylander 2007; Warren 1984, pp. 403–409 as cited in the CEC RSA, 2010).

An initial cultural chronology-culture history scheme for the Colorado Desert was developed in the 1930s and 1940s (Campbell 1931, 1936; Campbell and Campbell 1935; Campbell et al. 1937; Rogers 1939, 1945 as cited in the CEC RSA, 2010). This scheme has formed the foundation for subsequent efforts, most recently expressed by Sutton et al. (2007, pp. 233–243; table 15.4 as cited in the CEC RSA, 2010), relating the temporal periods and complexes delineated to those found in the Mojave Desert.

Paleo-Indian Period (about 10,000–8,000 BC)

The Paleoindian Period occurred during the late Pleistocene and the first half of the Early Holocene. Isolated fluted projectile points, assignable to the Western Clovis Tradition have been recovered from the Pinto Basin, Ocotillo Wells, Cuyamaca Pass, and the Yuha Desert (Dillon 2002, p. 113; Moratto 1984, p. 77, fig. 3.1; 87; Rondeau et al. 2007, pp. 64–65, fig. 5.1, table 5.1 as cited in the CEC RSA, 2010). All are surface finds, and have no associations with extinct fauna.

Lake Mojave Complex (8,000–6,000 BC)

The Lake Mojave complex, also known as the Western Pluvial Lakes/Western Stemmed Tradition (Beck and Jones 1997; Erlandson et al. 2007; papers in Graf and Schmitt 2007; Schaefer 1994, pp. 63–64; Sutton et al. 2007; papers in Willig et al. 1988 as cited in the CEC RSA, 2010), occurred during the second half of the Early Holocene. It is characterized by Great Basin Stemmed Series projectile points (Lake Mojave and Silver Lake types), abundant bifaces, steep-edged unifaces, crescents, and occasional cobble tools and ground stone tools. These artifacts often occur in undated surface contexts. Assemblage composition and site structure suggest highly mobile foragers, often traveling considerable distances. Little reliance upon vegetal resources is evidenced. The value of wetland habitats remains unclear. Lake Mojave lifeways may result from relatively rapidly changing climate and habitats during the Early Holocene. This would have produced unpredictability in resource distribution and abundance, producing a high degree of residential mobility.

Pinto Complex (8,000–3,000 BC)

The Pinto complex spans portions of the Early and Middle Holocene. Toolstone use, based on sites attributed to this complex, focuses upon materials other than obsidian and cryptocrystalline silicate (CCS). Pinto Series points are stemmed with indented bases, and display high levels of reworking. Bifacial and unifacial cores/tools are common. Ground stone tools are moderately to very abundant, indicating greatly increased use of plant resources. Pinto sites occur in a broad range of topographic and environmental settings, especially within remnant pluvial lake basins. Moderate to large numbers of people, practicing a collector subsistence strategy, occupied large residential base camps for prolonged periods. Logistical forays into surrounding resource patches probably were made from these sites.

Deadman Lake Complex (7,500–5,200 BC)

Currently, the Deadman Lake complex appears at this time to be confined to the Twentynine Palms area. Sites usually are surficial and located on old alluvial pediments. Artifacts include small-to-medium-size contracting stemmed or lozenge-shaped points, large concentrations of battered cobbles and core tools, and abundant bifaces, simple flake tools, and ground stone tools. The abundance of cobble tools suggests an emphasis upon plant processing. The Deadman Lake and Pinto complexes may represent two different human populations practicing different seasonal/annual rounds, or Deadman Lake may represent a component of the overall Pinto complex adaptation.

Possible Abandonment (3,000–2,000 BC)

Beginning roughly at this time, conditions in the Mojave Desert were warmer and drier. Few archaeological sites date to this period. This suggests population densities were very low. It is possible some areas were largely abandoned. This period corresponds in part to the latter part of the proposed “Altithermal Abandonment,” recognized by some prehistorians as characterizing portions of the Great Basin (see Kelly 1997, pp. 8–9 as cited in the CEC RSA, 2010).

Gypsum Complex (2,000 BC–AD 200)

The Gypsum complex, spanning most of the Early Late Holocene, is characterized by the presence of corner-notched Elko Series points, concave-base Humboldt Series points, and well-shouldered contracting-stemmed Gypsum Series points. Numerous bifaces also occur. Manos and metates are relatively common. During the early portion of the Gypsum complex, settlement-subsistence appears focused near streams. At this time, increased trade and social complexity apparently occurred. Gypsum components are smaller, more abundant, and occur over a more diverse suite of settings than those dating previously. Evidence for ritual activities includes quartz crystals, paint, split-twig animal figurines, and rock art. Gypsum Complex sites are uncommon in the southern and eastern Mojave Desert.

Rose Spring Complex (AD 200–AD 1000)

Cultural systems profoundly changed in the southern California deserts during the Late Late Holocene with the introduction of the bow and arrow, represented by Rosegate Series points. During this time, a major increase in population is thought to have occurred, possibly resulting from a more productive environment and a more efficient hunting technology. Sites often are located near springs, along washes, and sometimes along lakeshores. Intensive occupation is indicated by the presence of wickiups, pit houses, and other types of structures. Well-developed middens have yielded artifact assemblages containing knives, drills, pipes, bone awls, various ground stone tools, marine shell ornaments, and large amounts of obsidian. Obsidian procurement and processing apparently significantly structured settlement-subsistence.

Late Prehistoric Period (AD 1000–AD 1700)

During the Late Prehistoric period, horticultural practices and pottery were introduced (most likely from the Hohokam area in southern Arizona or from northern Mexico), having its greatest impact along the Lower Colorado River (McGuire and Schiffer 1982; Schaefer 1994, pp. 65–74; Schaefer and Laylander 2007, pp. 253–254 as cited in the CEC RSA, 2010). Ceramic artifacts began to appear in the Colorado Desert approximately AD 1000, assigned to the Lowland Patayan (Lower Colorado Buff Ware) and Tizon Brown Ware traditions (Lyneis 1988; Waters 1982 as cited in the CEC RSA, 2010).

A complex cultural landscape composed of rock art, trails, and geoglyphs[2] developed during the Late Prehistoric period. Trade and exchange were elaborated, with an emphasis on links between coastal southern California and the Southwest. In addition to pottery, artifact assemblages include Desert Series projectile points, shell and steatite beads, and a variety of milling tools. Obsidian use declined significantly, with CCS becoming the dominant toolstone.

Prehistory of the Chuckwalla Valley

Singer (1984 as cited in the CEC RSA, 2010) presents a lithic quarry-oriented prehistoric settlement model for the Chuckwalla Valley and environs. Over 200 prehistoric sites occur in the region. Past peoples inhabiting the area appear to have been very mobile, especially during late prehistoric and early historic times. During early historic times, native peoples inhabited towns/hamlets located along the Colorado River, within the Coachella Valley, and at major desert springs/oases.

The Chuckwalla Valley was a relatively closed resource exploitation zone. It served as an east-west oriented trade route/corridor between the Pacific Ocean and the Colorado River/greater Southwest. An extensive network of trails is present within the Chuckwalla Valley. Given its orientation and location, the valley may have been neutral territory (i.e., a buffer zone), unclaimed by neighboring native peoples. Quarry sites probably were “owned” by tribal groups. The distribution of particular types of toolstones may have corresponded to a group’s territorial boundaries, and a toolstone type may not have occurred beyond the limits of a group’s specific territory.

Within the Chuckwalla Valley, prehistoric sites are clustered around springs, wells, and other obvious important features/resources. Sites include villages with cemeteries, occupation sites with and without pottery, large and small concentrations of ceramic sherds and flaked stone tools, rock art sites, rock shelters with perishable items, rock rings/stone circles, geoglyphs (see Geoglyphs, below), and cleared areas, a vast network of trails, markers and shrines, and quarry sites. Possible village locations are present at Palen Lake, Granite Well, and Hayfield Canyon.

A cluster of temporary habitation and special activity (task) sites occurs around a quarry workshop in the Chuckwalla Valley. The Chuckwalla Valley aplite quarry workshop complex probably was used throughout the Holocene. During this period, Chuckwalla Valley most likely was occupied, abandoned, and reoccupied by a succession of ethnic groups. In the Early

2 Geoglyphs, also known as intaglios, were created on desert pavements by rearranging and/or clearing pebbles and rocks to form alignments, clearings, and/or figures. Rock alignments are present throughout this region, while representational figures only occur close to the Lower Colorado River. It is assumed that they played some role in sacred or ritual activities for prehistoric Native Americans.

Holocene (i.e., Lake Mojave complex times), the area may have been relatively densely inhabited. During the Middle Holocene (i.e., Pinto and Gypsum complexes period) it may only have been sporadically visited. The subsequent Late Holocene Rose Spring and Late Prehistoric periods probably witnessed reoccupation of the valley by Yuman and Numic-speaking peoples.

Research Topics

The research topics discussed below include lithic (stone) procurement, ceramic traditions, horticulture, trade and exchange, and cultural landscapes.

Lithic Procurement

The geology of the Colorado Desert provided prehistoric peoples with a variety of lithic materials for artifact production (Schaefer and Laylander 2007, pp. 252–253 as cited in the CEC RSA, 2010). These included obsidian, cryptocrystalline silicates (chert), crystalline volcanics (basalt, rhyolite), quartz, and plutonic, metamorphic, and sedimentary rocks.

Coso obsidian was the dominant source of obsidian used by Colorado Desert peoples prior to AD 1000. Other obsidian sources, from the southern Mojave Desert, include Bristol Mountains and Devil Peak (Shackley 1995 as cited in the CEC RSA, 2010). Approximately a dozen sources located in Baja California, extreme northwest Sonora, and western Arizona may also have been used (Shackley 1988, 1995, 2005 as cited in the CEC RSA, 2010). During the last thousand years, however, Obsidian Butte was the principal obsidian used in the Colorado Desert and coastal southern California (Hughes 1986; Hughes and True 1983; Laylander and Christenson1988; Schaefer and Laylander 2007, p. 251 as cited in the CEC RSA, 2010). Obsidian Butte, located near the southern edge of the Salton Sea, was inaccessible when Lake Cahuilla rose to inundate it (130 feet below sea level).

Several topics relating to prehistoric quarrying and tool manufacturing/use have been identified, including: distinction between formal versus the expedient procurement of lithics (Wilke and Schroth 1989 as cited in the CEC RSA, 2010); lithic reduction strategies and transport of lithic materials (Bamforth 1990, 1992 as cited in the CEC RSA, 2010); scales of production at quarries where lithic materials were procured to manufacture ground stone tools (Schneider et al. 1995 as cited in the CEC RSA, 2010); and differences in tools/lithic tools by gender (Walsh 2000 as cited in the CEC RSA, 2010).

Bamforth (1990, 1992 as cited in the CEC RSA, 2010) considers Holocene settlement, raw material, and lithic procurement at several quarry sites in the central Mojave Desert. He suggests that quarry use was conditioned upon mobility strategies, regional quality and abundance of lithic materials, as well as quarry location. Bamforth suggests that an emphasis on transporting prepared cores during the period 2000 BC–AD 500 may have resulted from the formation of relatively large and stable communities in areas with concentrated plant resources.

Singer (1984 as cited in the CEC RSA, 2010) studied two quarry workshop sites located in Chuckwalla Valley. Core production and reduction from locally available aplite was emphasized. This yielded flakes and bifaces, which appear to have been exported from the quarries for final reduction at other sites. Few formed tools were observed. Those that were present were choppers and scrapers, possibly used to manufacture wooden digging or prying sticks and shafts. The quarry sites appeared to have experienced long-term occupation and use.

Manufacturing efforts appear to have been directed towards production of expedient, rapidly discarded cutting/scraping/pounding/milling tools from locally available lithics (Ludwig 2005; Schaefer and Laylander 2007, pp. 252–252; Singer 1984 as cited in the CEC RSA, 2010). Specialized tool manufacturing included production of sandstone metates along the western side of the Colorado Desert, projectile point (arrow) workshops at seasonal task sites situated around playas, and large quarries at volcanic outcrops within the Lower Colorado and Gila River Valleys, where mortars and pestles were made (Schaefer and Laylander 2007, p. 252 as cited in the CEC RSA, 2010).

Ceramic Traditions

Schaefer and Laylander (2007, pp. 252–253 as cited in the CEC RSA, 2010) note that buffware pottery occurring within the Colorado Desert was initially assigned to the Hakataya ceramic series (Schroeder 1958, 1979 as cited in the CEC RSA, 2010). Subsequent studies (Waters 1982 as cited in the CEC RSA, 2010) place it within the Lowland Patayan Ceramic Tradition. Both typologies are based on surface collections of sherds, with little data resulting from stratigraphic excavations, or associated radiocarbon dates. Schroeder focuses upon details of temper, inclusions, and surface treatment, while Waters emphasizes rim form. Both attempt to define geographic limits of production for each type. Difficulties in applying typology, and problems with stratigraphic integrity, archaeological contexts, and anomalous associated radiocarbon dates, have allowed only gross chronological estimates and have limited identification of manufacturing regions.

In the Salton Basin, some sites dating between about AD 350 and AD 1200 contain pottery (Love and Dahdul 2002 as cited in the CEC RSA, 2010). This evidence suggests pottery was not introduced or rarely used prior to about 1000 AD. Earlier dates from the preceding 200 years suggest Lake Cahuilla may have attracted Colorado River peoples (and their pottery). Early ceramic dates from the Colorado Desert correspond closely with the inception of widespread use of Tizon Brownware pottery in the Peninsular Ranges and along the Pacific Coast (Lyneis 1988; Griset 1996 as cited in the CEC RSA, 2010), although some dates suggest initial introduction of ceramics by AD 800, if not before.

Viewed regionally, pottery use within the Late Prehistoric of the Colorado Desert can be divided into three periods (Arnold et al. 2002, pp. 46–47; Love and Dahdul 2002, pp. 72–73; Waters 1982 as cited in the CEC RSA, 2010). Patayan I times, about AD 800–AD 1050, witnessed the inception of several ceramic traditions. During Patayan II times, AD 1050–AD 1500, increased local manufacture and use of pottery occurred. Patayan III, AD 1500–AD 1760, saw the introduction of “Colorado Buff” pottery, and the westerly spread of ceramics to coastal southern California.

With respect to social and cultural factors governing pottery adoption and use within the Colorado Desert, recent analyses of pottery from the Mojave Desert and surrounding areas provide models focused on behavioral implications regarding its manufacture and function. One concern has been with determining if ceramic vessels were locally made (Eerkens 2001; Eerkens et al. 1999, 2002a; Griset 1996 as cited in the CEC RSA, 2010). Neutron activation analysis and petrographic studies have been used to identify chemical and material signatures (Eerkens et al. 2002b as cited in the CEC RSA, 2010). Pottery manufacture does not appear to have been organized at a higher regional level. Instead, pots generally appear to have been locally produced and used, with limited exchange of pots between different groups. Production appears to have been organized at an individual or family level, emphasizing production of largely utilitarian wares.

Pottery from sites in the northern Mojave is characterized by a relatively high number of elemental signatures suggesting higher levels of mobility (Eerkens et al. 2002b as cited in the CEC RSA, 2010). In addition to a higher degree of residential mobility, Eerkens (2003b as cited in the CEC RSA, 2010) suggests people inhabiting the northern Mojave Desert produced a fairly large number of pots. The combination of high mobility and a fairly high level of pottery production is seen as leading to caching pots near lowland wetlands, which were fixed in the landscape, development of pottery attributes promoting fuel consumption, and a high degree of standardization of largely utilitarian ceramics.

Sedentism in the Owens Valley, northeast of the project area, appears to have developed concurrently with, or immediately prior to, an emphasis on resource storage approximately 500 AD. Small seed intensification appears to have occurred about AD 1300–AD 1400, at the time brownware pottery became widely used. Eerkens concludes that social models, such as those suggesting the activities of aggrandizers or the stabilization of long-distance exchange networks, do not explain these developments. The role played by decrease(s) in population-to-resource balance(s), resulting from increased population pressure, remains unclear.

Eerkens (2003c; 2004 as cited in the CEC RSA, 2010) suggests the significant increase in small seed use and the advent of brownware pottery around AD 1300–AD 1400 are linked. People focused upon seeds because they could easily be privatized. That is, they could be individually owned and thus would not be subject to unrestricted sharing. Pots were a critical component of small seed intensification, because they generally were individually made and owned and could be used within houses, allowing food preparation and consumption to occur in private. Privatization of small seeds may have resulted from increased population size yielding more potential “freeloaders,” new community kinship structures, and the creation of resource surplus.

Horticulture

At the time of initial Euroamerican contact, 240 years ago, native peoples living along the Lower Colorado River and the Colorado Delta were growing a wide variety of domesticates and wild grasses, which provided 30–50 percent of their subsistence economy (Bean and Lawton 1973; Castetter and Bell 1951; Schaefer and Laylander 2007, pp. 253–254 as cited in the CEC RSA, 2010). Annual flooding of the floodplains along the Colorado rejuvenated the soil and provided enough moisture to sustain crops. Lower Colorado River agriculture is presumed to have begun around 700 AD. It probably spread either from the Hokokam area (to the east), or from northern Mexico (to the southeast) (McGuire and Schiffer 1982 as cited in the CEC RSA, 2010).

Horticulture subsequently appears to have spread west from the Colorado River. Desert Tipai peoples practiced floodplain agriculture along the New and Alamo Rivers. They also constructed small dams and ditches along washes to direct irrigation water onto adjacent terraces. Agricultural elements probably reached the Imperial Valley around AD 1700. Seed caches and mythological references to cultigens possibly indicate very late prehistoric adoption of agriculture. However, the caches contained both native and Old World cultigens. Thus it is unclear if agriculture penetrated west of the Peninsular Ranges in southern California before Euroamerican contact and the sustained influence that came with the establishment of Spanish missions.

Native cultigens may have reached the western Colorado Desert through trade instead of by local production (Schaefer and Laylander 2007, p. 254 as cited in the CEC RSA, 2010). Within the Colorado Desert, several archaeological sites have ceramic jars or rock-lined cache pits containing food remains of native or Old World plants (cf., Bayman et al. 1996; Swenson 1984; Wilke 1978; Wilke and McDonald 1989; Wilke et al. 1977 as cited in the CEC RSA, 2010). Pumpkin seeds occur in human coprolites (fossilized feces) from the Myoma Dunes at the north end of Lake Cahuilla, and also in a ceramic jar from the west shore of Lake Cahuilla, north of the Fish Creek Mountains. The latter dated to AD 1420–1660 (Wilke 1978; Wilke et al. 1977 as cited in the CEC RSA, 2010).

Early-to mid-nineteenth-century Cahuilla archaeological sites contain glass beads, flaked glass, domestic animal bones, carbonized maize and tepary beans, and uncarbonized gourds. Abundant evidence exists indicating the Cahuilla practiced irrigated agriculture during the early- and mid-nineteenth century. The paucity of macro- and micro-fossil cultigen remains from prehistoric archaeological deposits in Cahuilla territory strongly suggests agriculture did not play a significant role in the Cahuilla economy until the early nineteenth century. Early historic intensification of agriculture may have resulted from final desiccation of Lake Cahuilla, regional population growth, decreased mobility, and acculturation, including introduction of Euroamerican irrigation techniques.

In the Mojave Desert and environs, in the approximate period from AD 1–1200, agriculture first was practiced in southern Nevada and environs as a consequence of the Anasazi Intrusion (Warren 1984, p. 421, fig 8.25 as cited in the CEC RSA, 2010). Maize, squash, beans, grain amaranth, and sunflowers were grown. Agriculture was practiced along with foraging for wild plants and animals. Fields probably were irrigated in some manner. Agriculture appears to have intensified over time.

The Owens Valley Paiute were Great Basin Numic-speaking horticulturalists (Lawton et al. 1976; Liljeblad and Fowler 1986, pp. 417–418; Steward 1930, 1933, 1938, 1941, 1970 as cited in the CEC RSA, 2010). Ditch and surface irrigation of blue dicks (Brodiaea capitata), yellow nut grass (Cyperus esculentus), and spikerush (Eleocharis sp.), was practiced. This most likely developed during late prehistoric times, possibly triggered by increased population pressure resulting from climatic change and/or immigration (Bouey 1979 as cited in the CEC RSA, 2010).

Yohe (1997 as cited in the CEC RSA, 2010) notes aboriginal cultigens, such as melons, squash, and beans, were present at two rockshelters dating to the late nineteenth or early twentieth century in Death Valley. Fowler (1995, pp. 110–112; 1996, pp. 91–98 as cited in the CEC RSA, 2010) details garden horticulture among the Southern Paiute and Panamint and Timbisha Shoshone. Stream-irrigated gardens were cultivated, in which corn, beans, squash, sunflowers, and amaranth were grown. These groups also planted gardens near springs, had communal fields with irrigation ditches, and unirrigated stream-bank garden plots. Various land management practices were employed, including intentional burning, clearing, pruning, and coppicing, transplanting and cultivation, and cleaning of water sources.

Winter and Hogan (1986, pp. 125–127, table 1 as cited in the CEC RSA, 2010) note that during protohistoric times, agriculture was practiced by the southern California/Nevada Chemehuevi and Ash Meadows, Pahrump, Las Vegas, and Moapa Southern Paiute bands. Among the crops grown were corn, beans, squash, and sunflowers. Forms of plant husbandry directed towards non-domesticates included burning to encourage growth of new plants, broadcast seed sowing, and irrigation of wild stands of bulb and seed plants (Winter and Hogan 1986, pp. 128–129, table 2 as cited in the CEC RSA, 2010). These practices are thought to have begun prehistorically, continuing and possibly expanding during early historic times. Wallace (1980 as cited in the CEC RSA, 2010) suggests Native American agriculture in the Mojave region was exclusively a historic-period phenomenon.

Trade and Exchange

As Schaefer and Laylander (2007, pp. 254–256 as cited in the CEC RSA, 2010) note, prehistoric and ethnohistoric Colorado Desert peoples had a highly developed network of connections linking locations within and beyond the region. High mobility produced considerable cross-cultural interaction and integration in spite of frequent open aggression and warfare between different groups. This integration and interaction occurred between mobile hunter-gatherers and sedentary horticultural peoples. They are archaeologically manifested by the spatial distribution of site types, rock art, artifacts (especially ceramics and shell ornaments), and toolstones (especially obsidian).

Archaeologists monitor the dynamics of prehistoric trade in the Colorado Desert by analysis of the distributions of artifacts made from various lithics, shell beads and ornaments, and ceramic types and composition (Schaefer and Laylander 2007, pp. 255–256 as cited in the CEC RSA, 2010). As previously stated, with respect to lithics, obsidian from Obsidian Butte is fairly commonly represented in sites located within montane and coastal southern California (Hughes 1986; Hughes and True 1983; Laylander and Christensen 1988 as cited in the CEC RSA, 2010). Obsidian from sources in northern Baja California may have been routed via the Colorado Desert to coastal southern California sites (McFarland 2000 as cited in the CEC RSA, 2010). Wonderstone from the Rainbow Rock source is present in western San Diego County and the northern Coachella Valley (Bean et al. 1995; Pigniolo 1995 as cited in the CEC RSA, 2010).

Material for steatite artifacts found in Colorado Desert sites probably comes from sources in the Peninsular Ranges. Material for argillite artifacts may be from a central Arizona source.

Artifacts made from shellfish species inhabiting the northern Sea of Cortez occur in coastal southern California and the Great Basin (Bennyhoff and Hughes 1987; Fitzgerald et al. 2005 as cited in the CEC RSA, 2010) and may have been traded through the Colorado Desert (Schaefer and Laylander 2007, p. 255 as cited in the CEC RSA, 2010). Shells from southern California coastal species have been found at a number of Colorado Desert sites and those in the Southwest (Ford 1983 as cited in the CEC RSA, 2010). These artifacts may have resulted from direct procurement of shells, or exchange. At the Elmore site, associated with the protohistoric recession of Lake Cahuilla, shell debitage indicates local manufacture of shell beads and ornaments (Rosen 1995 as cited in the CEC RSA, 2010). In the Coachella Valley, shell artifacts may reflect close ties to peoples living along the Santa Barbara Channel.

A cache of Lower Colorado Buffware (i.e., Patayan) anthropomorphic figures found in an Orange County site indicates interregional connections (Koerper and Hedges 1996 as cited in the CEC RSA, 2010). These also are suggested by the frequency of Lower Colorado Buffware (i.e., Patayan/Hakataya) pottery throughout the Colorado Desert (Bean et al. 1995; Cordell 1997; McGuire 1982; Schaefer and Laylander 2007, p. 255; Schroeder 1979; Shaul and Hill 1998; Waters 1982 as cited in the CEC RSA, 2010). However, its use occurred among a number of prehistoric peoples practicing divergent settlement and subsistence patterns. Consequently little effort has been made to refine or apply the Patayan tradition as an integrative model.

On a local level, Plymale-Schneeberger (1993 as cited in the CEC RSA, 2010) examined pottery from three sites in Riverside County. Petrographic and geochemical analyses allowed quantitative distinction between Tizon Brown Ware and Lower Colorado Buff Ware. The study concluded that Brown Ware was locally produced while Buff Ware was imported. Seymour and Warren (2004 as cited in the CEC RSA, 2010) examined proportions of Tizon Brown Ware and Lower Colorado Buff Ware present at sites in Joshua Tree National Park and noted correspondence of pottery types with approximate boundaries of territories occupied by ethnohistorically known native peoples (that is, Cahuilla, Serrano, Chemehuevi).

Davis (1961 as cited in the CEC RSA, 2010) and Sample (1950 as cited in the CEC RSA, 2010) note that a considerable degree of historic-period trade between Native Americans occurred within and across the Colorado Desert. Trade networks across the Colorado Desert extended to the Yokuts and Chumash. Native peoples living along the Colorado River received and reciprocated goods from many groups living to the west.

Cultural Landscapes

In the Colorado Desert, trails, cairns, geoglyphs, cleared circles, rock rings, other desert pavement features, rock art sites, and artifact scatters appear to be some of the elements of prehistoric-ethnohistoric cultural landscapes[3] (Schaefer and Laylander 2007, pp. 254–255; Cleland and

[3] Cultural landscapes, when related to specific ethnic groups, are referred to as Ethnographic Landscapes (Hardesty 2000).

Apple 2003 as cited in the CEC RSA, 2010). Lower Colorado River geoglyph and rock art sites may represent prehistoric ceremonial centers, located along a route extending between sacred places, representing the cosmology and iconography of Yuman peoples (Altschul and Ezzo 1995; Cleland 2005; Ezzo and Altschul 1993; Gregory 2005; Hedges 2005; Johnson 1985, 2003; Woods et al. 1986 as cited in the CEC RSA, 2010).

Trails. During late prehistoric and ethnohistoric times, an extensive network of Native American trails was present in the Colorado Desert and environs (Heizer 1978; Cleland 2007; Sample 1950, p. 23; Apple 2005; Earle 2005; Melmed and Apple 2009; Von Werlhof 1986 as cited in the CEC RSA, 2010). Segments of many trails are still visible, connecting various important natural and cultural elements of landscapes. For example, these trails are often marked by votive stone piles/cairns and/or ceramic sherd scatters.

Late prehistoric-early historic Native American trail segments have been reported traversing roughly east/west through the Chuckwalla Valley (Johnston and Johnston 1957, map 1; Johnson 1980, pp. 89–93, fig. 1 as cited in the CEC RSA, 2010). Some trails may be located in the vicinity of the project site.

Rock Alignments and Geoglyphs. Geoglyphs were constructed on desert pavements by rearranging and/or clearing pebbles and rocks to form alignments, clearings, and/or figures (Arnold et al. 2002; Gilreath 2007, pp. 288–289; Solari and Johnson 1982 as cited in the CEC RSA, 2010). These constructions occur throughout the deserts of southeast California and adjacent portions of southern Nevada and western Arizona. Rock alignments are present throughout this region, while representational figures only occur close to the Lower Colorado River.

In the Mojave Desert, large rock alignments are found in Panamint Valley, Death Valley, Eureka Valley, and the Owens River Valley (Davis and Winslow 1965; Gilreath 2007, pp. 288–289; von Werlhof 1987 as cited in the CEC RSA, 2010). They have been interpreted as resulting from group ritual(s) (von Werlhof 1987 as cited in the CEC RSA, 2010). Many appear characterized by multiple-use episodes, with portions added through the years as part of ongoing rituals/ceremonies.

Colorado River geoglyphs include the Topock Maze (Rogers 1929 as cited in the CEC RSA, 2010) and a few dozen giant ground figures (Harner 1953; Setzler and Marshall 1952 as cited in the CEC RSA, 2010), often first observed from the air. During historic times, the Top Rock Maze was used by Yuman peoples for spiritual cleansing.

Johnson (1985, 2003 as cited in the CEC RSA, 2010), von Werlhof (2004 as cited in the CEC RSA, 2010), and Whitley (2000 as cited in the CEC RSA, 2010) relate the geoglyphs to Yuman cosmology, origin myths, and religion. Cation ratio dating[4] of desert varnish has provided

4 Cation ratios between weathered rock varnish and unweathered rock are used as a relative dating technique to roughly determine the age of prehistoric rock carvings (petroglyphs). The quantity of positively-charged ions within the varnish (a chemically-changed layer built up of calcium and potassium leachate over time) is compared to those within the unweathered rock beneath the varnish.

estimated ages of approximately AD 800–1000 for the Colorado geoglyphs (Dorn et al. 1992; Schaefer 1994, p. 63; von Werlhof 1995 as cited in the CEC RSA, 2010), although use of the technique remains controversial (Gilreath 2007, p. 289 as cited in the CEC RSA, 2010).

Von Werlhof (1995, 2004 as cited in the CEC RSA, 2010) relates these sites to the Yuman creation story. They also may have functioned as focal points for shamanistic activities, vision quests, curing, and group rituals/ceremonies. Symbolic activities also were represented by intentional pot-drop distributions along trails near water sources. The importance to Native Americans of water sources for survival during long-distance trips and seasonal rounds is obvious. Water sources also manifested significant spiritual values and often were associated with major rock art complexes (McCarthy 1993; Schaefer 1992 as cited in the CEC RSA, 2010).

Ethnographic Background

Currently, the region in which the project site is located is believed to have been occupied at various times by the Chemehuevi, Serrano, Cahuilla, Mojave, Quechan, Maricopa, and Halchidhoma.

Singer (1984, pp. 36–38 as cited in the CEC RSA, 2010) concluded the Chuckwalla Valley was not clearly assigned to any Native American group on maps depicting group territories. Following Johnston and Johnston (1957 as cited in the CEC RSA, 2010), Singer observed that the west end of the Chuckwalla Valley was near the intersecting boundaries of Cahuilla-Serrano-Chemehuevi territory. Possibly before 800 BC, the Chemehuevi may have expanded into Serrano territory, occupying the Chuckwalla Valley. No physical evidence suggested that the Cahuilla occupied the area. Given its east-west orientation and location, however, the Chuckwalla Valley may have been neutral territory, occupied by no Native American group in particular, which served as an east-west trade and travel route.

The Cahuilla

A wealth of information exists regarding traditional and historic Cahuilla society and culture (see Bean and Lawton 1967 for a comprehensive bibliography of sources). Primary sources for the Cahuilla include Bean (1972; 1978), Bean and Saubel (1972), Drucker (1937), Gifford (1918), Hooper (1920), James (1960), Kroeber (1908; 1925, pp. 692–708), and Strong (1929, pp. 36–182). The Cahuilla language, divided into Desert, Pass, and Mountain dialects, has been assigned to the Cupan subfamily of the Takic branch of the Uto-Aztecan linguistic family (Golla 2007; Moratto 1984; Shipley 1978. (As cited in the CEC RSA, 2010).

Territory traditionally claimed by the Cahuilla was topographically complex, including mountain ranges, passes, canyons, valleys, and desert. Bean (1978, p. 375 as cited in the CEC RSA, 2010) described it as, "…from the summit of the San Bernardino Mountains in the north to Borrego Springs and the Chocolate Mountains in the south, a portion of the Colorado Desert west of Orocopia Mountain to the east, and the San Jacinto Plain near Riverside and the eastern slopes of Palomar Mountain to the west." The natural boundaries of the desert, mountains, hills, and plains separated the Cahuilla from surrounding Native American groups. The Cahuilla interacted with surrounding peoples via intermarriage, ritual, trade, and war. The Cahuilla, Cupeno, Gabrielino, Serrano, and Luiseño shared common cultural traditions. The neighboring Cupeno were closest linguistically to the Cahuilla.

Cahuilla villages usually were located in canyons or on alluvial fans near water and food patches. The area immediately around a village was owned in common by a lineage. Other lands were divided into tracts owned by clans, families, and individuals. Numerous sacred sites with rock art were associated with each village. Trail networks used for hunting, trading, and social visiting connected villages. Trading was a prevalent economic activity. Some Cahuilla were trading specialists. The Cahuilla went as far west as the Channel Islands and east to the Gila River to trade.

Men hunted deer, mountain sheep, pronghorn, rabbits, rodents, and birds. This game was stalked/pursued/trapped by individuals and communal hunting groups. Blinds, pits, bows and arrows, throwing sticks, nets, snares, and traps were used to procure game. Communal hunts using fire drives sometimes occurred.

The Cahuilla had access to an immense variety of plant resources present within a diverse suite of habitats (Barrows 1900; Bean and Saubel 1972 as cited in the CEC RSA, 2010). Several hundred plant species were used for food, manufacture, and medicine. Acorns, mesquite and screw beans, pinyon nuts, and cactus fruits were the most important plant foods. They were supplemented by a host of seeds, tubers, roots, bulbs, fruits and berries, and greens. Corn, beans, squash, and melons were cultivated. Over 200 species of plants were used as medicines.

Structures varied in size from brush structures to dome-shaped or rectangular houses, 15–20 feet long, and ceremonial houses. The chief's house usually was the largest. Used for many social, ceremonial, and religious functions, it was located near a good water source. It generally was next to the ceremonial house, which was used for rituals, curing, and recreational activities. Other structures included a communal men's sweathouse and granaries.

Mortars and pestles, manos and metates, pottery, and baskets were used to process and prepare plant and animal foods. Cahuilla material culture included a variety of decorated and plain baskets; painted/incised pottery; bows, arrows, and other hunting-related equipment; clothing, sandals, and blankets; ceremonial and ritual costumes and regalia; and cordage, rope, and mats. Games and music were important social and ritual activities for the Cahuilla.

The Cahuilla had named clans, composed of 3–10 lineages, with distinct dialects, common genitors, and a founding lineage. Each lineage owned particular lands, stories, songs, and anecdotes. Each lineage occupied a village and controlled specific resource areas. All clan members jointly owned clan territory. Territory ownership was established by marked boundaries (rock art, geographic features), and oral tradition. Most of a clan's territory was open to all Cahuilla. Kinship rules determined rights to assets and responsibilities within a lineage. Each lineage cooperated in defense, large-scale subsistence activities, and ritual performance. The founding lineage within a clan often owned the office of ceremonial leader, the ceremonial house, and sacred bundle. Artifacts and equipment used in rituals and subsistence was owned by individuals and could be sold or loaned.

The office of lineage leader usually passed from father to eldest son. He was responsible for correct performance of rituals, care of the sacred bundle, and maintenance of the ceremonial house. The lineage leader also determined when and where people could gather and hunt, administered first-fruits rites, and stored food and goods. He knew boundaries and ownership rights, resolving conflict with binding decisions. The lineage leader met with other lineage leaders concerning various issues. He was assisted in his duties by a hereditary official responsible for arranging details for performance of rituals. Other functionaries included song leaders/ceremonialists, assisted by singers and dancers.

Laws were enforced by ritual, stories, anecdotes, and direct action. Supernatural and direct sanctions were used. Tradition provided authority. The past was the referent for the present and future. Old age provided access to privilege, power, and honor. Reciprocity was a significant expectation. Doing things slowly, deliberatively, and thoughtfully was stressed. Integrity and dependability in personal relations were valued. Secrecy and caution were exercised in dealing with knowledge.

Armed conflict occurred after all other efforts to resolve things had failed. A lineage leader and/or skillful warrior lead a temporary war party. Community rituals were held before and after a fight, which usually involved ambush.

Ritual and ceremony were a constant factor in Cahuilla society. Some ceremonies were scheduled and routine, while others were sporadic and situational. The most important ceremonies were the annual mourning ceremony, the eagle ceremony, rites of passage (especially those associated with birth, naming, puberty, and marriage), status changes of adults, and rituals directed towards subsistence resources. The main focus was upon performance of cosmologically oriented song cycles, which placed the Cahuilla universe in perspective, reaffirming the relationship(s) of the Cahuilla to the sacred past, present, to one another, and to all things.

The Serrano

Sources for the Serrano include Bean and Smith (1978), Benedict (1924,1929), Drucker (1937), Gifford (1918), Johnson (1965), Kroeber (1925, pp. 615–619), and Strong (1929, pp. 5–35). The Serrano shared many traits and artifacts with the Cahuilla, discussed above. The Serrano spoke a language belonging to the Serean Group of the Takic subfamily of the Uto-Aztecan family (Golla 2007; Moratto 1984; Shipley 1978). (As cited in the CEC RSA, 2010.)

It is nearly impossible to assign definite boundaries to Serrano territory. Territory traditionally claimed by the Serrano included the San Bernardino Mountains east of Cajon Pass, lands at the base and north of the San Bernardinos in the desert near Victorville, and territory extending east in the desert to Twentynine Palms and south to, and including, the Yucaipa Valley.

The Serrano occupied small village-hamlets located mainly in the foothills near water sources. Others were at higher elevations in coniferous forest, or in the desert. The availability of water was a critical determinant of the nature, duration, and distribution of Serrano settlements.

Women gathered, and men hunted and occasionally fished. Topography, elevations, and biota present within the Serrano territory varied greatly. Primary plant foods varied with locality. In the foothills, they included acorns and pinyon nuts. In the desert, honey mesquite, pinyon, yucca roots, and cactus fruits were staples. In both areas they were supplemented by a variety of roots, bulbs, shoots, and seeds, especially chia. Among primary game animals were deer, mountain sheep, pronghorn, rabbits, rodents, and quail. Large game was hunted with bows and arrows. Small game was taken with throwing sticks, traps, snares, and deadfalls. Meat was cooked in earth ovens. Meat and plant foods were parched or boiled in baskets. Plant foods were ground, pounded, or pulverized in mortars and pestles or with manos and metates. Processed meat and plant foods were dried and stored. Occasional communal deer and rabbit hunts were held. Communal acorn, pine nut, and mesquite gathering expeditions took place. These communal activities involved several lineages under a lineage leader’s authority.

Serrano houses were circular, domed, individual family dwellings, with willow frames and tule thatching. They were occupied by a husband and wife along with their children, and often other kin. Houses were mainly used for sleeping and storage. Most daily activities occurred outside, often in the shade of a ramada (a flat-roofed, open-sided shade structure) or other sun cover.

Settlements usually had a large ceremonial house where the lineage leader and his family lived. It was the social and religious center for each lineage/lineage set. The latter was two or more lineages linked by marriage, economic reciprocity, and ritual participation. Other structures included semi-subterranean, earth-covered sweathouses located near water, and granaries.

Serrano material culture was very similar to that of the Cahuilla. Stone, wood, bone, plant fibers, and shell were used to make a variety of artifacts. These included highly decorated baskets, pottery, rabbit skin blankets, bone awls, bows and arrows, arrow straighteners, fire drills, stone pipes, musical instruments, feathered costumes, mats, bags, storage pouches, cordage, and nets.

The clan was the largest autonomous landholding and political unit. No pan-tribal union between clans existed. Clans were aligned through economic, marital, and ceremonial reciprocity. Serrano clans often were allied with Cahuilla clans and Chemehuevi groups. The core of a clan was the linage. A lineage included all men recognizing descent from a common ancestor, their wives, and their descendants. Serrano lineages were autonomous and localized, each occupying and using defined, favored territories. A lineage rarely claimed territory at a distance from its home base.

The head of a clan was a ceremonial and religious leader. He also determined where and when people could hunt and gather. Clan leadership was passed down from father to son. The clan leader was assisted by a hereditary ceremonial official, from a different clan. This official held ceremonial paraphernalia (the sacred bundle), notified people about ceremonies, and handled ceremonial logistics.

Serrano shamans were primarily healers who acquired their powers through dreaming. A shaman cured illness by sucking it out of the sick person and by the administration of herbal medicines. Various phases of an individual's' life cycle were occasions for ceremonies. After a woman gave birth, the mother and baby were "roasted," and a feast held. Differing puberty ceremonies were held for boys (datura ingestion used in a structured ceremonial vision quest) and girls ("pit roasting," ingestion of bitter herbs, dietary restrictions, instruction on how to be good wives). The dead were cremated, and a memorial service was held. During the annual seven-day mourning ceremony, the sacred bundle was displayed, the eagle-killing ceremony took place, a naming ceremony for all those born during the preceding year was held, images were made and burned of those who had died in the previous year, and the eagle dance was performed.

The Chemehuevi

Sources for the Chemehuevi include Drucker (1937), Kelly (1934; 1936), Kelly and Fowler (1986), Kroeber (1925, pp. 593–600), Miller and Miller (1967), and Roth (1976; 1977). Carobeth Laird married a Chemehuevi and collected a large corpus of data, primarily on ritual, religion, and myth (Laird 1974a; 1974b; 1975a; 1975b; 1976; 1977a; 1977b; 1977c; 1978a; 1978b; 1984). The Chemehuevi spoke a language belonging to the Southern Group of the Numic subfamily of the Uto-Aztecan family (Golla 2007; Moratto 1984; Shipley 1978). Many traits characterizing Chemehuevi culture are very similar or identical to those of the Mojave, discussed below. Several probable Quechan traits also were noted for the Chemehuevi. (As cited in the CEC RSA, 2010).

For the territory traditionally claimed by the Chemehuevi, the Colorado River formed the eastern boundary south to the Palo Verde Mountains. The boundary then ran northwest, passing east of the Ironwood Mountains, crossing the Maria Mountains, paralleling the Iron Mountains, and then running between Old Woman Mountain and Cadiz Dry Lake (Kelly 1934; Kelly and Fowler 1986, p. 369, fig. 1 as cited in the CEC RSA, 2010). Mojave territory lay to the northeast, and that of the Las Vegas group of Southern Paiute to the north-northwest.

The Chemehuevi lacked any form of overall "tribal" organization. Anthropologists refer to territorial subdivisions among the Chemehuevi as "bands." Each band was composed of a small number of camps/communities/villages. Bands most likely corresponded to economic clusters (Kelly 1964 as cited in the CEC RSA, 2010). Each group was a geographic unit, associated with a definite territory. In general, each band was economically self-sufficient.

In general, Chemehuevi settlement was mobile and scattered, with residence recurring within a fixed area. Houses were closely grouped. Their occupants usually were related by blood or marriage. Settlement size ranged from 1–2 households up to 10–20. Springs often were inherited private property. Married siblings often camped at the same spring.

The Chemehuevi traveled widely. They had amicable contact with the Serrano, Cahuilla, Quechan/Yumans, and other Native American groups. The Chemehuevi sometimes joined with the Mojave/Quechan to fight the Cocopa/Halchidhoma. The Chemehuevi often crossed the Colorado River and hunted deer in Quechan, Yavapai, and Western Walapai territory. They also traded, intermarried, and competed in games with the Yavapai. To the west, the Chemehuevi hunted in the Tehachapi area and went to the Pacific Coast along the Santa Barbara Channel to get abalone shell. Sometimes, a party of 8–10 Chemehuevi men joined men from neighboring groups to make a two-month journey to the Hopi villages (in what is now New Mexico) to trade.

The Chemehuevi apparently did not eat fish, but bighorn sheep, deer, pronghorn antelope, and desert tortoise were among the animal food resources they used (Kelly and Fowler (1986, p. 369 as cited in the CEC RSA, 2010). Plant foods in this region included pinyon nuts and mescal. Men inherited rights to hunt large game within certain tracts, defined in songs using geographic references. Women gathered a great variety of plant foods, which were more important in the Chemehuevi diet than game. In addition to pinyon nuts and mescal, agave and seeds were staples. Along the Colorado River, the Chemehuevi practiced floodplain agriculture. They grew corn, squash, gourds, beans, sunflowers, amaranth, winter wheat, grasses, and devil's claw using techniques similar to Mojave agricultural practices (see below).

Chemehuevi winter houses were conical/sub-conical structures. They also built earth-covered houses without a front wall, similar to those constructed by the Mojave. During the summer, many Chemehuevi lived outside, often building and occupying armadas and windbreaks.

With respect to material culture, Chemehuevi baskets and cradles were made from plant fibers. Plant fibers also provided materials for rope, string, and cordage nets. Pottery, which followed Mojave patterns and styles, included cooking pots, water jars, seed germination and storage pots, spoons/scoops, and large pots for ferrying children across the Colorado River. Watercraft included log rafts and reed balsas. Clothing consisted of double skin or fiber aprons and sandals for men and women. The Chemehuevi commonly had pierced ears and wore body paint.

Monogamy was the commonest form of marriage among the Chemehuevi, but some men had more than one wife. Women gave birth in a special enclosure, followed by a 30-day period of seclusion for mother, father, and child. Puberty rites for boys and girls were held, with the former focused on acquisition of hunting skills. Cremation of the dead was traditional, replaced by in-ground burial in the historic period.

In general, no central political control existed. Territorial boundaries were not rigid, and some bands were named, while others were not. The basic social and economic unit was the nuclear family and could include other close kin. Groups of individual households moved together on hunting and gathering trips, returning to the same spring or agricultural site. Most large bands had a headman whose leadership was more advisory than authoritative. He was usually succeeded by his eldest son.

The principal role of Chemehuevi shamans was curing illness. They acquired their healing powers through dreams rather than through the use of datura or a trance. Chemehuevi families held a mourning ceremony ("cry"), with which several speeches and songs were associated, within the year after the death of a relative. The "cry" was sponsored by the family and included the ceremonial burning of material goods.

The Chemehuevi had deer and mountain sheep song-dances, held for entertainment and hunting success. The Chemehuevi had other songs, as well: bird, salt, quail, and funeral songs. During winter evenings, men narrated a rich body of traditional stories and myths. These performances often included mimicry, song, and audience participation. Oral tradition related people to social norms, their territories, and to the subsistence resources present within them.

The Mojave

Information regarding the traditional lifeways of the Mojave has mainly been drawn from the accounts of early explorers and/or fur trappers who were among the first to encounter native groups, as well as from the later ethnographic accounts of anthropologists, usually well after the influences of Euro-American contact had begun to alter traditional ways of life. The following summary derives mainly from Kroeber (1925) and Stewart (1983a, 1983b) as cited in the CEC RSA, 2010.

The name Mojave is a variation on the name Hamakhava, which is what the tribal people called themselves (Kroeber 1925, p. 727 as cited in the CEC RSA, 2010). The Mojave language is classified into the Yuman subfamily of the Hokan language family. The Mojave were the northernmost and largest tribe of the River and Delta Yumans, who comprised a series of agricultural tribes that occupied the lower Colorado and Gila Rivers. The traditional ethnographic territory attributed to the Mojave includes the Mojave, Chemehuevi, and Colorado River Valleys along the lower Colorado River at the intersection of the borders of Arizona, Nevada, and California. In pre-contact times, Mojave tribal settlement is reported to have centered in the Mojave Valley where their population densities were observed to be the greatest (Stewart 1983b, p. 55 as cited in the CEC RSA, 2010).

The Colorado River served as an oasis in the otherwise harsh, dry environment that surrounded the river valleys. The spring overflow of the river, which spread gently over the bottomlands, left behind a rich silt deposit in its recession. It is within these bottomlands that the Mojave cultivated crops, which served as the foundation of their subsistence economy. Their agricultural methods were relatively simple, consisting of planting seeds on the richly silted floodplains and allowing their crops to mature with a minimum of maintenance or effort. Corn was the primary crop, but several varieties of tepary beans, pumpkins, melons, and other plants were also grown. Once harvested, the portions of the harvest that were not immediately consumed were dried in the sun and stored in large basketry granaries. The Mojave supplemented their diet mainly by gathering wild plants and by fishing, which served as their principle source of meat. Hunting played a minor role in the Mojave subsistence economy (Stewart 1983b, pp. 56–59 as cited in the CEC RSA, 2010).

Technology of the Mojave was relatively simple, and tools were reported to have been crafted to meet only the minimum requirements of utility (Stewart 1983b, p. 59 as cited in the CEC RSA, 2010). According to Kroeber (1925, p. 736 as cited in the CEC RSA, 2010), the farming implements consisted of only two items: a heavy wooden staff or digging stick for planting and a spatulate wooden hoe-like implement, whose square edge was pushed flat over the ground to control weeds. Metates, consisting of a rectangular block of stone, were used for grinding corn, wheat, and beans, and both stone and wooden pestles, as well as stone mortars, were also used for food processing (Kroeber 1925, pp. 736–737 as cited in the CEC RSA, 2010). Fish were commonly taken with seines, large basketry scoops, sieves, dip nets, and weirs. The bow and arrow and cactus-spine fish hooks were also used for fishing. Mojave basketry was crudely woven, and their pottery was basic and utilitarian (Stewart 1983b, p. 59 as cited in the CEC RSA, 2010). Since hunting was of relatively little significance to the Mojave, hunting devices and techniques were not well developed, consisting mainly of snares, nets, bow and arrow, or curved throwing sticks (Stewart 1983b, pp. 59–61 as cited in the CEC RSA, 2010).

Mojave political and social organization was very informal, and no one individual or group had significant authority over another. Despite the Mojave's loose division into bands or local groups that were spread out over great distances, their cohesion as a tribe was very strong, and they considered themselves as one people occupying a nation with a well-defined territory (Stewart 1983a, 1983b as cited in the CEC RSA, 2010).

The nuclear family was the basic unit of economic and social cooperation, although the extended family constituted the core of a settlement. Rather than large centralized villages, Mojave settlements were widely distributed along the riverbanks in close proximity to arable lands. Houses were situated on low rises above the floodplain and often separated by as much as a mile or two (Stewart 1983b, p. 57 as cited in the CEC RSA, 2010). During most of the year, the Mojave slept under ramadas; however, during the colder season, they occupied more substantial, semi-subterranean, rectangular earth-covered houses.

Warfare was a dominant strain in River Yuman culture, and the Mojave's strong tribal unity served them well in times of warfare. They apparently traveled great distances to do battle, and their principle weapons were bows and arrows and hard wood clubs. According to Kroeber (1925, p. 727 as cited in the CEC RSA, 2010), their main motivation was sheer curiosity, as they liked to see other lands and were eager to know the manners of other peoples, but were not heavily interested in trade.

The Mojave were culturally similar to the other River and Delta Yumans: the Quechan, Halchidhoma, Maricopa, and Cocopa. During ethnohistoric times, the Quechan were considered friends and allies of the Mojave, while the Halchidhoma, Maricopa, and Cocopa were considered to be enemies with whom the Mojave engaged in warfare (Stewart 1983b, p. 56 as cited in the CEC RSA, 2010). The Mojave were also friendly with the Upland Yuman tribes of the Yavapai and Walapai of western Arizona, although relations with the Walapai were somewhat mixed.

One of the most important rituals observed by the Mojave centered on death, namely the funeral and subsequent commemorative mourning ceremony. As soon as possible after death, the deceased was cremated upon a funeral pyre along with all of his or her possessions. The house and granary of the deceased were also burned. It was believed that by burning, these things would be transmitted to the land of the dead along with the soul of the deceased (Stewart 1983b, pp. 65–67 as cited in the CEC RSA, 2010).

Due to their relatively remote location inland, the Mojave maintained their independence throughout the Spanish period of the sixteenth and seventeenth centuries and were only rarely visited by explorers during that time. The few Spanish accounts of encounters with the Mojave provided similar descriptions of Mojave lifeways as those reported later by ethnographers. It is believed that the ancestors of the Mojave resided in the area for at least 1000 years and the mode of life in prehistoric times is thought to be similar to that observed historically (Stewart 1983b, p. 56 as cited in the CEC RSA, 2010).

The Quechan/Yuma

The following summary of the Quechan or Yuma is derived mainly from Bee (1983), Kroeber (1925), and Stewart (1983a) as cited in the CEC RSA. 2010.

Quechan is a variation on the names Kwichyan or Kuchiana, which are the names the tribe called themselves, but this group was also commonly known as the Yuma. The Quechan are among the Yuman-speaking tribes who occupied the lower Colorado River where it forms the boundary between California and Arizona. According to Kroeber (1925, p. 782 as cited in the CEC RSA, 2010), the Quechan and their neighbors to the north, the Mojave, appear to be virtually identical in terms of their agriculture, manufactures, clothing, hairdress, houses, warfare, and sense of tribal unity.

The territory traditionally associated with the Quechan, now divided between the states of California and Arizona, is centered around the confluence of the Colorado and the Gila Rivers, extending several miles north and south along the Colorado and east along the Gila. Quechan legend tells of a southward migration of their ancestors from a sacred mountain; however, it is not known when the ancestors of the Quechan first settled near the confluence (Bee 1983, p. 86 as cited in the CEC RSA, 2010). No group of this name was mentioned in the account of Hernando de Alarcón when he passed through the area during an expedition in 1540, and the first reference to this group did not appear in Spanish documents until the late seventeenth century, at which time they were settled around the river confluence area (Bee 1983, p. 86 as cited in the CEC RSA, 2010).

In an environment otherwise surrounded by dry desert terrain, the subsistence economy of the Quechan focused on riverine agriculture, which was one of the main sources of food for the tribe. Crops were cultivated in the richly silted river bottomlands following the recession of the spring floods and provided a relatively high yield in exchange for relatively low labor output (Bee 1983, pp. 86–87 as cited in the CEC RSA, 2010). The main cultivated crops included corn, tepary beans, pumpkins, and gourds. In post-contact times, watermelons, black-eyed peas, muskmelons, and wheat were introduced by Europeans and brought into cultivation by the Quechan, as well. The Quechan also relied on the gathering of wild foods, the most important of which were mesquite and screw-bean pods, although a variety of other wild plants were also collected (Bee 1983, p. 87; Castetter and Bell 1951, pp. 187–188 as cited in the CEC RSA, 2010). Fishing was of minor importance, as there were few species in the lower Colorado River suitable for eating. Among the fish sought were the humpback, white salmon, and boneytail, which were sometimes caught with unfeathered arrows or cactus spine hooks, but more often taken with traps and nets during floods (Forde 1931, pp. 107–120 as cited in the CEC RSA, 2010). Given the low incidence of game available in the area, hunting played a minor role in the overall subsistence economy (Bee 1983, p. 86 as cited in the CEC RSA, 2010).

Like the Mojave, Quechan tribal settlements, or rancherias, consisted of extended family groups that were widely dispersed along the riverbanks. Settlements shifted throughout the year, dispersing into smaller groups along the bottomlands during the spring and summer farming seasons and reconvening into larger groups on higher ground, away from the river, during the winter and spring flood periods (Bee 1983, pp. 87–88 as cited in the CEC RSA, 2010). The geographic dispersion of the households within the rancheria groups was closely correlated with the condition of the rivers and the technology of riverine agriculture (Bee 1983, p. 89 as cited in the CEC RSA, 2010). The warm climate and scant precipitation made substantial housing unnecessary for most of the year, so most people made use of ramadas or dome-shaped arrowweed shelters. Each rancheria typically had one or two large, earth-covered shelters for the rancheria leaders' families, but these shelters also accommodated small crowds during colder weather (Forde 1931, p. 122 as cited in the CEC RSA, 2010).

Much like the Mojave, Quechan technology lacked technical or decorative elaboration beyond the demands of minimal utility (Bee 1983, p. 89 as cited in the CEC RSA, 2010). Quechan bows did not feature "backed" construction and so lacked power, and their arrows were frequently untipped, so the bow and arrow's range was short and the penetrating power weak. Sharpened staffs served as digging sticks or, when cut in longer lengths, as weapons (Bee 1983, p. 89 as cited in the CEC RSA, 2010).

In terms of property, there were no marked gradations in wealth, and social pressure favored the sharing of one's abundance with others who were less fortunate. Land ownership was informal, and people did not show much interest in the accumulation of material goods beyond the immediate needs of the family group or the surplus maintained by local leaders for redistribution to needy families within their rancheria (Bee 1983, p. 89 as cited in the CEC RSA, 2010). Lands were not inherited by family members upon the death of an individual; rather, the lands of the deceased were abandoned, and replacement plots were sought by the family members.

Despite the wide distribution of settlements, the Quechan had a strong sense of tribal unity. As with their neighbors and allies, the Mojave, warfare played a major role in Quechan culture, and it was during times of warfare that tribal unity was most prevalent among the individual settlements (Bee 1983, p. 92 as cited in the CEC RSA, 2010). Their major enemies were the Cocopa and the Maricopa, and they often allied themselves with the Mojave in strikes against common enemies (Bee 1983, p. 93 as cited in the CEC RSA, 2010). Bee (1983, p. 93 as cited in the CEC RSA, 2010) suggests that warfare among the riverine peoples may have increased in scale and intensity during the eighteenth and early nineteenth centuries due to new economic incentives, such as the opportunity to trade captives to the Spaniards or to other tribes for horses or goods.

Quechan social and political organization, like that of the Mojave, appears to have been very informal, with no one individual or group having significant authority over others. Two types of tribal leadership have been reported for the Quechan, one for civil affairs and the other for war, but it is questionable how influential these leadership roles may have been. Each rancheria had one or more headmen, but their authority was contingent upon public support and continued demonstration of competence. According to Bee (1983, p. 92 as cited in the CEC RSA, 2010), important matters at either the tribal or the rancheria level were always decided by consensus, sometimes after long debates dominated by the better and more forceful speaker.

Another important aspect of Quechan society that was shared with the Mojave concerns the commemoration of the dead, which was an elaborate ceremony involving wailing and the destruction of property and ritual paraphernalia. All possessions of the deceased, including the family home, were destroyed or given away (Bee 1983, pp. 89, 93–94 as cited in the CEC RSA, 2010).

The Maricopa and the Halchidhoma

Ethnographic information for the Maricopa and Halchidhoma is meager in comparison to the Mojave and the Quechan. The following brief summary is derived from Harwell and Kelly (1983) and Stewart (1983a) as cite in the CEC RSA, 2010.

The Halchidoma first entered written history in the early seventeenth century wit , who encountered the “Alebdoma” or “Halchedoma” during a Spanish expedition on the lower Colorado River, below its junction with the Gila River. When later encountered by missionary-explorer Eusebio Francisco Kino in the early eighteenth century, the Halchidhoma (or “Alchedoma,” as they were referred to by Kino) had moved farther north up the Colorado beyond the Gila. The traditional territory attributed to the Halchidhoma lay along the lower Colorado between the Mojave and the Quechan territories. They were later driven from that area under pressure from their hostile Mojave and Quechan neighbors and moved to the middle Gila River area, where some merged with the Maricopa (Stewart 1983a as cited in the CEC RSA, 2010).

The term Maricopa refers to the Yuman-speaking groups who in the early nineteenth century occupied the area along or near the Gila River and its tributaries (in what is now southern Arizona), but who earlier had occupied the lower Colorado River area. The Maricopa language is closely related to Quechan and Mojave, all three of which are classified as members of the River branch of the Yuman language family (Harwell and Kelly 1983, p. 71 as cited in the CEC RSA, 2010). The Maricopa call themselves pi•pa•s, “the people.” The name Maricopa is an English abbreviation of the name Cocomaricopa, first used by Eusebio Kino in the late seventeenth century (Harwell and Kelly 1983, p. 83 as cited in the CEC RSA, 2010).

The Maricopa, who by the early nineteenth century included remnant tribes of the Halyikwamai, Kahwan, Halchidhoma, and Kavelchadom, share common origins and are culturally similar to both the Quechan and the Mojave, the most prominent traits of which included floodwater agriculture and cremation of the dead. Their material culture was also essentially the same (Harwell and Kelly 1983, p. 71 as cited in the CEC RSA, 2010). The Colorado River Maricopa lived in low, rectangular, earth-covered houses, but the Maricopa of the Gila River had adopted the round houses of their Piman neighbors. Technology was of little interest to the River Yumans and remained at a low level of development (Stewart 1983a as cited in the CEC RSA, 2010).

Historical Background

The project site is located in an area that has historically been and remains remote from centers of development and settlement. The primary themes in this discussion focus on Spanish and Mexican routes through the desert, and early American traffic, mining, transportation, military training, power transmission, and agriculture/ranching.

Spanish and Mexican Routes through the Desert

Sixteenth-century maritime Spanish explorer, Hernando de Alarcon, made the first in-roads into the region in 1540, ascending 85 miles up the Colorado River to the head of navigation near present-day Yuma. Alarcon was sent to supply Coronado's land expedition that had set out on foot from Compostela, Mexico, in search of the fabled seven cities of gold. He eventually cached the supplies and departed after waiting many days. Melchior Diaz, leading a small contingent of Coronado's land unit, later arrived and recovered the supplies. Both Alarcon and Diaz reported the bleak nature of the country. The interior of the Colorado Desert was not explored further until 1702 when Father Eusebio Francisco Kino, a Jesuit missionary, situated in Sonora, began seeking an overland route to coastal California (Rice et al. 1996; Hague 1976; Von Till Warren 1980, pp 83–88 as cited in the CEC RSA, 2010).

Nearly seventy years later, Francisco Garcés (a Franciscan Padre) also seeking a route to the coast, forded the Colorado River at the mouth of the Gila River, traveling west through the desert before despairing and turning back. His efforts were eventually rewarded in March of 1774, arriving at Mission San Gabriel, accompanying the expedition of Captain Juan Bautista de Anza (Rice et al. 1996, Hague 1976 as cited in the CEC RSA, 2010). Two mission outposts were subsequently established near present-day Yuma in 1779 to minister to the native Quechan and strengthen Spain's hold on this strategic point of entry into California. All passage along this route, later known as the Anza or Yuma Trail, was discontinued in 1781 when the Quechan revolted, killing over thirty missionaries, settlers, and soldiers, including Garcés.

Jose Maria Romero, a Mexican Army captain, explored a second route between 1823 and 1826, along the indigenous Halchidhoma Trail. He had learned of this route a couple of years earlier when a group of Cocomaricopa Indians from Arizona arrived at Mission San Gabriel, having reportedly crossed the Colorado River near present-day Blythe, journeying westward through the Chuckwalla Valley and over the San Gorgonio Pass. On January 6, 1824, Romero was likely in the vicinity of Palen Lake (Bean and Mason 1962, pp. 40–41 as cited in the CEC RSA, 2010), having made his way up the Salton Wash, between the Orocopias and Chuckwallas. Estudillo, one of the members of the expedition, noted horse paths and footpaths of the Indians, and bones along the trail (Johnson 1980 as cited in the CEC RSA, 2010).

Early American Trans-Desert Crossings

In 1846, during the opening stages of the Mexican-American war, General Stephen Watts Kearny led an advance column of the United States Army into the region. From Santa Fe, Kearny's troops entered California by way of Yuma, reaching San Diego in December, having abandoned their wagons shortly after crossing the Rio Grande. The war ended in 1848 with the signing of the Treaty of Guadalupe Hidalgo.

Only days after the Mexican-American War ended, gold was discovered, kicking off the California Rush of 1849. It is estimated that more than 100,000 travelers passed by way of the Yuma Crossing.[5] The presence of so many travelers along the route had a definite impact on the desert. Whereas previous expeditions made the journey in isolation, during the Gold Rush, trails became relative highways. Companies of miners frequently encountered one another or ran across the remains of recently vacated campsites. The desert floor also became littered with articles abandoned when they either fell apart or proved too heavy or cumbersome for their weary owners. Broken wagons, furniture, articles of clothing, tools and even weapons left by the side of the road proved to be a bonanza for scavengers (Lamb n.d.).

After 1851, travel to California along the southern route through the Colorado Desert declined (Lamb n.d.). Horse traders and livestock drovers still used the trail to drive herds from Texas and Mexico to California and the U.S. Army continued to send caravans of provisions from San Diego to its outpost, Fort Yuma, at least until 1852. Emigrants, moving west, however, were more apt to be settling in southern California as farmers or ranchers instead of prospecting for mineral resources.

Desert Land Act, Entrymen, and Homesteading

Anglo-American homesteading and settlement in the Chuckwalla Valley was dependent upon the access to groundwater. The first known documented well was that of Hank Brown, mapped as early as 1856, apparently excavated for use by the Department of Interior's General Land Office survey to establish the San Bernardino Base Line and Meridian through the then uncharted area. Washington, the surveyor noted the well was 45 feet deep and provided good water (about one mile west of the project site) within Township 5 South and Range 16 E, northwest quarter of Section 10 (General Land Office, Plat Map 1856), near the present day airfield northeast of Desert Center (about five miles northwest of the project site). Brown reportedly blazed a wagon road for the boundary surveys up Salt Creek Pass between the Orocopia and Chocolate Mountains and on toward present-day Desert Center (Warren and Roske 1981, p. 17 as cited in the CEC RSA, 2010).

Some twenty years later, Congress, to encourage and promote economic development of the arid public lands of the West, passed the Desert Land Act in 1877. Through this act, individuals could apply for entry onto public lands that could not produce a paying crop without artificial irrigation. After four years demonstrating proof of reclamation and improvements, desert entrymen would gain title to the land.

Brown's offspring, Floyd Brown, was probably one of the earliest participants in the desert land entry program. It does not appear that many others joined him until a quarter century later. In 1908, a subsidiary organization to the Edison Light and Power Company of Los Angeles, the

5 http://www.yumaheritage.com/history.html

Chuckwalla Land and Power Co., obtained a number of claims on the California side of the Colorado River north of Parker with the intent of building a dam to generate power and irrigate the Chuckwalla Valley, 40 miles to the west.[6] By the following year, practically all the land in the valley was taken, either by purchase, desert claim, or homestead under the encouragement offered by the development company. The Santa Fe Railroad even had plans to build from Palo Verde through the heart of the valley (Los Angeles Herald 1910 as cited in the CEC RSA, 2010). Unfortunately, the Department of the Interior was of the opinion that it was a promoter's pipe dream and refused to sanction the scheme.[7]

Four years later, the California Conservation Commission reported to the Governor and Legislature that while the power and irrigation project had been abandoned by the Chuckwalla Development Company, a group of 410 desert entrymen had formed the Chuckwalla Valley and Palo Verde Mesa Irrigation Association to proceed with the project independently (California Conservation Commission 1913 as cited in the CEC RSA, 2010). Most of these men were facing forfeiture of their lands and a loss on their investments, not being able to show final proof of securing water. The Senate and House Committees on Public Lands, recognizing their hardship, passed legislation granting them an extension (an exemption from cancellation for a period of one year) to give them time to carry out their plans (U.S. House of Representatives 1913 as cited in the CEC RSA, 2010). The Chuckwalla relief act benefited 780 entrymen, nearly 100 of whom were situated within the project vicinity.

In 1909, at the start of the land rush, Brown's well was reportedly 300 feet deep, and plainly visible from the road, with two adobe buildings and a corral near it (Mendenhall 1909 as cited in the CEC RSA, 2010). A couple of years later, a man named Peter S. Gruendike settled in the valley not far west of the project site (Wharton 1912 as cited in the CEC RSA, 2010). Gruendike's well is in the same general vicinity of Brown's and may be one-and-the-same. Gruendike was an active entryman, publishing an account of his Mountain View Experimental Ranch in Out West in 1911. By then, he had a good 10-foot-tall windmill in working order and a large tank, along with many kinds of trees planted and 300 or more palms of different kinds. At the time, he was very enthusiastic regarding the future outlook, having visions of growing hay, grain, melons, grapes, dates, cotton, and all citrus fruits. His land was patented in 1916.

Stephen Ragsdale, a cotton farmer from Palo Verde Mesa, acquired Gruendike's property in 1915 and began operating a towing business at the establishment. Six years later, when Route 60 opened a mile or so to the north, he uprooted and founded the tiny settlement of Desert Center, midway between Indio and Blythe.[8] Desert Center, at that time, consisted of a café with an attached gasoline station, a towing service/repair garage, a market, post office, several cabins for travelers, and a swimming pool. In addition to supporting tourism by providing sparse amenities for travelers, the local farming community, and a couple of mobile home parks.

6 *Imperial Valley Press*, February 27, 1909, September 17, 1910.
7 *Imperial Valley Press*, June 3, 1911.
8 http://en.wikipedia.org/wiki/Desert_Center,_California

Desert Driving and Automobile Roads

Automobiles began seriously replacing buckboards (four-wheeled wagons drawn by a horses or mules) about 1910.[9] Because of bad roads, the high-centered Model-T became the vehicle of choice. At that time, no maps, road signs, or service stations existed. Venturesome motorists in Southern California, faced with these circumstances, banded together in 1900 to form a touring club and began publishing a monthly magazine with tips on travel and directions to popular destinations (Von Till Warren 1980, p. 92 as cited in the CEC RSA, 2010). As desert driving could be perilous, motorists began advocating for better information and road assistance. In 1917, the U.S. Geological Survey erected signs directing travelers to water at 167 localities in California's desert (Thompson 1921 as cited in the CEC RSA, 2010). The California Department of Engineering, after paving its first auto road in 1912, began issuing maps in 1918 (Von Till Warren 1980, p. 92 as cited in the CEC RSA, 2010).

In 1915, the Chuckwalla Valley Road was essentially ninety miles of blow sand and cross washes with a couple of ruts. It was not until 1936 that U.S. Highway 60-70 between Indio and Blythe was paved (Norris and Carrico 1978 as cited in the CEC RSA, 2010). In 1968, this highway became Interstate 10 (I-10), a major transportation corridor through the Chuckwalla Valley today, connecting Los Angeles and Phoenix. Most other roads in the area remained unpaved.

Canals and Capital, Irrigation in the Colorado Desert

The paucity of water in the desert prior to irrigation made agriculture a challenge. Plans to improve matters began as early as 1880s. Thomas Blythe, an investor from San Francisco, bank rolled the construction of a canal in the Palo Verde Valley,[10] forty miles east of the project site. The water, taken from a swamp area called Olive Lake, was used to irrigate pasturelands and small agricultural plots. With Blythe's death in 1883, no further agricultural development in the valley occurred until the turn of the century. In 1904, the Palo Verde Land and Water Company purchased the Blythe Estate and began the task of constructing additional canals and intake structures. As previously mentioned, the desert entrymen formed the Chuckwalla Valley and Palo Verde Mesa Irrigation Association in 1913. Flood damages inflicted by the Colorado River, however, necessitated the formation of the Palo Verde Joint Levee District in 1917. The Palo Verde Drainage District was later established in 1921.[11] Two years later, the state legislature was petitioned to pass the Palo Verde Irrigation District Act in order to better administer both irrigation and drainage functions.

Although schemes to appropriate Colorado River waters began as early as 1859, the first major canal, the Alamo, was not constructed until 1901 (Harrington 1962 as cited in the CEC RSA, 2010). It conveyed water to the Imperial Valley for two years before becoming choked with silt (Von Till Warren 1980, p. 99 as cited in the CEC RSA, 2010). A temporary measure to bypass the blocked areas resulted in disaster when a spring flood in 1905 diverted the whole river into the Salton Sink, creating the body of water known today as the Salton Sea. The task of turning the

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[9] http://www.dustyway.com/2008/12/desert-driving-in-early-days.html
[10] http://www.pvid.org/History.html
[11] It is not clear whether the desert entrymen were involved in the formation of the drainage district.

river back into its main channel was extremely difficult and complicated by the fact that the canal had been built on both sides of the U.S.-Mexican border making the repair an international effort. In response to this disaster, the California Irrigation District Act was passed in 1911. The Imperial Irrigation District was subsequently formed to straighten out the mess, acquiring the properties from the bankrupt irrigation company.

In the first decade of the twentieth century, farmers in the Coachella Valley, west of the project site relied solely upon groundwater from artesian wells, planting extensive dates, figs, and grapes (Von Till Warren 1980, p. 98 as cited in the CEC RSA, 2010). By 1918, however, the water table had become seriously depleted. The Coachella Valley County Water District was subsequently formed to promote water conservation and control distribution. With completion of a new and improved "All-American Canal" to irrigate the Imperial Valley in 1940, communities in the Coachella Valley began forming plans to tap into it. The Coachella Canal, 122 miles long, was built nine years later.

The Colorado River Aqueduct is a water conveyance structure operated by the Metropolitan Water District of Southern California. It impounds water from the Colorado River at Lake Havasu on the California-Arizona border west across the Mojave and Colorado deserts to the east side of the Santa Ana Mountains. Its construction, between 1933 and 1941, required an army of 5,000 men. It is recognized as one of the engineering marvels of the modern world and was nominated as a National Historic Engineering Landmark by the American Society of Civil Engineers.[12], A portion of this aqueduct tunnels through the Coxcomb Mountains north of the Chuckwalla Valley and the project site.

Hydroelectric Power Transmission

During the late 19th century, history was made generating and transmitting electricity in Southern California's Inland Empire.[13] Pioneer engineers and entrepreneurs took the industry's first steps toward large-capacity power plants and long-distance power transmission nearly 125 years ago. Charles R. Lloyd and Gustavus Olivio Newman built California's first hydroelectric power plant in western Riverside County in 1887. It relied upon water from a canal in Highgrove at the base of a 50-foot elevation drop. It began by powering 30 outdoor arc lights (15 in Colton and 15 in Riverside) from a direct-current dynamo (Powers 2009 as cited in the CEC RSA, 2010).

In the early 1890s, direct current (DC) relied upon a distributed system involving many power plants and numerous short transmission lines because it was not practical to vary the voltage to meet differing consumer requirements for lighting and motorized appliances. Further, DC systems were inefficient because low-voltage transmission necessitated conveyance of high-currents through resistive conducting wires resulting in large energy losses. In contrast, Alternating current (AC) relied upon a centralized system involving fewer power plants, long-distance transmission lines, and transformers to step down the voltage, essentially enabling the conveyance of high-voltages at low-currents, thereby reducing resistance and energy loss.

12 http://www.mwdh2o.com/mwdh2o/pages/about/history4.swf
13 http://www.edison.com/files/backgrounder_mtview_historic.pdf

In September of 1893, while the dominant electric companies were fighting over the emerging electric power standards (DC versus AC), the small community of Redlands, in San Bernardino County, managed to engineer and complete the first commercially viable power plant in the United States (Myers 1983; Hay 1991 as cited in the CEC RSA, 2010). With the foresight of Almarian Decker, long-distance electric power transmission was achieved via transformers and the development of a revolutionary three-phase AC generator. Decker's power generation and delivery system was so successful that it became the Southern California standard.

Hydroelectricity, referred to as "white coal," was a clean and inexpensive source of power that enabled industrial capitalism to take hold in the West (Teisch 2001 as cited in the CEC RSA, 2010). Engineers began to dam western rivers for electricity in the 1890s, just as the hydraulic mining industry declined. Citizens, politicians, and reformers viewed electricity as a necessity that would dramatically uplift the country's standard of living. Water and power companies like Edison Light and Power Company of Los Angeles (later known as Southern California Edison), seeing big money, made every effort to control the stakes.

Before 1913, the highest voltage lines in the Los Angeles area were operated in the 10–75-kV range. Some of the earliest distribution lines were built to serve rural communities (Taylor 2005 as cited in the CEC RSA, 2010). During the 1930s, any circuits built were those that extended lines constructed a decade earlier. Many of these lines focused on following railroad spur lines and existing distribution lines to growing communities.

The first electricity came to Blythe in 1917. Two 50-watt diesel engines generated power 18 hours a day. It was not until 1930 that this system was abandoned when a 70-mile-long transmission line was constructed connecting Blythe with Calipatria in the Imperial Valley, where the line's main system was located. In the 1950s, the Blythe-Eagle transmission line was constructed. It was a 161-kV transmission line that connected the Blythe-Eagle Mountain Substation in Blythe to a substation near Eagle Mountain (Williams 2009; Myers 1983 as cited in the CEC RSA, 2010). The other transmission line in the vicinity of the project is the Palo Verde-Devers line, a 500-kV lattice tower transmission line constructed in 1982. It connects a plant in Arizona with a substation near Palm Springs.

Mining

Riverside County is known mostly for its sporadic, small-scale mining of gold, silver, lead, copper, uranium, fluorite, and manganese.[14] The following summary is derived from Shumway et al (1980), who provide an overview of mining in the region, focusing on areas relevant to the project area as cited in the CEC RSA, 2010.

Large numbers of prospectors were attracted to the region during the gold boom in La Paz (in western Arizona, approximately six miles north of present-day Ehrenberg) in 1862. Not long after, miners began combing the mountains on either side of the Chuckwalla Valley. Gold was being mined as early as 1865 in the Eagle Mountain District northwest of the project site. Much

[14] Exceptions include sizeable sustained mining operations at Midland for gypsum and in the Eagle Mountains for iron.

later, in the late 1940s, Kaiser Steel began a large-scale iron ore mining operation in the Eagle Mountains. In the Granite Mountains to the north-northwest, there was a short stint of gold mining beginning in 1894, followed by a resurgence in the late 1920s by the Chuckwalla Mining and Milling Corporation. Copper mining occurred in the Palen Mountains to the northwest during the second decade of the twentieth century, by the Fluor Spar Group, Homestake Group, Crescent Copper Group, Orphan Boy, and Ophir mines. Most of these mines were abandoned by 1917 (California State Mineralogist 1919 as cited in the CEC RSA, 2010).

The short-lived Pacific Mining District was established in 1887, in the Chuckwalla Mountains, south of the project site, following gold and silver discoveries that caused the most substantial rush to Riverside County in its history. Sixty claims were filed by the end of the year, but the boom fizzled by 1890 because the owners never had enough capital to work them properly (California State Mineralogist 1890 as cited in the CEC RSA, 2010). About 1898, some 40 claims in the area were taken up by the Red Cloud Mining Company. In 1901, a force of 50 men worked there. The company installed a new hoist and a 30-ton mill, and was raising money through stock offerings to construct a tram from the mine to the mill. The company changed hands some time before 1915, however, and soon folded. Just prior to this, half-a-dozen prospectors began working the Chuckwalla Placer Diggings near Chuckwalla Springs, three miles south of the project site. This lasted about fifteen years. The Red Cloud Mine was later resurrected, in 1931, when a small amalgamation plant was built, and continued operations until 1945.

Military Activities

Desert Training Center

In 1942, during World War II, Gen. George S. Patton established the Desert Training Center/ California-Arizona Maneuver Area (DTC/C-AMA) in a sparsely populated region of southeastern California, Arizona, and Nevada. Its purpose was to prepare tank, infantry, and air units for the harsh conditions of North Africa, practicing maneuvers, developing tactics, and field testing equipment (Meller 1946 as cited in the CEC RSA, 2010). The installation, in operation for two years (until the end of the war), was 16,000 square miles in extent. It was the first simulated theater of operations in the United States. Its location was chosen for its unforgiving desert heat, rugged terrain, available telephone communications system, and accessibility by established railroads and highways (Henley 1992, pp. 5–7; Howard 1985, pp. 273–274 as cited in the CEC RSA, 2010).

Seven camps were established for divisional use. Camp Young, near Indio, served as the main headquarters (Crossley 1997 as cited in the CEC RSA, 2010). Camp Desert Center was located between Chiriaco Summit and the community of Desert Center in T5S/R14E, Sections 26, 28, 30, 32, and 34; and T4S/R15E, Sections 1-15, 17, 18, 22, and 30-34 (Ickes 1942, pp. 1–2, as cited in Bischoff 2000, p. 58 as cited in the CEC RSA, 2010). It encompassed 34,000 acres, consisting of an encampment with temporary housing structures, an evacuation hospital, observers' camp, an ordnance campsite, quartermaster truck site, and maneuver area (USACOE 1993, p. 3 as cited in the CEC RSA, 2010). The Desert Center Army Airfield was situated just northwest of the community of Desert Center. It contained two paved runways, more than

40 buildings (officer's quarters, a mess hall, a dispensary, a headquarters building, a recreation hall, a link trainer building, a hangar, various supply buildings, an operations building, a power house, a pump house, a control tower), a well, and a 10,000-gallon water tower (Bischoff 2000, p. 93 as cited in the CEC RSA, 2010).

In 1986, BLM planned to nominate each of the seven division camps to the NRHP, to develop an interpretive program for the DTC/C-AMA, and to provide historical resources protection through designation as an Area of Critical Concern (ACEC) (Bischoff 2000, p. 134 as cited in the CEC RSA, 2010). Subsequently, Bischoff (2000, p. 133 as cited in the CEC RSA, 2010), in considering the historical and archaeological contexts for the DTS/C-AMA, found that it was a historically significant resource under all four criteria of the NRHP. As such, he recommended that the facility be nominated to the NRHP as a discontiguous district of clearly functionally and temporally related resources. He further proposed that the facility be recorded as multiple properties consisting of contributing and noncontributing elements of the district. DTC/C-AMA can be thought of as an interconnected landscape of WWII training sites that are highly significant for their association with Gen. George S. Patton and for their contributions to our understanding of how American soldiers were trained during WWII.

Desert Strike

During the Cold War years, relations between the United States and the Soviet Union were fragile. While a campaign promoting the nonproliferation of nuclear weapons began in 1958, a treaty was not signed until 1970. Thus, amid worries of nuclear war, a two-week training exercise was launched in 1964, called Desert Strike. It involved over 100,000 men, 780 aircraft, 1,000 tanks, and 7,000 other vehicles along the banks the Colorado River and adjoining desert valleys ranging over 150,000 square miles of California, Nevada, and Arizona (Garthoff 2001, p. 199; Nystrom 2003 as cited in the CEC RSA, 2010). Four Army divisions, three Army Reserve and National Guard brigades, and fifteen tactical Air Force squadrons took part.

The exercise was a two-sided enactment, with fictitious world powers "Calonia" and "Nezona" sharing a common border at the Colorado River. The premise of the conflict between these two entities, each led by a Joint Task Force, was a dispute over water rights. Major tactical operations during the exercise included deep armored offensive thrusts, defensive operations along natural barriers, counterattacks including airmobile and airborne assaults, and the simulated use of nuclear weapons. The Air Force provided fighter, air defense, interdiction, counter-air reconnaissance, and troop carrier operations in support of both joint task forces (Desert Strike n.d., p. 316 as cited in the CEC RSA, 2010).

In the first phase of Desert Strike, Calonia initiated mock battle with a full-scale invasion of Nezona. A new concept for military river crossings was put into operation during this invasion, accomplished with a combination of assault boats, amphibious armored personnel carriers, ferries, bridges, and fords at eight major sites along a 140-mile stretch of the Colorado River. The practice of attack and counterattack continued into a second phase, in which simulated nuclear strikes and airborne assaults were traded between the forces. Heavy equipment, such as the M60 tank, was used during practice maneuvers, and the track marks can still be seen across the desert (Prose and Wilshire 2000 as cited in the CEC RSA, 2010).

Cultural Resources Inventory

This subsection provides the results of cultural resource inventories for the project, including literature and records searches (California Historical Resources Information System (CHRIS) and local records), archival research, Native American consultation, and field investigations.

Background Inventory Research

To compile information on known cultural resources and previously conducted cultural resources studies pertinent to the location of the project, records searches were conducted at the Eastern Information Center (EIC, part of the CHRIS) at the University of California, Riverside. This study area was of the project footprint and a one-mile buffer around the archaeological Area of Potential Effects (APE[15]), exclusive of the transmission route. A supplemental records search was performed to cover the transmission corridor and a half-mile buffer area.

CHRIS Records Search

Twelve previous studies have been conducted within the study area (including the buffer area outside the APE). These are summarized in Appendix F, Cultural Resources Table 1. Less than 1 percent of the APE had been previously surveyed.

Four studies, related to Southern California Edison's Palo Verde-Devers Transmission Lines, were conducted north of the APE (Cowan and Wallof 1977; Wallof and Cowan 1977; Westec Services, Inc. 1982; Wilson 2009 as cited in the CEC RSA, 2010). These same four studies reported on a linear corridor south of the APE. Three additional linear studies, south of the APE, include two along I-10 related to a pipeline project and a safety project (Greenwood 1975; Hammond 1981 as cited in the CEC RSA, 2010) and a fiber optic project along Chuckwalla Road (Underwood et al. 1986 as cited in the CEC RSA, 2010). Several localized surveys, scattered both in and out of the APE, relate to geotechnical boring and pole replacement projects (Crew 1980; BLM 1980; Schmidt 2005 as cited in the CEC RSA, 2010). The remaining investigations include a survey along Corn Springs Road (Martinez et al. 2008 as cited in the CEC RSA, 2010) and a reconnaissance along the dunes on the southeast edge of Palen Dry Lake (Ritter 1981 as cited in the CEC RSA, 2010).

Previously Recorded Resources

Twelve previously recorded resources were identified within the study area, seven historic-period and five prehistoric archaeological sites (see Appendix F, Cultural Resources Table 2). Only one resource, a segment of historical Chuckwalla Road, crosses a portion of the archaeological APE

[15] The APE is defined in the regulations implementing the National Historic Preservation Act, and is the area within which an undertaking could directly or indirectly alter the character or use of historic properties (Title 36 CFR Part 800.16(d)).

(P-33-17766). The remaining six historical archaeological resources include four early-twentieth-century tin can scatters and two isolates (a tin can and a 1940s general infantry periscope-style flashlight).

Five prehistoric resources were identified outside the APE. These included: a remnant of a foot trail (CA-Riv-893T); a pottery sherd scatter (P-33-14160); a rock ring (P-33-14177); and an isolated quartz biface fragment (P-13591). One very large seasonal campsite, CA-Riv-1515, was identified and recorded by Ritter and Reed (1981 as cited in the CEC RSA, 2010) prepared an Area of Critical Environmental Concern (ACEC) management plan and environmental assessment for Palen Dry Lake and CA-Riv-1515. The ACEC is situated adjacent to the project site in an area encompassing 5.3 square miles. Further afield, outside the CHRIS study area, Gallegos et al. (1980 as cited in the CEC RSA, 2010) discuss two other prehistoric sites near Palen Dry Lake, found during a cultural resources inventory of the Central Mojave and Colorado Desert regions (no numerical designations were assigned). Typical archaeological remains underlying the dunes in that vicinity include tools of basalt and chert, flakes of chalcedony and obsidian, and pottery sherds (Gallegos et al. 1980, p. 106 as cited in the CEC RSA, 2010). Notes associated with a collection of about 300 artifacts from these sites are archived at the University of California Los Angeles.

A major aplite toolstone quarry (CA-Riv-1814) was found during investigations in 1980 (Singer as cited in the CEC RSA, 2010). It was determined eligible for the NRHP. Also recorded during that study was a very large site (CA-Riv-1383) spread over 45 acres. This site was also determined eligible for the NRHP.

Archival and Library Research

Along with conducting the records search, the General Patton Memorial Museum and the Palo Verde Historical Museum and Society were visited in order to learn more about regional history. The General Patton Museum is located at Chiriaco Summit near Desert Center and contains information about the Desert Training Facility and other military history related to the project area. The Palo Verde Museum, in Blythe, houses information on the history of the region, focusing heavily on the development of the Blythe community, as well as a comprehensive collection of local periodicals.

Other archival research was also performed, including the examination of historic topographic maps including: Chuckwalla Mountains (1:50,000 scale, 1947); Sidewinder Well (1:62,500 scale, 1952); Palen Mountains (1:48,000 scale, 1943); and Hopkins Well 1:48,000, 1943). In addition, other historic maps were accessed online from California State University, Chico, and the University of Alabama. Also reviewed were maps from the Malcolm Rogers collection on file at the Museum of Man in San Diego.

In addition, the University of California, Davis Shields Library was visited, and on-line searches for historic maps depicting the project area were completed. The following maps were examined:

1. Beale (1861), Map of Public Surveys in California, Scale 1:1,140,000.

2. American Photo-Lithographic Company (1865), California, Scale 1:5,069,000.
3. Asher and Adams (1872), California and Nevada- South Portion, Scale 1:1,267,000.
4. Williams (1873), Map of California and Nevada, Scale 1:3,485,000.
5. Colton (1873), Colton's California and Nevada, Scale 1:2,091,000.
6. Mitchell (1875), Map of the State of California, Scale 1:2,408,000.
7. Hardesty (1882), Map of California and Nevada, Scale 1:2,000,000;
8. Hardesty (1883), Map of Southeastern California, Scale 1:1,140,000.
9. Rand McNalley (1884), California, Scale 1:2,028,000.
10. Punnett Brothers (1897), Map of the State of California, Scale 1:2,218,000.
11. Rand McNalley (1897), California, Scale 1:1,190,000.
12. U.S. Geological Survey (1914), Lithologic Map of California, Scale 1:2,000,000.
13. Smith (1916), Geological Map of the State of California, Scale 1:760,320.

Archival and Library Research Results

Historical data was acquired on the project vicinity, but no additional cultural resources were identified in or near the project APE (Tennyson and Apple 2009 as cited in the CEC RSA, 2010). Additional historical information was assessed from the University of California Davis library and documents available online.

Local Agency and Organization Consultation

Various local historical societies, museums, and research institutions were contacted to request information for the project footprint and surrounding area. The following institutions were contacted by both formal letter and follow-up phone calls: General Patton Memorial Museum; Historic Resources Management Programs, University of California, Riverside; Palm Springs Historical Society; Palo Verde Historical Museum and Society; and Riverside County Historical Commission. The Bureau of Land Management's (BLM) Palm Springs-South Coast Field Office also had General Land Office (GLO) plat maps that informed this analysis, particularly concerning desert land entries, and various survey reports.

Local Agency and Organization Consultation Results

No responses were received from the various historical societies, museums, and research institutions contacted.

Native American Consultation

The Native American Heritage Commission (NAHC) maintains two databases to assist in identifying cultural resources of concern to California Native Americans. The NAHC's Sacred Lands database has records for places and objects that Native Americans consider sacred or otherwise important, such as cemeteries and gathering places for traditional foods and materials. The NAHC Contacts database has the names and contact information for individuals, representing a group or themselves, who have expressed an interest in being contacted about development projects in specified areas.

The NAHC was contacted to request a list of local Native Americans who might have concerns about the project and a search of the Sacred Lands Files for any known resources that might be affected by project impacts. The NAHC responded, indicating that one resource is located within a 1.0 mile radius of the project [believed to be archaeological site CA-Riv-1515]. The NAHC also provided a list of individuals representing local Native American communities.

Appendix F, Cultural Resources Table 3 provides a list of Native Americans contacted their affiliations, and responses, if any. Among those contacted were individuals from the Luiseño (Pauma Valley Band), Cahuilla (Cahuilla Band, Agua Caliente Band, Torres-Martinez Band, Ramona Band, Morongo Band), Serrano (San Manuel Band and Morongo Band), Mojave (Fort Mojave AhaMaKav Cultural Society and Colorado River Indian Tribes), and the Chemehuevi (Twentynine Palms Band and Chemehuevi Reservation, Colorado River Indian Tribes) tribes. Follow-up phone calls were made with all identified Native American groups/individuals.

With the Applicant’s filing of the application for a right-of-way grant, the BLM initiated formal, government-to-government tribal consultation pursuant to the NHPA as well as other laws and regulations. The NAHC was contacted by letter about the project, and provided a list of Native American contacts. BLM initiated Section 106 consultation in the early stages of project planning by letter in July 2009. To date, twelve tribes have been identified and invited to consult on this project, as listed below. Tribes were also invited to a general information meeting and proposed project site visit, held on January 25, 2009.

On February 10, 2010, the BLM met with the Ft. Yuma Quechan Tribal Council. The BLM provided information on several solar energy projects, including the project, and answered questions.

Letters requesting consultation among tribes, the California Energy Commission, the applicant, the State Historic Preservation Officer, and the Advisory Council on Historic Preservation to develop a cultural resources Programmatic Agreement (PA) for the PSPP were mailed out to the below-listed tribes on March 3, 2010.

1. Ramona Band of Mission Indians
2. Torres-Martinez Desert Cahuilla Indians
3. Augustine Band of Cahuilla Mission Indians
4. Agua Caliente Band of Cahuilla Indians
5. Morongo Band of Mission Indians
6. Twentynine Palms Band of Mission Indians
7. Ft. Yuma Quechan Indian Tribe
8. Colorado River Indian Tribes
9. Chemehuevi Reservation
10. Colorado River Reservation
11. San Manuel Band of Mission Indians
12. Quechan Indian Tribe
13. Fort Mojave Indian Tribe

An initial meeting regarding the PA was held on April 23, 2010, in Palm Desert, to which all interested tribes were invited. Tribes were also notified of a workshop on the SA/DEIS for the proposed action, held on April 29, 2010, in the BLM Palm Springs-South Coast Field Office, where BLM also held an informational meeting for the tribes on May 25, 2010. The BLM issued a draft cultural resources PA for the PSPP on June 17, 2010, allowing 30 days for public and Native American comment. Most recently, BLM held a meeting in Palm Desert on August 11, 2010, to review and discuss the revised draft PAs for the PSPP and the two other nearby proposed solar projects, and some Native Americans were in attendance. At this meeting, representatives of Californians for Renewable Energy (CARE) and of La Cuna de Aztlan Sacred Sites Protection Circle expressed concern over geoglyphs and other sacred sites and ancient trails that could be affected by solar development in the Chuckwalla Valley and on Palo Verde Mesa.

Results of Inquiries Made to Native Americans

Few comments from Native Americans have been received to date. The Luiseño Council Member requested continued consultation by email on July 10, 2009. As a result of the consultation efforts made to date, Native Americans have identified no additional cultural resources that could be impacted by the project.

The BLM is in ongoing discussions with various tribes pursuant to the cultural resources PA for the PSPP. A log of BLM's consultations with specific individuals and groups is provided in Appendix I of the PA for the PSPP signed October 7, 2010. The following tribes participated in the PA: Morongo Band of Mission Indians, Ramona Band of Mission Indians, Fort Yuma Quechan Indian Tribe, San Manuel Band of Mission Indians, Torres-Martinez Desert Cahuilla Indians, Fort Mojave Tribal Council, Twentynine Palms Band of Mission Indians, Agua Caliente Band of Cahuilla Indians Augustine Band of Mission Indians, Chemehuevi Tribal Council, And Colorado River Tribal Council. Native American comments and recommendations are addressed in Section 5.5, *Public Comment Process* and will be addressed in the PA for the PSPP.

Field Inventory Investigations

Class III cultural resource inventories of the project APE were conducted in several stages:

1. The main project footprint and originally proposed transmission line/substation locations were surveyed by AECOM April 13–May 6, 2009, and October 14–26, 2009 (Tennyson and Apple 2009; AECOM EDAW 2009a as cited in the CEC RSA, 2010);

2. Portions of a new transmission line and transmission line alternative were surveyed by AECOM in May, 2010(CEC RSA, 2010);

3. Other portions of the new and alternative transmission line routes, the new and alternative substation locations, and the alternative substation access road route were surveyed in 2010 by ECORP for the Desert Sunlight Project.(ECORP 2010).

Results of Class III Cultural Resource Inventory

A total of 64 archaeological sites and 298 isolates were found during the field inventories. These included 9 prehistoric and 54 historic-period archaeological sites and one built-environment transmission line dating from the 1950s (Tennyson and Apple 2009, pp. 57–124; AECOM EDAW 2009a, pp. 15–17as cited in the CEC RSA, 2010). These are classified and summarized below.

Prehistoric Resources

Nine prehistoric sites were identified during field inventories, including five sparse lithic scatters, and four sparse lithic and fire-affected rock (FAR) scatters containing minor quantities of additional artifacts/ecofacts including ground stone fragments of manos and metates, hammerstones, battered cobbles, choppers, scrapers, and bifaces, and marine shell (see Appendix F, Cultural Resources Table 4).

Historic-Period Resources

Historic-period resources include 54 sites, 35 of which are refuse scatters dating from the 1880s to 1950s (most originating between 1920s and 1940s), composed primarily of tin cans and minor amounts of glass fragments (see Appendix F, Cultural Resources Table 5). Two of these scatters are adjacent to WWII tank tracks but associations have not been established. The refuse scatters include food cans, tobacco tins, bottles, jars, oil cans, and automobile parts. The remaining 19 sites include 3 other segments of tank tracks, 3 possible placer mining claims, 2 survey markers, 1 corral, 1 road, 5 prospecting quartz reduction loci, and 4 rock cairn features.

Cultural Landscapes

Cultural landscapes are geographic areas associated with historic events or activities, or that exhibit other cultural or aesthetic values. They reveal aspects of our country’s origin and development through their resources, forms and features. The designation can be useful planning tools for managing historic, prehistoric and ethnographic resources. Some cultural resources in the project site may be contributing elements to potential cultural landscapes. The PA developed for the PSPP addresses the designation of cultural landscapes in relation to cultural resources affected by the project. Using a “landscape approach” to characterize groups of related cultural resources in the APEs, two potential cultural landscapes could be described as follows:

Prehistoric Trails Network Cultural Landscape

A Prehistoric Trails Network Cultural Landscape would consist of the Halchidhoma Trail through the Chuckwalla Valley and the associated joining and diverging trails (and trail-related features such as pot drops and rock cairns), and the varied loci of importance to prehistoric Native Americans that these trails connected. These loci included springs (and the dry lakes when they were not dry), food and materials resource areas, and ceremonial sites (geoglyphs, rock alignments, petroglyphs). The Halchidhoma Trail (CA-Riv-53T) does not run through the project site, but possible contributors to this potential cultural landscape within the project site include sparse lithic scatters and sparse lithic and FAR scatters. Immediately north of the APE, additional prehistoric sites were recorded that were later determined to be outside the current APE. These could also be included as part of a potential cultural landscape.

Other contributors to this potential landscape, outside the APE, could include:

1. CA-Riv-1383 (a 45-acre site west of the project site, with 170 petroglyphs, 3 trail segments, sparse lithic scatters, cleared rock circles, and other features);
2. CA-Riv-1814 (a major aplite quarry west of the project site);
3. P-33-14177 (a cleared circle south of the project site); and
4. CA-Riv-1515 (an extensive elongated scatter of cultural materials southeast of the project site).

Desert Training Center/California-Arizona Maneuver Area Cultural Landscape

Some of the refuse disposal sites within the project site date to World War II and relate to military activities. These have the potential to contribute to a broader DTC/C-AMA Cultural Landscape. Additional contributors to this potential landscape may be discovered during subsequent archaeological investigations and/or construction. Immediately north of the APE, a bivouac (SMP-H-RMA) was recorded with several cleared pads and tank tracks that were later determined to be outside the current APE. This site could also be included as part of a potential landscape.

Results of Survey for Built-Environment Resources. Field surveys were conducted for the built-environment in May 2009 and May 2010. Five resources were identified. These include: two wooden bridges built in 1931, a transmission line from the late 1950s, a school house dating to around 1935, and a complex of residential buildings and structures built between the 1920s and 1950s. These are referenced, respectively, as the Aztec Ditch Bridge (Caltrans Bridge 56C0102), the Tarantula Ditch Bridge (Caltrans Bridge 56C0103), the Blythe-Eagle Mountain 161-kV transmission line (SMP-H-1024), the Desert Center School House (P-33-6833), and SMP-B-MKM-001. With the exception of the transmission line, none are within the APE.

Summary of Identified Cultural Resources in the APE. A total of 64 cultural resources are present within the APE (not including isolated artifacts) either previously recorded or discovered during field investigations (Table 3.4-1). One historic structure and 63 archaeological sites are known. Of the archaeological sites, 9 are prehistoric and 54 are of the historic period. Of the prehistoric sites, 5 are sparse lithic scatters and four are sparse lithic and FAR scatters. Of the historical sites, 35 are refuse scatters (mostly cans dating to the 1920s–1940s), 3 are placer mining claims, and 2 are survey marker features. Additionally, 1 road, 1 corral, 3 sets of military tank tracks, 5 small prospecting quartz reduction loci, and 4 rock cairns were identified. Lastly, one electrical power transmission line is noted as a built-environment resource.

3.4.2 Determining the Historical Significance of Cultural Resources

A key part of any cultural resources analysis under NEPA and Section 106 of the NHPA is to determine which of the cultural resources that a proposed or alternative action may affect, directly or indirectly, are historically significant, Within the context of Section 106, historically significant refers to cultural resources that are listed on or eligible for listing on the National Register of Historic Places. Subsequent effects assessments are made for those cultural resources

TABLE 3.4-1
SUMMARY OF CULTURAL RESOURCES (PREVIOUSLY IDENTIFIED & NEWLY DISCOVERED) WITHIN THE APE

Archaeological	Prehistoric Sites	Lithic Scatters	5
		Lithic & FAR Scatters	4
	Historical Sites	Refuse Scatters	35
		Placer Mining Claims	3
		Survey Marker Features	2
		Roads	1
		Corral	1
		Military Tank Tracks	3
		Quartz Reduction Loci	5
		Rock Cairns	4
Built-Environment	Structures	Power Transmission Line	1
Total			**64**

that are determined to be historically significant. Cultural resources that can be avoided by construction may remain unevaluated if the values they possess are only informational in nature. Unevaluated cultural resources that cannot be avoided are managed for project purposes as historically significant and therefore eligible to the National Register of Historic Places under Section 106 when determining effects.

3.4.3 Evaluation of Historical Significance under NHPA Section 106

Cultural resources are considered during federal undertakings chiefly under Section 106 of the NHPA and its implementing regulations, 36 CFR Part 800. Properties of traditional, religious, and cultural importance to Native Americans are also considered under Section 101(d)(6)(A) of the NHPA.

The NHPA Section 106 process requires federal agencies to consider the effects of their undertakings on any district, site, building, structure, or object that is included in or eligible for inclusion in the NRHP and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on such undertakings (36 CFR § 800.1). Significant cultural resources (historic properties) are those resources, districts, sites, buildings, structures, or objects, that are listed in or are eligible for listing on the NRHP per the criteria listed at 36 CFR § 60.4 and presented below.

Per National Park Service (NPS) regulations, 36 CFR § 60.4, and guidance published by the NPS, National Register Bulletin, Number 15, How to Apply the National Register Criteria for Evaluation, different types of values embodied in districts, sites, buildings, structures, and objects are recognized. These values fall into the following categories:

1. Associate Value (Criteria A and B): Properties significant for their association with or linkage to events (Criterion A) or persons (Criterion B) important in our past.

2. Design or Construction Value (Criterion C): Properties significant as representatives of the man-made expression of culture or technology.

3. Information Value (Criterion D): Properties significant for their ability to yield important information about prehistory or history.

The quality of significance in American history, architecture, archaeology, engineering and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling and association. Cultural resources that are determined eligible for listing in the NRHP are termed “historic properties” under Section 106, and are afforded the same protection as sites listed in the NRHP.

NRHP determinations of eligibility have not yet been formally made for the cultural resources that might be affected by the project under any of the alternatives. BLM has informed all consulting parties in the Section 106 process what the agency’s proposed determinations will be and is currently seeking comments from the consulting parties on those determinations. Final determinations will be made in accordance with Section 106 or the PA that has been developed for the PSPP by the BLM in consultation with the California State Historic Preservation Officer, Indian tribes and other interested parties. Until NRHP eligibility determinations are formally made, the cultural resources potentially affected by the project will be assumed to be eligible for the purpose of assessing effects under all alternatives. The isolated artifacts found within the APE lack archaeological contexts and associations that would contribute meaningfully to an understanding of history or prehistory and are considered not eligible for listing in the NRHP.

3.5 Environmental Justice

Title VI of the Civil Rights Act of 1964 (Public Law 88-352, 78 Stat.241) prohibits discrimination on the basis of race, color, or national programs in all programs or activities receiving federal financial assistance.

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," focuses federal attention on the environment and human health conditions of minority communities and calls on agencies to achieve environmental justice as part of this mission (59 Fed. Reg. 7629, Feb. 16, 1994). The order requires the US Environmental Protection Agency (EPA) and all other federal agencies (as well as State agencies receiving federal funds) to develop strategies to address this issue. The agencies are required to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations.

The Council on Environmental Quality (CEQ) and EPA share oversight responsibility for the Federal Government's compliance with Executive Order 12898 and NEPA. The CEQ, in consultation with the EPA and other agencies, has developed guidance to assist Federal agencies with their NEPA procedures so that NEPA documentation effectively identifies and addresses environmental justice concerns. According to the CEQ's "Environmental Justice Guidance under the National Environmental Policy Act," agencies should consider the composition of the affected area to determine whether minority populations or low-income populations are present in the area affected by the proposed action, and if so whether there may be disproportionately high and adverse environmental effects (CEQ, 1997).

3.5.1 Minority Populations

The CEQ defines minority individuals as members of the following groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. A minority population, for the purposes of environmental justice, is identified when the minority population of the potentially affected area is greater than 50 percent or meaningfully greater than the percentage of the minority population in the general population or other appropriate unit of geographical analysis (CEQ, 1997).[1]

Figure 3.5-1 shows the distribution of minority populations within a six-mile radius of the center of the project site. A six mile radius was selected as a maximum reasonable distance for identifying potential environmental justice communities of concern for the project. Beyond that distance, most direct physical effects would typically be expected to be relatively diminished and the residents' daily interaction with the project would likely be relatively limited.

1 According to the CEQ guidelines, "Minority" is defined as all persons except non-Hispanic whites. In order words, minority is defined as all racial groups other than white, and all persons of Hispanic origin, regardless of race.

As shown, the radius encompasses parts of census block group 458.00.6. The total population of the block group within the six-mile radius is 17 of which 10 are classified as Black or African-American, American Indian (or Alaskan Native), Asian, Native Hawaiian (or other Pacific Islander, some other race (including two or more races), and/or Hispanic or Latino).[2]
Table 3.5-1 presents the minority population composition of the six-mile radius of the project site, the nearby city of Blythe, and Riverside County as a whole. Riverside County as a whole exhibits a proportion of minority residents of 49 percent, which is lower than the City of Blythe and the area within six miles of the project site. The minority population within a six-mile radius of the project site as well as the City of Blythe as the whole is more than 50 percent. Therefore both the very local resident population and the City of Blythe are determined to represent a community of concern for the purpose of environmental justice analysis.

TABLE 3.5-1
RACIAL AND INCOME CHARACTERISTICS FOR RESIDENTS WITHIN THE ENVIRONMENTAL JUSTICE STUDY AREA

Geographic Area (Census Block Group)	Total Population	Total Minority (Percentage Minority)	Median Household Income (1999)	Proportion of the Population Living Below the Poverty Level (Percentage Low-Income)
Six-mile radius of PSPP	17	10 (58.8%)	--	--
Block Group 458.00.6	1,440	-- --	$27,404	28.3%
Blythe	12,155	7,050 (58%)	$35,324	20.9%
Riverside County	1,545,387	756,556 (49%)	$42,887	14.2%

NOTE: Persons living within a six-mile radius used to determine minority population. Persons living within the applicable Census Block Group used to determine low income population. See Footnote 2.

SOURCE: U.S. Census, 2000.

3.5.2 Low Income Populations

Unlike the CEQ (1997) guidance on minority populations, none of the environmental justice guidance documents contains a quantitative definition of how many low-income individuals it takes to comprise a low-income population. In the absence of guidance, for this analysis the density used to identify minority populations (i.e., 50 percent or greater) was also used as a minimum to identify low-income populations. In addition, for the purposes of the FEIR analysis a local population is judged to be “meaningfully greater” than the general population if the proportion of individuals living under the poverty line is 100 percent greater than that of the general population.

2 To accurately map the affected population typically includes only U.S. census blocks that contain over 50 percent of the blocks’ geographic area within a six-mile radius of a proposed site. In the PSPP case, the census blocks surrounding the site are extremely large and capture populations that extend well beyond the six-mile radius. However, when using the same census blocks used to determine minority population, the low-income population would have accounted for zero persons. Therefore, the census data used to determine low-income population includes all census blocks intersected by the six-mile radius, regardless if over 50 percent of the blocks’ geographic area was contained within.

In this analysis, the current below-poverty-level population is based on Year 2000 U.S. Census block group data within a six-mile radius of the PPSP site. As shown in Table 3.5-1, the 2000 census data reported that the median household income for Riverside County was $42,887. The block group in which the Project is situated (Census Block Group 458.00.6) has a median household income at $27,404 and the highest proportion of residents below the poverty level– a proportion of low-income residents (28.3 percent) nearly twice that for Riverside County as a whole.

Consequently, it is conservatively judged that the Census Block Group 458.00.6 is identified as a low income population that represents a community of concern for the environmental justice analysis.

3.6 Lands and Realty

3.6.1 Introduction

BLM manages a diverse combination of lands and resources administered by BLM in eastern Riverside County, including, but not limited to, land uses for utility corridors, communication sites, land tenure (disposal, acquisition or easement) issues, land use authorizations (permits and rights-of-way), withdrawals and renewable energy activities. Within the immediate and surrounding areas of the project site, there are no communications sites, land use permits, leases or easements of record, nor are any land tenure issues identified in close proximity to or that would be affected by the project. There are, however, utility corridors, rights-of-way and renewable energy activities (Figure 4.1-1**)**, and a withdrawal application.

3.6.2 Background

Section 503 of Title V of the Federal Land Policy and Management Act of 1976, as amended, (FLPMA) required the establishment of corridors, to the extent practical, to minimize adverse environmental impacts and the proliferation of separate rights-of-way. Through its planning efforts, the Palm Springs-South Coast Field Office has designated corridors throughout the Field Office boundaries that generically are identified as “locally-designated corridors” and specifically are identified by an alphabetical reference.

Section 368 of the Energy Policy Act of 2005 directs the Secretary of the Departments of the Interior, Defense, Energy, Agriculture, and Commerce to designate corridors for oil, gas, hydrogen pipe and electric transmission lines on federal land in the 11 western states, perform necessary reviews, and incorporate those designations into land use, land management or equivalent plans. Implementing this section, the *Approved Resource Management Plan/Record of Decision for Designation of Energy Corridors on Bureau of Land Management-Administered Lands in the 11 Western States* signed January 14, 2009, established corridors (generically identified as “368 corridors” and specifically identified by a numerical reference) pursuant to Section 368 of the Energy Policy Act of 2005.

Further, lands identified in the Notice of Availability of Maps and Additional Scoping for the *Programmatic Environmental Impact Statement to Develop and Implement Agency-Specific Programs for Solar Energy Development* (Solar Energy Development PEIS or PEIS) released by the Departments of the Interior and Energy identified Solar Study Areas determined to have high potential for development of solar energy facilities. As a result of release of these maps, the BLM filed an application for withdrawal with the Secretary of the Interior identifying 676,048 acres of land in Arizona, California, Colorado, Nevada, New Mexico and Utah to be “withdrawn from settlement, sale, location or entry under the general land laws, including the mining laws, on behalf of the BLM to protect and preserve solar energy study areas for future solar energy development.” The Notice of Proposed Withdrawal, published June 30, 2009, in the Federal Register (74 Fed. Reg. 31,308), segregated certain lands for up to two years to provide time for various studies and analyses in support of a final decision on the withdrawal application. The lands remain open to discretionary actions, such as rights-of-way and land use permits, and to the mineral sales and leasing laws.

3.6.3 Existing Condition

The project site lies within land segregated by the above-referenced withdrawal application. The project area is BLM-managed public land classified as Multiple-Use Class M (Moderate Use) in the CDCA Plan. The project includes one 40-acre parcel of private land (APN: 810-110-007), the use of which is covered by Riverside County General Plan – Eastern Riverside County Land Use Plan, and Riverside County General "Open Space-Rural" land use policies LU 20.1, LU 20.2 and LU 20.4. Reconfigured Alternative 2 would involve two additional parcels of private land also designated in the Riverside County General Plan as "Open Space-Rural" (CEC RSA, 2010).

Interstate-10 lies within a 368 corridor identified as "Corridor 30-52, 2 miles in width" as well as within locally-designated Corridor K (2 miles in width); these corridors are shaded green along I-10 in Figure 4.1-1 and lie south of the project site on a generally east-west heading. Numerous other linear rights-of-way also lie within and to the north and south of these two designated overlapping corridors.

Southern California Edison's existing 161 kV Eagle Mountain-Blythe power line runs in a northwesterly direction across the southwest portion of the proposed project site.

The southern portion of the project site would lie within the northern portion of both designated corridors. The redundant telecommunications line, the fiber optic cable and the majority of the gen-tie line would lie wholly within Corridors K and 30-52.

Two alternative routes for the new 12.47 kV temporary distribution line to provide power during construction have been identified and analyzed in this PA/FEIS. The distribution line would either lie wholly or partially within the designated corridors, depending on the route selected.

Site access would be from an extension of Corn Springs Road at the I-10 interchange. Corn Springs Road currently runs north-south across I-10 and terminates just north of the I-10 overpass. From this dead-end, Corn Springs Road would be extended about 1,350 feet to the north to connect with a new access road running east into the project site. A second road with secured gate would be constructed from the northern edge of the I-10 right-of-way boundary to the southern portion of the solar plant site to provide emergency access. Both roads would lie within the northern portion of Corridors K and 30-52.

Several transmission line projects are, or are planned for, existing corridors. The Devers-Palo Verde No. 1 (DPV1) is an existing 500 kV transmission line which spans approximately 128 miles of land within California paralleling I-10: it is within Corridors K and 30-52. The Blythe 230 kV Transmission Line Project involves building two 230 kV transmission lines spanning approximately 70 miles between the Julian Hinds and Bucks substations, and construction of a new midpoint substation: it is within the existing federally-designated utility corridors along I-10. The Devers-Palo Verde 2 Transmission Line Project, approved by the CPUC in January 2007, involves the construction of two 500 kV transmission lines along the south side of I-10, parallel to the existing DPV1 transmission line route.

3.7 Livestock Grazing

As shown on Map 2-8 of the Approved Northern and Eastern Colorado Desert Coordinated Management Plan (BLM CDD, 2002), there are no livestock grazing allotments within or adjacent to the project area or right-of-way application area.

3.8 Mineral Resources

3.8.1 Geologic Environment

Depending on the published reference, the project site is located in either the eastern portion of the Mojave Desert geomorphic province, or the northeastern quarter of the Colorado Desert geomorphic province (CEC RSA, 2010), in the Colorado Desert in Riverside County, California. The region is more characteristic of the Mojave Desert geomorphic province in terms of geology, structure and physiography. The Mojave Desert is a broad interior region of isolated mountain ranges which separate vast expanses of desert plains and interior drainage basins. The physiographic province is wedge-shaped, and separated from the Sierra Nevada and Basin and Range geomorphic provinces by the northeast-striking Garlock Fault on the northwest side. The northwest-striking San Andreas Fault defines the southwestern boundary, beyond which lie the Transverse Ranges and Colorado Desert geomorphic provinces. The topography and structural fabric in the Mojave Desert is predominately southeast to northwest, and is associated with faulting oriented similar to the San Andreas Fault. A secondary east to west orientation correlates with structural trends in the Transverse Ranges geomorphic province.

The project site is situated on an alluvial fan within the northwest-trending Chuckwalla Valley between the Chuckwalla Mountains to the southwest, and the Palen Mountains to the northeast. Overall, the site slopes at very shallow grades north and northeast toward the local topographic low at Palen Dry Lake.

Quaternary age alluvial, lacustrine and eolian sedimentary deposits are mapped in the vicinity of the proposed site (CEC RSA, 2010). Marine and transitional sediments of the Pliocene Age Bouse Formation are presumed to underlie alluvial fan deposits, and metasedimentary bedrock of the McCoy Mountains Formation outcrop in the McCoy and Palen Mountains (CEC RSA, 2010). The local stratigraphy, as interpreted by numerous authors, is presented in Table 3.8-1.

Holocene units, which include eolian sands, younger alluvium, and playa lake deposits, are mapped over nearly the entire project site surface. Eolian sands consist of unconsolidated deposits of well sorted, wind-blown sand in dunes and sheets. Younger alluvium is composed of sand, pebbly sand and sandy pebble-gravel, and is generally coarser grained closer to mountain ranges. Desert varnish is not well developed in the mostly unconsolidated and undissected sediments. Playa lake deposits are also unconsolidated, and are comprised of clay, silt, and sand. Older alluvium is present at the surface along the northern edge of both the western (entire length) and eastern (west end only) portion of the project site. The exposures of older alluvium occur as north-south oriented ridges of material protruding into the site from the north, with the intervening areas occupied by drainages filled with younger alluvium. Older alluvium is composed of consolidated gravel and sand that is moderately dissected with moderately developed desert pavement and varnish.

TABLE 3.8-1
CORRELATION AND AGES OF STRATIGRAPHIC UNITS

<table>
<tr><th>Age</th><th>Unit/Description</th><th>Jennings (CDMG 1967)</th><th>Stone (USGS 1990)</th><th>Stone (USGS 2006)</th></tr>
<tr><td rowspan="2">Holocene</td><td>Alluvium of modern washes</td><td rowspan="2">Qal</td><td>Qw</td><td>Qw</td></tr>
<tr><td>Alluvial-fan and alluvial-valley deposits</td><td rowspan="3">QTa</td><td>Qa$_6$</td></tr>
<tr><td>Holocene ± Pleistocene</td><td>Alluvial-fan deposits (Intermediate Alluvium)</td><td rowspan="2">Qc</td><td>Qa$_3$</td></tr>
<tr><td>Pleistocene</td><td>Alluvial deposits of Palo Verde Mesa</td><td>Qpv</td></tr>
<tr><td>Pleistocene ± Pliocene</td><td>Alluvial deposits of the McCoy Wash area</td><td>QP</td><td>QTfg</td><td>QTmw</td></tr>
<tr><td>Pleistocene ± Miocene</td><td>Alluvial-fan and alluvial-valley deposits (Older Alluvium)</td><td>Qc$_o$</td><td>QTdf</td><td>QTa$_2$</td></tr>
<tr><td>Pliocene ± Miocene</td><td>Bouse Formation[a]</td><td>Pu</td><td>Tbx</td><td>Tbx</td></tr>
<tr><td>Cretaceous and Jurassic?</td><td>McCoy Mountains Formation[b]</td><td>ms, mv</td><td>Km*(x)*, Kja, Kima?</td><td>Km*(x)*, Kja, Kima?</td></tr>
</table>

NOTES:
[a] Not mapped at the surface within the BSPP area and expected to present at depth below the alluvial-filled basin.
[b] Mapped only in a small portion at the southwest corner and expected to present at shallow depths near the McCoy Mountains.

SOURCE: CEC RSA, 2010 (Table 2)

Exploration drilling conducted in 1978 by the U.S. Geological Survey (USGS) resulted in two boreholes in the Palen Dry Lake area, one of which lies within the boundaries of the project solar field. U.S. Geological Survey Borehole PDL#1 was advanced to a depth of 505 feet below ground surface (bgs) near the north-central boundary of Section 27 near the northeast corner of the proposed project right-of-way. The lithologic log of PDL#1 indicates the subsurface near the northern site boundary is composed of moderately to thickly bedded sands, gravels, and clays to a depth of approximately 55 feet where a transition to overall clay dominated formation takes place and continues to the total depth of the borehole. The interbedded clays, sands, and gravels probably represent periods of primarily lakebed deposition interspersed with episodes of coarse sediment transport from the nearby Chuckwalla and Palen Mountains. A gravel dominated bed present from approximately 90 to 110 feet also attests to a period of clastic deposition during a period of primarily lakebed sedimentation (CEC RSA, 2010). A water exploration well, 06S/17E-03M01S, which was drilled in 1958 in what is now the southeast portion of the project site reportedly had a similar stratigraphic column with 48 feet of coarse alluvium overlying strata which are clay dominated to a depth of 818 feet bgs (CEC RSA, 2010).

A preliminary geotechnical investigation including 13 exploratory borings and eight test pits has been completed for the general area of the project site (CEC RSA, 2010). The preliminary geotechnical investigation reveals that the project site is underlain by alluvial and eolian deposits of Pleistocene through Holocene age, which consist of dune sands, alluvium and lake deposits to the depths explored (approximately 76.5 feet bgs). The project site is generally surfaced with unconsolidated soils due to desiccation and/or wind deposition to a maximum depth of 2 feet bgs. The soils below the surficial materials are generally medium dense to very dense poorly graded sand with varying amounts of silt, silty sand and clayey sand. Firm to very hard sandy clays are locally present as interbedded layers 5 to 10 feet thick at depths generally greater than 25 feet bgs. Near-surface site soils are primarily granular with no to low swell potential; however, potentially expansive soils were observed at the ground surface in the northeastern portion of the site (CEC RSA, 2010). Loose dune sand also was observed at the ground surface and at depth in the southwestern portion of the site (CEC RSA, 2010). Collapse potential tests indicate the site soils exhibit a collapse potential in the range of 0 to 3.0 percent when inundated with water.

The proposed solar fields are not crossed by any known active faults or designated Alquist-Priolo Earthquake Fault Zone (EFZ, formerly called Special Studies Zones). A number of major, active faults lie within 62 miles of the site. These faults are discussed in detail in Section 3.12, *Public Health and Safety,* under the Geologic Hazards heading. Several northwest-striking, south-dipping basement thrust faults are mapped at the extreme southern end of the Palen Mountains, and are inferred beneath Quaternary and Tertiary sediments in Chuckwalla Valley. The faults are part of a major Mesozoic terrain-bounding structural zone that was active during late Jurassic time, and are associated with folding and metamorphism in the Palen and McCoy Mountains. The basement faults are no longer active, and are not exposed anywhere on the surface of the proposed site.

Little is known regarding the depth to bedrock beneath the site. Gravity investigations indicate the Chuckwalla Valley overlies three alluvium filled sub-basins separated by east to northeast-trending subsurface basement ridges. Gravity data indicate basin fill in Chuckwalla Valley ranges from approximately 650 feet deep across faulted subsurface basement ridges to greater than 6,000 feet deep near the sub-basin centers. Analysis of gravity anomalies indicates the crystalline basement beneath the sediment filled basins is highly faulted and structurally complex. Review of gravity anomaly data suggests the project site is underlain at an undetermined depth by faulted tertiary non-marine and marine sedimentary, pyroclastic, and volcanic rocks.

The ground water level beneath the site was measured as part of Solar Millennium’s water resources investigation. Depth to water beneath the site in well 06S/17E-03M01S was reportedly 180 feet bgs on May 22, 2009. Subsurface exploration performed at the site encountered ground water at depths of 68 and 73 feet below existing grade; however, this occurrence of ground water is believed to be associated with perched conditions and not indicative of the true water table.

3.8.2 Mineral Resources Potential

Lands identified in the Notice of Availability of Maps and Additional Public Scoping for the *Programmatic Environmental Impact Statement to Develop and Implement Agency-Specific Programs for Solar Energy Development* (Solar Energy Development PEIS or PEIS) released by the Departments of the Interior and Energy identified Solar Study Areas determined to have high potential for development of solar energy facilities. As a result of the release of these maps, the BLM filed an application for withdrawal with the Secretary of the Interior identifying 676,048 acres of land in Arizona, California, Colorado, Nevada, New Mexico and Utah to be "withdrawn from settlement, sale, location or entry under the general land laws, including the mining laws, on behalf of the BLM to protect and preserve solar energy study areas for future solar energy development." The Notice of Proposed Withdrawal, published June 30, 2009 in the Federal Register (Vol. 47 No. 124), segregated certain lands for up to two years to provide time for various studies and analyses in support a final decision on the withdrawal application. The lands remain open to discretionary actions, such as rights-of-way and land use permits and to the mineral leasing laws.

As described in the RSA for the project, the project site is mapped as Mineral Resource Zone (MRZ)-4. This classification identifies "areas of no known mineral occurrences where geologic information does not rule out either the presence or absence of industrial mineral resources." No economically viable mineral deposits are known to be present at the site, and no mines are known to have existed within the proposed project boundaries (CEC RSA, 2010). Many inactive mines and mineral prospects are hosted by metamorphic and intrusive basement rocks within 10 miles of the proposed project boundary, primarily in the Palen and Chuckwalla Mountains. These have produced a number of precious and base metals, including iron (magnetite) and pyrophyllite. Minor gold, silver, copper and uranium prospects are located in the Palen Mountains northeast of the project site. The Black Jack Mine in the northern McCoy Mountains about 16 miles northeast of the site is known as the most productive and most extensively worked manganese mine in the southern California. This manganese mine was active during war times and in the 1950s to produce several thousand tons of manganese. This area is within the Ironwood Manganese District of approximately 1.4-square-mile surface area. Other mining areas, including the Blue Bird Mine area, St. John Mine area, and George Mine area also are located in the northern McCoy Mountains and have produced manganese, copper, and a small amount of silver and gold in the past. Uranium has been claimed in the southern McCoy Mountains about 22 miles east of the project site with reported past production by Caproci-Woock Groups. There are several other prospective or claim areas for minerals in the McCoy Mountains including manganese, copper, silver, gold, and uranium. The Roosevelt and Rainbow group of mines in the Mule Mountain district, also known as the Hodges Mountain district that is located about 26 miles southeast of the project site, have produced some gold and copper from the quartz veins in granitic rocks.

The nearest oil and gas fields are located more than 150 miles west of PSPP site in the Los Angeles Sedimentary basin. The nearest geothermal field is located at Brawley just south of the Salton Sea in the Imperial Valley basin about 40 miles southwest of project site (CEC RSA, 2010).

Several gravel borrow pits are present along Interstate 10 (I-10) south of the proposed site, and the presence of alluvial fan materials at the proposed project location means that the property could be accessed and developed as a source of salable sand and gravel resources. During construction, Solar Millennium may need or desire to move sand and gravel either off-site, or between the different units of the facility. Should this occur, Solar Millennium would be required to comply with the regulations in 43 CFR Part 3600, which regulate the production and use of sand and gravel from public lands. Use of sand and gravel or other mineral materials within the boundaries of an authorized right-of-way is permitted; however, removal of these materials from an authorized right-of-way would require payment to the United States of the fair market value of those materials.

Locatable Minerals

There are no active mining claims within the project area nor is there any locatable mineral activity within the boundaries of the project area. Based on the geological environment and historical trends, the potential for occurrence of locatable minerals is low within the project area.

Leasable Minerals

There are no mineral leases within the project area.

The BLM's Prospectively Valuable maps for leasable minerals show that there is low potential for the occurrence of oil and gas, oil shale or tar sands, coal, sodium, potassium and phosphate. However, the area is identified as prospectively valuable for geothermal resources.

Saleable Minerals/Mineral Materials

Sand and gravel deposits are ubiquitous throughout the project area and the region. There is potential for the project to use mineral materials on or near the site for its own construction needs after proper permitting for use of the material.

3.9 Multiple Use Classes

Under FLPMA Section 601, the BLM has developed the CDCA Plan to "provide for the immediate and future protection and administration of the public lands in the California desert within the framework of a program of multiple use and sustained yield, and the maintenance of environmental quality." In this context, the term "multiple use" means the management of the public lands and resource values so that, among other things, they are used in "a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historical values" (FLPMA, 2001 Section 103).

The CDCA Plan includes a classification system that places BLM-administered public lands within the planning area into one of four multiple-use classes, based on the sensitivity of the resources and types of uses for each geographic area. The class designations govern the type and degree of land-use actions allowed within the areas defined by class boundaries. CDCA lands in Eastern Riverside County are assigned to the classes in the proportions shown in Table 3.9-1.

TABLE 3.9-1
MULTIPLE-USE CLASS DESIGNATIONS

Class	Acreage	% of Total Planning Area Public Lands
C	576,858	38
L	550,087	36
M	399,024	26
I	0	0
U	1,886	0
Total	***1,527,855***	***100***

Descriptions of the multiple-use classes are:

Class C: Multiple-use Class C (Controlled) has two purposes. First, it shows those areas which are being "preliminarily recommended" as suitable for wilderness designation by Congress. This process is explained in the Wilderness Element of the CDCA Plan (BLM, 1980). Second, it will be used in the future to show those areas formally designated as "wilderness" by Congress.

The Class C Guidelines are different from the guidelines for other classes. They summarize the kinds of management likely to be used in these areas when and if the areas are formally designated wilderness by Congress. These guidelines will be considered in the public process of preparing the final Wilderness Study Reports. However, the final management decisions depend on Congressional direction in the legislation that makes the formal designation.

Class L: Multiple-use Class L (Limited Use) protects sensitive natural, scenic, ecological, and cultural resource values. Public lands designated as Class L are managed to provide for generally lower-intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished.

Class M: Multiple-use Class M (Moderate Use) is based upon a controlled balance between higher-intensity use and protection of public lands. This class provides for a wide variety of present and future uses such as mining, livestock grazing, recreation, energy, and utility development. Class M management is also designed to conserve desert resources and to mitigate damage to those resources which permitted uses may cause.

Class I: Multiple-Use Class I is an “Intensive use” class. Its purpose is to provide for concentrated use of lands and resources to meet human needs. Reasonable protection will be provided for sensitive natural and cultural values. Mitigation of impacts on resources and rehabilitation of impacted areas will occur insofar as possible.

Unclassified Lands: Scattered and isolated parcels of public land in the CDCA that have not been placed within multiple-use classes are “unclassified” land. These parcels will be managed on a case-by-case basis, as explained in the Land Tenure Adjustment Element of the CDCA Plan.

Plan Elements: The CDCA Plan Elements provide specific application of the multiple-use class guidelines for specific resources or activities about which the public has expressed significant concern.

The project is on lands designated as MUC-M. The multiple-use class guidelines (BLM, 1980 Table 1) describe land use and resource-management guidance guidelines for 19 land uses and resources as they apply to each class. For MUC-M lands, applicable guidelines from the CDCA Plan, Table 1 are as included in Table 3.9-2.

TABLE 3.9-2
MULTIPLE-USE CLASS-M LAND USE AND RESOURCE MANAGEMENT GUIDELINES

Land Uses / Resources	MUC-M Guidelines
1. Agriculture	Agricultural uses (excluding livestock grazing) are not allowed.
2. Air Quality	These areas will be managed to protect their air quality and visibility in accordance with Class II objectives of Part C of the Clean Air Act Amendments unless otherwise designated another class by the State of California as a result of recommendations developed by any BLM air-quality management plan.
3. Water Quality	Areas designated in this class will be managed to minimize degradation of water resources. Best management practices, developed by the Bureau during the planning process outlined in the Clean Water Act, Section 208, and subsequently, will be used to keep impacts on water quality minimal and to comply with Executive Order 12088.
4. Cultural and Paleontological Resources	Archaeological and paleontological values will be preserved and protected. Procedures described in 36 CFR 800 will be observed where applicable. A Memorandum of Agreement has been signed by the BLM, the California State Historic Preservation Officer, and for cultural resources the President's Advisory Council on Historic Preservation to protect cultural resources.
5. Native American Values	Native American cultural and religious values will be preserved where relevant and protected where applicable. Native American group(s) shall be consulted. Memorandums of Agreement and Understandings have been signed between BLM and the Native American Heritage Commission pertaining to Native American concerns and cultural resources.
6. Electrical Generation Facilities	All types of electrical generation plants may be allowed in accordance with State, Federal, and local laws. Existing facilities may be maintained and upgraded or improved in accordance with special-use permits or by amendments to rights-of-way. • Nuclear and Fossil Fuel may be allowed in accordance with Federal, State and local laws. • Wind/Solar may be allowed after NEPA requirements are met. • Geothermal may be allowed pursuant to licenses issued under 43 CFR Section 3250 et seq. NEPA requirements will be met.
7. Transmission Facilities	New gas, electric, and water transmission facilities and cables for interstate communication may be allowed only within designated corridors (see Energy Production and Utility Corridors Element). NEPA requirements will be met. Existing facilities within designated corridors may be maintained and upgraded or improved in accordance with existing rights-of way grants or by amendments to right-of-way grants. Existing facilities outside designated corridors may only be maintained but not upgraded or improved.
8. Communication Sites	New sites may be allowed. NEPA requirements will be met. A 30-day public comment period is required for environmental assessments for long distance line-of-site communication systems of three or more sites. Existing facilities may be maintained and utilized in accordance with right-or-way grants and applicable regulations.
9. Fire Management	Fire suppression measures will be taken in accordance with specific fire management plans subject to such conditions as the authorized officer deems necessary, such as use of motorized vehicle, aircraft, and fire retardant chemicals.
10. Vegetation	Removal of vegetation, commercial or non-commercial, may be allowed by permit only after NEPA requirements are met and after development of necessary stipulation. Harvesting by mechanical means may be allowed by permit only. All state and federally listed species will be fully protected. Actions which may jeopardize the continued existence of federally listed species will require consultation with the U.S. Fish and Wildlife Service. Identified sensitive species will be given protection in management decisions consistent with BLM policies.

TABLE 3.9-2 (Continued)
MULTIPLE-USE CLASS-M LAND USE AND RESOURCE MANAGEMENT GUIDELINES

Land Uses / Resources	MUC-M Guidelines
10. Vegetation (cont.)	Identified UPAs will be considered when conducting all site-specific environmental impact analyzes to minimize impact. See also Wetland/Riparian Areas guidelines. Mechanical control may be allowed, but only after consideration of possible impacts. Aerial broadcasting application of chemical controls will not be allowed. Spot application will be allowed after site-specific planning. Types and uses of pesticides, in particular herbicides, must conform to Federal, State, and local regulations (see Vegetation Element). Exclosures may be allowed. Prescribe burning may be allowed after development of a site-specific management plan.
11. Land-Tenure Adjustment	Sale of public land may be allowed in accordance with FLPMA and other applicable Federal laws and regulations. Sales in WSAs will not be allowed until after Congressional action.
12. Livestock Grazing	Grazing will be allowed subject to the protection of sensitive resources. Support facilities such as corrals, loading chutes, water developments, and other facilities, permanent or temporary, will be allowed. Manipulation of vegetation by chemical or mechanical means may be allowed and may be designed, developed, and managed for intensive livestock use.
13. Mineral Exploration and Development	Except as provided in Appendix 5.4, 516, DM 6, NEPA procedures titled “Categorical Exclusions”, prior to approving any lease, notice, or application that was filed pursuant to 43 CFR 3045, 3100, 3200, 3500 and S.O. 3087, as amended, an EA will be prepared on the proposed action. Mitigation and reclamation measures will be required to protect and rehabilitate sensitive scenic, ecological, wildlife vegetative and cultural values. Location of mining claims is nondiscretionary. Operations on mining claims are subject to the 43 CFR 3809 Regulations and applicable State and local law. NEPA requirements will be met. BLM will review plans of operations for potential impacts on sensitive resources identified on lands in this class. Mitigation, subject to technical and economic feasibility, will be required. Except as provided in Appendix 5.4, 516 DM 6, NEPA Procedures titled “Categorical Exclusions”, new material sales locations, including sand and gravel sites, will require an EA. Continued use of existing areas of sand and gravel extractions is allowed subject to BLM permits as specified in 43 CFR 3600.
14. Motorized-Vehicle Access/Transportation	Motorized-vehicle use will be allowed on “existing” routes of travel unless closed or limited by the authorized officer. New routes may be allowed upon approval of the authorized officer. Vehicle use on some major significant dunes and dry lakebeds may be is allowed (see Motorized Vehicle Access Element). Periodic or seasonal closures or limitations of routes of travel may be required. Access will be provided for mineral exploration and development. Railroads and trams may be allowed. Airports and landing strips may be allowed by lease subject to conformance with county or regional airport loans and FAA and DOD approval.
15. Recreation	This class is suitable for a wide range of recreation activities which may involve moderate to high user densities. Recreational opportunities include those permitted in Class L. Competitive motorized vehicle events are limited to “existing” routes of travel and must be approved by the authorized officer. Pit, start, and finish areas must be designated by the authorized officer. All competitive events and organized events having 50 or more vehicles require permits. Permanent or temporary facilities for resource protection and public health and safety are allowed. Trails are open for non-vehicle use and new trails for non-motorized access may be allowed.

TABLE 3.9-2 (Continued)
MULTIPLE-USE CLASS-M LAND USE AND RESOURCE MANAGEMENT GUIDELINES

Land Uses / Resources	MUC-M Guidelines
16. Waste Disposal	Public lands managed by BLM may not be used for hazardous or non-hazardous waste disposal. Where locations suitable for such disposal are found on BLM managed lands, consideration will be given to transfer of such sites to other ownership for this use. This amendment applies to waste normally handled through landfills or other waste management facilities. It does not apply to mining waste, including tailings and/or chemicals used in processing ore.
17. Wildlife Species and Habitat	All State and federal listed species and their critical habitat will be fully protected. Actions which may affect or jeopardize the continued existence of federally listed species will require formal consultation with the U.S. Fish and Wildlife Service in accordance with Section 7 of the Endangered Species Act. Identified species will be given protection in management decisions consistent with BLM policies. Control of depredation wildlife and pests will be allowed in accordance with existing State and Federal laws. Same as Classes C and L, except that chemical and mechanical vegetation manipulation may be allowed. Reintroduction or introduction of native species or established exotic species is allowed.
18. Wetland-Riparian Areas	Wetland/riparian areas will be considered in all proposed land-use actions. Steps will be taken to provide that these unique characteristics and ecological requirements are managed in accordance with Executive Order 11990, Protection of Wetlands (42 CFR 26951), legislative and Secretarial direction, and BLM Manual 6740, “Wetland Riparian Area Protection and Management” (10/1/79), as outlined in the Vegetation Element.
19. Wild Horses and Burros	Populations of wild and free-roaming horses and burros will be maintained in healthy, stable herds, in accordance with the Wild and Free-Roaming Horse and Burro Act of 1971 but will be subject to controls to protect sensitive resources. (See Wild Horse and Burro Element.)

3.10 Noise

The project site is located in the Colorado Desert in the eastern part of Riverside County, approximately 0.5 mile north of Interstate 10 (I-10) at the Corn Springs Road intersection. The site is in a remote area of primarily undeveloped land, with open space and some land developed as a nursery. The small community of Desert Center is located approximately 10 miles west of the site, along I-10.The predominant noise source in proximity to the project site is vehicular traffic on I-10.

Sensitive noise receptors are places that are sensitive to excessive noise levels, such as residential areas where noise can interfere with sleep, concentration, and communication, and can cause physiological and psychological stress and hearing loss. In addition, wildlife management areas where breeding could be disturbed are considered sensitive receptors to noise. One residence is located approximately 25 feet from the northwest corner of the proposed right-of-way boundary, but over one mile from the nearest proposed power block. The power block would be the major source of the power plant's noise during the facility's operation. Another residence is located approximately 3,500 feet northwest of the project site boundary and well over a mile from the nearest power block (CEC RSA, 2010).

The bighorn sheep Wildlife Habitat Management Area (WHMA), approximately 2.5 miles northeast of the site, is a sensitive noise receptor due to the presence of breeding Nelson's bighorn sheep. Sensitive bird nesting habitat also occurs in adjacent creosote scrub and desert dry wash woodland.

3.10.1 Ambient Noise

The Applicant conducted a baseline survey to establish an ambient noise level. Ambient noise levels were measured near the western boundary of the site, near the two residences on May 18 to May 19, 2009. One long-term measurement was taken at the two nearest residences over a 25-hour period between 6:51 p.m., May 18, and 7:51 p.m., May 19, 2009 (see Table 3.10-1). The survey was performed using standard acoustical measurement techniques. Figure 4.9-1 (see Section 4.9, *Impacts on Noise*) depicts the noise measurement sites and the nearest residence locations.

TABLE 3.10-1
SUMMARY OF MEASURED NOISE LEVELS

Measurement Sites	Measured Noise Levels, dBA	
	Average During Daytime Hours L_{eq}	Average During Nighttime Hours L_{eq}
LT1, Nearest Residence	43[a]	34[b]
LT2, Second Nearest Residence	43[a]	34[b]

[a] Staff calculations of average of the daytime hours.
[b] Staff calculations of average of the nighttime hours

SOURCE: CEC RSA, 2010 (Table 2)

The construction and operation of any power plant creates noise or unwanted sound. The character and loudness of this noise, the times of day or night that it is produced, and the proximity of the facility to sensitive receptors all combine to determine whether the facility would meet applicable noise control laws and ordinances and whether it would cause significant adverse environmental impacts. In some cases, vibration may be produced as a result of power plant construction practices such as blasting or pile driving. The ground-borne energy of vibration has the potential to cause structural damage and annoyance. Definitions of some technical terms related to noise are provided in Table 3.10-2.

TABLE 3.10-2
DEFINITION OF SOME TECHNICAL TERMS RELATED TO NOISE

Terms	Definitions
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a Sound Level Meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this testimony are A-weighted.
L_{90}	The A-weighted noise level that is exceeded 90 percent of the time during the measurement period. L_{90} is generally taken as the background noise level.
Equivalent Noise Level, L_{eq}	The energy average A-weighted noise level during the Noise Level measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 4.8 decibels to levels in the evening from 7 p.m. to 10 p.m., and after addition of 10 decibels to sound levels in the night between 10 p.m. and 7 a.m.
Day-Night Level, L_{dn} or DNL	The Average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10 p.m. and 7 a.m.
Ambient Noise Level	The composite of noise from all sources, near and far. The normal or existing level of environmental noise at a given location (often used for an existing or pre-project noise condition for comparison study).
Pure Tone	A pure tone is defined by the Model Community Noise Control Ordinance as existing if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the two contiguous bands by 5 decibels (dB) for center frequencies of 500 Hz and above, or by 8 dB for center frequencies between 160 Hz and 400 Hz, or by 15 dB for center frequencies less than or equal to 125 Hz.

SOURCE: CEC RSA, 2010 (Table A1)

BLM does not establish noise thresholds for public lands, but defers to other Federal, State and local regulatory agencies. Chapter 9.52, Noise Regulation, of the Riverside County Code sets forth noise restrictions to protect the health, safety, and general welfare of residents of Riverside County. This ordinance restricts construction hours within one-quarter mile of an inhabited dwelling to between the hours of six a.m. and six p.m. during the months of June through September and to between the hours of seven a.m. and six p.m. during the months of October through May.

Table 3.10-3 presents restrictions on exterior and interior noise from stationary sources for residential land use zones as identified in the Riverside County General Plan. These restrictions do not apply to construction noise.

TABLE 3.10-3
RIVERSIDE COUNTY LAND USE NOISE STANDARDS FOR STATIONARY SOURCES

Land Use	Time Period	Interior Standards (L_{eq})[a]	Exterior Standards (L_{eq})[a]
Residential	10 p.m. to 7 a.m.	40	45
	7 a.m. to 10 p.m.	55	65

[a] Standard is for a 10-minute average.

SOURCE: County of Riverside, 2008

3.11 Paleontological Resources

The project site is located entirely on undisturbed, BLM-administered federal land. The Paleontological Resources Preservation Act of 2009 requires the BLM to manage and protect paleontological resources on Federal land using scientific principles and expertise. The term ‘paleontological resource’ means any fossilized remains, traces, or imprints of organisms, reserved in or on the earth’s crust, that are of paleontological interest and that provide information about the history of life on earth, except that the term does not include--(A) any materials associated with an archaeological resource (as defined in section 3(1) of the Archaeological Resources Protection Act of 1979 (16 U.S.C. 470bb(1)); or (B) any cultural item (as defined in section 2 of the Native American Graves Protection and Repatriation Act (25 U.S.C. 3001). The potential for discovery of significant paleontological resources or the impact of surface disturbing activities to such resources is assessed using the Potential Fossil Yield Classification (PYFC) system. This system includes three conditions: Condition 1 (areas known to contain vertebrate fossils); Condition 2 (areas with exposures of geological units or settings that have high potential to contain vertebrate fossils); and Condition 3 (areas that are very unlikely to produce vertebrate fossils). The PYFC class ranges from Class 5 (very high) for Condition 1 to Class 1 (very low) for Condition 3 (CEC RSA, 2010).

Depending on the published report the project site is located in either the southeastern portion of the Mojave Desert geomorphic province (CEC RSA, 2010), or the northeastern quarter of the Colorado Desert geomorphic province (CEC RSA, 2010), in the Mojave Desert of Southern California near the Arizona border. Geologically and geographically the area is more characteristic of the Mojave Desert geomorphic province. The Mojave Desert is a broad interior region of isolated mountain ranges which separate vast expanses of desert plains and interior drainage basins. The physiographic province is wedge-shaped and separated from the Sierra Nevada and Basin and Range geomorphic provinces by the northeast-striking Garlock Fault on the northwest side. The northwest-striking San Andreas Fault defines the southwestern boundary, beyond which lie the Transverse Ranges. The Colorado Desert geomorphic province lies to the south and east of the proposed project area. The topography and structural fabric in the Mojave Desert is predominately southeast to northwest, and is associated with mid-Miocene to recent faulting oriented similar to the San Andreas Fault. A secondary east to west orientation correlates with structural trends in the Transverse Ranges geomorphic province.

The project site would be situated on a broad alluvial plain within the northwest-trending Chuckwalla Valley between the Chuckwalla Mountains to the southwest, and the Palen Mountains to the northeast. Overall the proposed site slopes at very shallow grades north and northeast toward the local topographic low at Palen Dry Lake.

Quaternary age alluvial, lacustrine and eolian sedimentary deposits are mapped in the vicinity of the project site (CEC RSA, 2010). The local stratigraphy as interpreted by different authors is presented in Table 3.11-1.

TABLE 3.11-1
CORRELATION AND AGES OF STRATIGRAPHIC UNITS

Age	Unit/Description	Jennings (CDMG 1967)	Stone & Pelka (USGS 1989)	Stone (USGS 1990)
Holocene	Eolian sands	Qs	Qs	Qs
	Younger alluvium	Qal	Qya	Qta
	Playa lake deposits	Ql	Qp	Qp
Pleistocene	Older alluvium	Qc	Qia	Qta
			Qoa	

Holocene units, which include eolian sands, younger alluvium, and playa lake deposits, are mapped over nearly the entire project site surface. Eolian sands consist of unconsolidated deposits of well-sorted, wind-blown sand in dunes and sheets. Younger alluvium is composed of sand, pebbly sand and sandy pebble-gravel, and generally is coarser grained closer to mountain ranges. Desert varnish is not well developed in the mostly unconsolidated and undissected sediments. Playa lake deposits are also unconsolidated and are comprised of clay, silt and sand. Older alluvium is present at the surface along the southwestern edge of the project site.

The exposures of older alluvium occur as northeast-oriented ridges of material protruding into the site from the southwest, with the intervening areas occupied by drainages filled with younger alluvium. Older alluvium is composed of consolidated gravel and sand that is moderately dissected with moderately developed desert pavement and varnish.

Exploration drilling conducted in 1978 by the U.S. Geological Survey (USGS) resulted in two boreholes in the Palen Dry Lake area, one of which lies within the boundaries of the proposed plant site. USGS Borehole PDL#1 was advanced to a depth of 505 feet below ground surface (bgs) near the north-central boundary of Section 27 near the northeast corner of the proposed project right-of-way. The lithologic log of PDL#1 indicates the subsurface near the northern site boundary is composed of moderately to thickly bedded sands, gravels, and clays to a depth of approximately 55 feet where a transition to overall clay dominated formation takes place and continues to the total depth of the borehole. The interbedded clays, sands, and gravels probably represent periods of primarily lakebed deposition interspersed with episodes of coarse sediment transport from the nearby Chuckwalla and Palen Mountains. A gravel dominated bed present from approximately 90 to 110 feet also attests to a period of clastic deposition during a period of primarily lakebed sedimentation (CEC RSA, 2010). A water exploration well, 06S/17E-03M01S, which was drilled in 1958 in what is now the southeast portion of the project site reportedly had a similar stratigraphic column with 48 feet of coarse alluvium overlying strata which are clay dominated to a depth of 818 feet bgs (CEC RSA, 2010).

A preliminary geotechnical investigation including 13 exploratory borings and eight test pits was completed for the general area of the project site (CEC RSA, 2010). This investigation reveals that the site is underlain by alluvial and eolian deposits of Pleistocene through Holocene age, which consist of dune sands, alluvium and lake deposits to the depths explored (approximately 76.5 feet below the existing ground surface). The project site is generally surfaced with unconsolidated soils due to desiccation and/or wind deposition to a maximum depth of 2 feet below the existing grade.

Near-surface geology beneath the project site consists primarily of Quaternary alluvium, eolian and lacustrine sediments which increases in age with depth from Holocene at the surface to Pleistocene and older at depth (CEC RSA, 2010). Coarse-grained sediments grade laterally and are interbedded with lakebed deposits of similar ages. Pleistocene age older alluvium, which is exposed along the southwestern boundary of the site, underlies younger alluvium and lacustrine sediments. Older alluvium would likely be buried at progressively deeper depths beneath Holocene sediments to the northeast across the site.

A paleontological resources assessment (CEC RSA, 2010) was prepared. Correspondence from Natural History Museum of Los Angeles County; University of California Berkeley Museum of Paleontology; and the Riverside County Land Information System also was reviewed for information regarding known fossil localities and stratigraphic unit sensitivity within the proposed project area (CEC RSA, 2010). All research was conducted in accordance with accepted assessment protocol of the Society for Vertebrate Paleontology to determine whether any known paleontological resources exist in the general area (CEC RSA, 2010).

The information reviewed indicates there are no recorded fossil collection sites within the proposed project boundary or within a one-mile radius. Three vertebrate fossil collection areas have been documented in the vicinity of the proposed project area within the same or similar sedimentary units which underlie the site. One location east-southeast of the site between I-10 and Ford Dry Lake contained fossil remains of a pocket mouse. Another site northwest of the proposed project site in the northern Chuckwalla Valley yielded fossil remains of tortoise, horse, camel, and llama.

The results of a site-specific comprehensive field survey recorded one non-significant fossil occurrence that yielded a non-diagnostic vertebrate material within the project limits (CEC RSA, 2010). The specimen was discovered *ex-situ* (i.e., removed from its original place of fossilization) as a lag deposit transported an unknown distance and re-deposited on top of alluvial sediments (CEC RSA, 2010). As a result, the fossil resource discovered on the surface within the limits of the project boundary is not considered significant.

The Riverside County Transportation and Land Management Agency (TLMA) has produced a paleontological sensitivity map of the County (CEC RSA, 2010). The mapping indicates that areas underlain by playa lake, eolian and younger alluvial deposits within and around the Palen Dry Lake basin have a high paleontological sensitivity rating. Younger alluvium upslope from the lake bed has a low sensitivity rating, and older alluvium is assigned an undetermined sensitivity rating, according to the TLMA.

The paleontological resource sensitivity of undisturbed Quaternary alluvium and lacustrine sediments varies from low at shallow depths to high at deeper depths. These units are mapped at the surface or may be present near the surface adjacent to these mapped areas along the northern and southern borders of the project site. The depth to Pleistocene age alluvial and lacustrine deposits is undetermined at present for the remainder of the site.

Based on the above research, criteria of the Society for Vertebrate Paleontology, the paleontological report provided in Appendix F, and the confidential paleontological information filing (CEC RSA, 2010), there is a high probability that paleontological resources will be encountered during grading and excavation in the older Quaternary age alluvial and lacustrine sediments within the project site. Further, deeper excavations in the younger alluvium that will encounter the underlying older Quaternary age alluvial soils will also have a high probability to encounter paleontological resources.

3.12 Public Health and Safety

3.12.1 Introduction

The affected environment for Public Health and Safety includes an evaluation of several program areas, including hazardous materials/hazardous waste management, unexploded ordnance (UXO), abandoned mined lands (AML), undocumented immigrants (UDI), transmission line safety and nuisance, traffic and transportation (including aviation) safety, worker safety and fire protection, public and private air strips/airfields, and geologic hazards.

3.12.2 Hazardous Materials

Several factors associated with the project location affect the potential for an accidental release of a hazardous material that could cause public health impacts. These include:

1. local meteorology;
2. terrain characteristics;
3. location of population centers and sensitive receptors relative to the project;
4. existing public health concerns; and
5. existing environmental site contamination.

Meteorological Conditions

Meteorological conditions, including wind speed, wind direction, and air temperature, affect both the extent to which accidentally released hazardous materials would be dispersed into the air and the direction in which they would be transported. This affects the potential magnitude and extent of public exposure to such materials, as well as exposure to associated health risks. When wind speeds are low and the atmosphere stable, dispersion is reduced but could lead to increased localized public exposure. Recorded wind speeds and ambient air temperatures are described in Section 3.2, *Air Quality*.

Terrain Characteristics

The location of elevated terrain is often an important factor in assessing potential exposure. An emission plume resulting from an accidental release could impact high elevations before impacting lower elevations. The existing topographic conditions of the proposed solar field site show an average slope of approximately one foot in 75 feet (1.33 percent) toward the northeast.

Location of Exposed Populations and Sensitive Receptors

The general population includes many sensitive subgroups that could be at risk from exposure to emitted pollutants. Sensitive receptors are people who are particularly susceptible to illness, such as the elderly, very young children, people already weakened by illness (e.g., asthmatics), and persons engaged in strenuous exercise, or locations or institutions that may be occupied predominantly by one or more of these sensitive subgroups, such as residences, schools, hospitals, and hospices. The location of the population in the area surrounding a project site may have a major bearing on health risk. The nearest sensitive receptors are single residences about 25 feet and 3,500 feet from the project's northwest boundary, but over one mile from the nearest power block; otherwise, there are no sensitive receptors within a three-mile radius of the project site. Within a six-mile radius of the site, the total population is 17 people. The nearest school (Eagle Mountain Elementary School) is about 10 miles west of the site.

Existing Public Health Concerns

Analyses of existing public health issues typically are prepared in order to identify the current status of respiratory diseases (including asthma), cancer, and childhood mortality rates in the population located near proposed project sites to provide a basis on which to evaluate any additional health impacts from the proposed action. Because of the very low population in the immediate vicinity of the project and because no existing health concerns within a six-mile radius of the site have been identified by the Applicant (CEC RSA, 2010), no analysis of existing public health issues has been conducted.

Existing Environmental Site Contamination

The Phase I Environmental Site Assessment conducted for the project site in 2009 found no "Recognized Environmental Conditions" per the American Society for Testing and Materials Standards (ASTM) definition. That is, there was no evidence or record of any use, spillage, or disposal of hazardous substances on the site, nor was there any other environmental concern that would require remedial action (CEC RSA, 2010).

3.12.3 Waste Management

The Riverside County Waste Management Department operates six landfills, has a contract agreement for waste disposal with an additional private landfill, and administers several transfer station leases (see Table 3.12-1, *Solid Waste Disposal Facilities*, for the capacities of landfills that are available to receive solid waste generated in Riverside County). The California Integrated Waste Management Act requires that each jurisdiction reuse, recycle, compost, or otherwise divert 50 percent of its annual waste away from landfills or show a good faith effort to reach this goal. The unincorporated areas of Riverside County currently meet their diversion goal, in addition to adopting the necessary plans and policies to comply with the act (CalRecycle, 2010). The combined remaining capacity of these eight landfills which may receive project waste (this excludes the Oasis Sanitary and Desert Center Landfills) is over 200 million cubic yards; however, the remaining capacity of the Oasis Sanitary Landfill is only 75,727 cubic yards, and the remaining capacity of the Desert Center Landfill, which is expected to close in 2011, is only 23,246 cubic yards (CEC RSA, 2010).

TABLE 3.12-1
SOLID WASTE DISPOSAL FACILITIES

Waste Disposal Site	Title 23 Class	Maximum Permitted Capacity (Cubic Yards)	Current Operating Capacity (Tons/Day)	Remaining Capacity (Cubic Yards)	Estimated Closure Date
Badlands Sanitary Landfill	Class III	30,386,332	4,000	21,866,092	2016
Lamb Canyon Sanitary Landfill	Class III	34,292,000	3,000	20,908,171	2023
Oasis Sanitary Landfill	Class III	870,000	400	75,727	2019
Desert Center Landfill	Class III	117,032	60	23,246	2011
Blythe Sanitary Landfill	Class III	4,633,000	400	2,289,139	2034
El Sobrante Landfill	Class III	184,930,000	10,000	118,573,540	2030
Monofill Facility	Class II	1,729,800	750	1,314,800	2012
Chiquita Canyon Sanitary Landfill	Class II, III	63,900,000	6,000	35,800,000	2019
Kettleman Hills Landfill	Class I	10,700,000	8,000	1,100,000	2037
Clean Harbors Buttonwillow Landfill	Class I	14,300,000	10,500	8,884,000	2043

Class I landfill – A landfill that accepts for disposal 20 tons or more of municipal solid waste daily (based on an annual average) including permitted hazardous wastes.

Class II landfill – A landfill that (1) accepts less than 20 tons daily of municipal solid waste (based on an annual average); (2) is located on a site where there is no evidence of groundwater pollution caused or contributed by the landfill; (3) is not connected by road to a Class I municipal solid waste landfill, or, if connected by road, is located more than 50 miles from a Class I municipal solid waste landfill; and (4) serves a community that experiences (for at least 3 months each year) an interruption in access to surface transportation, preventing access to a Class I landfill, or a community with no practicable waste management alternative.

Class III landfill – A landfill that is not connected by road to a Class I landfill or a landfill that is located at least 50 miles from a Class I landfill. Class III landfills can accept no more than an average of 1 ton daily of ash from incinerated municipal solid waste or less than 5 tons daily of municipal solid waste.

SOURCE: CalRecycle, 2010

3.12.4 Unexploded Ordnance (UXO)

Unexploded ordnance (UXO) are military munitions that have been primed, fused, armed or otherwise prepared for action, fired, dropped, launched, projected, or placed in such a manner to constitute a hazard to operations, installations, personnel, or material; or remain unexploded either by malfunction, design, or any other case (USAEC, 2010). UXO presents an immediate risk of acute physical injury from fire or explosion resulting from accidental detonation.

Although the Phase I ESA did not mention the potential of encountering unexploded ordnance (UXO) at or near the project site, historical use of the project site included General George Patton’s Desert Training Camps during World War II. Palen Pass is near the project site and was the site of some of the largest mock battles in the California-Arizona Maneuver Area. Live-fire training occurred in camps and facilities in the PSPP area. Additionally, conventional and unconventional land mines and improvised personnel mines have been detected along with UXO. Due to historical uses in and adjacent to the PSPP area, UXO are a potential hazard at the project site.

3.12.5 Undocumented Immigrants (UDI)

There are no known incidents with undocumented immigrants at the site or near the project area.

3.12.6 Transmission Line Safety and Nuisance

This affected environment analysis focuses on hazards and nuisances resulting from the presence of transmission lines, taking into account both the physical presence of the line and the physical interactions of its electric and magnetic fields.

Power generated from the project would be transmitted to the Southern California Edison (SCE) power grid using a single-circuit overhead 230 kV line. The point of connection with the SCE grid would be at SCE's proposed Red Bluff Substation, approximately five miles to the west. Since SCE's Red Bluff Substation would be under the jurisdiction of the CPUC, it would be designed, built, and operated to reflect implementation of CPUC requirements.

The site is in an undeveloped open desert land with no existing structures other than SCE's 161-kV Eagle Mountain-Blythe transmission line that traverses the southwestern portion of the site. The proposed transmission line would exit the northwest corner of the project site and travel west and south, crossing the I-10, and would continue south to the proposed Red Bluff Substation. The available land for the line's right-of-way would traverse some BLM-administered land in a largely uninhabited desert area, which has only two residences within two miles of the transmission line route, one of which would be as close as 1,000 feet from the line. The closest residence to the project site is approximately 25 feet northwest of the southern site boundary and the next closest is 3,500 feet northwest of the southern site boundary (CEC RSA, 2010).

Aviation Safety

Hazards to area aircraft can arise from the potential for collision in the navigable airspace. However, the project site is not located near a major commercial aviation center.

The closest airfield to the project site is the privately-operated Desert Center Airport, which is located at the end of an unnamed road, one mile (1.6 km) east of CA Route 177 (Desert Center – Rice Road) and 5 miles (8.0 km) northeast of the town of Desert Center; this is approximately 5 miles northwest of the main project site but only 2 miles from the proposed gen-tie line. The Desert Center Airport was built in the early 1940s as Desert Center Army Airfield, officially opened in April 1943, and turned over to the Army Corps of Engineers in 1946, following the end of World War II. The airport operated as a civil airport (owned by Riverside County) at some point between 1966 and 2002; however, by 2002 it was all but abandoned. In 2003, the airfield was being used to fly unmanned aircraft: the hangar had been converted to a workshop and an inclined launching ramp was constructed. Thereafter, Riverside County sold the airfield to Chuckwalla Valley Associates, LLC, which now operates two runways to service the Chuckwalla Valley Raceway (FAA, 2010a; AirNav, 2010). The most recent information available indicates 150 aircraft operations per year at the airfield for the 12-month period ending December 31, 2006 (AirNav, 2010).

The next closest airport (Blythe Airport) is located about 30 miles east of the project site, outside the path of the proposed transmission lines.

Communication System Interference

According to the Federal Aviation Administration, communication systems interference can be caused by solar technologies that cause a negative impact on radar, NAVAIDS, and infrared instruments (FAA, 2010b). Radar interference occurs when objects are placed too close to a radar sail (or antenna) and reflect or block the transmission of signals between the radar antenna and the receiver (either a plane or a remote location). NAVAIDS can be impacted similarly to radar, but they include passive systems with no transmitting signals. Impacts on infrared communications can occur because the solar panels continue to retain heat into the first part of dusk and the heat they release can be picked up by infrared communications in aircraft causing an unexpected signal.

Although it is possible for communication system interference to be caused by other communication signals, it is less common. Transmission line related radio frequency interference is produced by the physical interactions of line electric fields and is a potential indirect effect of transmission line operation. Such interference is due to the radio noise produced by the action of the electric fields on the surface of the energized conductor. The process involved is known as *corona discharge*, but is referred to as *spark gap electric discharge* when it occurs within gaps between the conductor and insulators or metal fittings. Because of the power loss from such corona discharges, it is in the interest of each line proponent to employ design, construction, and maintenance plans that minimize them. When generated, such corona noise manifests itself as perceivable interference with radio or television signal reception or interference with other forms of radio communication when the signal is amplitude modulated (AM). Such radio interference is the buzzing and crackling noise one might hear from the speaker of an AM broadcast receiver when near a transmission line. The potential for corona-related interference generally becomes a concern for lines with voltage of 345 kV and above, and less so for lines such as the proposed 230 kV transmission line.

Frequency modulated (FM) signals are normally unaffected as are modern digital signals such as those involved in cellular telephone communication or modern airport and other types of radio communication. Maximum interference levels are not specified as design criteria for modern transmission lines because the level of the AM interference in any given case would depend on factors such as line voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration, and weather conditions. The level of any such AM interference usually depends on the magnitude of the electric fields involved and the distance from the line. The potential for such impacts is therefore minimized by reducing the line electric fields and locating the line away from inhabited areas. The Federal Communications Commission (FCC) requires the line's owner to mitigate such interference in any specific case.

Audible Noise

Audible noise usually results from the action of the electric field at the surface of the line conductor and could be perceived as a characteristic crackling, frying, or hissing sound or hum, especially in wet weather. The noise level depends upon the strength of the line's electric field, and is a concern mainly from lines of 345 kV or higher. In fair weather, audible noise from modern transmission lines generally is indistinguishable from background noise at the edge of a right-of-way 100 or more feet wide. The noise-reducing designs related to electric field intensity are not specifically mandated by federal or state regulated noise limits. As with radio noise, it is limited through design, construction, or maintenance practices established from industry research and experience as effective without significant impacts on line safety, efficiency, maintainability, and reliability.

Fire Hazards

Transmission line-related fire hazards could be caused by sparks from conductors of overhead lines, or from direct contact between the line and nearby trees and other combustible objects.

Hazardous Shocks

Hazardous shocks are those that could result from direct or indirect contact between an individual and the energized line, whether overhead or underground. Such shocks are capable of serious physiological harm or death and remain a driving force in the design and operation of transmission and other high-voltage lines. No design-specific federal regulations have been established to prevent hazardous shocks from overhead power lines. However, safety is assured within the industry from compliance with the requirements specifying the minimum national safe operating clearances applicable in areas where the line might be accessible to the public.

Nuisance Shocks

Nuisance shocks are caused by current flow at levels generally incapable of causing significant physiological harm. They result mostly from direct contact with metal objects electrically charged by fields from the energized line. Such electric charges are induced in different ways by the line’s electric and magnetic fields. The potential for nuisance shocks around the proposed line would be minimized through standard industry grounding practices specified in the National Electrical Safety Code and the joint guidelines of the American National Standards Institute and the Institute of Electrical and Electronics Engineers (CEC RSA, 2010).

Electric and Magnetic Field Exposure

Electric and magnetic fields (EMF) occur together whenever electricity flows. The possibility of deleterious health effects from EMF exposure has increased public concern in recent years about living near high-voltage lines; however, scientific uncertainty regarding these potential health effects remains. Available data have not established that EMF exposure is a human health hazard. There are no health-based federal regulations or industry codes specifying environmental limits on the strengths of fields from power lines. Most regulatory agencies believe that health-based limits are inappropriate at this time. They also believe that the present knowledge of the issue does not justify any retrofit of existing lines.

While there is considerable uncertainty about EMF health effects, State policy requires reduction of EMF in the design, construction, and maintenance of new or modified lines, if feasible, without affecting the safety, efficiency, reliability, and maintainability of the transmission grid. Further, each new or modified transmission line in California must be designed according to the EMF-reducing guidelines of the electric utility in the service area involved. EMF produced by new lines must be similar to the fields of comparable lines in that service area.

3.12.7 Traffic and Transportation Safety

Roadway Access

Access to the PSPP would be from an extension of Corn Springs Road at the I-10 interchange. The Corn Springs Road extension would be about 1,350 feet long and would run east from just north of the I-10 Corn Springs Road entrance/exit ramps to the project site entrance. For setting information relative to these roadways, see Section 3.17, *Transportation and Public Access – Off-Highway Vehicle Resources*.

The project also proposes to construct an approximately 7.5 mile transmission line running west and south from the site that would cross I-10 before reaching SCE's new Red Bluff substation.

Airports

No major airports exist near the project site. As described under Aviation Safety, above, the closest airfields to the project site are the Desert Center Airport and the Blythe Airport. The Desert Center Airport is approximately 5 miles northwest of the project site but only 2 miles from the gen-tie line. The Blythe Airport is much farther away: about 30 miles east of the site.

Emergency Services Vehicle Access

Riverside County has adopted the 2007 California Fire Code and 2007 California Building Standards Code in their entirety regulating and governing the safeguard of life and property from fire and explosion hazards arising from the storage, handling and use of hazardous substances, materials, and devices, and from conditions hazardous to life or property in the occupancy of buildings and premises in the Riverside County (Riverside County Ord. No. 787). Accordingly, emergency services access roads must be installed and made serviceable prior to and during the time of construction. The grade of the fire department access road must be within the limits established by the Fire Chief and may not exceed 15 percent. The project would include the development of two all-weather access roads in accordance with County and fire code requirements to provide adequate access for emergency vehicles.

Water and Rail Obstructions

The project would not be located adjacent to a navigable body of water; therefore, the project would not be expected to alter water-related transportation. The nearest passenger rail service is an Amtrak station in Palm Springs to the west. Additionally, commercial rail service is banned in Riverside County.

Reflectivity

Reflectivity refers to light reflected off of surfaces that could cause a brief episode of a loss of vision (also known as flash blindness) on pilots or air traffic controllers. Potential impacts of reflectivity include glint and glare. The term *glint* refers to a momentary flash of bright light; by comparison, *glare* is a continuous source of bright light. Flash blindness is defined in FAA Order 7400.2f as “a temporary visual interference effect that persists after the source of illumination has ceased.” For facilities placed in the desert, far from most ground-based receptors, potential impacts would be limited to aircraft passing by (FAA, 2010b).

The amount of light reflected off of a solar panel surface depends on the amount of sunlight hitting the surface as well as the surface reflectivity. The amount of sunlight interacting with the solar panel will vary based on geographic location, time of year, cloud cover, and solar panel orientation. Frequently, 1,000 watts per square meter (W/m2) is used in calculations as an estimate of the solar energy interacting with a panel. According to researchers at Sandia National Lab, flash blindness for a period of 4-12 seconds (i.e., time to recovery of vision) occurs when 7-11 W/m2 (or 650-1,100 lumens/m2) reaches the eye (FAA, 2010b).

Reflectivity from solar projects varies depending on the type of solar technology, its materials and design. Concentrated solar power systems such as the project use mirrors to maximize reflection and focus the reflected sunlight and associated heat on a design point to produce steam that generates electricity. Concentrated solar power systems tend to be highly reflective: the percent of sunlight reflected is about 90 percent, translating to 900 W/m2 reflected (FAA, 2010b).

The character of reflected light, i.e., whether it is “specular” or “diffuse,” also is important in evaluating reflectivity. Specular reflection occurs when the surface in question is smooth and polished; it results in a more concentrated type of light. Diffuse reflection occurs from rough surfaces such as pavement or vegetation; it produces a less concentrated light. Flash blindness generally occurs only from specular reflections.

Distance between a solar field and potential reflectivity receptors also factors into an analysis of potential impacts, because the intensity of the light reflected from the solar panel decreases as the distance from it increases. The distance necessary to avoid flash blindness is directly proportional to the size of the array in question (FAA, 2010b).

Accordingly, under certain circumstances, reflected light and glare could affect the vision of pilots flying within view of the proposed solar field.

Industrial Plumes

In January 2006, the FAA conducted a Safety Risk Analysis (SRA) of industrial plumes (FAA, 2006). Based on this analysis, the FAA concluded that turbulence associated with plumes could result in the following:

1. Possible airframe damage or negative effects on aircraft stability in flight or both;

2. Adverse effects on aircraft due to high levels of water vapor, engine and aircraft contaminants, icing, and restricted visibilities; and

3. Loss of the aircraft or fatal injury to the crew as well as substantial damage to ground facilities.

As a result, the FAA recommended that FAA Order 7400.2 be amended to consider a plume-generating facility as a hazard to navigation when expected flight paths pass less than 1,000 feet above the top of the object. In addition, the FAA included in its 2006 Safety Risk Analysis three other recommendations concerning plumes:

1. Amend the Aeronautical Information Manual (AIM), Chapter 7, Section 5, with wording that overflights at less than 1,000 feet vertically above plume-generating industrial sites should be avoided;

2. Where operationally feasible, make permanent the temporary flight restriction (TFR) that pertains to the overflight of power plants; and

3. Amend Advisory Circular 70.7460-2K, *Proposed Construction of Objects that May Affect Navigable Airspace*, by changing Instructions to completing FAA Form 7460-1, *Notice of Proposed Construction or Alternation*, Item #21 by adding "For structures such as power plants or any industrial facility where exhaust plume discharge could reasonably be expected and reportable under the provisions of Part 77, thoroughly explain the nature of the discharge."

According to the FAA, those actions would serve to further enhance aviation safety within the National Airspace System.

More recently, in its 2010 FAA Solar Guide, the FAA explained that thermal plume-related hazards vary depending on the solar technology employed. A "power tower," for example, produces unexpected upward moving air columns into navigable air space that raise concerns about hazards to safe air navigation. By contrast, conventional solar thermal and photovoltaic solar energy systems can be used reliably and safely even on airport property (FAA, 2010b).

3.12.8 Worker Safety and Fire Protection

Worker safety and fire protection is regulated through the implementation of the federal, state, and local laws, ordinances, regulations, and standards (LORS) identified in Table 1-1.

3.12.9 Geologic Hazards

The project site is located entirely on undisturbed BLM-administered federal land in a moderately active geologic area of the eastern Mojave Desert geomorphic province in eastern Riverside County in southeastern California. This discussion presents the existing geologic hazards in the region of the project site. A brief geologic overview is provided and includes information from a preliminary geotechnical investigation completed by Kleinfelder in 2009. The preliminary geotechnical investigation included 13 exploratory borings and eight test pits in the project study area (CEC RSA, 2010).

Regional Geology

The project site is located in the southeastern portion of the Mojave Desert geomorphic province (CEC RSA, 2010). The Mojave Desert is a broad interior region of isolated mountain ranges that separate vast expanses of desert plains and interior drainage basins. The physiographic province is wedge-shaped, and separated from the Sierra Nevada and Basin and Range geomorphic provinces by the northeast-striking Garlock fault on the northwest side. The northwest-striking San Andreas Fault defines the southwestern boundary, beyond which lie the Transverse Ranges and Colorado Desert geomorphic provinces.

Local Geology

The project site would be situated on a broad alluvial plain within the northwest-trending Chuckwalla Valley between the Chuckwalla Mountains to the southwest, and the Palen Mountains to the northeast. Overall the project site slopes at very shallow grades north and northeast toward the local topographic low at Palen Dry Lake. Quaternary age alluvial, lacustrine and eolian sedimentary deposits are mapped in the vicinity of the project site (CEC RSA, 2010).

Topography

The topography in the Mojave Desert is predominately sloping southeast to northwest, and is associated with faulting similarly-oriented to the San Andreas Fault. A secondary east to west orientation correlates with the topography associated with the Transverse Ranges geomorphic province. Overall the project site slopes at very shallow grades north and northeast toward the local topographic low at Palen Dry Lake. The ground surface in the study area generally slopes gently downward to the southeast at a gradient of less than 1%. Ground surface elevations range from approximately 680 feet msl in the southwest to 425 feet msl in the northeast. Steeper grades are present as the terrain transitions to the isolated sand dunes along the northern portion of the site.

Soils

A preliminary geotechnical investigation including 13 exploratory borings and eight test pits reveals that the project site is underlain by alluvial and eolian deposits of Pleistocene through Holocene age, consisting of dune sands, alluvium, and lake deposits to depths of 76.5 feet below the existing ground surface (the maximum depth of exploratory borings). The project site contains loose soils due to desiccation and/or wind deposition to a maximum depth of 2 feet below the existing grade. The materials below the surface soils are generally medium dense to very dense, poorly graded sand with varying amounts of silt, silty sand and clayey sand. Firm to very hard sandy clays are locally present as interbedded layers 5 to 10 feet thick at depths generally greater than 25 feet below existing grade. More detailed information about soils present at the site and impacts to soil resources are discussed in Section 3.15, *Soil Resources*, and Section 4.14, *Impacts to Soil Resources*.

Faulting and Seismicity

The project site is not crossed by any known active faults or designated Alquist-Priolo Earthquake Fault Zone (CEC RSA, 2010). A number of major, active faults lie within 63 miles of the site. The fault type, potential magnitude, and distance from the site are summarized in Table 3.12-2. Each of the faults listed are considered active. Because of the large size of the project site, the distances to faults were measured from the approximate center of the site. The closest mapped active faults to the solar plant site are the faults attributed to the Brawley Seismic Zone located approximately 37 miles to the southwest. Several northwest-striking, inactive faults are mapped at the extreme southern end of the Palen Mountains, and are inferred beneath Quaternary and Tertiary sediments in Chuckwalla Valley (CEC RSA, 2010). These faults are part of a major Mesozoic terrain-bounding structural zone that was active during late Jurassic time, and are associated with folding and metamorphism in the Palen and McCoy Mountains. They are not exposed anywhere on the surface of the project site.

TABLE 3.12-2
ACTIVE FAULTS RELATIVE TO THE PROPOSED PROJECT SITE

Fault Name	Distance from Site (miles)	Maximum Earthquake Magnitude (Mw)	Estimated Peak Site Acceleration (g)
Brawley Seismic Zone	37.0	6.4	0.071
San Andreas: Coachella M-1c-5	37.0	7.2	0.108
San Andreas SB-Coachella M-1b-2	37.0	7.7	0.140
San Andreas: Whole	37.0	8.0	0.165
Elmore Ranch	40.6	6.6	0.073
Pinto Mountain	50.8	7.2	0.085
Pisgah-Bullion Mountain– Mesquite Lake	54.9	7.3	0.084
Imperial	57.4	7.0	0.069
Superstition Hills	59.0	6.6	0.055
San Jacinto–Anza	60.0	7.2	0.074
Superstition Mtn.	62.1	6.6	0.053

SOURCE: CEC RSA, 2010 Geology and Paleontology Table 3

Seismic Hazards

Surface Fault Rupture

Seismically induced ground rupture is defined as the physical displacement of surface deposits in response to an earthquake’s seismic waves. The magnitude and nature of fault rupture can vary for different faults, or even along different strands of the same fault. Ground rupture is considered most likely along active faults. No active or potentially active faults are mapped within the study area (CEC RSA, 2010). The closest fault zone to the site zoned under the Alquist-Priolo Special Studies Zone Act is the Brawley Seismic Zone, which is 37 miles from the study area.

Ground Shaking

Generally, the greater the earthquake magnitude and the closer the fault rupture to a site, the greater the intensity of ground shaking. The amplitude and frequency of ground shaking is related to the size of an earthquake, the distance from the causative fault, the type of fault (e.g., strike-slip), and the response of the geologic materials at the site. Ground shaking can be described in terms of acceleration, velocity, and displacement of the ground.

A common measure of ground motion during an earthquake is the peak ground acceleration (PGA). The PGA for a given component of motion is the largest value of horizontal acceleration obtained from a seismograph. PGA is expressed as the percentage of the acceleration due to gravity (g), which is approximately 980 centimeters per second squared. Unlike measures of magnitude, which provide a single measure of earthquake energy, PGA varies from place to place, and is dependent on the distance from the epicenter and the character of the underlying geology (e.g. hard bedrock, soft sediments or artificial fills). The estimated bedrock peak horizontal ground acceleration for the power plant is 0.27 times the acceleration of gravity (0.27g) based on 2 percent probability of exceedence in 50 years under 2007 California Building Code criteria (CEC RSA, 2010). Determination of the peak horizontal ground acceleration at the ground surface will require additional analysis once a design-level geotechnical report has been prepared for the project.

The Modified Mercalli Intensity Scale (Table 3.12-3) assigns an intensity value based on the observed effects of ground-shaking produced by an earthquake. Unlike measures of earthquake magnitude, the Modified Mercalli Intensity Scale (MM) is qualitative in nature (i.e., it is based on actual observed effects rather than measured values). MM intensity values for an earthquake at any one place can vary depending on its magnitude, the distance from its epicenter, and the type of geologic material. The MM values for intensity range from I (earthquake not felt) to XII (damage nearly total), where intensities ranging from IV to X could cause moderate to significant structural damage. Because the MM is a measure of ground-shaking effects, intensity values can be related to a range of PGA values, also shown in Table 3.12-3.

The close proximity of the project site to the Mojave-Sonoran belt and relatively great distance from more seismically active areas to the west and northwest would suggest a relatively low to moderate probability of intense ground shaking in the project area. However, events such as the Landers earthquake (7.6 Mw), which occurred on June 28, 1992 approximately 78 miles from the project site (CEC RSA, 2010), demonstrate that the proposed site could be subject to moderate levels of earthquake-related ground shaking in the future.

Secondary Earthquake Hazards

Secondary earthquake hazards at the site include earthquake-induced land sliding, settlement, and liquefaction. Liquefaction is a condition in which a saturated cohesionless soil may lose shear strength because of a sudden increase in pore water pressure caused by an earthquake. Lateral spreading of the ground surface can occur within liquefiable soil beds during seismic events. Lateral spreading generally requires an abrupt change in slope such as a nearby steep hillside or deeply eroded stream bank. Other factors such as distance from the epicenter, magnitude of the

TABLE 3.12-3
MODIFIED MERCALLI INTENSITY SCALE

Intensity Value	Intensity Description	Average Peak Ground Acceleration[a]
I	Not felt except by a very few persons under especially favorable circumstances.	< 0.0017 g
II	Felt only by a few persons at rest, especially on upper floors on buildings. Delicately suspended objects may swing.	0.0017-0.014 g
III	Felt noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motor cars may rock slightly, vibration similar to a passing truck. Duration estimated.	0.0017-0.014 g
IV	During the day felt indoors by many, outdoors by few. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.	0.014–0.039g
V	Felt by nearly everyone, many awakened. Some dishes and windows broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees, poles may be noticed. Pendulum clocks may stop.	0.035 – 0.092 g
VI	Felt by all, many frightened and run outdoors. Some heavy furniture moved; and fallen plaster or damaged chimneys. Damage slight.	0.092 – 0.18 g
VII	Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motor cars.	0.18 – 0.34 g
VIII	Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motor cars disturbed.	0.34 – 0.65 g
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.	0.65 – 1.24 g
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from riverbanks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks.	> 1.24 g
XI	Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.	> 1.24 g
XII	Damage total. Practically all works of construction are damaged greatly or destroyed. Waves seen on ground surface. Lines of sight and level are distorted. Objects are thrown upward into the air.	> 1.24 g

NOTES:
[a] Value is expressed as a fraction of the acceleration due to gravity (g). Gravity (g) is 9.8 meters per second squared. 1.0 g of acceleration is a rate of increase in speed equivalent to a car traveling 328 feet from rest in 4.5 seconds.

SOURCE: ABAG, 2003

seismic event, and thickness and depth of liquefiable layers also affect the amount of lateral spreading. The potential for liquefaction of strata deeper than approximately 40 feet below the ground surface is considered negligible because geologic pressures exerted on soils at that depth create soils too compact to liquefy.

Earthquake-induced settlement of soils results when relatively unconsolidated granular materials experience vibration associated with seismic events. The vibration causes a decrease in soil volume, as the soil grains tend to rearrange into a more dense state. The decrease in volume can result in settlement of overlying structural improvements. Loose soils identified at the site could potentially settle during a seismic event.

Slope failures, commonly referred to as landslides, include many phenomena that involve the downslope displacement and movement of material, either triggered by static (i.e., gravity) or dynamic (i.e., earthquake) forces. Slope stability can depend on several complex variables, including the geology, structure, the amount of groundwater present, as well as external processes such as climate, topography, slope geometry, and human activity. The factors that contribute to slope movements include those that decrease the resistance in the slope materials and those that increase the stresses on the slope.

While landslides can occur on slopes of 15 percent or less, the probability is greater on steeper slopes, especially those that exhibit old landslide features such as scarps, slanted vegetation, and transverse ridges. Landslides typically occur within geologic units that contain excessive amounts of water; are located on steep slopes; or where unstable soil already tends to move down-slope. Landslide potential at the project site is low since the proposed energy facility is located on broad, gently sloping terrain.

Other Geologic Hazards

Subsidence and Settlement

Potential hazards in the study area include subsidence, settlement, and earthquake-induced settlement (discussed above). Subsidence of the land surface is a general process that can be attributed to natural phenomena, such as tectonic deformation, consolidation, hydro compaction, collapse of underground cavities, oxidation of organic-rich soils, or rapid sedimentation, and also by the activities of man, such as the withdrawal of groundwater. Local subsidence or settlement may also occur when areas containing compressible soils are subjected to foundation or fill loads.

The Riverside County General Plan indicates the basin fill sediments in Chuckwalla Valley are susceptible to subsidence (CEC RSA, 2010). Regional ground subsidence is typically caused by petroleum or groundwater withdrawal that increases the weight per unit volume of the soil profile, which in turn increases the effective stress on the deeper soils. This results in consolidation or settlement of the underlying soils. The dense to very dense granular site soils are indicative of low to negligible local subsidence. Groundwater levels in the area have been steady in recent years and petroleum withdrawals do not occur locally.

Hydrocompaction

Hydrocompaction (also known as hydro-collapse) generally is limited to young, saturated soils that were deposited rapidly, most commonly by a flash flood. The soils dry quickly, leaving an unconsolidated, low density deposit with properties similar to weak cement. These soils can be compressed easily or collapse under pressure as well as dissolve if infiltrated by water. Foundations built on these types of compressible materials can settle excessively. The depositional environment of the Chuckwalla Valley suggests that the soils may be subjected to hydrocompaction. The project geotechnical report indicates that there is a low to moderate hydrocompaction potential based on the geotechnical data and the observation of soil profile in the test pits (CEC RSA, 2010).

Expansive Soils

Expansive soils have high clay content and in response to changes in moisture content can cause movements that result in damage and/or distress to structures and equipment with shallow foundations. Expansion or contraction occurs near the ground surface where changes in moisture affect the soils. The addition of moisture from irrigation, capillary tension, water line breaks, etc. causes clay soils to collect water molecules in their structure, which in turn causes an increase in the overall volume of the soil. This increase in volume can correspond to movement of overlying structural improvements. Often times, grading, site preparations, and backfill operations associated with subsurface structures can eliminate the potential for expansion. The near surface soils are primarily granular with no to low swell potential; however, potentially expansive soils were observed at the ground surface in the northeastern portion of the site (CEC RSA, 2010).

Corrosive Soils

Corrosivity refers to potential soil-induced electrochemical or chemical action that could corrode or deteriorate concrete, reinforcing steel in concrete structures, and bare-metal structures exposed to these soils. The rate of corrosion is related to factors such as soil moisture, particle-size distribution, and the chemical composition and electrical conductivity of the soil. Fine grain soils with naturally high moisture contents that contain sulfides can be corrosive to buried metal pipe. Placing pipes in corrosive soils could lead to premature pipe failure and leaking. Such soils are present at the project site, and the preliminary geotechnical investigation (CEC RSA, 2010) indicates that site soils could be potentially corrosive to metal pipe.

Erosion

Erosion is the wearing away of soil and rock by processes such as mechanical or chemical weathering, mass wasting, and the action of wind. Additionally, local flash flooding contributes to erosion. Excessive soil erosion can eventually lead to damage of building foundations and roadways. Areas that are susceptible to erosion are soils that would be exposed during the construction phase. Typically, the soil erosion potential is reduced once the soil is graded and covered with concrete, structures, asphalt, or slope protection features. More detailed information about erosion potential of the soils and impacts to soil resources as a result of erosion are discussed in Section 3.15, *Soil Resources*, and Section 4.14, *Impacts to Soil Resources*.

Volcanic Hazards

The project site is located approximately 40 miles west of the Lavic Lake volcanic hazard area (VHA), an approximately 14-square-mile area within the Mojave Desert comprised of Miocene to Holocene age dacitic to basaltic flows, pyroclastic rocks, and volcaniclastic sediments. The Lavic Lake VHA has been designated by the USGS as an area subject to lava flows and tephra deposits associated with basalt or basaltic andesite vents (CEC RSA, 2010). The Lavic Lake VHA is considered to be subject to future formation of cinder cones, volcanic ash falls, and phreatic explosions.

3.12.10 Site Security

The energy generation sector is one of 14 areas of Critical Infrastructure listed by the U.S. Department of Homeland Security (DHS). Nearly all of the other areas of Critical Infrastructure are reliant, at least in part, on the energy sector. The level of security needed for any particular facility depends on the threat imposed, the likelihood of an adversarial attack, the likelihood of success in causing a catastrophic event, and the severity of consequences of that event.

On April 9, 2007, the DHS published, in the Federal Register (6 CFR Part 27), an Interim Final Rule setting forth Chemical Facility Anti-Terrorism Standards requiring facilities that use or store certain hazardous materials to conduct vulnerability assessments and implement certain specified security measures. This rule was implemented with the publication of Appendix A, the list of chemicals of interest, on November 2, 2007. Petroleum is listed as a chemical of interest with a threshold level of 60,000 lbs. The project would store a maximum of 152,000 lbs of propane/LPG and, therefore, the CFATS regulation will apply and the Applicant would need to submit a “Top Screen” assessment to the DHS. The chemical constituents of Therminol VP-1 (diphenyl ether and biphenyl) and other chemicals proposed to be used and stored at the project site are not on the chemicals of interest list.

Energy sector members also are leading a significant voluntary effort to increase planning and preparedness, including infrastructure protection and cyber security. The North American Electric Reliability Corporation (NERC) published *Security Guidelines for the Electricity Sector* in 2002 (NERC, 2002) as well as issued a Critical Infrastructure Protection standard for cyber security (NERC, 2009), and the U.S. Department of Energy published a draft *Vulnerability Assessment Methodology for Electric Power Infrastructure* in 2002 (DOE, 2002).

3.13 Recreation

3.13.1 On-site Allowable Recreational Uses

Recreational uses on public lands at the project site are guided by the CDCA Plan (BLM, 1980) and the NECO Plan (BLM CDD, 2002). The site is designated in the CDCA and NECO Plans as Multiple Use Class M (Moderate Use; MUC-M). The Class M category is suitable for a range of recreation activities, which generally involve moderate to high user densities, including backpacking, primitive unimproved site camping, hiking, horseback riding, rockhounding, nature study and observation, photography and painting, rock climbing, spelunking, hunting, land sailing on dry lakes, noncompetitive vehicle touring, and events only on “designated open” routes of travel. (BLM, 1980; BLM CDD, 2002). Recreational opportunities allowed in MUC-M designated areas include those permitted in Class L and C (BLM CDD, 2002). Permanent or temporary facilities for resource protection and public health and safety also are allowed (BLM, 1980). Trails are open for non-vehicular use and new trails for non-motorized access may be allowed. Recreational vehicle use, including off-highway vehicle (OHV) use, is discussed in Section 3.17, *Transportation and Public Access – Off-Highway Vehicle Resources*.

Primary activities observed on the project site by BLM staff include OHV touring and sightseeing, photography, rockhounding, hiking, and hunting. Camping or backpacking is not common. There are no recreation facilities or specific recreational attractions on the site. The BLM has no visitor counts for the site but visitor use is assumed to be low due to the limited availability and accessibility of recreation opportunities in the immediately surrounding area. Most use is by local residents from Desert Center and Blythe, or visitors stopping for short periods while traveling along I-10.

3.13.2 Regional Recreation Areas and Opportunities

The unincorporated community of Desert Center is the closest community to the site. Desert Center is approximately 10 miles west of the site in the Chuckwalla Valley. It has no community parks. The Riverside County Regional Park and Open Space District operates no regional parks or open space areas in the Chuckwalla Valley. Similarly, there are no California State parks within the Chuckwalla Valley. Lake Tamerisk, located two miles north of Desert Center, is a 55 member-owned community for active seniors with 150 mobile homes spaces, mobile home rentals, dry campground, heated pool and club house (Lake Tamarisk Desert Resort, 2010).

By contrast, both the Palo Verde Valley to the east of the site and the Coachella Valley to the west offer myriad outdoor recreational opportunities for boating, water skiing, jet skiing, swimming, fishing, canoeing, camping, rock hounding, hiking, archery, hunting, horseback riding, trapping, trap and skeet shooting, and OHV use. The City of Blythe (within the Palo Verde Valley approximately 38 miles east of the site) and the City of Indio (within the Coachella Valley approximately 60 miles west of the site) provide for year-round sporting activities.

The Blythe Parks Department oversees eight parks (approximately 74 acres total), including five neighborhood parks, two community parks, and one regional park. The “Big Foot Skate-board Park” is located at Todd Park. Other recreational opportunities in Blythe include the Blythe Municipal Golf Course; Blythe Skeet & Trap Club (a shooting range and gun club); Blythe Marina; soccer, football, track and volleyball leagues; and indoor racquetball, basketball, aerobic activities, weight room, and summer swimming. Various nearby privately-owned recreational vehicle (RV) parks and campgrounds also provide recreational facilities, including a boat dock, launch ramp, fishing, swimming, horseshoe pits, wildlife observation and other active and passive recreation opportunities (Blythe, 2007).

The City of Indio’s Buildings and Parks Division oversees 11 parks (Indio, 2010). Other recreational opportunities in Indio include several golf clubs, equestrian centers and private polo fields; two public tennis courts; seven museums, including the Coachella Valley Museum and Cultural Center; seven cultural murals; and the Indio Date Gardens. Various nearby privately-owned RV parks and campgrounds also provide recreational facilities, including a boat dock, launch ramp, fishing, swimming, horseshoe pits, wildlife observation and other active and passive recreation opportunities (Village Profile, 2010).

The BLM administers wilderness areas; campgrounds, including long term visitor areas (LTVAs); trails; interpretive sites; and an extensive network of backcountry approved travel and OHV routes in the vicinity of the site. Areas of critical environmental concern (ACECs) and wilderness also provide dispersed recreation opportunities in the region. Overall, recreation use on BLM lands in the California desert is limited to the cooler months of September through May, with little or no use in the summer. Popular recreation activities include car and RV camping, OHV riding and touring, hiking, photography, hunting (dove, quail, deer), sightseeing and visiting cultural sites. Outside of fee collection sites, the BLM has no accurate estimates of visitor use; however, staff observations and Law Enforcement Ranger patrols indicate the area described in this section received approximately 2,000 – 3,000 visitors per year. Recreation areas within 20 miles of the project site are identified in Table 3.13-1, beginning with the area closest to the site, and are discussed below.

The National Park Service administers the Joshua Tree National Park the southeast end of which is located about three miles west of the project site. Joshua Tree National Park comprises approximately 1,017,748 acres, mostly federally-administered, and is used for hiking, mountain biking and rock climbing, and includes nine campgrounds. Other recreational opportunities within the Park include wildflower viewing and birdwatching (NPS, 2011; NPS, 2010). The Park is open year round, with peak visitation occurring in April. There were 1,280,917 recreational visits to the Park in 2001 (National Parks Conservation Association, 2002).

Wilderness Areas

Wilderness Areas are shown in Figure 3.16-1 and described in Section 3.16, *Special Designations*. As indicated in Table 3.13-1, four wilderness areas are located within 20 miles of the project site: the Chuckwalla Mountains Wilderness, Palen/McCoy Wilderness, Joshua Tree Wilderness, and Little Chuckwalla Mountains Wilderness.

TABLE 3.13-1
RECREATION AREAS AND SPECIAL DESIGNATIONS WITH RECREATIONAL OPPORTUNITIES

Recreation Area	Approximate Direction from the Project site	Approximate Distance from the					Approximate Size
		Proposed Action	Reconfigured Alternative 1	Reconfigured Alternative 2 Option 1	Reconfigured Alternative 2 Option 2	Reduced Acreage Alternative	
Chuckwalla Desert Wildlife Management Area ACEC	southwest	0.25 mi; crossed by linear facilities	0.25 mi; crossed by linear facilities	0.25 mi; crossed by linear facilities	0.25 mi; crossed by linear facilities	0.25 mi; crossed by linear facilities	352,633 acres
Palen Dry Lake ACEC	northeast	0.5 mi	<.5 mi	1 mi	1 mi	1 mi	3,632 acres
Chuckwalla Mountains Wilderness	south	1.5 mi	1.5 mi	1.5 mi	1.5 mi	1.5 mi	99,548 acres
Palen/McCoy Wilderness	northeast	1.25 mi	1.5 mi	2 mi	2 mi	2 mi	236,488 acres
Corn Springs ACEC	southwest	4.5 mi	4.5 mi	4.5 mi	4.5 mi	4.5 mi	2,467 acres
Alligator Rock ACEC	west	5 mi	5 mi	5 mi	5 mi	5 mi	7,754 acres
Desert Lily Preserve ACEC	northwest	5 mi	5.5 mi	5 mi	5 mi	5 mi	2,055 acres
Joshua Tree National Park	northwest	7 mi	7.5 mi	7 mi	7 mi	7 mi	1,017,748 acres
Joshua Tree Wilderness	northwest	7 mi	7.5 mi	7 mi	7 mi	7 mi	594,502 acres
Little Chuckwalla Mountains Wilderness	southeast	14 mi	12.5 mi	13 mi	13 mi	13 mi	28,034 acres
Chuckwalla Valley Dune Thicket ACEC	southeast	15.5 mi	14 mi	14.5 mi	14.5 mi	14.5 mi	2,273 acres
Corn Springs Campground	southwest	6.5 mi	6.5 mi	6.5 mi	6.5 mi	6.5 mi	9 camping units
Bradshaw Trail Back Country Byway	south	17 mi	17 mi	17 mi	17 mi	17 mi	65 miles long

SOURCE: BLM, 2009; BLM, 2002; Nelson, 2010.

The Wilderness Act limits allowable types of recreation on wilderness lands to those that are primitive and unconfined, depend on a wilderness setting, and do not degrade the wilderness character of the area. Motorized or mechanized vehicles or equipment for recreational purposes are not permitted in wilderness (916 USC 1133(c)). The BLM regulates such recreation on lands within its jurisdiction in accordance with the policies, procedures and technologies set forth in the Code of Federal Regulations (43 CFR 6300), BLM Manual 8560 (*Management of Designated Wilderness Areas*) (BLM, 1983), BLM Handbook H-8560-1 (*Management of Designated Wilderness Areas*) (BLM, 1985), and BLM's Principles For Wilderness Management In The California Desert (BLM, 1995). More specifically, camping, hiking, rockhounding, hunting, fishing, non-commercial trapping, backpacking, climbing, and horseback riding are permissible (BLM, 1988; BLM, 1983). By contrast, physical endurance contests (such as races, competitive trail rides and survival contests), commercial recreational activities, and the use of motorized or mechanized vehicles (including OHVs, aircraft and motor boats) generally are prohibited (16 USC 1133(c); BLM, 1995; BLM, 1988; BLM, 1983).

The four wilderness areas in the vicinity of the project site have no developed trails, parking/trailheads, or other visitor use facilities. These areas are generally steep, rugged mountains, with no permanent natural water sources, thus limiting extensive hiking or backpacking opportunities. Visitor use within the wilderness areas is very light. Though BLM has no visitor use counts, the Desert Peaks Section of the Sierra Club's Angeles Chapter maintains a list of 99 desert peaks which members have climbed. The section also sponsors hikes to the desert peaks. Five of the peaks on the list are within 30 miles of the project site with the closest peak, Black Butte, being approximately 11 miles from the project site. None of the peaks directly overlook the project site, although the site may be visible from certain peaks, depending on elevation and topography. While total numbers of visitors is unknown, it is assumed to be very low due to the difficulty in reaching the peaks. However, two of the peaks (Granite and Black Butte) were featured as destinations in the 2010-2011Desert Peaks newsletter.

The peaks, elevation, legal description and location are included in Table 3-2 in order of relative distance from the project site:

TABLE 3.13-2
DESERT PEAKS WITHIN THE VICINITY OF THE PROJECT SITE

Desert Peak/ Elevation (ft)	Relative distance from site (air miles)	Legal Description	Special Designation
Black Butte/4,510	11 miles	T.7 S., R.16 E., Sec. 17	Chuckwalla Mountains Wilderness
Red Top/3,854	14 miles	T.4 S., R.18 E., Sec. 12	Palen McCoy Wilderness
Bunch/3,451	18 miles	T.8 S., R.17 E., Sec. 26	Chuckwalla DWMA/ACEC
Granite/4,356	21 miles	T.2 S., R.18 E., Sec. 27	Palen McCoy Wilderness
Eagle Mountain/5,347	29 miles	T.5 S., R.12 E., Sec. 9	Joshua Tree National Park

Observations by staff and Law Enforcement Rangers indicate only 100 - 200 hikers per year within all the wilderness areas near the project site. More popular is vehicle camping along roads that are adjacent to the wilderness areas. RV camping near wilderness areas, with associated hiking, OHV use, photography, sightseeing, etc. accounts for up to 2,000 visitors per year.

Areas of Critical Environmental Concern

Areas of Critical Environmental Concern (ACECs) are shown in Figure 3.16-1 and described in Section 3.16, *Special Designations*. As indicated in Table 3.13-1, six ACECs are located near the site: the Chuckwalla Desert Wildlife Management Area ACEC, Palen Dry Lake ACEC, Corn Springs ACEC, Alligator Rock ACEC, Desert Lily Preserve ACEC, and Chuckwalla Valley Dune Thicket ACEC. Recreation activities allowed in ACECs are determined by the resources and values for which the ACECs were established, and by the associated ACEC Management Plan. Most ACECs allow low-intensity recreation use that is compatible with protection of the relevant values.

The Alligator Rock and Corn Springs ACECs primarily protect cultural resources. The Chuckwalla Desert Wildlife Management Area (DWMA) and Desert Lily ACECs protect sensitive wildlife and plant species, while Chuckwalla Valley Dune Thicket and Palen Dry Lake ACECs protect both natural and cultural resources. Other than Corn Springs, these ACECs do not have recreation use facilities, but are signed to inform visitors of the special values of the areas and associated protection measures. Other than the campground in the Corn Springs ACEC, BLM has no visitor counts for these sites, but observations and patrols indicate very low use, in the hundreds per year.

Long Term Visitor Areas

The BLM manages seven Long Term Visitor Areas (LTVAs), which accommodate visitors who wish to camp for as long as seven consecutive months. Five are in California and two are in Arizona. None is located within 20 miles of the project site. The closest LTVAs to the site are the Mule Mountains LTVA, approximately 25 miles east, and the Midland LTVA, which is approximately 36 miles east. See Figure 3.16-1.

Two campgrounds are located within the boundaries of the Mule Mountains LTVA: Wiley's Well and Coon Hollow Campgrounds. Both are year-round facilities with campsites, picnic tables, grills, shade ramadas and handicapped-accessible vault toilets. (BLM, 2010 [Trigo Mountains]).

Table 3.13-3 provides average recreational use information for these facilities.

TABLE 3.13-3
AVERAGE RECREATION USE AT DEVELOPED SITES 2007-2009

Recreation Fee Site	Average Annual # of Camping Permits	Average Annual Recreation Visits
Corn Springs Campground	186	1,184
Midland LTVA	41	2,826
Mule Mountain LTVA	135	5,545
Total	362	9,555

SOURCE: Use Data from BLM Recreation Management Information System-RMIS

Other Recreational Areas and Opportunities

The Bradshaw Trail

The Bradshaw Trail is a 70-mile Back Country Byway in Southeastern Riverside County, with a small segment in Imperial County. This east-west trail is located about 17 miles south of the project site, and extends from about 12 miles east of the community of North Shore near the Salton Sea State Recreation Area to about 14 miles southwest of Blythe near the Colorado River (see Figure 3.16-1). It was the first road through Riverside County, blazed by William Bradshaw in 1862 as an overland stage route beginning in San Bernardino, California, and ending at Ehrenberg, Arizona. The trail was used extensively between 1862 and 1877 to transport miners and passengers. The trail is a dirt road that traverses mostly public land between the Chuckwalla Mountains and the Chocolate Mountain Aerial Gunnery Range. Four-wheel-drive vehicles are recommended due to stretches of soft sand (BLM, 2009). Recreational opportunities along the Bradshaw Trail include four-wheel driving, wildlife viewing, plant viewing, birdwatching, and scenic drives. All commercial activities require a land use or special recreation permit from the BLM. Fourteen-day camping limits apply on public lands. Primitive vehicular camping is allowed within 300 feet of the trail except in designated wilderness areas, several of which are nearby. Wilderness areas are closed to all motorized and mechanical vehicles, including bicycles (BLM, 2009).

3.14 Social and Economic Setting

3.14.1 Social

This section describes the social and economic background and existing conditions in the proposed action area, which is located in the eastern portion of unincorporated Riverside County. The proposed action area is located approximately 40 miles west of the City of Blythe and 10 miles east of the community of Desert Center. Additionally, this section discusses applicable plans, policies, and regulations that represent the social aspirations, community characteristics, and desired lifestyle, values, and goals of the stakeholders. These plans, policies, and regulations are necessary to understanding social group concerns in the context of renewable energy development. Information in this section is based on regional and national sources as well as input received from members of the public during the scoping process. The primary comments and concerns related to socioeconomic conditions were raised during scoping and were associated with the economic effects of construction, implementation, and operation of the project.

Applicable Plans, Policies and Regulations

Riverside County

Local goals and policies for Riverside County's future planning are described within the County's General Plan. The following General Plan goals and policies are relevant to evaluating how socioeconomic resources may be affected by the proposed action (Riverside, 2008):

1. *Land Use Policy 1.1*: Allow for the continued occupancy, operation, and maintenance of legal uses and structures that exist at the time of the adoption of the General Plan and become non-conforming due to use, density, and/or development requirements.

2. *Land Use Policy 1.*5: The County shall participate in regional efforts to address issues of mobility, transportation, traffic congestion, economic development, air and water quality, and watershed and habitat management with cities, local and regional agencies, stakeholders, Indian nations, and surrounding jurisdictions.

3. *Land Use Policy 7.*1: Accommodate the development of a balance of land uses that maintain and enhance the County's fiscal viability, economic diversity, and environmental integrity.

4. *Housing Element Goal 1*: To assist in the development of adequate housing to meet the County's fair share of the region's housing needs for all economic segments of the population, with an emphasis on lower income households and households with special needs.

5. *Housing Element Goal 2*: To conserve and improve the condition of the housing stock, particularly affordable housing.

Additional local goals and policies for Riverside County's future planning are described within the County of Riverside General Plan/Desert Center Area Plan. The following goals and policies listed in this Plan are also relevant to evaluating how socioeconomic resources may be affected by the proposed action (County of Riverside, 2008):

1. *Desert Center Area Plan (DCAP)_Policy 1.1:* Development and operations within (Policy) areas shall be in accordance with Specific Plans #305 (Eagle Mountain Landfill) and 306 (Eagle Mountain Townsite).

2. *DCAP Policy 2.2:* Provide for a balance of housing, services, and employment uses such that Desert Center and Lake Tamarisk residents and/or employees can access necessary services or facilities such as health care, housing, employment, food, recreational, and entertainment facilities.

3. *DCAP Policy 2.*3: Assure that the design of new land uses subject to discretionary review visually enhances, and does not degrade, the character of the Desert Center region.

City of Blythe

The main local plans, policies, and goals for the City of Blythe's future community development are described within the City's General Plan and the City's Redevelopment 2005-2009 Implementation Plan. The following General Plan goals are relevant to evaluating how socioeconomic resources may be affected by the proposed action (Blythe, 2007):

1. *Land Use Policy 1*: Preserve the scale and character of established neighborhoods.

2. *Land Use Policy 2*: Encourage new residential growth in the form of neighborhoods.

3. *Land Use Policy 6*: Provide for appropriate relationships between higher density and lower density residential areas, and require buffers of varying size between residential uses and non-residential uses without restricting foot and bicycle access.

4. *Land Use Policy 19*: Ensure that industrial development is compatible with and does not adversely affect the natural environment.

5. *Housing Element Goal 1* (Overall Housing Production): Provide housing to meet the present and future needs of residents in the City of Blythe and to aim at providing a fair share of the area housing needs, within identified governmental, market, economic and natural constraints.

6. *Housing Element Goal 2* (Housing Affordability): Facilitate the development of programs that will provide quality housing for those who otherwise would have difficulty affording such housing at market rates. Specifically, such programs will be directed at low and particularly very low income groups.

7. *Redevelopment Agency Goal 1*: Preserve and enhance the economic prosperity of the community and aid business development and retention.

City of Coachella

The main local plans, policies, and goals for the City of Coachella's future community development are described within the City's General Plan. The following General Plan goals are relevant to evaluating how socioeconomic resources may be affected by the proposed action (Coachella, 2008):

1. *Land Use Goal 1:* The City shall plan for a diversity of residential densities and housing types for the current and future needs of Coachella residents.

2. *Land Use Goal 2:* Strive to improve the existing neighborhoods, including the housing stock, the infrastructure and the quality of life.

3. *Land Use Goal 3:* Encourage commercial development that meets the needs of the residents, neighborhoods and the community and that attracts shoppers from the regional commercial market.

4. *Land Use Goal 4:* The City shall establish sufficient industrial areas to provide a diversified economy and a stable employment base for Coachella's residents.

5. *Land Use Goal 5:* The City shall contain ample amounts and varying types of open space and agriculture for its scenic, recreational and economic contribution to Coachella's quality of life.

6. *Land Use Goal 6:* The City shall contain sufficient land for public purposes.

7. *Land Use Goal 7:* The City shall recognize and incorporate existing approved master plans and major highways.

8. *Land Use Goal 8:* The City shall organize the community to participate in the implementation of the General Plan goals, objectives and policies utilizing the existing organizational structure based on the eight colonias.

9. *Land Use Goal 9:* The growth of the City shall be based on fiscally responsible decisions regarding its ability to provide services and to meet the needs of developing adjacent land outside the corporate limits.

10. *Economic Development Goal:* The City shall create an economic climate which is supportive of existing business and which will attract new business and tourism.

11. *Housing Element Goal 1:* To provide adequate housing in a satisfying living environment for all persons regardless of age, race, ethnic background, national origin, religion, family size, marital status, handicap or any other arbitrary factor

12. *Housing Element Goal 2:* To provide housing which is affordable to low and moderate income households

13. *Housing Element Goal 3:* To maintain and conserve the existing housing supply in a safe and serviceable condition while eliminating housing deficiencies and preventing further deterioration

14. *Housing Element Goal 4:* Arbitrary housing discrimination based on race, religion, ethnic origin, marital status, age, sexual orientation or physical characteristics is to be eliminated

15. *Housing Element Goal 5:* To provide a means by which the citizens may furnish a meaningful contribution to the realization of the overall housing goals of the community

City of Indio

The main local plans, policies, and goals for the City of Indio's future community development are described within the City's General Plan. The following General Plan goals are relevant to evaluating how socioeconomic resources may be affected by the proposed action (Indio, 2004):

1. *Goal LU-1:* To plan for a city with a diversity of residential opportunities and lifestyles to fit the current and future needs of Indio.

2. *Goal LU-2:* In portions of the Planning Area that have large amounts of undeveloped land under a few ownerships, provide the tools and flexibility to guide the development of these area to achieve a range of housing opportunities with higher than average amenity packages. Areas requiring this added level of planning are designated with a Residential Planned Development (RPD) overlay designation unique to that area.

3. *Goal LU-3:* To plan for a range of commercial sites within the Planning Area to serve the needs of those living, working, and visiting Indio. These commercial areas will provide a range of commercial opportunities in line with the needs of the above groups, and will continue to develop Indio as the retail center of Eastern Coachella Valley.

4. *Goal LU-4:* Provide additional guidelines for the development of key areas within Indio in order to encourage master planned commercial developments with a strong sense of identity and high levels of design. These areas will be designated with a Commercial Planned Development (CPD) designation unique to that area.

5. *Goal LU-5:* Provide additional guidelines for the development of medical centers needed to support the population in Indio and the surrounding region.

6. *Goal LU-6:* To enhance the employment base of Indio through the provision of adequate lands dedicated to industrial use and to take advantage of the City's Enterprise Zone.

7. *Goal LU-7:* Provide a development framework for the reuse of the areas within and adjacent to the railroad corridor that provides opportunities for the development of manufacturing, transportation, and commercial uses while maintaining the historic significance of the railroad center.

8. *Goal LU-8:* To plan for areas for the provision of public and quasi-public services, such as schools, libraries, police and fire facilities, government centers, and other related facilities that area of a size and location to efficiently serve the current and future population of Indio.

9. *Goal LU-9:* To provide a range of active and passive recreational areas as well as provide areas for the preservation of the natural environment.

10. *Goal LU-10:* Provide areas in the community that encourage the combination of commercial, medium/high density residential, and active and passice open space uses within an area to create a vibrant village atmosphere dominated by pedestrian oriented land uses.

11. *Goal LU-11:* Recognize the need for flexibility in design of large development projects, and allow the adoption of City or developer provided specific plans that will become the guiding document used in the approval of future projects within their boundaries.

12. *Goal ED-1:* Provide the City with the tools needed to promote a balanced economic growth with sufficient fiscal resources to provide for the necessary infrastructure, and public and community services.

13. *Goal H-1:* The community of Indio will ensure that adequate supplies of dwelling units are developed to provide a wide range of housing types, price ranges, and sizes to all sectors of the population.

14. *Goal H-2:* The City will maintain the integrity of existing residential areas so residents can continue to enjoy these areas.

15. *Goal H-3:* Provide housing opportunities that are affordable to moderate, low, and very low income groups.

Social Conditions

The proposed action includes the construction and operation, and ultimately the closure and decommissioning, of a solar energy generating facility located in the Southern California inland desert, approximately 60 miles east of the City of Indio and approximately 40 miles west of the City of Blythe, in eastern Riverside County, California (CEC RSA, 2010).

The expected catchment area for the project's construction workers' daily work commuting is a primary determinant for the affected social and economic environment associated with the project. As discussed in more detail in Section 4.13, *Social and Economic Impacts*, the origin of the project workers likely would be a central factor determining the magnitude and extent of the proposed action's potential socioeconomic impacts to the local and regional communities and economy. The direct benefits of employment and higher personal incomes will primarily benefit the communities where workers and their families reside because these communities would likely be where employees spend most of their earnings. Workers' spending for goods and services also would have an indirect effect on the communities and economies where that spending occurs and result in added secondary employment.

If the number of suitable workers to staff the proposed action locally or in the region is insufficient, then the project could attract individuals to relocate to the area (either temporarily or permanently). Additional new residents consequently could result in increased demand for housing and local services.

There is little research and analysis providing guidance for determining the socioeconomic impact area boundaries for power facilities. The referenced EPRI analysis (CEC RSA, 2010) is widely cited as research showing that workers may commute as much as two hours each direction from their communities rather than relocate (CEC RSA, 2010). Recent testimony by a representative of the Riverside/San Bernardino Building Trades Council also stated that construction workers associated with the proposed action would commute daily two to three hours each way (CEC RSA, 2010).

However, the common representation of the EPRI study findings may overestimate the likelihood of construction workers commuting *daily* for project-related employment and appears to misrepresent the cited EPRI report findings. The EPRI study importantly distinguishes between "daily commuting," "weekly commuting" and relocation (or in-migration). The EPRI study also acknowledges a prevalence of weekly commuting for power projects and reported 1.42 hours as the average "construction workers maximum daily commuting time" observed amongst its 12 case studies. The study also estimated that the average maximum daily commute distance was 73 miles.[1] The report also identifies other factors (e.g., quality of life) that determine whether commuting (daily and weekly) versus relocation is likely to occur.

In addition, from its case studies, the EPRI study also determined that "(o)verall, the proportion of in-migrants ranges from 5 to 50 percent for construction workers and 5 to 84 percent for operating staff." Furthermore, the study observed that: "(1) more in-migration is required in rural, remote areas; (2) the existence of a regional work force experienced in power plant construction reduces in-migration; (3) weekly commuting is more widely practiced in the West, or in rural areas."

For the affected socioeconomic environment and analysis, the DEIS recognizes the rural nature of eastern Riverside County and conservatively assumes that a two-hour daily commute radius defines the regional study area. Figure 3.14-1 depicts contours from the site up to a two-hour commute shed to show the potential estimated travel time for project workers' commutes to the site.

Figure 3.14-1 shows the two-hour commute shed estimated by ESA based on similar analysis by AECOM (CEC RSA, 2010). The commute area is shown to extend into parts of San Diego, Imperial and San Bernardino counties in California. The commute radius also extends east into both La Paz and western Maricopa County in Arizona and westwards to Banning in Riverside County. The northwestern boundary for commute radius includes the small community of Morongo Valley in San Bernardino County north of its border with Riverside County.

Because no major populated urban centers occur within the commute radius in the counties of San Diego, Imperial and Maricopa, these areas are not included in the regional study area for the proposed action. The community of Twentynine Palms is shown to be within the outermost limits of the two-hour radius; however, given both the relatively poor roadway connection along Route 62 (suggesting that actual commute time may be higher) and the prevalence of other solar projects closer to these communities, it is expected that relatively few if any San Bernardino County residents would commute daily to work at the project site. Consequently, the social and economic analysis covers predominantly of eastern Riverside County in California and La Paz County in Arizona. In addition, the small city of Twentynine Palms, the community of Morongo Valley, and their respective nearby unincorporated areas of San Bernardino County are included in the regional study area.

As a conservative assumption, the western limit for the two-hour commute area extends only as far as the community of Banning in contrast to the previous AECOM analysis, which suggested that Moreno Valley and Redlands would be within a daily two hour commute of the project site.

[1] This estimate was strongly influenced by one project (Laramie River) that reported a maximum daily commute distance of 115 miles.

The slightly smaller drive-time radius is considered a more realistic representation of actual typical drive time conditions from the project site. Furthermore, adopting this slightly smaller regional study area, the subsequent socioeconomic impact analysis will be more conservative in its evaluation of potential project employment-related adverse impacts.

As required by the BLM Land Use Planning Handbook, Appendix D requirements (BLM, 2005), the analysis of a proposed action of this type needs to consider existing socioeconomic conditions and impacts on several geographic scales. An analysis at a local level presents a challenge because the proposed action is in a sparsely populated area, with the largest urban center being the City of Riverside, located approximately 120 miles west of the site.

Based on BLM guidelines, a reasonable study area for localized socioeconomic impacts would, at a minimum, include the four nearest communities: the City of Blythe, California (approximately 40 miles east of the site); the very small community of Desert Center, California; the City of Ehrenburg, Arizona (approximately 45 miles east of the site); and the Town of Quartzsite, Arizona (approximately 57 miles east of the site). These cities represent all the major communities located within an hour commute of the site and therefore together represent the local study area for the proposed action. The cities of Indio and Coachella are estimated to be just over an hour's drive away from the project site and therefore are considered within the analysis's regional study area.

Population

The current population estimates and recent growth trends for both the regional and local study areas are summarized in Table 3.14-1. All the cities determined to be located within a two-hour commute of the site are shown. In addition, data for Riverside, San Bernardino, and La Paz Counties are presented.

Zip code population estimates were used to estimate the approximate size and location of the residential populations within the unincorporated areas of eastern Riverside County located within the two-hour commute distance of the site. Figure 3.14-1 also shows both the five digit zip code areas and the 2010 estimated population living within each zip code. The unincorporated communities of Cabazon, Desert Center, Mecca, Thermal and Thousand Palms are represented within the unincorporated area population estimates of Riverside County. The unincorporated community of Morongo Valley also is represented within the unincorporated area population estimates of San Bernardino County. While the population estimates for the unincorporated areas are only approximate, Figure 3.14-1 shows that the areas east of Coachella are very sparsely populated and that most of the population within the regional study area lives more than a 90-minute drive from the site. The total population of eastern Riverside County within the regional study area is estimated to be 521,707, which represents approximately 24.4 percent of Riverside County's total population. The majority of this population resides in the Coachella Valley.

Housing

Current housing conditions for the regional and local study areas are summarized in Table 3.14-2. All the cities determined to be located within a two-hour commute of the site are shown. In addition, Table 3.14-2 also presents data for Riverside, San Bernardino, and La Paz Counties.

TABLE 3.14-1
POPULATION PROFILE OF THE REGIONAL STUDY AREA

Population			
	Year		
Area	**2000 Population**	**2010 Population**	**Average Annual Growth Rate (2000 – 10)**
Riverside County, CA	1,545,387	2,139,535	3.3%
Blythe	20,465	21,812	0.6%
Coachella	22,724	42,591	6.5%
Indio	49,116	83,675	5.5%
Indian Wells	3,816	5,144	3.0%
La Quinta	23,694	44,421	6.5%
Palm Desert	41,155	52,067	2.4%
Rancho Mirage	13,249	17,006	2.5%
Cathedral City	42,647	52,841	2.2%
Palm Springs	42,805	48,040	1.2%
Desert Hot Springs	16,582	26,811	4.92%
Banning	23,562	28,751	2.00%
Unincorporated Area[a]	64,269	99,322	4.5%
Eastern Riverside County, CA	364,084	522,481	3.6%
San Bernardino County, CA	1,710,139	2,073,149	1.9%
Twentynine Palms[b]	14,764 (est)	16,877	1.4%
Unincorporated Area	5,890	10,580	6.0%
South San Bernardino County, CA	20,654	27,457	2.9%
La Paz County, AZ	19,715	21,616 [c]	0.9%
Ehrenburg	1,357	1,488 [c](est)	0.9%
Quartzite	3,354	3,731 [c]	1.1%
Cibola	172	189 [c] (est)	0.9%
Unincorporated Area[d]	4,226	4,621	0.9%
Western La Paz County, AZ	9,109	10,029	1.0%
Local Study Area[e]	25,176	26,781	0.7%
Regional Study Area	392,908	559,968	3.5%

NOTES: CA Cities are shown (by County) in order of their relative distance from the project site.

a Adjusted to remove Chuckwalla and Iron Wood State Prison population.
b Estimated population to adjust for Twentynine Palms Military Base.
c 2009 Data
d Consists of entire remainder of La Paz County except for the population of the City of Parker (3,401) and the estimated Colorado River Reservation population (8,186).
e Blythe, CA; Ehrenburg, AZ and Quartzite, AZ.

SOURCE: California Department of Finance, 2010; Arizona Department of Commerce, 2010.

TABLE 3.14-2
HOUSING PROFILE OF THE REGIONAL STUDY AREA (2010)

Housing		
	Year	
Area	**2010 Total Housing Units**	**2010 Vacancy Rate**
Riverside County, CA	784,357	13.0%
Blythe	5,472	16.1%
Coachella	9,145	4.4%
Indio	28,167	18.0%
Indian Wells	5,025	48.4%
La Quinta	21,491	28.5%
Palm Desert	34,425	30.9%
Rancho Mirage	13,542	38.6%
Cathedral City	21,527	21.5%
Palm Springs	33,603	33.4%
Desert Hot Springs	11,073	16.7%
Banning	11,644	8.4%
Unincorporated Area	36,990 (est)	15.3%
Eastern Riverside County, CA	232,104	23.7%
San Bernardino County, CA	693,712	11.58%
Twentynine Palms	9,228	14.7%
Unincorporated Area	4,650 (est)	28.3%
Eastern San Bernardino County, CA	13,878	19.3%
La Paz County, AZ	16,765 [a]	45.0% [a]
Ehrenburg	824 [b]	34.9% [b]
Quartzite	3,541 [a]	41.9% [b]
Cibola	161 [b]	60.0% [b]
Unincorporated Area[c]	4,262 [a] (est)	49.5% [a]
Western La Paz County, AZ	8,788 [a]	45.3% [a]
Local Study Area[d]	9,837	25.2%
Regional Study Area	219,328	25.0%

NOTES: CA Cities are show (by County) in order of their relative distance from the project site.

a 2009 Data
b 2000 Data
c Consists of entire remainder of La Paz County except for the population of the City of Parker (3,401) and the estimated Colorado River Reservation population (8,186).
d Blythe, CA; Ehrenburg, AZ and Quartzite, AZ.

SOURCE: California Department of Finance, 2010; Arizona Department of Commerce, 2010.

In 2010, Riverside County had 784,357 total housing units, with a vacancy rate of 13.0 percent. However, vacancy rates vary widely across this large county and are particularly high in the Coachella Valley communities. Overall, the regional study area contains a high number of housing units, with La Paz County communities having the highest vacancy rates.

Among the cities in Riverside County relevant to the proposed action,[2] Indian Wells has the highest vacancy rate (48.4 percent), and Palm Desert has the highest number of vacant housing units, with 11,223. Among the cities in La Paz County relevant to the Project, Cibola had the highest vacancy rate (60.0 percent), but Quartzsite had the highest number of vacant units at 1,336.

Population Projections

The forecasted population trends for Riverside, San Bernardino, and La Paz Counties are shown in Table 3.14-3. The projected population growth for eastern Riverside County is estimated based on the county-wide growth projections. Population growth in Riverside County is expected to slow over the next few decades. The growth rate is projected to be 3 percent per year between 2010 and 2020, and then to fall to 2.1 percent per year between 2020 and 2030. The population projections discussed above were made prior to the economic recession that began in 2008, likely explaining the decrease in the 2010 actual population estimate for Riverside County and that previously estimated for the future population growth projections.

TABLE 3.14-3
POPULATION PROJECTIONS FOR RIVERSIDE COUNTY AND THE REGIONAL STUDY AREA

	Population			
	Year			
Area	2010 Actual Population	2010 Projected Population	2020 Projected Population	2030 Projected Population
Riverside County, CA	2,139,535	2,239,053	2,904,848	3,507,498
Eastern Riverside County, CA[a]	521,707	545,974	708,322	855,273
San Bernardino County, CA	2,073,149	2,177,596	2,582,777	2,957,744
South San Bernardino County, CA[a]	27,457	28,840	34,207	39,173
La Paz County, AZ	21,544	22,632	25,487	28,074
Western LaPaz County, AZ[a]	10,029	10,535	11,865	13,069
Regional Study Area	559,193	585,349	754,393	907,514

NOTES:
[a] Estimates based on Countywide growth projections.

SOURCE: CEC RSA 2010; ESA, 2010.

[2] The high vacancy rates for the affluent cities of Indian Wells and Rancho Mirage primarily reflect a large proportion of vacation homes and these cities are not expected to provide much of the project workers population.

Temporary Housing Resources

Rental Homes

Table 3.14-2 shows that vacancy rates are high in the study area. Based on reported current vacancy rates for the City of Blythe, approximately 881 housing units are unoccupied in 2010 and may be available for rental (or purchase) by future PSPP workers. Similarly, the data also suggests that up to 1,594 local housing units may be available within the city of Ehrenburg and the town of Quartzsite, Arizona (CEC RSA, 2010).

However, the condition, suitability, and availability of the existing housing resources for use as temporary housing for project-related construction workers are unknown. In addition, as shown by the high vacancy rates elsewhere in the region study area, some “vacant” homes may be second homes and, therefore, less available for use as temporary housing.

Hotel and Motel Accommodations

In addition to the existing residential units, project construction workers and operational workers could use local lodging facilities as temporary housing. Hotel/motel lodging suitable for potential temporary housing use typically is concentrated in urban areas or near major transportation nodes. For the purposes of this analysis, only those hotels in the communities closest to the proposed action were tabulated under the assumption that construction and operations workers would congregate to those areas for commuting ease.

Data compiled by Smith Travel Research for hotels and motels with 15 or more rooms identified 19 hotels with a total of 878 rooms within the local study area in 2008, which presents the most current available data (CEC RSA, 2010). These hotels were all located in Blythe, the only community in California with hotels or motels with 15 or more rooms within one hour’s driving distance of the site.

In addition, 120 hotel/motel rooms are located in Ehrenberg and another 22 rooms are located within the City of Quartzite, Arizona (Arizona Department of Commerce, 2010). The extent that the local motel and hotels within the local study area could provide temporary housing for project construction workers would depend both on the then-current room rates and occupancy rates. Typical room rates for most of the hotel/motels are currently relatively inexpensive during the off-season with quoted rates of $60 to $70 per night (not including tax). Provided operators would maintain comparable rates, these local hotel/motel rooms would likely be a possible temporary housing option, particularly for workers that might be willing to share accommodations.

Fifty-seven hotels with a total of 8,285 rooms were identified in communities located from 1 to 1.5 hours drive from the project site. These communities include Indio, Palm Desert, Indian Wells, and Rancho Mirage. Applying the 2008 average occupancy ratio (70.8 percent) suggests that, on average, 2,419 unoccupied rooms are available for rent within 1 to 1.5 hours drive of the project site. A total of 129 hotels with 7,541 rooms were identified in communities within 1.5 to 2 hours’ drive from the project site (CEC RSA, 2010). These communities include Desert Hot Springs, Palm Springs, and Needles. Assuming an annual average occupancy rate of 70.8 percent, 2,202 unoccupied motel and hotel rooms were available for rent within 1.5 to 2 hours drive from the project site. Data was unavailable for local study area hotel/motel rooms located within Arizona, but there will likely be some unoccupied lodging available to workers.

The average annual occupancy rate for hotels in Riverside and San Bernardino Counties in 2007 was 70.8 percent (CEC RSA, 2010). Applying this ratio (70.8 percent) to the total number of hotel rooms identified within the local study area would suggests that, on average, in 2008 a total of 298 unoccupied rooms were available for rent in the local study area. However, given the seasonality of local tourism to the area, it is considered likely that higher occupancy and room rates would apply during the winter season (December to March), while higher vacancy rates and lower room rates would apply during the off-season (summer and early fall) when very hot local conditions persist.

The attractiveness of temporary housing resources for project construction workers generally would decrease further from the site. The size of some of these hotels and their location within more affluent communities make it likely that many of these hotels would have higher room rates and, therefore, and thus not suitable temporary housing for project workers.

Campground/RV Parks

Other housing opportunities are available in recreational vehicle (RV) facilities, mobile home sites, and campgrounds. Under some circumstances, these types of facilities could be usable by project construction workers as temporary housing. Generally, their lower cost for overnight use could make them more attractive as a potential temporary housing resource. Particularly for construction workers who may own their own RV or trailers, RV parks with utility hook-ups and other amenities would be more suitable for use during the summer and could serve as a longer-term rental for workers who prefer a weekly commute.

There are at least 10 RV parks located in the vicinity of Blythe, with a combined total of about 800 spaces (CEC RSA, 2010). RV parks in Blythe tend to be located along the Colorado River and receive higher levels of use during the summer. Research performed on a small sample of these RV parks suggests that a large number of spaces are occupied by year-round residents or are privately-owned and, therefore, unavailable for use by construction workers (CEC RSA, 2010). Additional RV parks are located in Ehrenberg and Quartzsite, Arizona, approximately four miles and 20 miles east of Blythe, respectively. The town of Quartzsite’s web site states more than 70 campgrounds are in the vicinity of the community. Typically the campgrounds are occupied between October and March, with visitors attracted to the gem, mineral, and swap meets and shows that are popular tourist attractions in the area (CEC RSA, 2010). Twenty local RV parks are identified by the Quartzite Chamber of Commerce as operating within Quartzite.

Long-term camping is available by permit in Long-Term Visitor Areas (LTVAs) on BLM lands. There are two LTVAs located near the Project site: Mule Mountains LTVA, which includes two primitive campgrounds, Wiley’s Well and Coon Hollow, and Midland LTVA, which is located north of the City of Blythe. BLM also operates another LTVA within the local study area at La Posa, south of Interstate 10 near Quartzsite, Arizona. LTVAs are intended for recreation use only and workers would generally not be permitted to use these areas (CEC RSA, 2010).

However, BLM may allow temporary LTVAs to be established on site for construction workers for the duration of project construction as temporary lodging facilities.[3]

Except for "special areas" with specific camping regulations, vehicle camping is allowed anywhere on BLM-administered land within 300 feet of any posted Open Route. There are, however, no facilities in these locations and there is a 14-day limit for camping in any one location. After 14 days, campers wishing to stay in the area longer are required to move 25 miles from their original camp site (CEC RSA, 2010).

Affected Groups and Attitudes

This section discusses some of the groups whom the proposed action could affect. Social effects to these groups and other stakeholders are discussed under Section 4.13, *Social and Economic Impacts*.

Classifying stakeholders into groups does not imply that other stakeholders who do not fit into a group are ignored or left outside of the social and environmental review process. Discussion of the affected groups is a means to highlight and facilitate framing issues related to the social concerns of some stakeholders who may have a particular local or regional relationship to the host landscape that may potentially be developed to exploit solar energy.

Blythe Area Chamber of Commerce

The Blythe Area Chamber of Commerce provides a forum for local businesses and residents on important community issues. The Chamber of Commerce maintains a directory of all the businesses in Blythe and promotes the city’s business economy. The purpose of the Blythe Area Chamber of Commerce is to encourage and facilitate activities that improve the economic viability of this community, provide a forum for guidance and support, provide opportunities to inform, and seek funds necessary for implementing compatible activities that would improve this agricultural community.

Blythe/Palo Verde Valley Economic Development Partnership

The Blyth/Palo Verde Valley Economic Development Partnership is a consortium comprised of the community college workforce and economic development leadership within the Blythe/Palo Verde Valley region. The consortium received funding from the California Community Colleges to enhance the consortium’s capacity to support economic and workforce development efforts within its rural and remote sub-regions. This partnership consists of representatives from the City of Blythe, Palo Verde Valley College, Blythe Chamber of Commerce, Riverside County, Palo Verde Unified School District, Palo Verde Irrigation District, and other community and regional representatives. Members of the partnership generally have supportive attitudes toward renewable energy projects, and believe that these types of projects will help the local area’s economy (Blythe/Palo Verde Economic Development Partnership, 2010).

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3 There are two other campgrounds in the local area: Corn Springs (located 7.5 miles southwest) operated by the BLM and Cottonwood Springs (36 miles west) operated by the NPS. However, due to their use restrictions and conditions both would not be suitable for construction workers use.

Environmental Groups

Several national and local groups have concerns about the siting criteria used for renewable energy projects proposed for development in sensitive biological resource areas. Environmental groups also have concerns regarding impacts on wildlife movement corridors, impacts on special status species associated with the implementation of solar panels (e.g., shading effects on species), and greenhouse gas emission impacts on plants and wildlife (CEC RSA, 2010) to name a few.

Recreational Users

Recreational users include OHV users, hikers, campers and wildlife viewing enthusiasts. The recreational user group has a deep appreciation for the natural high desert landscape, and their social attitudes are participatory and protective of this resource. This group is concerned with the indirect impacts associated with the displacement of recreational lands with solar energy facilities, including the cumulative loss of land available for OHV recreational uses (CEC RSA, 2010).

Local Private Land Owners and Residents

Local private land owners with properties that are in the vicinity of the proposed action have mostly positive attitudes toward renewable energy development. However, some area landowners and residents oppose major change to the desert environment and are concerned about permanent changes to the natural desert environment and wildlife. Others appear to be largely indifferent to the proposed action. Nonetheless, because the area is in an economic recession, many residents and landowners support of new local employment opportunities and revenues that the new renewable energy development project would bring to the local area at least in the near term.

Project Workers and Suppliers to the Renewable Energy Industry

The proposed action has the potential to affect both local and non-local labor force from surrounding areas and the nation. Construction and operation of the proposed action would require both temporary and permanent workers. Since the area is in the midst of a recession, social attitudes towards future employment opportunities are generally supportive.

3.14.2 Economic

Employment statistics by industry sector and county for 2008 are summarized in Table 3.14-4. Government is Riverside County’s largest employer. Governmental employment accounts for over 17 percent of the total jobs in the County. Additional important industries in the area include natural resources, mining, and construction; manufacturing; transportation; trade (wholesale and retail); information; financial activities; and services (e.g., professional, business, educational, health). In Riverside County, natural resources, mining and construction, government, and retail trade services are the leading industry groups in terms of employment.

TABLE 3.14-4
EMPLOYMENT BY INDUSTRY GROUP – 2008

Industry Group	Riverside County Employment		San Bernardino County Employment		La Paz County Employment	
	Total	Percent of Total	Total	Percent of Total	Total	Percent of Total
Agriculture	13,800	2.3%	2,967	0.3%	323	5.65%
Natural Resources, Mining, and Construction	55,100	9.3%	57,660	6.5%	289	5.05%
Manufacturing	48,600	8.2%	63,634	7.2%	218	3.81%
Transportation, Warehousing, and Utilities	21,400	3.6%	63,164	7.2%	146	2.55%
Wholesale Trade	20,400	3.4%	40,192	4.6%	n/a	n/a
Retail Trade	84,200	14.2%	106,217	12.1%	1,340	23.43%
Information	7,700	1.3%	8,949	1.0%	n/a	n/a
Financial Activities	22,300	3.8%	29,563	3.4%	515	9.01%
Professional and Business Services	57,700	9.7%	151,391	17.2%	161	2.82%
Educational and Health Services	58,800	9.9%	96,586	11.0%	n/a	n/a
All Other Services	94,300	15.9%	120,791	13.7%	261	4.56%
Government	110,200	18.5%	139,329	15.8%	2,465	43.11%
Total	**594,500**	**100%**	**880,443**	**100.0%**	**5,718**	**100.00%**

SOURCE: California EDD, 2010a; Bureau of Economic Analysis, 2010.

Labor Force

The labor force of the study area counties and communities is presented in Table 3.14-5. As of May 2010, Riverside County had a labor force of 909,400 workers, of which 782,400 were employed. Consequently, Riverside County's unemployment rate was 14 percent - considerably higher than the statewide unemployment rate of 11.9 percent. Blythe has a labor force of 7,100 workers. In addition, the labor force and employment estimates for the unincorporated area within the proposed project's regional study area were based on the County-wide average. As of May 2010, Twentynine Palms had a labor force of 6,200, of whom 5,200 were employed (the population of the Twentynine Palms military base has been excluded because those residents would not be available to work at the proposed solar facility). Consequently, Twentynine Palms's unemployment rate was 17.1 percent – also considerably higher than the statewide unemployment rate.

In Arizona, La Paz County had an estimated average labor force of 7,875 workers over the first four months of 2010. No 2010 sub-County area labor force data are available. Therefore, labor force estimates for the sub-County areas were based on 2008 data and adjusted for subsequent population growth. The estimated total labor force for the local study area is 8,480 workers. The total estimated labor force for the regional study area is 238,245 workers.

**TABLE 3.14-5
LABOR FORCE AND UNEMPLOYMENT DATA FOR THE REGIONAL STUDY AREA**

Jurisdiction	Civilian Labor Force	Total Employment	Number Unemployed	Unemployment Rate	Median Household Income[a]
Riverside County	919,200	780,600	132,600	14.5%	$60,085
Blythe	7,100	5,900	1,200	16.7%	$39,187
Coachella	12,300	9,600	2,700	21.7%	$41,797
Indio	27,200	23,100	4,100	15.1%	$55,598
Indian Wells	1,700	1,600	100	5.0%	$122,983 [b]
La Quinta	14,600	13,500	1,100	7.4%	$81,498
Palm Desert	24,700	22,700	2,100	8.4%	$57,038
Rancho Mirage	6,400	5,600	800	12.5%	$78,284 [b]
Cathedral City	26,100	22,500	3,600	13.7%	$43,411
Palm Springs	26,100	23,200	2,800	10.9%	$46,632
Desert Hot Springs	9,600	7,600	1,900	20.2%	$39,733
Banning	11,700	9,700	1,900	16.5%	$40,849
Unincorporated Area	58,400 (est)	50,200 (est)	8,200 (est)	14.5%	na
Eastern Riverside County, CA	225,900	195,200	30,500	13.5%	na
San Bernardino County, CA	866,500	742,700	123,800	14.3%	$58,440
Twentynine Palms	6,200	5,200	1,100	17.1%	$44,879
Unincorporated Area	3,000 (est)	2,600 (est)	400 (est)	14.3%	na
Southern San Bernardino County, CA	9,200	7,800	1,500	16.3%	na
La Paz County, AZ	7,875	7,150	725	7.6%	$31,812
Ehrenberg	645 (est)	595 (est)	50 (est)	7.6%	$35,330 [b]
Quartzsite	735 (est)	680 (est)	55 (est)	7.6%	$30,165 [b]
Cibola	80 (est)	75 (est)	5 (est)	7.6%	$28,420 [b]
Unincorporated Area	1,685 (est)	1,555 (est)	130 (est)	7.6%	na
Western La Paz County, AZ	3,145	2,905	240	7.6%	na
Local Study Area	8,480	7,175	1,305	15.4%	na
Regional Study Area	238,245	205,905	32,240	13.5%	na

NOTES:
[a] 2005-2007 Census average converted in 2010 dollar values.
[2] 2000 Census data converted in 2010 dollar values.

SOURCE: California EDD, 2010; U.S. Census, 2010; U.S. Census 2000; Arizona Department of Commerce, 2010.

Unemployment Rates

The unemployment rate for Riverside County in May 2010 was 14.5 percent. In Riverside County, the community with the highest unemployment rate is the City of Coachella (21.7 percent). Reported unemployment data for the two communities located within the regional study area differed greatly. Mecca’s labor force reported a 27.1 percent rate of unemployment for May 2010 while the more affluent community of Thousand Palm’s 2,500 labor force had a 9.8 percent rate of unemployment. However, in the absence of more specific information, the Riverside County unemployment rate was used to estimate the current unemployment for the unincorporated areas within Eastern Riverside County.

As discussed above, Twentynine Palms’s unemployment rate was 17.1 percent in May 2010 and higher than the San Bernardino County’s unemployment rate of 14 percent. In Arizona, the unemployment rate for La Paz County was 7.6 percent over the first four months of 2010. No 2010 sub-county area unemployment data is available. Generally, past unemployment rates for most of the communities within the regional study area have been lower than the County-wide average. However, in the absence of more current information, the La Paz County unemployment rate was used to estimate the current unemployment for the sub-county areas within the County.

The unemployment rate for the local study area is estimated to be 15.4 percent. Given the estimated local study area labor force estimate of 8,480, it is estimated that there are approximately 1,305 unemployed local study area residents. The unemployment rate for the regional study area is estimated to be 12.7 percent. Given the estimated local study area labor force estimate of 238,245, it is estimated that there are approximately 32,240 unemployed regional study area residents.

Labor Force Growth Projections

Table 3.14-6 presents County labor force estimates and projections for those skilled workers (by craft) required for construction and operation of the project as estimated by the Applicant. Employment figures for 2006 are provided, as well as employment projections for the selected occupations for 2016. The California Employment Development Department (EDD) groups Riverside and San Bernardino into one statistical area for data presentation purposes. As of 2006, there were relatively high numbers of skilled workers in Riverside and San Bernardino Counties, including metal workers (19,460), carpenters (28,850), and construction laborers (27,930).

Relevant specialized positions generally were fewer in number, including paving, surfacing, and tamping equipment operators, power plant operators, and construction trade helpers. Employment figures for all occupations presented are anticipated to either remain constant or increase by 2016. The two occupations with the largest anticipated future job growth by 2016 are construction laborers (4,150 new jobs) and carpenters (3,540 new jobs). The highest rate of job growth by occupation in Riverside and San Bernardino Counties is architects, surveyors, and cartographers (17.6 percent) (EDD, 2010).

TABLE 3.14-6
LOCAL LABOR POOL BY CRAFT – RIVERSIDE AND SAN BERNARDINO COUNTIES

Occupational Title	Annual Average Employment		Employment Change		Average Annual Job Openings		
	2006	2016	Number	Percent	New Jobs	Net Replacements	Total
Construction Managers	4,380	5,110	730	16.7%	135	160	295
Carpenters	28,850	32,390	3,540	12.3%	198	380	578
Cement Masons and Concrete Finishers	4,110	4,690	580	14.1%	38	120	158
Construction Laborers	27,930	32,080	4,150	14.9%	348	236	584
Paving, Surfacing, and Tamping Equipment Operators	630	720	90	14.3%	8	16	24
Operating Engineers and Other Construction Equipment Operators	4,790	5,460	670	14.0%	37	85	122
Electricians	6,740	7,600	860	12.8%	66	336	402
Plumbers, Pipefitters, and Steamfitters	4,630	5,330	700	15.1%	81	249	330
Metal Workers and Plastic Workers	19,460	20,800	1,340	6.9%	0	1024	1024
Helpers – Construction Trades	120	130	10	8.3%	35	169	204
Welders, Cutters, Solderers, and Brazers	3,960	4,640	680	17.2%	48	178	226
Architects, Surveyors, and Cartographers	1,420	1,670	250	17.6%	56	135	191
Engineering Managers	1,370	1,600	230	16.8%	43	170	213
Supervisors, Construction and Extraction Workers	10,990	12,380	1,390	12.6%	95	216	311
Machinists	2,630	2,960	330	12.5%	0	161	161
Total	**122,010**	**137,560**	**15,550**	**12.9%**	**1,188**	**3,635**	**4,823**

SOURCE: EDD, 2010.

No County-level employment projections for La Paz County are available. Given the small size of the available Arizona labor force within the regional study area, any future growth to the La Paz labor force would have a very minor change in future employment for construction occupations.

3.14.3 Fiscal Resources

A summary of Riverside County's expenses and revenues for the 2007-2008 fiscal year is provided in Table 3.14-7. As the proposed action would be constructed in Riverside County, the County would be the local agency with taxing power and could be expected to receive the majority of the direct impacts from the proposed project in the form of additional expenses or revenues (from business and sales taxes, permits, and other sources). The economic benefits of increased income and employment would result in indirect and induced revenue, and potential expenditures in Riverside and other surrounding counties (such as La Paz and San Bernardino Counties). However, impacts to the surrounding counties cannot be reasonably quantified as the actual distribution of economic benefits will largely depend on the origin of project's future construction worker population. It is difficult to predict the workers actual origin and consequently therefore corresponding local economy where they are likely to spending most of their earnings.

TABLE 3.14-7
RIVERSIDE COUNTY EXPENSES AND REVENUES FOR FY 2007-2008

	Amount (Dollars)	Percent
Expenses	$2,717,107,833	100%
General Government	$299,748,199	11.0%
Public Safety	$1,059,121,385	39.0%
Public Ways and Facilities	$146,363,144	5.4%
Health	$340,957,271	12.5%
Public Assistance	$760,500,349	28.0%
Education	$17,907,992	0.7%
Recreation & Cultural	$199,776	0.0%
Debt Services	$77,863,426	2.9%
Transfers Out	$14,446,291	0.5%
Revenue Sources	$2,999,779,907	100%
Special Benefit Assessment	--	--
Property Taxes	$541,147,001	18.0%
Other Taxes	$69,873,595	2.3%
Licenses, Permits, Franchises	$40,960,870	1.4%
Fines, Forfeitures and Penalties	$90,299,415	3.0%
From Use of Money and Property	$106,339,835	3.5%
From Other Governmental Agencies	$1,719,722,101	57.3%
Charges for Current Services	$400,693,092	13.4%
Miscellaneous Revenue	$23,922,463	0.8%
Other Financing Sources	$2,848,266	0.1%
Transfers In	$3,973,269	0.1%

SOURCE: State of California County Controller, 2009.

For the fiscal year 2007-2008, tax revenue for Riverside County totaled approximately $3.0 billion, and expenditures totaled $2.7 billion. Riverside's key expenditures were on public assistance, public safety, and health. The County acknowledges that the economic slowdown may result in revenues lower than past projections which may lead to cutbacks in services.

3.15 Soils Resources

The Project site is located in the Mojave Desert Geomorphic Province (NRCS, 2011). The Province is a broad interior region of isolated mountain ranges separated by expanses of desert plains and is characterized by interior enclosed drainages and many playas. The Project site lies near the toe of alluvial fans emanating from the Chuckwalla Mountains to the south, the Coxcomb Mountains to the north, and the Palen Mountains to the northeast. The elevation of Chuckwalla Valley ranges from under 400 feet at Ford Dry Lake to approximately 1,800 feet above mean sea level (amsl) west of Desert Center and along the upper portions of the alluvial fans that ring the valley flanks. The surrounding mountains rise to approximately 3,000 and 5,000 feet amsl.

The ground surface in the region of the Project site generally slopes gently downward to the southeast at a gradient of less than 1 percent. Ground surface elevations at the Project site itself range from approximately 680 feet amsl in the southwest to 425 feet amsl in the northeast. The existing topographic conditions of the site show an average slope of approximately one foot in 75 feet (1.33%) toward the northeast. Steeper grades are present at isolated sand dunes along the northern portion of the site. Toward the north and central portions of the site, the ground becomes hummocky as it transitions to playa.

The climate in the Chuckwalla Valley is arid and has low precipitation. The region experiences a wide range in temperature, with very hot summer months with an average maximum temperature of 108 degrees Fahrenheit (ºF) in July and cool dry winters with an average maximum temperature of 66.7 ºF in December (CEC RSA, 2010). The Blythe area receives approximately 3.5 inches of rainfall per year. The majority of the rainfall occurs during the winter months, but rainfall during the late summer is not uncommon. The summer rainfall events tend to be a result of tropical storms that have a short duration and a higher intensity than the winter rains. Annual average precipitation ranges from 0.02 to 0.47 inches per month (CEC RSA, 2010).

Prevailing winds in the vicinity of the project vary seasonally, and indicate two dominant wind directions during typical years. During the spring and summer months, the strongest winds are associated with monsoonal storm events, and come from the south. During the fall and winter months, the prevailing winds are associated with Pacific Ocean derived weather patterns, and come from the north-northwest.

3.15.1 Soil Characteristics

The Natural Resources Conservation Service (NRCS) is the leading resource for soil surveys that detail soil characteristics of an area. Soil units described by the NRCS are classified as a 2nd Order survey at a scale of 1:20,000 with delineations of 1.5 to 10 acres. Soil mapping at the Project site is currently underway by the NRCS but the publication date of survey results is unknown (CEC RSA, 2010). General soils data discussed here were derived from the United States General Soil Map (NRCS 2011; known as STATSGO2, updated in 2006) which is a 4th Order survey (5th Order being the least detailed – scale of 1:250,000 to 1: 1,000,000). The

STATSGO 2 data are not designed for use as a primary tool for permitting or citing decisions. They do serve as a general reference to general soil conditions.

The Regional Soil Map shows two soil map units on the Project site: 1) the Rositas–Dune land–Carsitas map unit and 2) the Vaiva-Quilotosa-Hyder-Cipriano-Cherioni map unit (Figure 3.15-1). The Rositas-Dune land-Carsitas map unit occurs on 54 percent of the site and is characterized by soils with a very high sand percentage (greater than 95 percent) and is highly susceptible to wind erosion. The remaining 46 percent of the site was mapped as the Vaiva-Quilotosa-Hyder-Cipriano-Cherioni map unit characterized by soils with high percentage (greater than 65 percent) of sand with moderate susceptibility to wind erosion. These data were used in conjunction with field observations and laboratory testing conducted as the result of field reconnaissance to better characterize the soils on site (CEC RSA, 2010).

Because the NRCS has not mapped soils at the site as part of the Riverside County soil survey, the Applicant commissioned a general survey to characterize the soil conditions at the Project site. CH2M HILL conducted a preliminary site reconnaissance at the Project site in 2008 and collected two soil samples. Based on the reconnaissance and the two samples collected, soils on site were described as consisting of sandy material and classified as poorly graded sand with silt. Across most of the project site, the soils would be expected to range from silty sand to poorly graded sand with silt. Typical fines content in these soils would be in the range of 5 to 35 percent (CEC RSA, 2010).

AECOM (CEC RSA, 2010) characterized soils on site in greater detail through field observations and laboratory testing. Laboratory textural analysis and field observations determined that the on-site soils were predominantly sands. Soil profiles observed in the test pits were typically sands and laboratory analysis measured sand content from 83 to 94 percent. Silt content measured in the soils ranged from 2 to 8 percent, and clay content from 2 to 11 percent. Observed profiles exhibited a range of effervescence from none to slight in the top layers, but effervescence increased with depth indicating increasing percentages of carbonates (CEC RSA, 2010).

The laboratory and field observations are not consistent with the descriptions of the Vaiva-Quilotosa-Hyder-Cipriano-Cherioni map unit from the General Soil Map. However, this is not unexpected, based on the relatively low resolution of STATSGO mapping data. The data from the current investigation are considered more accurate than the generalized soils map. Therefore, the Rositas-Dune land-Carsitas map unit is considered the representative soil type at the Project site (CEC RSA, 2010). Active sand dunes are located in the northern portion of the Project site (discussed in detail below).

Detailed soil descriptions come from the NRCS Official Series Descriptions (CEC RSA, 2010). Table 3.15-1 includes information about soil characteristics including depth, texture, drainage, permeability, and erosion hazard of individual soil mapping units. Land capability classification is an indicator of the soils' primary limitations for revegetation. Soils on the plant site include VIIe and VIIIc Capability Subclasses. These subclasses indicate that the soils are unsuitable for cultivation and production of commercial crops.

TABLE 3.15-1
SOIL SERIES AND THEIR DESCRIPTIONS

Soil Series Name	Description
Rositas	Rositas Series – Sandy Loam - Dunes and sand sheets - Very deep, well drained - Slopes range from 0 to 30 percent with hummocky or dune micro relief - Negligible to low runoff - Rapid permeability - High susceptibility of wind erosion - Capability Subclass VIIe nonirrigated - Taxonomic Class: Mixed, hyperthermic Typic Torripsamments (source: http://www2.ftw.nrcs.usda.gov/osd/dat/W/WASCO.html)
Carsitas	Carsitas Series – Gravelly Sand - Formed in alluvial fans, moderately steep valley fills and dissected remnants of alluvial fans - Excessively drained - Slopes range from nearly level to strongly sloping - Slow runoff except during rare torrential showers - Rapid permeability - High susceptibility of wind erosion - Capability Subclass VIIe nonirrigated - Taxonomic Class: Mixed, hyperthermic Typic Torripsamments http://www2.ftw.nrcs.usda.gov/osd/dat/C/CARSITAS.html
Dune land	Dune land – Sand - Dunes can be as much as 25 feet high but are generally 10 feet high - Very slow runoff - High hazard of wind erosion - None or slight hazard of water erosion

SOURCE: CEC RSA, 2010.

3.15.2 Sand Migration and Dunes

The project site is located within the Chuckwalla Valley, a region of active aeolian (wind-blown) sand migration and deposition. Active aeolian sand migration occurs in migration corridors in the northeastern section of the project site and to the northeast of the site. Aeolian processes play a major role in the creation and establishment of sand dune formations and habitat in the Chuckwalla Valley and those within the project area. (CEC RSA, 2010; PWA, 2010).The sand corridor stretches down the Chuckwalla Valley to Blythe and the Colorado River, however, the amount (if any) of Palen-Ford dunefield sand that reaches the Colorado River is unknown at present. At a macroscale, the site is part of the Clark's Pass sand ramp running from NW to SE from the Dale Lake playa in the southern Mojave Desert north of Joshua Tree National Park (San Bernardino County) to sediment sinks in the Palen-Ford dune field in Sonoran Desert of Riverside County (Zimbelman et al., 1995). Winds enable the sand ramp to surmount topographic barriers that otherwise separate the Dale Lake Basin and the Palen-Ford Basin. The proposed project area covers several different land units (Figure 3.15-2) including (from southwest to northeast) a currently stable coarse gravel alluvial fan surface with some relict sand dunes that have largely deflated (blown away), a more active wind-blown sand area with relatively shallow sand deposits, and an area of deeper and more active vegetated sand dunes that is Mojave Fringe Toed Lizard (MFTL) habitat (discussed in detail in Section 3.23, *Wildlife Resources*; see also, PWA, 2010). In the southern and western sectors of the Project site, the surface is a mixture of deflated vegetated dunes with thin coarse sand and patches of alluvial gravel and desert varnish with little available fine loose sand for transport to dunes downwind (PWA, 2010). Moving north and east the fan surface has sandier conditions and transitions from creosote (*Larrea tridentata*) shrub to grasses. This area has shallow vegetated sand dunes and sand sheets that are less deflated and that have more abundant sand than the dunes in the mid fan. The dunes appear to be in relative equilibrium; losses of sand due to wind erosion are matched by deposition of sand from upwind. There is evidence of moderate levels of wind-borne sand transport, and this surface appears to form the outer zone of the sand transport corridor (PWA, 2010). Moving north and east, the vegetated dunes become deeper and the sand becomes more abundant. This area has hummocky vegetated dunes with greater topographic expression than the zone to the west, implying that they are more actively supplied by sand. This area is characterized as MFTL sand dune habitat and this portion of the sand transport corridor is more active than the shallow vegetated sand dunes (PWA, 2010).

The dominant sand migration direction within the corridors is toward the east and south (CEC RSA, 2010). Sand delivered from upwind is deposited, replenishing sand that has been lost downwind. Regional aeolian system studies indicate that the prevailing wind responsible for aeolian sand transport was from the northwest toward the southeast and locally controlled by topography (mountain ranges; CEC RSA, 2010). Three aeolian sand migration corridors occur in the Chuckwalla Valley region: the Dale Lake-Palen Dry Lake-Ford Dry Lake sand migration corridor along the Chuckwalla Valley; the Palen Valley-Palen Dry Lake sand migration corridor where sand is transported southeast along the Palen Valley; and the Palen Pass-Palen-McCoy Valley sand migration corridor, located between the Palen and McCoy Mountains, where sand is transported in a southerly direction/towards the Chuckwalla Valley (CEC RSA, 2010). These sand migrations appear to be driven primarily by winter/Pacific ocean oriented winds, which generally blow from the north-northwest. The proposed project lies within the Palen-Ford sand migration corridor. Nearly half of the project disturbance area (1,735 acres; CEC RSA, 2010) would be located in stabilized and partially stabilized sand dunes, wash habitat, and other areas with soils characteristic of active aeolian sand migration and deposition. Additional sand is added to corridors from local wind corridors that can be thought of as ‘sand corridor tributaries’ and by fluvial sources. The activity and location of sand transport corridors are not fixed in time or space. Sand corridors can expand, contract or migrate with changing weather and climate (PWA, 2010). The sand migration corridor where the project is sited can be further divided into discrete zones that characterize differing rates of sand transport, for correlation to MFTL habitat sensitivity (PWA, 2010). The sand migration corridor near the project site has been divided into four zones for describing the sand migration process at and proximate to the Project (Figure 3.15-3). Zone 1 has the greatest rate of sand transport and Zone 3 the lowest rate. Zone 4 is designated to the south of the borders of Zones 2 and 3, and represents an area where wind transport is not a significant process for sand migration (and subsequently is estimated to have low sensitivity and value as MFTL habitat). The greatest abundance of MFTL has been observed in Zone 2 (discussed in detail in Section 3.23, *Wildlife Resources*) due to the combination of active wind transport and vegetation cover, with fewer MFTL in Zones 1 (abundant sand but little vegetation) and 3 (plentiful vegetation but less active sand transport). Therefore, Zone 2 represents the most sensitive zone within the sand migration corridor proximate to the Project site (PWA, 2010).

3.16 Special Designations

Two systems of federally managed lands are in the vicinity of project. In December 2008, the Secretary of the Interior signed a Secretarial Order to officially designate the 258 million acres of lands managed for multiple-use by the BLM as the *National System of Public Lands*. The project site and the vast majority of the federally-administered public lands in the vicinity of the site are managed as part of this system. The second system of federally managed lands is the *National Park System*. Joshua Tree National Park, a National Park Service (NPS)-managed component of this system, is located approximately 8.5 miles from the project site and would be within the viewshed of the project. Specially-designated BLM-administered public lands and the NPS-administered Joshua Tree National Park are shown on Figure 3.16-1. The visibility of the project from specially-designated areas is discussed in Chapter 3.19, *Visual Resources*.

3.16.1 National System of Public Lands

Special designations on public lands are established through the BLM's land use planning process, Congressional legislation, or Executive Orders and include, but are not limited to, National Monuments, National Conservation Areas (NCAs), Wilderness, National Scenic or Historic Trails, Wild and Scenic Rivers, Cooperative Management and Protection Areas, Outstanding Natural Areas, National Recreation Areas, Forest Reserves, and Areas of Critical Environmental Concern. These designations also may be part of the BLM's National Landscape Conservation System (NLCS) as described in Public Law 111-11 Sec. 2002(b). There are four designated wilderness areas within approximately 20 miles of the project site (see below). The Omnibus Public Land Management Act of 2009 specified that the public lands within the California Desert Conservation Area administered by the BLM for conservation purposes would be included in the NLCS. There are no National Monuments, National Scenic or Historic Trails, Wild and Scenic Rivers, Cooperative Management and Protection Areas, Outstanding Natural Areas, National Recreation Areas, or Forest Reserves within 20 miles of the project site.

Other special designations are defined in FLPMA or have been established through the BLM's land use planning process. Such designations include wilderness study areas (WSAs), Areas of Critical Environmental Concern (ACECs), Scenic or Back Country Byways, watchable wildlife viewing sites, wild horse and burro ranges, and other special designations identified in BLM Handbook H-1601 – Land Use Planning Handbook, Appendix C, III, *Special Designations*. There are five ACECs and one Back Country Byway within about 20 miles of the project site. Although the project site includes acreage that formerly was included in a wilderness study area, the designation was released decades ago. There are no WSAs, Scenic Byways, designated watchable wildlife viewing sites, or wild horse and burro ranges in the vicinity of the site.

Designated Wilderness Areas (WAs)

Wilderness areas are congressionally designated and are managed pursuant to the federal Wilderness Act of 1964 (16 USC 1131–1136) and the specific legislation establishing the wilderness. The Department of Interior agencies are authorized to manage wilderness areas for the public's use and enjoyment in a manner that will leave such areas unimpaired for future use and enjoyment as "wilderness" by providing for their protection and the preservation of their wilderness character, and by gathering and disseminating information about their use and enjoyment. The Wilderness Act (16 USC Sec 1131-1136) defines "wilderness" as an "area where the earth and its community of life are untrammeled by man." A designated wilderness area is defined as having four primary characteristics, including the following:

1. a natural and undisturbed landscape;
2. outstanding opportunities for solitude and unconfined recreation;
3. at least 5,000 contiguous acres; and
4. feature(s) of scientific, educational, scenic, and/or historic value

Four designated wilderness areas are located in the vicinity of the project site and were established by the California Desert Protection Act of 1994 (CDPA) (16 USC Sec 410aaa. *et seq*.). Managed by the BLM, the Palen/McCoy Wilderness is approximately two miles northeast, the Chuckwalla Mountains Wilderness is approximately 1.5 miles south and the Little Chuckwalla Mountains Wilderness is approximately 16 miles southeast. Managed by the National Park Service (NPS), the Joshua Tree Wilderness is approximately 8.5 miles northwest of the project site (see Section 3.16.2, *National Park System* for further discussion).

Palen/McCoy Wilderness

The Palen/McCoy Wilderness encompasses approximately 236,488 acres. Within it are the Granite, McCoy, Palen, Little Maria, and Arica Mountains, which are five distinct mountain ranges separated by broad sloping bajadas. Because this large area incorporates so many major geological features, the diversity of vegetation and landforms is exceptional. The desert wash woodland found here provides food and cover for burro deer, coyote, bobcat, gray fox, and mountain lion. Desert pavement, bajadas, interior valleys, canyons, dense ironwood forests, and rugged peaks form a constantly changing landscape pattern. State Highway 62 near the Riverside County line provides access from the north, and Interstate 10 via the Midland Road near Blythe provides access from the south. The area is accessible by four-wheel drive vehicles only. Mechanized or motorized vehicles are not permitted in a wilderness (CEC RSA, 2010).

Chuckwalla Mountains Wilderness

The Chuckwalla Mountains Wilderness is approximately 99,548 acres and lies south of I-10. Within the area is the Chuckwalla Mountains. Included within the walls of this rock fortress are a variety of landforms, textures, and colors. Steep-walled canyons, inland valleys, large and small washes, isolated rock outcrops and vast desert expanses interact to form a constantly changing panorama. The plant and wildlife species are as uniquely diverse. Bighorn sheep, burro deer, raptors, snakes, coyotes and fox inhabit the area. The southwestern bajada region has been identified as highly crucial habitat for the desert tortoise. Ocotillo, cholla, yucca, creosote and barrel and foxtail cactus cover the landscape and provide seclusion. Hunting, fishing, and non-commercial trapping are allowed. Pets are allowed. Horses are permitted. Camping is permitted, limited to 14 days. Access to the wilderness is from the north via I-10. Eastern access via Corn Springs and Du Pont Roads is provided by the Corn Springs exit on I-10. The Red Cloud Road exit from I-10 provides access from the west, and the Bradshaw Trail provides access to the wilderness from the south. Mechanized or motorized vehicles are not permitted in a wilderness (CEC RSA, 2010).

Little Chuckwalla Wilderness

The Little Chuckwalla Wilderness is 28,034 acres and also lies south of I-10. It includes rugged mountains surrounded by a large, gently sloping bajada laced with a network of washes. To the north, a bajada gently rises to 400 feet, while the rugged mountains crest at 2,100 feet. Habitat for bighorn sheep and desert tortoise can be found in portions of this region, and the southern bajada has been identified as crucial desert tortoise habitat. Several sensitive plant species grow here, including the California snakeweed, Alverson's foxtail cactus, and the barrel cactus. Interstate 10 provides northern access to the Little Chuckwallas via the Ford Dry Lake exit; Graham Pass Road from the west; and Teague Well four-wheel drive route from the east. Both routes access the Bradshaw Trail to the south, which connects to Wileys Well Road.

Users of these wilderness areas, including the Joshua Tree Wilderness Area, discussed below, are seeking opportunities to experience nature, solitude, and unconfined recreation. The areas have no developments other than sparse trails and routes that have not been reclaimed since the wilderness designation. Little data exist on the amounts, types, and trends of visitor use experiences such as camping, hiking, or site seeing. Recreation uses are discussed in Section 3.13, *Recreation*, and include hunting, fishing, and non-commercial trapping. Pets are allowed. Horses are permitted. Camping is permitted, but is limited to 14 days. After 14 days, campers must relocate at least 25 miles from the previous site.

Motorized-vehicle access is prohibited in wilderness areas except under certain circumstances (i.e., where access is required to private property, to facilitate activities associated with valid mining claims or other valid occupancies, to fulfill fish and wildlife management responsibilities under jurisdiction of the California Department of Fish and Game or the U.S. Fish and Wildlife Service, or to accomplish certain administrative and law enforcement operations, including fire suppression and search and rescue operations). Opportunities for the general public to stop, park, or base camp with vehicles inside wilderness are not available.

Wilderness Study Areas (WSAs)

The BLM, through Section 603(a) of FLPMA or established by statute, manages 80 WSAs in California, totaling over 1,360,000 acres. Such areas are roadless, generally at least 5,000 acres, and consist of islands of public lands that have the wilderness characteristics described above. BLM is required to manage WSAs so as not to impair their suitability as wilderness until Congress decides whether it either should be designated as wilderness or should be released for other purposes.

The closest existing wilderness study areas to the site are the Beauty Mountain Wilderness Study Area, approximately 30 miles west of the city of Temecula in San Diego County, and the Cady Mountain Wilderness Study Area between Barstow and Baker along I-40 in San Bernardino County (CEC RSA, 2010). Both wilderness study areas are approximately 100 miles from the project site.

Lands with Wilderness Characteristics

Lands outside of designated wilderness or WSAs are assessed during the RMP or amendment process to determine if they possess one or more wilderness characteristics. Also, plan decisions can include a land use allocation requiring these lands to be managed as Wild Lands to protect one or more wilderness characteristics during the life of the plan (see BLM Land Use Planning Handbook, H-1601-1, Appendix C, (K) Wilderness Characteristics, BLM IM No. 2011-034, and Secretarial Order 3310). These characteristics include naturalness, outstanding opportunities for solitude, and outstanding opportunities for primitive and unconfined recreation.

The proposed LUP amendment for the PSPP includes public lands that were inventoried for potential wilderness designation between 1976 and 1979. All Public Lands within the CDD were analyzed and summarized in 1979 wilderness inventory decisions performed pursuant to the FLPMA. See “California Desert Conservation Area – Wilderness Inventory – Final Descriptive – March 31, 1979”. Public Land within the project site is contained within CDCA Wilderness Inventory Units (WIU) #CDCA 325, 330, and 331. No part of the project site would be on public lands identified as having wilderness characteristics in that 1979 decision.

WIU #CDCA 325 encompassed a large area. The boundary was generally tied on the west to Highway 177; on the north to Highway 62 and an aqueduct; and on the east to Midland-Rice Road. The 1979 decision established the Palen/McCoy WSA for the Public Lands determined to have wilderness characteristics. Public lands not included in the WSA, including those lands now being analyzed for the project, were those where the imprints of man were substantially noticeable. These included impacts from mining, extensive networks of vehicle ways on some bajadas, and sites used by the U.S. Army for desert tank training during WWII. The California Desert Protection Act (CDPA) of 1994 designated the Palen/McCoy Wilderness. The boundary for the wilderness was similar to the boundary of the WSA.

WIU #CDCA 330 was a narrow, elongated area bordered by a pole line access road to the north and by Interstate 10 to the south. This relatively flat, linear area has little topographic relief and ranges from sparsely vegetated creosote to nearly nonexistent vegetation on Ford Dry Lake. The area has been disturbed by man. Fence enclosures are located throughout the area, along with past evidence of development and two wells. With an average width of one to two miles, the confining nature of the unit severely restricts opportunities for solitude or a primitive and unconfined type of recreation. As such, the 1979 decision was that no portion of this unit had wilderness characteristics and no public lands were identified as a WSA.

WIU #CDCA 331 was bordered on the northeast by a maintained road; on the south, by Interstate 10; and, on the northwest, by Highway 177. This area is relatively flat and includes creosote and some ironwood vegetation. Much of the western portion is in private land ownership. Man's work is substantially noticeable within this area, especially on the large portion of privately-owned lands which includes buildings, roads, and an airport. Opportunities for solitude or a primitive and unconfined type of recreation are limited due to the confining nature of the area and inability of topographic features to screen visitors from one another. As such, the

1979 decision was that no portion of this unit had wilderness characteristics and no public lands were identified as a WSA.

Relevant portions of the Wilderness Inventories for the three WIUs were maintained pursuant to section 201(a) of the FLPMA. The current conditions existing in 2011 are essentially the same as in 1979. In summary, no changes have occurred since 1979 that would result in findings that differ from the 1979 decision that wilderness characteristics were not present in the project area. Therefore, wilderness characteristics were not analyzed further in this EIS.

Areas of Critical Environmental Concern (ACECs)

ACECs are BLM-specific, administratively-designated areas within the public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values; fish and wildlife resources; or other natural systems or processes; or to protect life and safety from natural hazards (FLPMA, 43 USC 1702(a); 43 CFR 1601.0-5(a)). By itself, the designation does not automatically prohibit or restrict uses in the area; instead, it provides a record of significant values that must be accommodated when BLM considers future management actions and land use proposals.

There are six ACECs located in the vicinity of the site. Chuckwalla Desert Wildlife Management Area (DWMA) ACEC is approximately 0.25 mile southwest and is 352,633 acres. The NECO Plan designates this DWMA as an area of “critical environmental concern” to protect desert tortoise and other significant natural resources including special status plant and animal species and natural communities. The Palen Dry Lake ACEC is located approximately 0.5 mile northeast of the project site; it was established to protect cultural resources. The Corn Springs ACEC is approximately 2,467 acres and is approximately 5.5 miles southwest of the site. This ACEC boundary includes land suitable for wilderness designation by Congress. Alligator Rock ACEC consists of 7,754 acres. It is located six miles west of the site and also was established based on the suitability of the acreage for wilderness designation. The Desert Lily Preserve ACEC is six miles northwest of the site and is designated to protect sensitive natural, scenic, ecological, and cultural resource values of its 2,055 acres. The 2,273-acre Chuckwalla Valley Dune Thicket ACEC is located approximately 17 miles southeast of the site. This ACEC is managed for wildlife habitat, specifically that of the desert tortoise. Recreation uses allowed in ACECs are discussed in Section 3.13, *Recreation*.

Back Country Byway

The Bradshaw Trail is a 65-mile National Back Country Byway located about 17 miles south of the project site that extends from about 35 miles southeast of Indio to about 15 miles southwest of the City of Blythe. It was the first road through Riverside County, blazed by William Bradshaw in 1862 as an overland stage route beginning in San Bernardino, California, and ending at Ehrenberg, Arizona. The trail was used extensively between 1862 and 1877 to transport miners and passengers. The trail is a graded dirt road that traverses mostly public land between the Chuckwalla Mountains and the Chocolate Mountain Aerial Gunnery Range. Recreational opportunities include four-wheel driving, wildlife viewing, plant viewing, birdwatching, scenic drives, rockhounding, and hiking.

3.16.2 National Park System

Like the BLM, the NPS is a bureau of the U.S. Department of the Interior. Since 1916, the NPS has been entrusted with the care of America's national park system, which now numbers nearly 400 places that collectively are visited by more than 275 million people each year (NPS, 2010). One unit of the National Park System is located approximately 8.5 miles from the project site: Joshua Tree National Park.

President Franklin D. Roosevelt proclaimed Joshua Tree a National Monument on August 10, 1936, to protect various objects of historical and scientific interest (Proclamation 2193, 50 Stat. 1760). Congress re-designated a National Park on October 31, 1994, as part of the California Desert Lands Protection Act of 1994 (16 U.S.C. § 410aaa et seq.). In establishing this National Park, Congress found that the desert lands within it constitute a "public wildland resource of extraordinary and inestimable value for current and future generations," that has "unique scenic, historical, archeological, environmental, ecological, wildlife, cultural, scientific, educational and recreational values." Joshua Tree also is recognized by the United Nations Educational, Scientific, and Cultural Organization under its Man and the Biosphere Program as a Biosphere Reserve.

As of September 23, 2000, the Joshua Tree National Park consisted of approximately 1,017,748 acres. It lies 140 miles east of Los Angeles, 175 miles northeast of San Diego, and 215 miles southwest of Las Vegas. One of three park entrance locations is at Cottonwood Spring, which lies 25 miles east of Indio and near the project site. Joshua Tree National Park is open year-round, although the peak time for visitors is April. The total number of visitors to the Park increased by 240 percent between 1986 (525,000 visitors) and 1997 (1,200,000) (NPS, 1998). Visitorship remains over a million people per year (Uhler, 2007).

Joshua Tree Wilderness

The Joshua Tree Wilderness is approximately 594,502 acres and is managed by the National Park Service as part of Joshua Tree National Park. The Joshua Tree Wilderness is bordered by the Sheephole Valley Wilderness to the north and the Pinto Mountains Wilderness to the north. It is approximately 10 miles north of I-10 and abuts State Highway 177 to the west. The lower, drier Colorado Desert dominates the eastern half of the wilderness, home to abundant creosote bushes, ocotillo, and the cholla cactus. The slightly more cool and moist Mojave Desert covers the western half of the wilderness, serving as a breeding ground for the Joshua trees. Five fan-palm oases are located in this wilderness area, where surface or near-surface water gives life to palms trees. A diverse variety of desert wildlife species, such as Bighorn sheep, eagles, and kangaroo rats occupy this wilderness. The steep elevations provide views to the south and east which overlook the project. Aerial photography shows no trails or other established routes within this Wilderness segment.

3.17 Transportation and Public Access – Off Highway Vehicle Resources

3.17.1 Public Access

Introduction

Recreation and motorized travel opportunities are determined, in part, by California Desert Conservation Area Plan (CDCA) Multiple Use Class and off-road area designations. The multiple use class is based on the sensitivity of resources and kinds of uses appropriate in various geographic areas. Each of the four multiple-use classes describes a different type and level or degree of use permitted within specified areas. The BLM also designates the public lands it administers as open, limited, or closed to off-road vehicles pursuant to Executive Order 11644 (1972), *Use of Off-Road Vehicles on the Public Lands*, as amended in 1974 by Executive Order 11989; and other authorities, including the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 et seq.), BLM planning regulations (43 CFR Part 1600), and BLM Land Use Planning Handbook H-1601-1. For the purpose of this section, the terms Off-Road Vehicle and Off Highway Vehicle (OHV) are used interchangeably, although OHV is the term most used by the BLM and in other federal land use planning efforts.

Multiple Use Class

With the exception of a privately-owned 40-acre parcel, the proposed action would be developed entirely within Multiple Use Class M-Moderate Use. This class is based upon a controlled balance between higher intensity use and protection of public lands. This class provides for a wide variety of present and future uses such a mining, livestock grazing, recreation, energy, and utility development. See Section 3.9, *Multiple Use Classes*, for more information about the land use and resource-management guidelines applicable to MU-M areas.

OHV Routes

In establishing the CDCA, Congress declared that “the use of all California desert resources can and should be provided for in a multiple use and sustained yield management plan to conserve these resources for future generations, and to provide present and future use and enjoyment, particularly outdoor recreation uses, including the use, where appropriate, of off-road recreational vehicles.” 43 USC 1781(a)(4).

The CDCA Plan and NECO Plan Amendment state that vehicle access is among the most important recreation issues in the desert. A primary consideration of the recreation program is to ensure that access routes necessary for recreation enjoyment are provided (BLM, 2001 Section 3.8.2). For purposes of OHV management, vehicle access in MUC-M areas is directed toward use of approved (“open” or “limited”) routes of travel, or “open washes.”

Under the CDCA Plan, as amended, BLM-administered public lands within the CDCA are designated as *Open, Limited* or *Closed.* Within open areas, motorized vehicles may travel anywhere; in closed areas, such travel is prohibited. There are no BLM-designated open OHV areas in Riverside County. In limited areas, motorized-vehicle access is allowed only on certain *routes of travel*, defined to include roads, ways, trails, and washes.

In addition to OHV areas being designated as open, closed, or limited, OHV routes also are designated as *open*, *closed*, or *limited*, with the following definitions:

1. *Open Route:* Access by all types of motorized vehicles is allowed generally without restriction.
2. *Limited Route:* Access by motorized vehicles is allowed, subject to limitations on the number and types of vehicles allowed and restrictions on time or season and speed limits.
3. *Closed Route:* Access by motorized vehicles is prohibited except for certain official, emergency or otherwise authorized vehicles.

As required by the CDCA Plan, the NECO Plan amendment created a detailed inventory of existing routes within the NECO Plan area that were officially designated as *Open, Limited* or *Closed* as part of the NECO routes of travel system. The BLM's Palm Springs-South Coast Field Office (PSSCFO) currently is implementing route signing on the ground. A route has high significance if it provides access to other routes, historical sites, or recreational areas such as the back county driving, photography, camping, rock hounding and hiking opportunities in eastern Riverside County.

The project site has approximately 9 miles of designated open routes. OHV recreational opportunities on the site are limited to driving or riding on these routes. Routes of travel, other than washes, are shown in Figure 3.17-1.

The BLM has no traffic counters or other means to determine accurate use of routes in the vicinity of the project site. Observations by BLM staff and Law Enforcement Rangers report that use is relatively low on routes within the vicinity of the project site, not exceeding 300 visits per year. Recreation and vehicle use generally is limited to the cooler months of September through May. Use is nearly non-existent during the summer. Recreational vehicle use consists of touring in passenger cars, SUVs, motorcycles, and ATVs.

Washes Open Zones

The CDCA Plan, as refined in the NECO Plan, provides special management considerations for OHV use on washes, sand dunes and dry lakes. As part of the land use planning process, MUC designations were assigned to regions throughout the CDCA Plan area. As stated in the NECO Plan, "all navigable washes not individually inventoried and mapped on public lands would be designated as open routes as a class except where such washes occur within a washes closed zone" (p. 2-77). Since there are no OHV *Open Area* designations within the PSSCFO area, motorized travel available to the public in the NECO Plan area is restricted to authorized routes of travel with the exception of washes open zones (BLM CDD, 2002).

The project site is in a "washes open zone." Under the NECO Plan, all MUC-M areas are considered "washes open zones" unless specifically designated limited or closed. The use of washes within "washes open zones" is restricted to those considered "navigable," unless it is determined that vehicle use must be further limited. Navigable washes in "washes open zones" are designated "open" *as a class*, that is, washes are not individually designated unless they are identified as specific routes in the NECO route inventory. In this context, the term "wash" is defined as a watercourse, either dry or with running or standing water, which by its physical nature, width, soil, slope, topography, vegetative cover, etc. permits the passage of motorized vehicles, thereby establishing its "navigability" (BLM, 1980; BLM CDD, 2002 Section 3.9.5).

There are approximately 100 minor dry washes that cross the site from southwest to northeast, draining the area downstream of I-10 towards Palen Dry Lake. There are two more significant ephemeral wash complexes that cross the site from southwest to northeast, draining the area downstream of I-10 towards Palen Dry Lake. The BLM has not inventoried or analyzed specific washes in the project area as to their navigability, but by the above definition, all or portions of these washes may be considered navigable through a portion of the project site. As is the case with designated routes, the BLM has no means to determine accurate use of "open wash zones" in the vicinity of the project site.

3.17.2 Transportation

Major Traffic Routes within the Vicinity of the Project

U.S. Interstate 10

Interstate 10 is an east-west regional arterial that crosses much of the southern United States. It runs from the Los Angeles area east to Phoenix, Arizona, where it turns south and continues to Tucson, Arizona, ultimately continuing east to Jacksonville, Florida. In the project area, the speed limit is 70 miles per hour and the road is fully improved to freeway status with two lanes in each direction, each direction experiencing an Average Annual Daily Traffic (AADT) volume of 21,400 vehicles in 2008 (the most recent year for which Caltrans figures are available). There are no bicycle or pedestrian facilities located on I-10 near the project site; however, bicycles are allowed on I-10 from Dillon Road, Coachella (west of the project site) to Mesa Drive, Blythe (east of the project site). The State Department of Transportation (Caltrans) allows bicycle use on State highways where no alternative route is available.

Corn Springs Road

Corn Springs Road is an exit off of I-10 accessed by a diamond-configured interchange. The interchange includes single-lane ramps with ramp junctures, where stop signs control traffic from I-10 before it enters Corn Springs Road. Corn Springs Road is a relatively short road that runs north toward the project site, as well as south, where it intersects with Chuckwalla Valley Road. Corn Springs Road has curb and gutter, but no bicycle or pedestrian facilities.

Chuckwalla Valley Road

Chuckwalla Valley Road is a minor local access road running in an east-west direction just south of I-10 in the vicinity of the project site. It is a two-lane frontage road extending from the southern part of the Corn Springs Road interchange to the Ford Dry Lake Road interchange approximately 10 miles to the east. Stop signs on the Chuckwalla Valley Road approaches control the Corn Springs Road/Chuckwalla Valley Road intersection. Chuckwalla Valley Road has curb and gutter, but no bicycle or pedestrian facilities.

Existing Traffic Volumes

The level of service (LOS) is defined as a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. LOS indicators for the highway and roadway system are based on specific characteristics of traffic flow on designated sections of roadway during a typical day. For mainline freeway and road segments, these include overall traffic volume, speed, and density.

Several physical and operational characteristics of the roadway, such as lane configuration, flow speed (typical speed between intersections), and number of intersections per mile, are used to determine the vehicular capacity of the roadway segment. When these two sets of data are compared, a volume-to-capacity ratio is calculated. These factors are then converted to a letter grade identifying operating conditions and expressed as LOS A through F. The *Highway Capacity Manual 2000*[1], published by the Transportation Research Board, Committee on Highway Capacity and Quality of Service, includes six levels of service for roadways or intersections ranging from LOS A (best operating conditions characterized by free-flow traffic, low volumes, and little or no restrictions on maneuverability)—the best operating conditions—to LOS F (forced traffic flow with high traffic densities, slow travel speeds, and often stop-and-go conditions)—the worst.

Table 3.17-1 provides existing traffic volumes and LOS for I-10 that likely would be used for indirect access to the project site. As indicated below, I-10 and Corn Springs Road are classified as LOS A in the project area.

Site Access

Site access would be via a new 24-foot wide paved access road, 1,350 feet long, starting at the existing Corn Springs Road at the I-10 interchange. No improvements to I-10 would be needed. Corn Springs Road currently runs north-south across I-10 and terminates just north of the I-10 overpass. From this dead-end, Corn Springs Road would be extended east to connect with a new access road into the site.

[1] This manual is a common guide used for computing the capacity and quality of service of various highway facilities, including highways, arterial roads, signalized and unsignalized intersections and the effects of mass transit, pedestrians, and bicycles on the performance of these systems.

TABLE 3.17-1
EXISTING TRAFFIC VOLUMES AND LEVEL OF SERVICE

Roadway/Segment	Existing Conditions			
	Travel Lanes	Volume	Capacity	LOS
I-10 West of Project Site	4	3,145	8,000	A
I-10 East of Project Site	4	3,145	8,000	A
Corn Springs Road	2	Negligible		A

NOTES: Capacity represents approximate two-way capacity in vehicles per hour.
Volume represents the number of vehicles crossing a section of road per unit time at any selected period.

SOURCE: CEC RSA, 2010

Public Transportation in the Vicinity of the Project

Public transportation consists of rail and bus service, bicycle and pedestrian facilities, and airports. Information about these forms of public transportation follows.

Rail Service

The Arizona & California Railroad Company, which previously provided rail service in the vicinity of the site, filed a petition to abandon service with the Surface Transportation Board on March 12, 2009. The Surface Transportation Board is a federal economic regulatory agency charged with resolving railroad rate and service disputes and reviewing proposed rail mergers, rail line purchases, construction and abandonment. On January 13, 2010, the Surface Transportation Board ruled that the Arizona & California Railroad Company could abandon service in San Bernardino County and Riverside County. Consequently, no rail service is available near the site at this time.

In addition, no regional passenger railroad transportation exists in the immediate area. The nearest rail passenger service is at Amtrak Stations in Palm Springs, California and Yuma, Arizona.

Bus Service

There is no bus service to the site. Local bus service near the project site is limited to Route 3 of the Desert Roadrunner/Palo Verde Valley Transit Agency bus service, which provides express service on weekday peak hours from Blythe to multiple California State prisons located along I-10, including the Ironwood/Chuckwalla Valley State Prison complex located approximately 21 miles east of the project site. Other regional bus service is provided in the Coachella Valley by SunLine Transit Agency, whose bus system extends from Desert Hot Springs to Mecca (SunBus, 2010). Amtrak Thruway Bus Route 19b is an Indio-Bakersfield route that connects to Amtrak's larger system in Bakersfield. Greyhound routes include I-10 with a bus station in Indio.

Bicycle and Pedestrian Facilities

Bicycle and pedestrian activity in the vicinity of the project site is minimal-to-none. Development is extremely low-density and spread over a large area, which is not conducive to biking or walking.

Airports

The closest airfield to the project site is the privately-operated Desert Center Airport, located at the end of an unnamed road approximately 5 miles northwest of the main project site, but only about 2 miles (approximately 10, 500 feet) from the proposed gen-tie line. (As indicated in Table 2-1, *General Project Dimensions*, the proposed gen-tie transmission towers would range in height between 90 and 145 feet). The airport's runway is approximately 4,200 feet long. Chuckwalla Valley Associates, LLC, operates the airport to serve the Chuckwalla Valley Raceway. Airport use is light: about 150 aircraft operations per year at the airfield for the 12-month period ending December 31, 2006. See Section 3.12, *Public Health and Safety*, for more information about this airport.

Regarding new construction near airports, the Federal Aviation Administration (FAA) standards (14 CFR Part 77) require FAA notification if, as a result of construction, any criterion is met among those listed in Part 77.13 of Title 14 of Code of Federal Regulations. Notification is required, for example, if a proposed structure or object would be taller than 200 feet above the ground level at its site, or if it is taller than an imaginary surface extending outward and upward at a slope of 100 to 1 for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of an airport that has at least one runway more than 3,200 feet long.

3.18 Vegetation Resources

In addition to the analysis contained with the BLM's DEIS, this section is based on, and draws heavily from, the California Energy Commission's Staff Assessment (SA), Revised Staff Assessment (RSA) and Commission Decision for the PSPP. The project would be located in the Chuckwalla Valley between the Chuckwalla and Palen mountains in eastern Riverside County, and less than two miles from the southern edge of Palen Dry Lake (DTPC 2006 as cited in the CEC RSA, 2010). The Biological Resources Study Area (Study Area) consists of a 14,771 acre area that encompasses the approximately 4,024-acre Project Disturbance Area (including the transmission disturbance area) and a surrounding buffer area (Commission Decision, 2010).

The project site is located in the central portion of Chuckwalla Valley, an area east of Palm Springs in the Colorado Desert, a subsection of the Sonoran Desert. The elevation range of the Chuckwalla Valley is from 400 feet above mean sea level at Ford Dry Lake to approximately 1,800 feet above mean sea level along some of the bajadas that occur west of Desert Center, California, with the surrounding mountains rising to over 3,000 feet above mean sea level (Solar Millennium 2009a as cited in the CEC RSA, 2010). Hydrologically, the Study Area occurs in the Colorado River Basin within the Chuckwalla Valley Drainage Basin. This is an internally drained basin and all surface water flows to Palen Dry Lake in the western portion of Chuckwalla Valley and Ford Dry Lake in the eastern section of Chuckwalla Valley.

The unique position of the region at the junction with the Neotropic ecozone to the south contributes to the presence of a number of rare and endemic plants and vegetation communities specially adapted to this bi-modal rainfall pattern, and not found elsewhere in California. These include microphyll woodlands, palm oases, and a number of summer annuals that only germinate after a significant warm summer rain (CEC RSA, 2010).

This distinctive bi-modal climate of the Sonoran Desert distinguishes it, floristically, from other deserts, including the Mojave Desert, and from the rest of California, where warm dry summers and a single rainy season in winter are characteristic. In addition to being hotter and drier, the Sonoran Desert region also rarely experiences frost. Although the region supports numerous perennial species, including a wide variety of cacti, more than half of the region's plant species are herbaceous annuals, which appear only during periods of suitable precipitation and temperature conditions.

The Chuckwalla Valley is a region of active aeolian (wind-blown) sand migration and deposition but at a magnitude substantially less that it had experienced during dune aggradational events since the late Pleistocene (CEC RSA, 2010). Nevertheless, aeolian processes play a major role in the creation and establishment of sand dune habitat in Chuckwalla Valley and within the project area, habitat that is essential to the existence of the Mojave fringe-toed lizard among many other dune habitat specialists (especially beetles). In general, major local sand migration corridors used in the past currently are continue to be used, but the corridors have decreased in width since the late Pleistocene within the project area indicating that the aerial extent of aeolian activity in recent times is less that it once was during regional dune aggradational events (Solar Millennium 2010b as cited in the CEC RSA, 2010).

The dominant sand migration direction within the corridors is toward the east and south. Regional aeolian system studies indicate that the prevailing wind responsible for aeolian sand transport was from the northwest toward the southeast and locally controlled by topography (mountain ranges). Three aeolian sand migration corridors have been identified within the Chuckwalla Valley region including the following: The Dale Lake–Palen Dry Lake–Ford Dry Lake sand migration corridor; the Palen Valley–Palen Dry Lake sand migration corridor; and the Palen Pass–Palen-McCoy Valley sand migration corridor (Solar Millennium 2010b as cited in the CEC RSA, 2010; CEC RSA, 2010 Appendix C).

The project would be located within two areas designated in the NECO plan as wildlife habitat management areas (WHMA): Palen-Ford WHMA and Desert Wildlife Management Area (DWMA) Connectivity WHMA. Management emphasis for the Palen-Ford WHMA is on the management of the dunes and playas within the Palen-Ford dune system. Management emphasis for the DWMA Connectivity WHMA is on the geographic connectivity for the desert tortoises for the conservation areas east of Desert Center (i.e., connectivity between the Chuckwalla DWMA and the wilderness area north of I-10). The Palen-McCoy Wilderness is approximately 3 miles to the northeast of the project site, the Chuckwalla DWMA is located approximately 2 miles to the south, and the Palen Dry Lake ACEC borders the site to the east.

3.18.1 Overview of Natural Vegetation Communities

Seven natural vegetation communities occur within the Study Area (Figure 3.18-1): Sonoran creosote bush scrub, desert dry wash woodland (Figure 3.18-2), unvegetated ephemeral dry wash, stabilized and partially stabilized desert dune, active desert dune, desert sink scrub, and dry lake bed (Figure 3.18-1). Two other cover types occur in the Study Area: agriculture and developed. Table 3.18-1 summarizes the acreage associated with each within the Biological Resources Study Area. The 4,024-acres that would be disturbed to construct, operate and maintain the project (i.e., the Project Disturbance Area) consist almost entirely of native habitats, including 148 acres of desert dry wash woodland, 164 acres of unvegetated ephemeral dry wash, 3,422 acres of Sonoran creosote bush scrub, and 285 acres of stabilized and partially stabilized desert dunes (Figure 3.18-3) (AECOM 2010a as cited in the CEC RSA, 2010).

3.18.2 Ephemeral Drainages “Riparian” Communities

Desert Dry Wash Woodland

Desert dry wash woodland (also known as microphyll woodland) is a sensitive vegetation community recognized by the California Natural Diversity Database (CNDDB) and the BLM. As discussed below, CDFG (CDFG, 2003 as cited in the CEC RSA, 2010; BLM, 2002) have designated the woodlands as State waters (Figure 3.18-2). Holland describes this community as an open to relatively densely covered, drought-deciduous, microphyll (small compound leaves) riparian scrub woodland. These habitats often are supported by braided wash channels that change

TABLE 3.18-1
NATURAL COMMUNITIES/COVER TYPES

Natural Communities and Cover Type within the Biological Resources Study Area	Project Disturbance Area[a]	One-Mile Buffer	Biological Resources Study Area[b]
Ephemeral Drainages "Riparian"			
Desert dry wash woodland	148	699	846
Unvegetated ephemeral dry wash	164	61	225
Subtotal Ephemeral Drainages "Riparian"	*312*	*760*	*1,071*
Upland			
Active desert dunes	0	684	684
Desert sink scrub	0	9	9
Dry lake bed	0	270	270
Sonoran creosote bush scrub	3,422	7,423	10,845
Stabilized and partially stabilized desert dunes	285	625	910
Subtotal Upland	*3,707*	*9,011*	*12,718*
Other Cover Types			
Agricultural Land	3	830	833
Developed	2	147	149
Subtotal Other Cover Types	*5*	*977*	*982*
Total Acres	**4,024**	**10,748**	**14,771**

a The Project Disturbance Area encompasses the disturbance resulting from the proposed construction of the project, including solar fields, transmission facilities, office and maintenance buildings, lay down area, bioremediation area, drainage channels, leach fields, and other components. It includes the impact acreage of the gen-tie line for the eastern Red Bluff Substation.

b The Biological Resources Study Area encompasses the Project Disturbance Area (area inside and outside the facility fence that would be disturbed by the project), the solar facility footprint area inside the facility fence including solar fields and other support structures and facilities, the transmission line route and buffer areas (1 mile for solar footprint, 1,000 feet for the transmission line).

SOURCE: Solar Millennium 2010m as cited in the CEC RSA, 2010 (acreages are rounded)

patterns and flow directions following every surface flow event (Figures 3.18-4 and 3.18-5) (Holland, 1986 as cited in the CEC RSA, 2010).

This vegetation community occupies the major washes that traverse the Project Disturbance Area and is dominated by an open tree layer of blue palo verde (*Parkinsonia florida*), honey mesquite (*Prosopis glandulosa* var. *torreyana*), ironwood (*Olneya tesota*), and smoke tree (*Psorothamnus spinosus*) with an understory of big galleta grass (*Pleuraphis rigida*), desert starvine (*Brandegea bigelovii*) and intermixed with creosote bush (*Larrea tridentata*) and Russian thistle (*Salsola tragus*) (Solar Millennium, 2009a as cited in the CEC RSA, 2010, AECOM, 2010a as cited in the CEC RSA, 2010).

Ironwood, palo verde, and smoke tree are desert phreatophytes, groundwater-dependent plants with deep root systems that can extend tens of feet below the ground surface to the underlying water table. Phreatophytes are known for their ability to tap into groundwater 40 feet to 200 feet or deeper, depending on the species. Other known phreatophytes in the project area desert washes include the native cat's claw (*Acacia greggii*) and the invasive exotic Saltcedar (*Tamarix* *ramosissima*). However, these deep-rooted species sometimes also occur away from the streams where they have access to deep groundwater.

Desert dry wash woodland is prevalent in the primary wash near I-10 where channel development is most pronounced and water supply more abundant. As the washes become shallower and eventually abate into the landscape further northward from I-10 within the Project Disturbance Area, desert dry wash woodland eventually is replaced by smaller washes of mixed creosote bush and big galleta grass, and a mixture of other upland and wash-dependent species. Outside major washes, desert dry wash woodland appears to be declining overall within the Project Disturbance Area as hydrological diversions upstream (diking and the construction and placement of I-10) in the early 1960s interrupted natural flow paths and reduced water flows either through obstruction and/or redistribution from the Corn Springs Wash (AECOM, 2010a as cited in the CEC RSA, 2010).

Desert dry wash woodland in the study area supports a rich community of wildlife and special status species described in this section and in Section 3.23, *Wildlife Resources*.

Unvegetated Ephemeral Dry Wash

In the project area, the smaller channels without a continuous cover of desert dry wash woodland consist of a sparse to intermittent cover of shrubs and perennial herbs. As discussed below, these habitats also are recognized and regulated as State waters and termed “Unvegetated Ephemeral Dry Wash,” which is somewhat of a misnomer. These smaller channels are subject to frequent channel avulsion and highly variable flow pathways contained within broad floodplains. Vegetative cover consists largely of mixed upland and wash-dependent perennial herbs in a community of creosote bush and big galleta grass—both along the banks and within the riparian interfluves. Like desert dry wash woodland habitats, unvegetated ephemeral dry washes also showed evidence of wildlife use by small and large mammals as movement corridors; they also provide a food and water source for many species of migrating songbirds, raptors, and reptiles. Special-status species likely to benefit from these ephemeral desert washes include desert tortoise.

3.18.3 Upland Communities

Active Desert Dunes

Active desert dunes are considered sensitive by the CNDDB (CDFG, 2003 as cited in the CEC RSA, 2010) and the BLM (NECO Plan). This community is characterized by mostly unvegetated drifted sand dunes and sand fields of five feet or less in height. Dominant and indicator plants within the Study Area for this community include desert twinbugs (*Dicoria canescens*), creosote bush, birdcage evening primrose (*Oenothera deltoides*), and Russian thistle (*Salsola tragus*). The active desert dunes are in the northeastern portion of the Study Area and northeast of Palen Dry Lake. Despite the presence of Russian thistle, the active desert dunes within the Study Area provide habitat values to many species of plants and wildlife (AECOM, 2010a as cited in the CEC RSA, 2010).

Active desert dunes only occur in the buffer area, northeast of the project site boundary within the most active part of the wind transport corridor; no active desert dune acreage occurs within the Project Disturbance Area. The active desert dunes within the Study Area are an important habitat for the MFTL, western burrowing owl, American badger, desert kit fox, and many species of locally common plant species, reptiles, and birds.

Dry Lake Bed (Playa)

There is no associated Holland or Sawyer and Keeler-Wolf classification for this community. The northeastern portion of the Study Area lies within Palen Dry Lake which is made up of clay and silt. This dry lake bed has a soft surface when wet and displays desiccation cracks once the surface dries. Dry lake beds are prone to periodic flooding with a high coefficient for swelling and contracting once dried. Palen Dry Lake is characterized as a “wet playa” because it supports significant groundwater discharge at the ground surface by evaporation (Solar Millennium2009a, as cited in the CEC RSA, 2010). Palen Dry Lake bed has no natural or artificial outlet (CEC RSA, Soil and Water Appendix A).

Sonoran Creosote Bush Scrub

Sonoran creosote bush scrub habitat characterizes most of the Study Area and intergrades with desert dry wash woodland along desert washes. This vegetation community is not designated as a sensitive plant community by BLM (NECO Plan). CNDDB (CEC RSA, 2010) recognizes many rare associations of creosote bush scrub; however, none of these were found in the Project Disturbance Area. Areas of desert pavement occur in this habitat where there is a lower density of vegetation, with cobbles ranging in size from one to three inches (Solar Millennium 2009a as cited in the CEC RSA, 2010). Sonoran creosote bush scrub occurs on well-drained, secondary soils of slopes, fans, and valleys and is the basic creosote bush scrub habitat of the Colorado Desert (Holland 1986 as cited in the CEC RSA, 2010). Within the Study Area, this community is characterized by sandy soils with a shallow clay pan. Past disturbance of the Study Area by military training and agricultural practices has resulted in a high percentage of invasive plant species, especially in the southern portion of the Study Area, consisting primarily of Sahara mustard (*Brassica tournefortii*), Mediterranean grass (*Schismus* spp.), and Russian thistle. The diversion of all the smaller washes by collector ditches south of I-10 also may contribute to the overall sparse vegetative cover and low diversity of creosote bush scrub in the Project Disturbance Area.

Stabilized and Partially Stabilized Desert Dunes

Stabilized and partially stabilized desert dunes are considered sensitive by the CNDDB (CDFG, 2003 as cited in the CEC RSA, 2010) and the BLM (NECO Plan). These dune systems, recognized as sensitive in the NECO Plan (Figure 3.18-6), are sand accumulations in the desert that have stabilized or partially stabilized as evergreen and/or deciduous shrubs and scattered, low grasses have colonized. These dunes typically occur at lower elevations than active dune systems and retain water just below the sand surface. Water availability allows deep-rooted, perennial vegetation to survive during longer drought periods (Holland, 1986 as cited in the CEC RSA, 2010).

This community occupies the margins of Palen Dry Lake and extends into the Project Disturbance Area. Desert sand dunes provide unique habitats that often support plants, mammals, reptiles and insects that are restricted to sand dunes. Dominant plants within the Study Area of this community include honey mesquite, dyebush (*Psorothamnus emoryi*), and annual desert milkvetch (*Astragalus aridus*). The dunes within the Study Area are an important habitat type for the MFTL, Harwood's milkvetch (*Astragalus insularis var. harwoodii*), western burrowing owl, American badger, desert kit fox, and a variety of common plant and wildlife species (AECOM, 2010a as cited in the CEC RSA, 2010). In addition, a potentially undescribed taxon of saltbush has been documented on the dunes just outside the Project Disturbance Area.

Figure 3.18-7 depicts the stabilized and partially stabilized desert dunes as a few discrete patches within the northern and eastern portion of the Project Disturbance Area, totaling 285 acres. Based on review of the aerial photos and mapping provided in the Applicant's Preliminary Geomorphic Aeolian and Ancient Lake Shoreline Report (Solar Millennium 2010b as cited in the CEC RSA, 2010) and in Soil & Water Appendix A of the CEC RSA, the mapping of the stabilized and partially stabilized desert dunes in the CEC Application for Certification (AFC) may under-represent the extent of this community type. Both these recent studies, which focus on sand transport, provide aerial photos that depict an extensive area of active sand dune building that occupies much of the northeastern portion of the Project Disturbance Area. In light of existing uncertainty about the precise number of acres of stabilized and partially stabilized desert dunes, the BLM uses the 285-acre figure in this PA/FEIS.

3.18.4 Other Cover Types

Areas of non-native vegetation within the Study Area include agricultural and developed areas and are limited to approximately five acres within the Project Disturbance Area. These areas, along with other conditions such as gathering/channeling water, often create favorable conditions for the occurrence and spread of non-native invasive plant species (e.g., noxious weeds), which are discussed in Section 3.18.7, *Invasive and Noxious Weeds*.

Agriculture

Neither Holland (1986 as cited in the CEC RSA, 2010) nor Sawyer and Keeler-Wolfe (2009 as cited in the CEC RSA, 2010) provide a vegetation community designation for this land cover type. CDFG characterizes farmed areas as cropland or more general categories of agriculture and urban/agriculture (CEC RSA, 2010). Areas of active and fallow agricultural fields occur within the buffer of the Study Area and not within the Project Disturbance Area. The majority of the lands mapped as agriculture within the Study Area are palm tree plantations. In fallow agricultural areas, ruderal vegetation is recolonizing with exotic plant species interspersed with some native vegetation (Solar Millennium, 2009a as cited in the CEC RSA, 2010). Fallow and active agriculture fields provide habitat to local and migratory wildlife in the form of food, cover, and shelter habitat, especially if fields are actively irrigated (Mayer and Laudenslayer, 1988 as cited in the CEC RSA, 2010).

Developed

Developed areas consist of roadways (I-10 and Corn Springs Road) and cleared land in the southern portion of the Study Area.

3.18.5 Sensitive Natural Communities and Jurisdictional Waters

Sensitive natural communities support unique or biologically important plant or wildlife species, or perform important ecological functions (e.g., bank stabilization or water filtration). These communities usually are scarce locally and regionally and therefore vulnerable to elimination. Sensitive natural communities in the desert region include many wash-dependent communities, dune and playa habitats, and groundwater-dependent plant communities (such as those discussed below), waters of the State, wetland and riparian habitats, and others that are of particular concern to BLM, CDFG and other federal, state and agencies.

The CNDDB maintains a list of all currently recognized and documented natural communities. This list provides an additional measure of a community's rarity. Communities that are marked by an asterisk are considered rare (relative to widespread and common plant communities such as Sonoran creosote bush scrub) and have a CNDDB State-rank of 3 or lower, meaning they are found over less than 10,000 to 50,000 acres or are represented by fewer than 21 to 100 occurrences. These communities may be rare due to a naturally restricted range (e.g., wash-dependent or riparian communities are restricted to narrow stringers of habitat), or widespread declines, or other factors.

The following sensitive natural communities occur in or immediately adjacent to the Project Disturbance Area, and so may be directly, indirectly, or cumulatively affected by the project:

1. Desert sink scrub (off-site)
2. Active dunes (off-site)
3. Stabilized and partially stabilized dunes
4. Desert dry wash woodland (waters of the State)
5. Unvegetated ephemeral wash (waters of the State)

Groundwater-Dependent Vegetation Communities

In the Chuckwalla Valley Groundwater Basin, the groundwater is too deep to support surface vegetation other than communities of deeper-rooted, groundwater-dependent "phreatophytes." Desert phreatophytes are able to tap into groundwater up to 40 to 200 feet or deeper, depending on the species. Groundwater elevation contour mapping by Steinemann (1989 as cited in the CEC RSA, 2010) suggests that groundwater levels are very close to the surface in the northwestern 25 percent of Palen Dry Lake but drop to over 100 feet below surface at Ford Dry Lake. Groundwater levels are even deeper in other portions of the valley (Worley-Parsons, 2009a as cited in the CEC RSA, 2010). The levels around Palen Lake are within the known rooting depths for most of the phreatophyte communities present within the zone potentially affected by the project wells, including: mesquite woodlands (Solar Millennium, 2009a, Appendix F as cited in the CEC RSA, 2010; Sawyer, 2009 as cited in the CEC RSA, 2010; Evens & Hartman, 2007 as cited in the CEC RSA, 2010; Silverman pers. comm. as cited in the CEC RSA, 2010.), alkali sink scrublands (Solar Millennium, 2009a as cited in the CEC RSA, 2010), dune communities along the margins of the playa (Solar Millennium, 2009a as cited in the CEC RSA, 2010; Silverman pers. comm. as cited in the CEC RSA, 2010), and ironwood-palo verde woodlands (Evens & Hartman, 2007 as cited in the CEC RSA, 2010; BLM, 2002). Documented communities around Palen Dry Lake also were confirmed through aerial photo interpretation and other methods.

The groundwater-dependent plant communities occurring outside the project boundary near Palen Dry Lake are also potentially vulnerable to water table drawdowns caused by groundwater pumping. The following groundwater-dependent plant communities are sensitive communities recognized by the CNDDB (CDFG, 2003 as cited in the CEC RSA, 2010) and/or BLM (NECO Plan).

1. Honey mesquite woodlands (mostly small groves also called “bosques”);
2. Microphyll woodlands (ironwood and palo verde desert dry wash woodlands)
3. Alkali (desert) sink scrubs (dominated or co-dominated by bush seep-weed, iodine bush, fourwing saltbush, spinescale, and allscale);
4. Sparsely vegetated playa lake beds; and
5. Jackass clover (or spectacle fruit) (*Wislizenia refracta*) unique stands (discussed under special-status plants)

Honey Mesquite Bosques

Shrubby “bosques” (groves) of honey mesquite occur around the open, unvegetated playa along the northwest and southwest margins of Palen Dry Lake on small coppice dunes. They also have been documented elsewhere in Chuckwalla Valley (Evans and Hartman, 2007, as cited in the CEC RSA, 2010).

Mesquite bosques are a rare and sensitive community recognized by BLM and the CNDDB (CDFG, 2003, as cited in the CEC RSA, 2010). They occur in areas with access to permanent and stable groundwater. Like other desert phreatophytes, mesquite is known for its their deep-rooting: Mesquite typically root to depths of 40 feet but have been documented to root as deep as 150 feet (Steinberg, 2001, as cited in the CEC RSA, 2010) to over 250 feet in one example at a mine shaft (Sosebee and Wan, 1989, as cited in the CEC RSA, 2010). When available, mesquite will exploit sources of deep water by growing a taproot. Mesquite also can persist on sites that have little or no groundwater by growing lengthy shallow lateral roots. In some parts of their range they are considered “facultative phreatophytes” that function as phreatophytes if unlimited water is available, but are capable of surviving on sites with limited soil water. In California, however, they are very rare outside of washes or areas with available groundwater; they also occur as a decumbent or running bush found on coppice dunes (vegetated sand mounds). These adaptations allow honey mesquite to retain most leaves in all but the most severe droughts (Ansley et al., 2004, as cited in the CEC RSA, 2010).

The fruit of honey mesquite is valuable forage for wildlife; it is quite predictable, even in drought years, annually providing an abundant and nutritious food source for numerous wildlife species upon ripening in summer (Steinberg, 2001, as cited in the CEC RSA, 2010). The fruit's pericarp is high in sugars and the seeds contain large amounts of protein. Where they occur, honey mesquite seeds form an important part of the diet of mice, kangaroo rats, ground squirrels, quail, black-tailed jackrabbit, mule deer, and many other wildlife. Mesquite flowers are eaten by numerous bird species and are an important nectar source for neotropical migrant birds in their spring passage across California deserts. Quail and many other birds eat mesquite buds and flowers in the spring and seeds during the fall and winter. Western honey mesquite communities often attract large numbers of birds that feed on the mistletoe fruit.

Microphyll Woodlands

Other known phreatophytes in the project area include the native ironwood trees, palo verde, smoke tree, and cat's claw; the invasive exotic (tamarisk), and the native chenopod shrub bush seep-weed. Most of the microphyllous trees (ironwood, palo verde, smoke tree cat's claw) occur along the many desert washes in the project area. The best examples are described above under "Desert Dry Wash Woodland." However, these deep-rooted trees sometimes also occur away from the streams where they have access to deep groundwater.

The distinction between phreatophytes depending on groundwater or exploiting surface water or soil moisture is complicated in areas where groundwater levels are not shallow. However, groundwater elevation contour mapping by Steinemann (1989), as cited in the CEC RSA, 2010, suggests that groundwater levels around Palen Lake are within the known rooting depths for most of the phreatophytes documented within the zone potentially affected by the project wells, including: mesquite woodlands (Solar Millennium, 2009a, Appendix F; Sawyer, 2009; Evens & Hartman, 2007; Silverman pers. comm., all cited in the CEC RSA, 2010), alkali sink scrubs (Solar Millennium, 2009a, as cited in the CEC RSA, 2010), dune communities along the margins of the playa (Solar Millennium, 2009a, as cited in the CEC RSA, 2010; Silverman pers. comm., as cited in the CEC RSA, 2010), and ironwood-palo verde woodlands (Evens & Hartman, 2007, as cited in the CEC RSA, 2010; BLM CDD, 2002, as cited in the CEC RSA, 2010). Documented examples around Palen Dry Lake also were confirmed through aerial photo interpretation and other methods. Groundwater levels drop to over 100 feet at Ford Dry Lake and are even deeper in other portions of the valley (Worley-Parsons, 2009a, as cited in the CEC RSA, 2010).

Alkali sink scrubs

Other known phreatophytes observed in the Project vicinity include succulent chenopod scrubs dominated by bush seep-weed, which forms pure stands over large areas around the margins of Palen Dry Lake. Bush seep-weed is a characteristic component of alkali sinks, a low-growing, grayish, succulent phreatophyte (Barbour et al., 2007, as cited in the CEC RSA, 2010) occupying fine-textured, often poorly-drained, saline-alkaline soils on or around the playa margins. It is a "facultative" wetland plant, meaning that it can occur in wetlands or non-wetlands; however, it is also a deep-rooted phreatophyte, rooting at depths of several meters to access groundwater (Patten et al., 2007, as cited in the CEC RSA, 2010).

In the project area, bush seep-weed-dominant chenopod scrubs occur in the northern portion of the project area and around Palen Dry Lake, predominantly in sand drifts over playa. These communities often occur on the margins of dry lake beds in the Colorado, Sonoran, Mojave, and Great Basin deserts typically below 4,000 feet in elevation (Holland, 1986, as cited in the CEC RSA, 2010). Chenopod scrub provides habitat value to many species of common and special-status plants, mammals, and reptiles as dispersal, foraging and cover habitats especially in association with other upland and desert wash communities. In the project area, many occurrences of the special-status Mojave fringe-toed lizard were found in this community and other communities with a fine sandy substrate. Alkaline sink scrubs in the vicinity also are associated with the rare Abram's spurge, which is documented from less than five viable occurrences Statewide, including an occurrence at Ford Dry Lake in similar habitats.

Special Status Plants

Special-status plant species have been afforded special recognition by Federal, State, or local resource agencies or organizations. Listed and special-status species have relatively limited distributions and typically require unique habitat conditions. Special-status plant species for the purpose of the FEIS are defined as meeting one or more of the following criteria:

1. Listed as threatened, endangered or candidates for future listing under FESA;
2. Listed as threatened or endangered by CESA;
3. Listed as species of concern by CDFG;
4. A species with a California Native Plant Society (CNPS) Rank of 1A, 1B, and 2 as well as some species with a rank of 3 or 4[1];
5. BLM Sensitive species
6. A plant listed as rare under the California Native Plant Protection Act of 1977 (California Fish and Game Code Sections 1900-1913)[1]; or
7. Considered a locally significant species, that is, a species that is not rare from a State-wide perspective but is rare or uncommon in a local context such as within a county or region or is so designated in local or regional plans, policies, or ordinances.

BLM designates sensitive species as those requiring special management considerations to promote their conservation and reduce the likelihood and need for future listing under the ESA. BLM sensitive species include all Federal Candidate and Federally Delisted species that were so designated within the last 5 years, and species with a CNPS Rank of 1B that occur on BLM lands. For the purposes of this document, all BLM Sensitive species are included as special-status species.

1 As defined by the California Native Plant Protection Act, a plant is rare when, although not presently threatened with extinction, the species, subspecies, or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens (Fish and Game Code Section1901) (CDFG, 2009 as cited in the CEC RSA, 2010).

Table 3.18-2 lists all special-status plant species evaluated during the analysis that are known to occur or could potentially occur in the Study Area. Special-status plant species detected or considered possible or likely to occur based on known occurrences in the vicinity and suitable habitat present within the Study Area are discussed in more detail below. Special-status species observed during the 2009 and 2010 field surveys are indicated by bold-face type (Solar Millennium, 2009a as cited in the CEC RSA, 2010; AECOM, 2010a as cited in the CEC RSA, 2010; CEC RSA, 2010).

As shown in Table 3.18-2, several special-status plant species have the potential to occur within the Study Area. Four of these species were observed within the Study Area:

1. Harwood's milkvetch
2. Harwood's eriastrum
3. California ditaxis
4. ribbed cryptantha

Utah vining milkweed was observed outside the Study Area to the east and was documented in the Applicant's July 2010 spring survey report (Solar Millennium, 2010m as cited in the CEC RSA, 2010). An undescribed taxon of saltbush has been reported and documented in the dunes just north of the project boundary (Andre, pers. comm. as cited in the CEC RSA, 2010); it was mapped in the Applicant's preliminary spring 2010 survey report (AECOM, 2010d, as cited in the CEC RSA, 2010). It has no official status or recognition at this time; however, the BLM State Botanist has indicated that any undescribed taxa should be treated as BLM Sensitive species (Christina Lund, pers. comm., as cited in the CEC RSA, 2010), and thus it is included here as a special-status species. Of the six species observed during the surveys, only the Harwood's milkvetch, California ditaxis, and ribbed cryptantha occur within the Project Disturbance Area.

Several additional species were included in the analysis because they are documented or reported to occur within Chuckwalla Valley in similar habitats, or along washes in the surrounding foothills; however, they were not observed in the Study Area during the spring 2009 or 2010 surveys (AECOM, 2010d as cited in the CEC RSA, 2010; Solar Millennium, 2009a, as cited in the CEC RSA, 2010; Solar Millennium, 2010k as cited in the CEC RSA, 2010; Solar Millennium, 2010 as cited in the CEC RSA, 2010): Jackass clover (discussed above), Palmer's jackass clover, mesquite nest straw, dwarf germander, Abram's spurge, glandular ditaxis, desert unicorn plant, winged cryptantha, and Las Animas colubrina. Another rare species, morning-glory heliotrope (*Heliotropium convolvulaceum var. californicum*), has been observed in the Chuckwalla Valley and Palo Verde mesa, but this new range extension from the Arizona flora has no status yet in California (Silverman, pers. comm. as cited in the CEC RSA, 2010).

The following late-blooming special-status plants have some potential to occur based on suitable habitat and known occurrences within the Sonoran Desert region of California: Abram's spurge, flat-seeded spurge, lobed ground cherry, and glandular ditaxis. Fall plant surveys were completed in October, 2010 and no special-status plants were found in the study area.

TABLE 3.18-2
SPECIAL-STATUS SPECIES KNOWN* OR POTENTIALLY OCCURRING IN THE BIOLOGICAL RESOURCES STUDY AREA

Common Name	Scientific Name	Status State/Fed/CNPS/BLM/ Global Rank/State Rank
PLANTS		
Chaparral sand verbena	*Abronia villosa var. aurita*	__/__/1B.1/BLM Sensitive_/G5T3T4/S2.1
Angel trumpets	*Acleisanthes longiflora*	__/__/2.3/__/G5/S1.3
Desert sand parsley	*Ammoselinum giganteum*	__/__/2.3/__/G2G3/SH
Small-flowered androstephium	*Androstephium breviflorum*	__/__/2.2/__/G5/S2*
Harwood's milkvetch	***Astragalus insularis var. harwoodii***	**__/__/2.2/__/G5T3/S2.2**
Coachella Valley milkvetch	*Astragalus lentiginosus var. coachellae*	__/FE/1B.2./ BLM Sensitive / G5T2/S2.1
California ayenia	*Ayenia compacta*	E/__/2.3/__/G4/S3.3
Pink fairy duster	*Calliandra eriophylla*	__/__/2.3/__/G5/S2.3
Sand evening-primrose	*Camissonia arenaria*	__/__/2.2/__/G4/S2
Crucifixion thorn	*Castela emoryi*	__/__/2.3/__/G3/S2.2
Abram's spurge	*Chamaesyce abramsiana*	__/__/2.2/__/G4/S1.2
Arizona spurge	*Chamaesyce arizonica*	R/__/2.3/__/G5/S1.3
Flat-seeded spurge	*Chamaesyce platysperma*	__/__/1B.2/ BLM Sensitive / G3/S1.2
Las Animas colubrina	*Colubrina californica*	__/__/2.3/__/G4/S2S3.3
Spiny abrojo/Bitter snakeweed	*Condalia globosa var. pubescens*	__/__/4.2/__/G5T3T4/S3.2
Foxtail cactus	*Coryphantha alversonii*	__/__/4.3/__/G3/S3.2
Ribbed cryptantha	***Cryptantha costata***	**__/__/4.3/__/G4G5/S3.3**
Winged cryptantha	*Cryptantha holoptera*	__/__/4.3/__/G3G4/S3
Wiggins' cholla	*Cylindropuntia wigginsii (syn=Opuntia wigginsii)*	__/__/3.3/__/G3?Q/S1.2
Utah milkvine	*Cynanchum utahense*	__/__/4.2/__/G4/S3.2
Glandular ditaxis	*Ditaxis claryana*	__/__/2.2/__/G4G5/S1S2
California ditaxis	***Ditaxis serrata var. californica***	**__/__/3.2/__/G5T2T3/S2.2**
Cottontop cactus	*Echinocactus polycephalus var. polycephalus*	__/__/__/__/__/__
Harwood's Eriastrum	***Eriastrum harwoodii***	**__/__/1B.2/BLM Sensitive_/G2/S2**
California satintail	*Imperata brevifolia*	__/__/2.1__/G2/S2.1
Pink velvet mallow	*Horsfordia alata*	__/__/4.3/__/G4/S3.3
Bitter hymenoxys	*Hymenoxys odorata*	__/__/2/__/G5/S2
Spearleaf	*Matelea parvifolia*	__/__/2.3/__/G5/S2.2
Argus blazing star[a]	*Mentzelia puberula*	__/__/__/__/__/__
Slender woolly-heads	*Nemacaulis denudata var. gracilis*	__/__/2.2/__/G3G4T3/S2S3
Lobed cherry	*Physalis lobata*	__/__/2.3/__/G5/S1.3
Desert portulaca	*Portulaca halimoides*	__/__/4.2/__/G5/S3
Desert unicorn plant	*Proboscidea althaeifolia*	__/__/4.3/__/G5/S3.3
Orocopia sage	*Salvia greatae*	__/__/1B.3./ BLM Sensitive /G2/S2.2
Desert spikemoss	*Selaginella eremophila*	__/__/2.2./__/G4/S2.2
Cove's cassia	*Senna covesii*	__/__/2.2/__/G5/S2.2
Mesquite nest straw	*Stylocline sonorensis*	__/__/1A/__/G3G5/SX
Dwarf germander	*Teucrium cubense ssp. depressum*	__/__/2.2/__/G4G5T3T4/S2

**TABLE 3.18-2 (Continued)
SPECIAL-STATUS SPECIES KNOWN OR POTENTIALLY OCCURRING IN THE BIOLOGICAL RESOURCES STUDY AREA**

Common Name	Scientific Name	Status State/Fed/CNPS/BLM/ Global Rank/State Rank
PLANTS		
Jackass clover	*Wislizenia refracta ssp. refracta*	__/__/2.2/__/G5T5/S1.2
Palmer's jackass clover[b]	*Wislizenia refracta ssp. palmeri*	__/__/Proposed 1B/__/__/__
"Palen Lake atriplex"[c]	***Atriplex* sp. nov. J. Andre (*Atriplex canescens* ssp)**	**__/_ / _/BLM Sensitive/__/__**

NOTES:

* Species in bolded type were found in the Biological Resources Study Area

[a] Proposed new addition to the CNPS Inventory (Andre, pers. comm. as cited in the CEC RSA, 2010)
[b] Proposed new addition to the CNPS Inventory (Silverman, pers. comm. as cited in the CEC RSA, 2010)
[c] Proposed new taxon (Andre, pers. comm.). BLM may consider proposed new taxa as BLM Sensitive (Lund, pers. comm. as cited in the CEC RSA, 2010)

Status Codes:

Federal
FE = Federally listed endangered: species in danger of extinction throughout a significant portion of its range
FT = Federally listed, threatened: species likely to become endangered within the foreseeable future
BCC: Fish and Wildlife Service: Birds of Conservation Concern: Identifies migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent highest conservation priorities <www.fws.gov/migratorybirds/reports/BCC2002.pdf>

State
CSC = California Species of Special Concern Species of concern to CDFG because of declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction.
CFP = California Fully Protected
SE = State listed as endangered
ST = State listed as threatened
WL = State watch list

California Native Plant Society
List 1B = Rare, threatened, or endangered in California and elsewhere
List 2 = Rare, threatened, or endangered in California but more common elsewhere
List 3 = Plants which need more information
List 4 = Limited distribution – a watch list
0.1 = Seriously threatened in California (high degree/immediacy of threat)
0.2 = Fairly threatened in California (moderate degree/immediacy of threat)
0.3 = Not very threatened in California (low degree/immediacy of threats or no current threats known)

Bureau of Land Management
BLM Sensitive = BLM Manual §6840 defines sensitive species as"…those species that are (1) under status review by the FWS/NMFS; or (2) whose numbers are declining so rapidly that Federal listing may become necessary, or (3) with typically small and widely dispersed populations; or (4) those inhabiting ecological refugia or other specialized or unique habitats. www.blm.gov/ca/pdfs/pa_pdfs/biology_pdfs/SensitiveAnimals.pdf

Global Rank/State Rank
Global rank (G-rank) is a reflection of the overall condition of an element throughout its global range. Subspecies are denoted by a T-Rank; multiple rankings indicate a range of values
G1 = Less than 6 viable element occurrences (EOs) OR less than 1,000 individuals
G2 = 6-20 EOs OR 1,000-3,000 individuals
G3 = 21-100 EOs OR 3,000-10,000 individuals
G4 = Apparently secure; this rank is clearly lower than G3 but factors exist to cause some concern; i.e., there is some threat, or somewhat narrow habitat.
G5 = Population or stand demonstrably secure to ineradicable due to being commonly found in the world.

State rank (S-rank) is assigned much the same way as the global rank, except state ranks in California often also contain a threat designation attached to the S-rank. An H-rank indicates that all sites are historical
S1 = Less than 6 EOs OR less than 1,000 individuals
S1.1 = very threatened
S1.2 = threatened
S1.3 = no current threats known
S2 = 6-20 EOs OR 1,000-3,000 individuals
S2.1 = very threatened
S2.2 = threatened
S2.3 = no current threats known
S3 = 21-100 EOs or 3,000-10,000 individuals
S3.1 = very threatened
S3.2 = threatened
S3.3 = no current threats known

SOURCE: CNDDB, 2010 as cited in the CEC RSA, 2010

The special-status plants found in the Study Area during the 2009 and 2010 spring surveys are described below, followed by a discussion of species that are considered to have some potential for occurrence in the Study Area based on the presence of suitable habitat and known occurrences in the region.

Harwood's Milkvetch

Harwood's milkvetch has a CNPS Rank of 2.2, meaning that is it fairly threatened in California, but more common elsewhere. It is also a covered species under the NECO Plan (Figure 3.18-8). It has a CNDDB (NatureServe) Global rank of G5T3/S2.2, which denotes a subspecies whose range in California is imperiled, and that is rare, uncommon or threatened but not immediately imperiled outside California. It is an annual herb that mainly occurs in Sonoran desert scrub throughout the Colorado Desert (BLM 2002). This subspecies is found in desert dunes and sandy or gravelly areas throughout the Mojave and Sonoran Deserts that cover portions of Imperial, Riverside, and San Diego counties (CNPS, 2009 as cited in the CEC RSA, 2010). Historic and recent collections include Ogilby Road in Imperial County and three locales west of Blythe, the Pinto Basin, and the Chuckwalla Basin in Riverside County. Harwood's milkvetch has also been reported from Baja California, Sonora Mexico, and portions of Yuma County, Arizona (Reiser, 1994). There are 97 CNDDB records for this species, including several within the vicinity of the project site (CNDDB, 2010 as cited in the CEC RSA, 2010).

Review of the occurrence data in the Consortium of California Herbaria resulted in the detection of three new occurrences that were not in the CNDDB. All of these are historical occurrences. Of the total 46 occurrences in California (CNDDB plus new additional occurrences), nine of these are protected under Park Service or State Park ownership. A total of 11 records are historical records. Of the total, 16 occurrences have documented threats including development, OHV, agriculture, transmission lines, road maintenance, and trash dumping.

A total of 146 Harwood's milkvetch plants were documented at multiple locations in the Study Area during the 2009 and 2010 surveys (Solar Millennium, 2010k as cited in the CEC RSA, 2010). Seven of these occur within the Project Disturbance Area. Many new occurrences were documented in Chuckwalla Valley and the Palo Verde mesa during the 2010 surveys for the study areas of two nearby projects: the Blythe Solar Power Project (Solar Millennium, 2010k as cited in the CEC RSA, 2010) and the Genesis Solar Energy Project (Solar Millennium, 2010k as cited in the CEC RSA, 2010).

Ribbed Cryptantha

Ribbed cryptantha has a CNPS Rank of 4.3, meaning that it has limited distribution in California but it is not very threatened as defined by CNPS in California. It typically occurs in loose friable soils in the eastern Mojave and Sonoran Deserts in Imperial, Riverside, San Diego, and San Bernardino counties and into Arizona and south to Baja California, Mexico (CNPS, 2009 as cited in the CEC RSA, 2010). It commonly occurs in stabilized and partially stabilized desert dunes and sandy areas of Sonoran and Mojavean desert creosote bush scrub. There are 116 records of this species from several locations throughout Riverside, Imperial, San Diego, and Imperial counties in the Consortium of California Herbaria database; the nearest collection is from the Palen Valley approximately three miles east of the Desert Center Airport (CCH, 2010 as cited in the CEC RSA, 2010).

A large local population of this species was found during the 2010 surveys for this and other projects in the vicinity (Solar Millennium, 2010k as cited in the CEC RSA, 2010; TTEC, 2010m as cited in the CEC RSA, 2010; AECOM, 2010v as cited in the CEC RSA, 2010). None of the surveyors have reported that the occurrences exhibit local or regional significance. Plant density was estimated for this species using sub-sampling methods, and an estimate of 8,903 plants per acre was used to calculate total plant numbers. Approximately 1.4 X 10^7 plants on 1,593 acres of occupied ribbed cryptantha acreage were estimated within the Study Area (Solar Millennium, 2010m, Table 3 as cited in the CEC RSA, 2010).

Harwood's Eriastrum

Harwood's eriastrum, also known as Harwood's phlox, or Harwood's woollystar, is a BLM Sensitive spring annual currently known from only 14 documented locations worldwide. It has a Rare CNPS of 1B.2, which indicates it is rare, threatened or endangered throughout its range. It is a California endemic with a global range restricted to San Diego, Riverside, and San Bernardino counties, typically occurring in dunes at the margins around dry lakes such as Dale, Cadiz, and Soda lakes. Surveys conducted in spring 2010 for the Blythe Solar Power Project located this plant primarily in the sandy areas south of I-10, where 2,134 plants were located and mapped (AECOM, 2010v as cited in the CEC RSA, 2010). All of these plants were identified in the general vicinity of Southern California Edison's proposed Colorado River substation. All stabilized and partially stabilized dunes are considered to be suitable habitats for this species in the Study Area.

Review of the occurrence data in the Consortium of California Herbaria identified two new occurrences that were not in the CNDDB. Both of these are historical records from 1939 and 1958. Of the 14 total occurrences in California (12 CNDDB plus two additional historic records), three are protected under Park Service or State Park ownership. A total of three records are historical records. Four of these occurrences have documented threats, including OHV and non-native plant impacts.

This species was not observed during 2009 field surveys; however, a total of two Harwood's eriastrum plants were observed in one area of the partially-stabilized dunes in the northeast corner of the Study Area during spring 2010 field surveys (Solar Millennium, 2010m, Table 3 as cited in the CEC RSA, 2010). No Harwood's eriastrum were found within the Project Disturbance Area.

Utah Vining Milkweed

Utah twining milkweed has a CNPS Rank of 4.2, meaning that it has limited distribution in California and that some of the occurrences are threatened. This twining perennial occurs in sandy or gravelly soils in Mojavean and Sonoran desert scrub habitats or washes from approximately 500 feet to 4,300 feet in elevation (CNPS, 2009 as cited in the CEC RSA, 2010).

The distribution of this species includes San Diego, Imperial, Riverside, and San Bernardino counties and portions of Arizona, Nevada and Utah.

There are 58 records of this species from the Consortium of California Herbaria database primarily from San Bernardino and San Diego counties. There is one record from the Big Maria Mountains from wash and stabilized dune habitat at approximately 1,200 feet elevation (CCH, 2010 as cited in the CEC RSA, 2010). Until recently discovered growing on the Palo Verde Mesa (AECOM, 2010v as cited in the CEC RSA, 2010), it was believed that the project was outside of the range of this species. This species was not found during 2009 field surveys; however, it was observed incidentally at a single location outside of the Study Area, east of Palen Lake. No Utah vining milkweed plants were observed within the Project Disturbance Area or buffer area during 2009 or 2010 field surveys (see Figure 3.18-9).

California Ditaxis

California ditaxis has a CNPS Rank of 3.2, meaning that its taxonomic status was not resolved during its last status review. Its occurrences in California are fairly endangered (CNPS, 2009 as cited in the CEC RSA, 2010). It has a CNDDB rank of S2.2, meaning that there are 6-20 occurrences or 1,000-3,000 individuals and the plant faces threats. This species occupies Sonoran desert scrub, and prefers sandy washes and alluvial fans of the foothills and lower desert slopes, from 100 to 3,000 feet above mean sea level. Reports of this species are known from San Bernardino, Riverside, Imperial, San Diego, and Sonora, Mexico (CNPS, 2009 as cited in the CEC RSA, 2010). There are 17 records from the CNDDB (2010) primarily from Riverside.

Review of the occurrence data in the Consortium of California Herbaria resulted in the detection of four new occurrences that were not in the CNDDB. Three of these are historical records from between 1921 and 1952; however, one more recent occurrence was found at Anza-Borrego Desert State Park near Starfish Cove Canyon. Of the total 21 occurrences in California (CNDDB plus new additional occurrences), two of these are protected under Park Service ownership. A total of four records are historical records. Five of these occurrences have documented threats, including, OHV, road grading, and construction of a new power line.

A total of 22 plants were documented in the Study Area during the 2010 surveys; half of which (11) occur within the Project Disturbance Area along the gen-tie line (Solar Millennium 2010m, Table 3 as cited in the CEC RSA, 2010).

Atriplex sp. nov

A potentially new, undescribed taxon of saltbush (*Atriplex*) was discovered on the saline playa margins of Palen Dry Lake last year by a botanist with the U.C. Reserve System (Andre and La Doux, pers. comm. as cited in the CEC RSA, 2010). It resembles the common four-wing saltbush (*Atriplex canescens*), a common plant of dunes which has very linear leaves, but the undescribed taxon has obovate leaves that distinguish it from all other *Atriplex canescens* subspecies (Andre, pers. comm.). The Applicant’s botanical consultant tentatively is treating it as a new variety of the common four-wing saltbush.

The undescribed Atriplex first was collected in 2005 at the “dry lake” just northeast of the Interstate 15/ Highway 95 junction approximately 35 miles east and northeast of Las Vegas, Nevada. The first voucher/observation of it in California was at Palen Lake in 2009. There also is potential for it to occur along the I-8 corridor in Imperial County. Although it is distinct from the common *Atriplex canescens* in its obovate leaves, it would be easy to overlook the undescribed taxon where they co-occur, even by experienced botanists. The undescribed taxon is more confined to subsaline or saline playa margins, though not necessarily so. Andre (pers. comm.) indicated that it also may have been observed in the Ford Dry Lake area (unconfirmed) and it has been observed in other saline (but non-playa) habitats on remnants of the lower Colorado River flood plain (Andre, pers. Comm.; Silverman, pers. comm. as cited in the CEC RSA, 2010).

Several plants of the new four wing saltbush were found within in the buffer area, northeast of the project site during spring 2010 field surveys (see Figure 3.18-2).

Desert Unicorn Plant

Desert unicorn plant has a CNPS Rank of 4.3, meaning it has limited distribution in California and its susceptibility to threat is presently low. It is also a covered species under the NECO Plan. This species is a low-growing, perennial that occurs in sandy washes within Sonoran desert scrub in San Bernardino, Imperial, Riverside, and San Diego counties of California. There are 13 records known from the NECO planning area in Milipitas Wash, Chuckwalla Valley, and Chemehuevi Valley (BLM, 2002). The blooming period is from May to August (CNPS, 2009 as cited in the CEC RSA, 2010). Although it is a late-season bloomer it has large and distinctive seed pods that can be detected during routine spring surveys. It has a fleshy root system that can remain dormant in dry years. There are 36 records in the Consortium of California Herbaria, several of which are from the Chuckwalla Mountains and Desert Center area, including the project area (CCH, 2010 as cited in the CEC RSA, 2010). This species was not observed during Spring 2009 or 2010 field surveys performed for the project; however, this plant has been identified in the region for other solar projects (AECOM, 2009d as cited in the CEC RSA, 2010, 2009a,b as cited in the CEC RSA, 2010).

Abram’s Spurge

Abram’s spurge is a late-season, ephemeral annual that responds to summer monsoonal rains but dries quickly and cannot be detected during routine spring surveys. It has CNPS Rank of 2.2, meaning it is fairly rare in California but more common elsewhere (CNPS, 2009 as cited in the CEC RSA, 2010). Habitat consists of sandy flats in creosote bush scrub from approximately 600 to 2,700 feet above mean sea level. This summer annual occurs in halophytic (saline-alkaline) scrub flats, playas, and along inlets and floodplains of playas and always seems to prefer the lower floodplain ecotone, but it can also extend higher up in the floodplain drainages (Silverman, pers. comm. as cited in the CEC RSA, 2010). Based on Consortium of California Herbaria database records for this species, it occurs in sandy soil often along dry lake margins in Riverside, San Diego, and Imperial counties, whereas documented occurrences in San Bernardino County occur on coarser, possibly sandy loams. Abram’s spurge occurs from San Bernardino County to Imperial and eastern San Diego counties to Arizona, Nevada, Mexico, and Baja

California. The CNDDB (2010 as cited in the CEC RSA, 2010) lists 15 occurrences of this plant within Riverside, Imperial, San Bernardino, and San Diego counties in California of these, seven are protected under Park Service, CDFG, or State Park ownership. A total of four records are historical and one of these occurrences has documented threats which include grazing. A 2000 CNDDB record from a location near the project site: approximately 0.5 mile east of Ford Dry Lake on Gasline Road just south of I-10, is reported as a “substantial population” (CNDDB, 2010 as cited in the CEC RSA, 2010).

The blooming period is identified by CNPS as September through November (CNPS, 2009 as cited in the CEC RSA, 2010). However, because the project site occurs in an area known for bi-modal rain patterns and late summer/fall rains, this species typically blooms during summer or fall months only following monsoonal rains (>+/- 0.10 inch) (Silverman, pers. comm.). On average, August receives the most rainfall, although rainfall is also received during winter months of December, January, and February. Regional botanical experts have concluded that this, and other summer annuals, may be missed if surveys are only conducted within the mid-March through mid-April window, and that a full inventory at multiple temporal windows are necessary in order to capture all appropriate growing conditions (typically following 12 to 18 mm rain events) (CEC, 2009a as cited in the CEC RSA, 2010).

This species was not identified during spring 2009 or 2010 botanical surveys but surveys were not conducted during a time of year adequate for detecting this species. Fall surveys completed in October, 2010, did not detect this species in the study area (AECOM, 2010 as cited in the CEC Commission Decision, 2010)

Flat-seeded Spurge

Flat-seeded spurge has a CNPS Rank of 1B.2, meaning it is rare, threatened, or endangered in California and elsewhere and some of the occurrences face known threats. It is a BLM Sensitive species and has a CNDDB element rank of S1.2 meaning that there are less than 6 occurrences or there are fewer than 1,000 individuals known and they are threatened. This species occurs in desert dunes and Sonoran desert scrub in sandy places or shifting dunes at elevations from approximately 200 to 300 feet. Some experts speculate that the species may be a waif in California and note that it is more common in Arizona and Mexico (CNDDB, 2010 as cited in the CEC RSA, 2010), but overall, little is known or can be concluded about this species (LaDoux, pers. comm. as cited in the CEC RSA, 2010). This ephemeral summer annual blooms February through September (CNPS, 2009 as cited in the CEC RSA, 2010). There are four CNDDB records of this species for the entire state of California, only one of which is from Riverside County; the closest occurrences are approximately 50 miles away.

Review of the occurrence data in the Consortium of California Herbaria resulted in the detection of one new occurrence that was not in the CNDDB. This occurrence is a historical record from 1933. Of the total five occurrences in California (CNDDB plus the new additional occurrence), one is protected under State Park ownership. Three records are historical records; none has documented threats.

This species was not observed during spring 2009 or 2010 botanical surveys. Although there are no documented nearby occurrences, the project occurs within its range, suitable habitat is present, and as an ephemeral summer annual it may be under-surveyed and its potential to occur cannot be dismissed (LaDoux, pers. comm. as cited in the CEC RSA, 2010).

Glandular Ditaxis

Glandular ditaxis has a CNPS rank of 2.2, meaning that is it rare, threatened, or endangered in California, but more common elsewhere, and some of the California occurrences face known threats. It has a CNDDB element rank of S1.2, meaning that there are less than six occurrences or 1,000 individuals and it is threatened. This plant species grows from sea level to approximately 1,400 feet above mean sea level in Mojavean and Sonoran desert scrub, in the sandy soils of dry washes and rocky hillsides. Glandular ditaxis, an annual or short-lived perennial, blooms from October through March (CNPS, 2009 as cited in the CEC RSA, 2010); while it can be detected during spring surveys, it is easier to detect in fall following the start of the rainy season (Silverman, pers. comm. as cited in the CEC RSA, 2010).

Review of the occurrence data in the Consortium of California Herbaria resulted in the detection of three new occurrences that were not in the CNDDB. All of these are historical records from 1932. Of the total 21 occurrences (CNDDB plus new additional occurrences), one is protected under CDFG land ownership. Six records are historical occurrences. One has documented threats, including land development, and is likely extirpated. This species was not observed during spring 2009 or 2010 botanical surveys performed for the project. Fall surveys completed in October, 2010, did not detect this species in the study area (AECOM, 2010 as cited in the CEC Commission Decision, 2010).

Lobed Ground Cherry

Lobed ground cherry is a late season perennial that blooms September to January. It has a CNPS Rank of 2.3, meaning that is rare, threatened, or endangered in California, but more common elsewhere and not very endangered in California. It has a CNDDB element rank of S1.3, meaning that there are fewer than six occurrences but no current threats are known. This species occurs in Mojavean desert scrub on decomposed granite soils, playas, and alkaline dry lake beds. This species occurs from approximately 1,500 feet to 2,400 feet above mean sea level. There are four occurrence records in the CNDDB (2010 as cited in the CEC RSA, 2010), and six additional collection records in the Consortium of California Herbaria database (CCH, 2010 as cited in the CEC RSA, 2010); all records are from San Bernardino County.

Review of the occurrence data in the Consortium of California Herbaria resulted in the detection of two new occurrences that were not in the CNDDB. Both of these are more recent occurrences, including one from Joshua Tree National Park and one in the eastern Mojave Desert. Of the total six occurrences in California (CNDDB plus new additional occurrences), none is protected under Park Service or other agency land ownership. None is an historical record and none has documented threats. This species was not observed during spring 2009 or 2010 botanical surveys performed for the project. Fall surveys completed in October, 2010, did not detect this species in the study area (AECOM, 2010 as cited in the CEC Commission Decision, 2010).

Dwarf Germander

Dwarf germander has a Rare Plant Rank of 2.2, meaning that is it rare, threatened, or endangered in California, but more common elsewhere, and fairly endangered in California. It has a CNDDB element rank of S2. This species occurs in desert dune, playa margins, and Sonoran desert scrub habitats from approximately 100 feet to 1,200 feet. This species typically blooms from March to May but may also bloom from September through November. This species typically occurs in sandy soils and wash habitats and is known from 5 occurrences in California (CNPS, 2009 as cited in the CEC Commission Decision, 2010).

Of the five occurrences in California, one occurs in a BLM Desert Wildlife Management Area. Three records are historical records, and none of these occurrences have documented threats. This species was not observed during spring 2009 or 2010 botanical surveys performed for the project. Fall surveys completed in October, 2010, did not detect this species in the study area (AECOM, 2010 as cited in the CEC Commission Decision, 2010).

Jackass Clover

Jackass clover has a CNPS Rank of 2.2 and considered fairly endangered in California but more common outside California. It has a CNDDB element rank of 1.2 which means there are 6 or fewer occurrences or fewer than 1,000 individuals and they are threatened. Jackass clover inhabits desert dunes in Mojavean desert scrub, playas, or Sonoran desert scrub. This species commonly is associated with sandy washes, roadsides, or alkaline flats, at elevations from 425 to 2,630 feet.

The CNDDB (2010 as cited in the CEC RSA, 2010) reports 6 occurrences in California, two of which are protected under National Park Service ownership. Two of the occurrences are based on historical records. One of these occurrences has documented threats, including development. Jackass clover also was documented at several locations from the northern to southern end of Palen Lake in dune habitats during a detailed vegetation mapping and classification project conducted by the CNPS Vegetation Program for BLM (Evens & Hartman, 2007 as cited in the CEC RSA, 2010). The populations of jackass clover at Palen Lake are considered to be unique stands and are included in this analysis as a sensitive natural community. This species was not observed during spring 2009 or 2010 botanical surveys performed for the project.

Palmer's Jackass Clover

Palmer's jackass clover is a proposed new addition to the CNPS inventory (Silverman, pers. comm.). CNPS Rank of 2.2, indicating that it is fairly endangered in California but more common elsewhere. It is a perennial herb that occupies sandy washes, and Sonoran desert scrub habitat from sea level to 650 feet. There are no CNDDB records for this species (CNDDB, 2010 as cited in the CEC RSA, 2010). Review of the occurrence data in the Consortium of California Herbaria resulted in the detection of seven occurrences that were not in the CNDDB. Four are historical records from between 1937 and 1952; however, two more recent occurrences were found in the

Chocolate-Chuckwalla Mountains region, one southeast of Palen Dry Lake and one near the Palen Sand Dunes. No information on land ownership or documents of threats is available from the Consortium of California Herbaria. One occurrence in the Chuckwalla Valley is reported to be threatened by solar development, water table diversions, OHV activity, and agriculture. This species was not observed during spring 2009 or 2010 botanical surveys performed for the project.

Winged Cryptantha

Winged cryptantha has a CNPS Rank of 4.3, meaning that is have a limited distribution in California but is not very endangered. This is a spring-blooming annual that occurs in Mojavean and Sonoran desert scrub from 300 feet to approximately 5,000 feet above mean sea level. This species blooms from March through April (CNPS, 2009 as cited in the CEC RSA, 2010). Winged cryptantha is found in California, Arizona, and Nevada. There are 79 records of this species in the Consortium of California Herbaria database from Riverside, Imperial, San Bernardino, and San Diego counties, representing 50 to 60 element occurrences (CCH, 2010 as cited in the CEC RSA, 2010). This species has low to moderate potential to occur at the project site. This species was not observed during spring 2009 or 2010 botanical surveys performed for the project, but was observed near the proposed Colorado Substation at the southeastern end of Chuckwalla Valley, south of I-10 (Solar Millennium, 2010 as cited in the CEC RSA, 2010).

Las Animas Colubrina

Las Animas colubrina has a CNPS Rank of 2.3, indicating it is not very endangered in California and more common elsewhere (CNPS, 2009 as cited in the CEC RSA, 2010). It is a covered species under the NECO Plan. It is an evergreen to semi-evergreen shrub that occurs in Mojavean and Sonoran desert scrub (creosote bush series) and occurs at elevations from approximately 30 to 3,000 feet. It primarily occurs in dry canyons or headwater reaches of desert washes with gravelly, sandy soils. The distribution of this species includes San Diego, Imperial and Riverside counties; portions of Arizona; Baja California; and Sonora, Mexico. This species has been reported from isolated desert locales in Joshua Tree National Park, the Eagle Mountains, and Chuckwalla Mountains (Reiser, 1994 as cited in the CEC RSA, 2010). There are approximately 27 occurrences primarily from the Chocolate Mountains area (CNDDB, 2010 as cited in the CEC RSA, 2010; BLM, 2002). This species typically blooms from April through June.

Review of the occurrence data in the Consortium of California Herbaria resulted in the detection of 12 new occurrences that were not in the CNDDB. Of these, eight are historical records from between 1930 and 1966; however, four are more recent occurrences found in the Sonoran (Colorado) Desert, including several occurrences in the mountains and foothills surrounding Chuckwalla Valley (CCH, 2010 as cited in the CEC RSA, 2010). Of the 36 records in California (CNDDB plus new additional occurrences), six are protected under Park Service, State Park, or BLM DWMA land ownership. A total of 11 records are historical records. None of these occurrences has documented threats. This species was not identified during Spring 2009 or 2010 botanical surveys performed for the project; however, this plant has been identified in the region during surveys performed for other solar projects (AECOM, 2009d as cited in the CEC RSA, 2010; GSEP 2009a,b as cited in the CEC RSA, 2010).

Other Special Status Plant Species

Table 3.18-3 shows Special Status Plant Species that could occur in the Study Area but were not detected during spring and fall surveys and are not expected to occur due to a low to moderate probability of occurrence.

Jurisdictional Waters

A formal jurisdictional delineation for regulated waters was conducted by the Applicant to determine the extent of potential jurisdictional waters of the U.S. and/or waters of the State within the site. This includes waters (and/or wetlands) regulated under the federal Clean Water Act and/or streams and associated habitat regulated under the California Fish and Game Code. The Applicant has requested a jurisdictional determination (JD) of isolated waters (non-jurisdictional waters of the U.S.) from the U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency (USEPA) (Galati & Blek 2009a as cited in the CEC RSA, 2010). The application assumes there are no potential jurisdictional waters of the U.S. within the Project Disturbance Area based on the fact that the features occur in a closed basin with no identifiable outlet and have no direct hydrologic connection to any navigable waters. Both vegetated and unvegetated dry washes include unique habitat that is distinct from the surrounding uplands, providing more continuous vegetation cover and microtopographic diversity, as well as movement corridors and refuge for a variety of wildlife. Both the wash-dependent and upland vegetation along these washes drive food webs, and provide seeds for regeneration, habitat for wildlife, and access to water when present, as well as creating cooler, more hospitable microclimatic conditions essential for a number of plant and animal species.

A revised jurisdictional delineation report was submitted as part of the Streambed Alteration Agreement application to CDFG on November 25, 2009, which includes all delineated aquatic features, including desert washes which lack a continuous component of desert wash woodland but provide other wildlife habitat function and values (Galati & Blek 2009a as cited in the CEC RSA, 2010). The revised delineation also includes areas of waters and wash-dependent vegetation downstream of the project footprint that are likely to be indirectly affected by the diversion of waters at the upstream side of the project into a perimeter stormwater conveyance channel. This area of potential indirect effect includes the full extent of the downstream washes that would be deprived of flows. Additionally, the delineation was revised to include the full floodplain width of compound features of multiple small channels with variable flow pathways, including the interfluves of mixed upland and wash-dependent vegetation.

The total (302.8 acres) area of all waters of the State delineated within the Project Disturbance Area includes 141.0 acres of desert dry wash woodland and 161.8 acres of other ephemeral desert washes. A total of 61.1 acres of jurisdictional State waters were delineated downstream of the Project Disturbance Area, encompassing the full downstream reach of waters that would likely be indirectly affected by the diversion of waters at the upstream edge of the Project Disturbance Area. The 61.1 acres of off-site waters includes: 27.5 acres of desert dry wash woodland and 33.6 acres of other ephemeral desert washes.

TABLE 3.18-3
SPECIAL-STATUS PLANT SPECIES WITH LOW TO MODERATE POTENTIAL TO OCCUR IN THE PROJECT STUDY AREA

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
Plants		
Angel trumpets *Acleisanthes longiflora*	This species occurs in Sonoran desert scrub on carbonate soils from approximately 200 to 300 feet above MSL. There are two records from the Consortium of California Herbaria from the Colorado Desert, Palo Verde area (CCH, 2010 as cited in the CEC RSA, 2010).	This species has a low potential to occur since the elevation range of the project site is appropriate for this species although the Study Area does not support carbonate/limestone derived soils in mountainous areas.
Argus blazing star *Mentzelia puberula*	This species occurs in desert scrub and desert woodlands with limestone and granitic slopes above 2,000 feet in elevation. Based on 13 Consortium of California Herbaria database records, this species has been collected from Riverside, San Bernardino, and Imperial Counties from the Little and Big Maria Mountains in Riverside County.	This species is not expected to occur in the Study Area due to lack of limestone and granitic slopes, which are soil types preferred by this species that are absent from the Study Area. The project site is located at approximately 130 to 200 feet above MSL, which is well below the typical elevation where this species typically occurs.
Arizona spurge *Chamaesyce arizonica*	This species occupies sandy, areas in Sonoran desert scrub and has been reported from Imperial, Riverside, and San Diego Counties and portions of Arizona and Baja California (CNPS, 2009 as cited in the CEC RSA, 2010) from approximately 150 feet to 1,200 feet above MSL. There are 7 database records from the Consortium of California Herbaria primarily from San Diego County but also from Riverside and Imperial Counties often from sandy areas and transition areas between chaparral and desert habitats. The record from Riverside County is near Palm Springs from Andreas Canyon (CCH, 2010 as cited in the CEC RSA, 2010).	Arizona spurge has a low potential to occur within the Study Area due to the presence of suitable habitat and appropriate elevation range of the project site.
Bitter hymenoxys *Hymenoxys odorata*	Bitter hymenoxys grows riparian scrub and Sonoran desert scrub from 150 feet to 500 feet above MSL. This species blooms from February through November (CNPS, 2009 as cited in the CEC RSA, 2010). There are five CNDDB records for this species for the entire State of California, two of which occur in Riverside County; the nearest CNDDB occurrence is a historical record approximately 5 miles southeast of the Project Area from sandy slope, low bottom lands and overflow flats (CNDDB, 2010 as cited in the CEC RSA, 2010).	This species was not found during spring 2009 or 2010 field surveys. This species is a target plant species to be surveyed for during spring 2010 botanical surveys within the transmission line, substation, and associated road spurs. This species has a potential to occur within desert dry wash woodland, unvegetated washes, and Sonoran creosote bush scrub habitats within the project area.
Bitter snakewood *Condalia globosa* var. *pubescens*	Another common name for this species is spiny abrojo. Bitter snakewood occurs in Sonoran desert scrub from approximately 400 feet to 3,000 feet above MSL. Bitter snakewood blooms from March through May (CNPS, 2009 as cited in the CEC RSA, 2010). Based on 35 records Consortium of California Herbaria database, all records are from Imperial County except one from Riverside County, a record from 1,900 feet elevation from a relatively flat alluvial fan from Chuckwalla Bench (CCH, 2010 as cited in the CEC RSA, 2010). There are no CNDDB records for this species for California (CNDDB, 2010 as cited in the CEC RSA, 2010).	This species was not observed during spring 2009 or 2010 field surveys. This species is a target plant species to be surveyed for during spring 2010 botanical surveys within the transmission line, substation, and associated road spurs. The Project site occurs below the elevation where this species typically occurs.
California ayenia *Ayenia compacta*	This species occurs in Mojavean and Sonoran desert scrub from approximately 500 to 3,300 feet above MSL. This species blooms from March through April. There are 29 records from the Consortium of California Herbaria database from the Anza-Borrego area alone, and one from Riverside County from a sandy wash in the Santa Rosa Mountains off Martinez Canyon (CCH, 2010 as cited in the CEC RSA, 2010). The nearest CNDDB occurrence is a historical record from 1776 approximately 30 miles southwest of the Project Area in the Chuckwalla Mountains (CNDDB, 2010 as cited in the CEC RSA, 2010).	This species was not observed during spring 2009 or 2010 field surveys. This species is a target plant species to be surveyed for during spring 2010 botanical surveys within the transmission line, substation, and associated road spurs. This species has a potential to occur within Sonoran creosote bush scrub and desert wash habitats within the project area.

TABLE 3.18-3 (Continued)
SPECIAL-STATUS PLANT SPECIES WITH LOW TO MODERATE POTENTIAL TO OCCUR IN THE PROJECT STUDY AREA

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
Plants (cont.)		
California ditaxis *Ditaxis serrata* var. *californica*	This species occupies Sonoran desert scrub and has been reported as occurring from San Bernardino, Riverside, Imperial, San Diego, and Sonora, Mexico (CNPS, 2009 as cited in the CEC RSA, 2010) from approximately 100 to 3,000 feet above MSL. There are 23 records from the Consortium of California Herbaria database primarily from Riverside County from sandy, open alluvial fans.	California ditaxis has a low potential to occur within the Study Area due to the presence of suitable habitat and records from the Chuckwalla Valley and Desert Center areas. This species was not observed during spring 2009 field surveys.
California satintail *Imperata brevifolia*	This species occurs in grassy areas found near chaparral, desert scrub, riparian scrubs, coastal scrub, wet springs, meadows, stream sides and floodplains from sea level to approximately 1,500 feet above MSL. There are 64 records from the Consortium of California Herbaria database from many northern and southern California counties. Records from Riverside County are from the Palm Springs and San Jacinto Mountains area along irrigation ditches or streams.	California satintail has a low potential to occur within the Study Area due to the presence of suitable habitat although lack of occurrences from the project area. This species was not observed during spring 2009 field surveys.
Chaparral sand verbena *Abronia villosa* var. *aurita*	This species occupies sandy soil areas of chaparral, coastal sage scrub, and sandy desert dunes (CNPS, 2009 as cited in the CEC RSA, 2010) from approximately 240 feet to approximately 4,800 feet above MSL. There are 147 records in the Consortium of California Herbaria database, many of which are from Riverside County in the San Jacinto Mountains area.	Chaparral sand verbena has a low potential to occur within the Study Area due to the presence of suitable habitat although lack of occurrences from the project area. This species was not observed during spring 2009 field surveys.
Coachella Valley milkvetch *Astragalus lentiginosus* var. *coachellae*	The Coachella Valley Multiple Species Habitat Conservation Plan states that this species occurs on "dunes and sandy flats, along the disturbed margins of sandy washes, and in sandy soils along roadsides and in areas formerly occupied by undisturbed sand dunes. Within the sand dunes and sand fields, this milkvetch tends to occur in the coarser sands at the margins of dunes, not in the most active blowsand areas. As this species is strongly affiliated with sandy substrates, it may occur in localized pockets where sand has been deposited by wind or by active washes. It may also occur in sandy substrates in creosote bush scrub, not directly associated with sand dune habitat (CVAG, 2007 as cited in the CEC RSA, 2010). This plant species blooms from February to May, producing pink to deep magenta-colored flowers. This species occurs on aeolian deposits with fewer than 25 occurrences in the Coachella Valley. Coachella Valley milkvetch depends on natural disturbances from fluvial and aeolian processes for seedling establishment (BLM, 2002).	This species was not observed during spring 2009 surveys and does not have a potential to occur in the Study Area. This species is not expected to occur in the project area. The distribution of Coachella Valley milkvetch is restricted to the Coachella Valley in Riverside County, between Cabazon and Indio. CVAG (2007 as cited in the CEC RSA, 2010) identifies six outlying occurrences within a 5-mile area along Rice Road in the Chuckwalla Valley north of Desert Center, California (CVAG, 2007 as cited in the CEC RSA, 2010); however, USFWS staff has indicated that these occurrences are not of the listed taxon (Engelhard, per. comm. as cited in the CEC RSA, 2010).
Cove's cassia *Senna covesii*	This species occurs on dry, sandy desert washes and slopes of the Sonoran Desert between 1,600 to 2,000 feet above MSL. This species occurs in sandy washes, roadsides, alkaline flats in the Mojave Desert and northern Sonoran Desert between 1,600 to 2,000 feet above MSL (CNPS, 2009 as cited in the CEC RSA, 2010).	Cove's cassia has a low potential to occur within the Study Area due to the presence of suitable habitat and the project site being located below the typical elevation range where this species is known from. This species was not observed during spring 2009 field surveys.
Crucifixion thorn *Castela emoryi*	This species occurs in Sonoran Desert and Mojavean Desert in scrub and playas with dry, gravelly washes, slopes, and plains from approximately 300 to 2,100 feet above MSL. There are 64 records in the Consortium of California Herbaria database from Riverside, San Bernardino, Imperial Counties among others and often times prefers grassy or hayfield habitats. There is a record from a hayfield in Chuckwalla Valley.	This species has a low potential to occur within the Study Area due to the presence of suitable habitat and appropriate elevation range of the project site. This species was not observed during spring 2009 field surveys.

TABLE 3.18-3 (Continued)
SPECIAL-STATUS PLANT SPECIES WITH LOW TO MODERATE POTENTIAL TO OCCUR IN THE PROJECT STUDY AREA

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
Plants (cont.)		
Desert portulaca *Portulaca hamiloides*	This species occurs in Joshua tree woodlands and has been reported from Riverside, San Bernardino, and portions of Arizona and Baja, California from 3,000 feet to 3,600 feet above MSL (CNPS, 2009 as cited in the CEC RSA, 2010).	This species is not expected to occur within the Study Area due to lack of typical habitat associations and the project site being located outside of the elevation range. This species was not observed during spring 2009 field surveys.
Desert sand parsley *Ammoselinum giganteum*	This species occupies Sonoran creosote bush scrub and has been reported from Riverside County, California and portions of Arizona (CNPS, 2009 as cited in the CEC RSA, 2010) at approximately 1,200 feet elevation. There are 2 records from the Consortium of California Herbaria database from Riverside County from the Chuckwalla Valley where this species was observed growing in dry basins at 500 feet above MSL (CCH, 2010 as cited in the CEC RSA, 2010).	Desert sand parsley has a low potential to occur within the Study Area due to presence of suitable habitat and reported occurrences from the Chuckwalla Valley. This species was not observed during spring 2009 field surveys.
Desert spike moss *Selaginella eremophila*	This is a dense, mat forming, non-flowering plant. This species occurs in Sonoran creosote bush scrub in gravelly or rocky soils from approximately 600 to 2,700 feet above MSL. There are 56 records in the Consortium of California Herbaria database from Riverside and San Diego Counties with several records from Anza-Borrego Desert State Park, Palm Springs, Palm Canyon, and San Jacinto Mountain Range. One collection from Riverside County is from the vicinity of the Chocolate-Chuckwalla Mountain region near the north side of the Orocopia Mountains from sloped rocky, shady surfaces in gravelly soils (CCH, 2010 as cited in the CEC RSA, 2010).	This species was not observed during spring 2009 field surveys. This species has a low potential to occur within the Study Area give the presence of suitable desert scrub habitat and historic collections from the project area, although the project site is located below the typical elevation range of this species.
Dwarf germander *Teucrium cubense* ssp. *depressum*	This species occurs in desert dune, playa margins, and Sonoran desert scrub from approximately 100 feet to 1,200 feet above MSL. This species typically blooms from March to May but may also bloom from September through November. This species typically occurs in sandy soils and wash habitats and is known from fewer than 10 occurrences in California (CNPS, 2009 as cited in the CEC RSA, 2010). There are 15 records from Consortium of California Herbaria database from Riverside and Imperial Counties; there are records from the Chuckwalla Valley in the Hayfield area and Palo Verde Valley. There is a CNDDB record from Wiley's Well Road (400 feet elevation) during 1979 (CNDDB, 2010 as cited in the CEC RSA, 2010). Another CNDDB occurrence is a historical record from 1912 located approximately 7 miles southeast of the project area from the Palo Verde Valley (CNDDB, 2010 as cited in the CEC RSA, 2010).	This species has a low potential to occur due to the presence of suitable habitat and appropriate elevation range of the site. This species was not observed during spring 2009 field surveys.
Foxtail cactus *Coryphantha alversonii*	This species occurs on rocky, granitic soils in Sonoran and Mojavean desert scrub from 200 feet to 4,600 feet above MSL. Prior to conducting spring 2009 field surveys, a reference population was observed on April 9, 2009 at a gravel pit northwest of Blythe along State Route 95 and several individuals were observed in relatively undisturbed Sonoran creosote bush scrub on granitic rock, a preferred habitat type of this species (CNPS, 2009 as cited in the CEC RSA, 2010). This species was not found during surveys performed in the Study Area. There are 25 records of this species from the Consortium of California Herbaria database from Riverside, Imperial, and San Bernardino Counties. There are records from the Chuckwalla Valley from rocky, granitic slopes (CCH, 2010 as cited in the CEC RSA, 2010).	Foxtail cactus has a low potential to occur within the Study Area due to the presence of suitable desert scrub habitat and appropriate elevation of the site although lack of rocky, granitic soils. This species was not observed during spring 2009 field surveys.

TABLE 3.18-3 (Continued)
SPECIAL-STATUS PLANT SPECIES WITH LOW TO MODERATE POTENTIAL TO OCCUR IN THE PROJECT STUDY AREA

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
Plants (cont.)		
Mesquite nest straw *Stylocline sonorensis*	This species occupies Sonoran desert scrub around 1,300 feet elevation and has been reported from Riverside County and portions of Arizona and Sonora, Mexico (CNPS, 2009 as cited in the CEC RSA, 2010). There are 2 records from the Consortium of California Herbaria database from Riverside County both from the Chuckwalla Mountains, Hayfields region from 1930 (CCH, 2010 as cited in the CEC RSA, 2010).	This species was not observed during spring 2009 field surveys. Mesquite nest straw has a low potential to occur within the Study Area due to suitable habitat present within the project site.
Orocopia sage *Salvia greatae*	This species occurs in the southeastern Sonoran Desert and is associated with the Orocopia and Chocolate Mountains on alluvial slopes between 100 and 800 feet above MSL. There are 49 records from the Consortium of California Herbaria database several from the Chocolate, Chuckwalla, and Orocopia mountain areas (CCH, 2010 as cited in the CEC RSA, 2010).	This species was not observed during spring 2009 field surveys. This species has a low potential to occur within the Study Area due to the presence of suitable habitat and appropriate elevation range of the site.
Pink fairyduster *Calliandra eriophylla*	This species occurs in the Sonoran Desert in sandy washes, slopes and mesas from 350 to 5,000 feet above MSL. There are 62 records from the Consortium of California Herbaria database several from the Chocolate-Chuckwalla Mountains area in Imperial and San Diego Counties (CCH, 2010 as cited in the CEC RSA, 2010).	This species was not observed during spring 2009 field surveys. Pink fairy duster has a low potential to occur within the Study Area due to suitable habitats, appropriate elevation range of the site, and reported records from the project area.
Pink velvet mallow *Horsfordia alata*	This species occurs in the Sonoran Desert in California, Arizona, and Mexico. It occurs in Sonoran desert scrub from approximately 300 to 1,500 feet above MSL. There are no CNDDB records for this species for the entire state of California; the most recent collections have been from the Chocolate, Chuckwalla, and Cargo Muchacho Mountains approximately 50 miles south of the Study Area and are believed to be extant.	This species was not observed during Spring 2009 field surveys.
Sand evening-primrose *Camissonia arenaria*	This species occupies sandy and gravelly areas of Sonoran desert scrub and has been reported from Imperial and Riverside Counties and areas of Arizona and Mexico from 200 feet to 2,700 feet above MSL (CNPS, 2009). There are 13 records of this species in the Consortium of California Herbaria database several from the Chocolate-Chuckwalla Mountains, Palo Verde Valley, and Ogilby Pass area (CCH, 2010 as cited in the CEC RSA, 2010).	This species has a low potential to occur within the Study Area due to the presence of suitable habitat and appropriate elevation of the site. This species was not observed during spring 2009 field surveys.
Slender woolly-heads *Nemacaulis denudata* var. *gracilis*	This species occupies desert sand dunes, coastal dunes, and Sonoran desert scrub (CNPS, 2009 as cited in the CEC RSA, 2010) from 150 to 1,200 feet above MSL. There are 45 records in the Consortium of California Herbaria database from the Palm Springs, Indian Wells area in Riverside County (CCH, 2010 as cited in the CEC RSA, 2010).	Slender woolly-heads has a low potential to occur within the Study Area due to suitable habitat and appropriate elevation range of the site. This species was not observed during spring 2009 field surveys.
Small-flowered androstephium *Androstephium breviflorum*	This species occurs in desert dune and Mojavean desert scrub from approximately 700 feet to 2,000 feet above MSL (CNPS, 2009 as cited in the CEC RSA, 2010). This species blooms from March through April and often occurs on desert bajadas. The nearest CNDDB record for this species is from Cadiz Valley from Riverside and San Bernardino Counties approximately one mile north of Highway 62 during 1995 from a sandy, Mojavean Desert shrub-land bajada (CNDDB, 2010 as cited in the CEC RSA, 2010).	This species has a potential to occur within the site due to suitable sand dune habitat and appropriate elevation range of the site. This species was not observed during 2009 field surveys, nor was it found during 2010 botanical surveys.

TABLE 3.18-3 (Continued)
SPECIAL-STATUS PLANT SPECIES WITH LOW TO MODERATE POTENTIAL TO OCCUR IN THE PROJECT STUDY AREA

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
Plants (cont.)		
Spearleaf *Matelea parvifolia*	This species occurs in Mojavean and Sonoran desert scrub from 1,320 feet to approximately 3,300 feet above MSL. This species blooms from March through May (CNPS, 2009). The nearest CNDDB record for this species is from the Chuckwalla Bench area during 1986 from desert dry wash woodland and creosote bush scrub habitats (CNDDB, 2010 as cited in the CEC RSA, 2010).	This species has a potential to occur within the Project Disturbance Area although was not observed during spring 2009 field surveys. The site is located below the typical elevation range of this species. This species was a target plant species during spring 2010 botanical surveys within the transmission line, substation, and associated road spurs. No plants were found.
Wiggins' cholla *Cylindropuntia wigginsii*	Wiggins' cholla is not recognized as a species, but is considered a hybrid of silver cholla (*C. echinocarpa*) and pencil cholla (*C. ramosissima*). Wiggins' cholla is not found as a separate species in The Jepson Manual (1993) nor in Munz et al A California Flora and Supplement (1973); however, the BLM's Proposed Northern and Eastern Colorado Desert Coordinated Management Plan identifies Wiggins' cholla as a special-status species (BLM, 2002). The CNPS recognizes Wiggins' cholla as a CNPS List 3.3 species meaning more information is needed about this species and is not considered very endangered in California and also considers this species a sporadic hybrid of the two Cylindropuntia species mentioned above (CNPS, 2009 as cited in the CEC RSA, 2010).	Wiggins' cholla is not expected to occur in the project area.

The revised delineation also included waters associated with the proposed new substation south of I-10 and the interconnecting transmission line. However, the impacts and mitigation measures associated with the substation are the responsibility of Southern California Edison, not the Applicant. The acreages itemized above include features that cross the interconnecting transmission line alignment but do not include waters contained within the footprint of the proposed substation (AECOM, 2010a as cited in the CEC RSA, 2010).

Hydrology

The affected waters occur within the Chuckwalla-Palen hydrologic unit, or "watershed" of the Colorado River Hydrologic Basin Planning Area (Galati & Blek, 2010a). The rainfall pattern is bimodal with a rainy season in both summer and winter (December through March and July through September [commonly the wetter of the two]). Average annual rainfall for the project area is approximately 3.7 inches (NOAA, 2009 as cited in the CEC RSA, 2010).

In arid fluvial systems, it is the flash flood events (particularly the larger summer thunderstorms), combined with the highly erosive soils of alluvial fans that most contribute to the conversion from single thread channels to a compound or anastomosing (braided) morphology. Because the ephemeral washes occurring within the disturbance area are subject to very wide fluctuations in discharges over a short period of time their channels can change configuration frequently to accommodate large variations in surface flow during storm events. As a result, arid fluvial systems usually exhibit long periods of little morphologic change interspersed with short-term dramatic changes in channel configuration. Therefore, arid stream geometry is more likely to be influenced strongly by a large event of low recurrence frequency (Lichvar et al., 2006 as cited in the CEC RSA, 2010).

Surface hydrology in the project area is influenced largely by stormwater runoff off the northeastern flank of the Chuckwalla Mountains, approximately 4 miles south, and south of I-10 (Galati & Blek, 2010a as cited in the CEC RSA, 2010). The main hydrologic feature in the watershed, and in the project area, is Corn Springs Wash, which is supported largely by precipitation but also in part by Corn Springs. The stream drains approximately 31 square miles of the Chuckwalla Mountains at higher elevations (AECOM, 2009a as cited in the CEC RSA, 2010). Corn Springs Wash and all other desert washes in the watershed are ephemeral (flowing only in response to storm events). At the foot of the Chuckwalla Mountains, as Corn Springs Wash and other features empty onto the alluvial fan of more erosive, less consolidated soils, the stream system changes from single thread channel to compound, anastamosing channels with highly variable flow pathways. Compound channels are considered the most common channel types in arid regions and are characterized by low-flow meandering channels inset into a wider braided channel network (Lichvar et al., 2006 as cited in the CEC RSA, 2010). These channels are highly susceptible to widening and avulsions (i.e., rapid changes in channel position and/or channel relocation) during moderate to high discharges, reestablishing a low-flow channel during subsequent low flows (Lichvar and McColley, 2008 as cited in the CEC RSA, 2010). This channel avulsion creates diverse physical features and habitats, supports a complex ecosystem, and sustains healthy stream function despite frequent and rapid changes in channel position (USACE, 2007 as cited in the CEC RSA, 2010). With any compound/anastomosing ephemeral stream system in arid regions, the riparian corridor may consist of streambanks lined with adapted riparian vegetation, unvegetated areas such as recently created swales and terraces (interfluves), or a mosaic of these types (Bendix and Hupp, 2000 as cited in the CEC RSA, 2010).

Historic Hydrologic Alterations

When I-10 was constructed across the alluvial fan outlet of Corn Springs Wash over 40 years ago, it deprived the downstream reaches of all surface flows, interrupted natural channel formation and meandering nature of the alluvial fan flow path(s) that historically drained unimpeded from the Chuckwalla Mountains and toward Palen Dry Lake, a playa lake (depressional desert sink) (Galati & Blek, 2010a as cited in the CEC RSA, 2010). A series of wing dikes were constructed just upstream (south) of the freeway, diverting the flows of numerous smaller channels into the three largest branches of Corn Springs Wash, which I-10 crosses with three short bridge spans. These dikes and bridges along I-10 concentrate the flows of dozens of small washes into three discrete discharge points. The westerly bridge near Corn Springs Road Interchange conveys flows from the main branch of Corn Springs Wash to the northwest corner of the site. The two other bridges convey flows to the center and east side of the project site respectively. The flat topography at the outlet of the culverts creates an initially incised watercourse, which rapidly diminishes and eventually spreads out into numerous small, newly formed channels that abate fairly quickly.

The elevated freeway permanently deprived flows of many of the channels that once crossed the project site; many dead and declining ironwood trees are still evident and there is a marked decrease in the cover, vigor, diversity, and overall habitat function and value in the impaired reaches on the site. This observation also is supported by comparisons of current and historical aerial photography of the project site (before and after the diversions) (Galati & Blek, 2010a as cited in the CEC RSA, 2010).

Function and Value of State Waters for Vegetation

The desert dry washes play an integral role in the ecology of the watershed. The ephemeral washes (both vegetated and unvegetated) provide unique habitat that is distinct from the surrounding uplands, providing more continuous vegetation cover and microtopographic diversity than the surrounding uplands, migration corridors, and refuge, for a variety of wildlife. Both the wash-dependent and upland vegetation along these washes drive food webs, and provide seeds for regeneration, habitat for wildlife, access to water when present, and create cooler, more hospitable microclimatic conditions essential for a number of plant and animal species. The vegetation—whether dominated by woodland trees or shrubs and perennial herbs—contributes channel roughness that reduces the velocity of floodwaters, and provides organic matter for soil development and nutrient cycling.

The desert dry wash woodland provides additional structural elements of food, cover, nesting and breeding habitat, and movement/migration corridors for wildlife that are quite distinct from the surrounding uplands of sparse creosote bush scrub and sandy plains. Functional services of these communities include moderating soil and air temperatures, stabilizing channel banks and interfluves, seed banking and trapping of silt and fine sediment favorable to the establishment of diverse floral and faunal species, and dissipating stream energy which aids in flood control (USEPA, 2008 as cited in the CEC RSA, 2010).

During seasonal dry periods, plant species diversity levels along ephemeral stream channels typically are low. Following seasonal wet periods, however, diversity levels along some ephemeral stream channels can equal that along perennial stream channels (Lichvar and McColley, 2008 as cited in the CEC RSA, 2010) with ephemeral desert annuals.

Because ephemeral and intermittent stream channels have a higher moisture content and more abundant vegetation than the surrounding areas, they are very important to wildlife. Frequently, these streams may retain the only available water in the area, with permanent pools interposed wherever hydrogeological conditions allow (USEPA, 2008 as cited in the CEC RSA, 2010). The short duration and episodic flood pulses of surface and overbank flow is important as it allows some species to complete important life-history developmental stages. The habitat provided by desert streams contracts and expands dramatically in size due to the extreme variations in flow, which can range from high-discharge floods to periods when surface flow is absent. This spatial variation in habitat or ecosystem size is a fundamental, defining feature of these streams (Smith et al., 1995 as cited in the CEC RSA, 2010; USEPA, 2008 as cited in the CEC RSA, 2010).

Within the survey area there was ample evidence of the presence of wildlife use of the ephemeral washes (e.g., tracks and scat) as a movement corridor (Solar Millennium, 2010a as cited in the CEC RSA, 2010). In addition to Sonoran creosote bush scrub, the desert dry wash woodland and unvegetated ephemeral dry wash communities within the Survey Area are considered suitable burrowing owl foraging and nesting habitat. Desert tortoise will be present in higher densities associated with drainages, swales, mountainous areas and alluvial fans. Annual and perennial plant production is higher in these areas and is longer lasting. Ephemeral streams also contain rich assemblages of both invertebrates and macro-invertebrates (USEPA, 2008 as cited in the CEC RSA, 2010).

3.18.6 Sand Dune Transport System

This subsection provides a brief explanation of wind transport of sand relative to the creation, preservation and destruction of sand dunes in the project area. Soil & Water Appendix A of the CEC RSA provides a more detailed explanation (CEC RSA, 2010), as does the Applicant’s Preliminary Geomorphic Aeolian and Ancient Lake Shoreline Report (Solar Millennium, 2010b as cited in the CEC RSA, 2010) and Biological Resources Appendix B in the RSA (CEC RSA, 2010, Appendix B).

The proposed footprint of the project covers several different land units that vary along a southwest to northeast gradient in the degree of aeolian sand transport they experience. The least sandy land unit is within the project’s western solar array, which is almost entirely a stable, coarse gravel alluvial fan surface (referred to as Zone IV in Solar Millennium, 2010b as cited in the CEC RSA, 2010). The sand dunes in the southern and western sector of the site are a mixture of degraded vegetated dunes with thin coarse sand, and patches of alluvial gravel lag and desert varnish. This surface has been formed primarily by deposition of sand and gravel from alluvial fans (fluvial action) over hundreds of thousands of years, overlain with patches of vegetated sand dunes that formed from wind action during periods of greater sand availability. The sand dunes on the mid fan have subsequently degraded due to wind erosion and deflation (sand is being removed by the wind but not replaced). Deflation of the relict dunes is leaving behind the more resistant alluvial deposits as a protective lag of gravel. In many places the lag has formed desert varnish (a black coloration on the exposed surface of gravel particles). The presence of desert varnish suggests that parts of this surface have been stable and exposed in its current condition for many hundreds to thousands of years. There is little available sand for either transport to dunes down wind, and the sand that is present is coarse (1-2 mm) with abundant fine gravel (2 mm and larger). The vegetation cover is largely sparse creosote bushes with ironwood trees in the larger washes.

The northeast dune area is a more active wind-blown sand area with relatively shallow sand deposits (Zone III) on the lower alluvial fan. This is an area of shallow vegetated sand dunes with a transition from creosote bushes to grasses. The dunes are in relative equilibrium – losses of sand due to wind erosion are matched by deposition of sand from upwind.

At the northeastern portion of the project site within the lower alluvial fan is an area of deeper and more active vegetated sand dunes (Zone II). This area is characterized by hummocky vegetated dunes with greater topographic expression than the zone to the west, implying that they are more actively supplied by sand. This zone lies within the Palen Dry Lake – Chuckwalla sand transport corridor, a regionally significant geomorphic feature that provides sand build and support sand dune habitat. This sand corridor stretches down the Chuckwalla Valley to Blythe and the Colorado River.

The most active area of sand transport is Zone 1, northeast of the project boundary. Two sand transport corridors come together just to the east of the project: the Palen Valley corridor which runs from north to south along the eastern edge of the project and the Palen Dry Lake – Chuckwalla Valley corridor which runs northwest to southeast through the northeastern half of the project.

3.18.7 Invasive and Noxious Weeds

Noxious and invasive weeds are species of non-native (exotic) plants included on the weed lists of the California Department of Food and Agriculture (CDFA) (CDFA, 2007 as cited in the CEC RSA, 2010), the California Invasive Plant Council (Cal-IPC), or those weeds of special concern identified by the BLM. They are of particular concern in wild lands because of their potential to degrade habitat and disrupt the ecological functions of an area (Cal-IPC, 2006 as cited in the CEC RSA, 2010). Specifically, can alter habitat structure, increase fire frequency and intensity, decrease forage (including for special-status species, such as desert tortoise), exclude native plants, and decrease water availability for both naive plants and wildlife. Soil disturbance and channeling water create conditions favorable to the introduction of new invasive weeds or the spread of existing populations. Construction equipment, fill material, and mulch can act as vectors in introducing invasive exotic plant seeds and propagules into an area.

Non-native plant species recorded as a part of project surveys are located especially in the southern portion of the Study Area, they are: Sahara mustard, Russian thistle, Saltcedar, and Mediterranean grass. Each of these species is identified on a list of the region's worst weeds compiled by the Natural Resource Conservation Service for the Low Desert Weed Management Area (NRCS, 2005 as cited in the CEC RSA, 2010).

Sahara Mustard

Sahara mustard (*Brassica tournefortii*), also called African mustard, was found in disturbed areas throughout Sonoran creosote bush scrub habitat (Solar Millennium 2009a, Appendix F). This species is a BLM weed of special concern, Cal-IPC has declared this plant highly invasive (Cal-IPC, 2006 as cited in the CEC RSA, 2010) and recommends that it should be eradicated whenever encountered. This species is associated with impacts to habitat for native wildlife as well as for native plants. It promotes the spread of fire by increasing fuel load and competes with native plants for moisture and nutrients. In addition, it increases cover and works to stabilize sand, thereby affecting wildlife species dependent on open sandy habitat (Brossard et al., 2000 as cited in the CEC RSA, 2010; Barrows and Allen, 2007 as cited in the CEC RSA, 2010).

Russian Thistle

Russian thistle (*Salsola* sp.), also called tumbleweed, was found in several habitat types in the Project Disturbance Area, including dune, desert scrub, desert dry wash woodland, and Sonoran creosote bush scrub (Solar Millennium, 2009a, Appendix F). Although all invasive plants share the trait of being adapted to disturbed habitat, Russian thistle particularly tends to be restricted to roadway shoulders and other sites where the soil has been recently disturbed (CEC RSA, 2010). However, once an area is disturbed this species competes readily and can affect native plant ecosystems and increase fire hazard (Orloff et al., 2008 as cited in the CEC RSA, 2010; Lovich, 1999 as cited in the CEC RSA, 2010). Dune habitat is particularly vulnerable to non-native species, which can stabilize sand or block sand movement, and Russian thistle is considered an invasive species of primary concern in this habitat (CDFG, 2007 as cited in the CEC RSA, 2010). There is a high potential that Russian thistle could become established in the construction area and should be eradicated if observed. Cal-IPC has determined that this plant has a limited invasiveness rating in California (Cal-IPC, 2006 as cited in the CEC RSA, 2010) and the California Department of Food and Agriculture (CDFA) has given it a "C" rating. A C rating means that the pest is of known economic or environmental detriment and, if present in California, it is usually widespread. If found in the State, C-rated species are subject to regulations designed to retard spread or to suppress at the discretion of the individual county agricultural commissioner. There is no State-enforced action other than providing for pest cleanliness.

Tamarisk or Saltcedar

Tamarisk or Saltcedar (*Tamarix ramosissima*) is restricted to habitats where there is perennial saturation such as springs and seeps, or runoff from poorly maintained water pipelines or well pumps. It was observed interspersed throughout desert dry wash woodland within the Study Area. Cal-IPC has declared this plant highly invasive (Cal-IPC, 2006 as cited in the CEC RSA, 2010) and it is a CDFA "B" rated species, meaning it is a pest of known economic or environmental detriment and, if present in California, it is of limited distribution. If found in the State, B-rated species are subject to State-endorsed holding action and eradication only to provide for containment, as when found in a nursery. At the discretion of the individual county agricultural commissioner they are subject to eradication, containment, suppression, control, or other holding action. Saltcedar is associated with many ecological impacts including impacts to channel geomorphology, groundwater availability, plant species diversity, and fire frequency (Lovich, 1999 as cited in the CEC RSA, 2010). Saltcedar also can affect sand dunes by blocking sand movement, a vital part of the natural function of these habitats (CDFG, 2007 as cited in the CEC RSA, 2010).

Mediterranean grass

Mediterranean grass (*Schismus* spp.) is prevalent throughout Sonoran creosote bush scrub within the Study Area. Mediterranean grass is an annual that reproduces by seed, and is widespread in arid and semi-arid California landscapes. This species competes effectively with native plants for nutrients and water and can provide cover that prevents native annuals from sprouting (VanDevender et al., 1997 as cited in the CEC RSA, 2010; Brossard et al., 2000 as cited in the CEC RSA, 2010) and contributes to dune stabilization (CDFG, 2007 as cited in the CEC RSA, 2010). Fire, historically, was rare in the Colorado Desert. The presence of Mediterranean grass and other annual non-native grasses has provided a continuous and increased fuel load, influencing the extent, frequency, and intensity of fire in these ecosystems (Brooks and Pyke, 2001 as cited in the CEC RSA, 2010; Brooks et al., 2004 as cited in the CEC RSA, 2010). BLM and other agencies recognize that because of the widespread distribution of Mediterranean grass, this species is not considered feasible to eradicate. The USDA has not approved any fungi or invertebrate species to control Schismus spp.

Cacti, Yucca, and Native Trees

The 2009 and 2010 surveys also included an inventory of native cacti, succulents and native trees that are not considered rare (e.g., they are not tracked by CNDDB or included on the CNPS special-status plant lists) but the harvesting of these native plants is regulated under the California Native Plant Protection Act (Fish and Game Codes 1900-1913) and the California Desert Native Plant Act of 1981 (Food and Agricultural Code § 80001 et. seq.; Fish & Game Code §§ 1925-1926), which prohibit unlawful harvesting of non-listed native desert plants of the state (see, CEC RSA, 2010; Biological Resources Table 1).

During 2009 and at the request of the BLM, the Applicant conducted sampling plots for cacti, yucca, and native trees in the study area primarily to search for and map any locations of California barrel cactus, cottontop cactus, or hedgehog cactus for future salvage when construction begins (Solar Millennium 2009a, Appendix F Biological Resources Technical Report as cited in the CEC RSA, 2010). None of these species were observed in the study area during spring 2009; however, a total of four species in the Cactaceae family were observed during 2009 field surveys, including teddybear cholla (*Cylindropuntia bigelovii*), silver cholla (*C. echinocarpa*), pencil cholla (*C. ramosissima*), and common fishhook cactus (*Mammilaria tetrancistra*). Additionally, native trees that were found during 2009 field surveys including smoke tree (*Psorothamnus spinosus*), ironwood (*Olneya tesota*), blue palo verde (*Parkinsonia florida*), ocotillo (*Fouquieria splendens ssp. splendens*), and honey mesquite (*Prosopsis glandulosa var. torreyana*). Additional mapping of cacti species was performed during 2010, and California barrel cacti (*Ferocactus cyylindraceus*), cottontop cactus (*Echinocactus polycephalus*), and hedgehog cactus, *(Echinocactus engelmannii*) were found. A single location with five barrel cacti was observed within the buffer study area and south of I-10, and a single location of cottontop cactus was found in the eastern portion of the Project Disturbance Area (Solar Millennium 2010m, Table 3 and Figure 7 as cited in the CEC RSA, 2010).

3.19 Visual Resources

This chapter describes the project study area in terms of its existing value as a visual resource, and describes the applicable regulatory framework for managing and protecting scenic values. Following a brief description of the characteristics and extent of the study area, this section focuses on determining the extent and quality of visual resources in the study area by referencing existing inventory efforts that use the methodology outlined in BLM's Visual Resource Management (VRM) Program.

3.19.1 Project Study Area

The project site is located in the Mojave Desert geomorphic province of California, also referred to as the Sonoran Desert section of the Basin and Range physiographic region of the United States.[1] This region is characterized as a broad interior region of isolated mountain ranges separated by expanses of internally-drained desert plains. The plains are mantled by scattered patchworks of Sonoran creosote bush and dissected by dry desert washes which terminate at dry lakes. Figure 3.19-1 provides a view of the project area, as seen from a dirt road immediately north of I-10. In the photo, the project would be located in the immediate foreground, and would extend into the middleground of the photo occupied by the dry lake bed. Figure 3.19-2 provides a number of context photographs illustrating common visual features of the desert environment, and the characteristic landscape of the Chuckwalla Valley area.

The project study area is defined as all land areas from which any element of the project would be visible (i.e., the project's viewshed). The project viewshed is shown in Figure 3.19-3, and was generated via computer-generated viewshed tools. Distance zones in the figure provide a reference to approximate the prominence of the project in views. Based on BLM guidance (BLM Handbook H-8410), the outer extent of the background visibility zone is a radius 15 miles away from the outer edges of the project footprint. Beyond 15 miles is considered the "seldom seen" zone. Beyond this distance the project may be visible, although it would constitute a distant and minor element in views and would likely disappear into the horizon line, or be hidden by atmospheric conditions (e.g., haze or dust) and intervening topography. The 15-mile viewshed of the project would occupy 17,149 acres of the Chuckwalla Mountains Wilderness (or about 19 percent of the wilderness area), 5,938 acres of the Little Chuckwalla Mountains Wilderness (or about 20 percent of the wilderness area), 46,619 acres of the Palen/McCoy Wilderness (or about 21 percent of the wilderness area), and 6,707 acres of the Joshua Tree National Park (JTNP) (or less than one percent of the park area).

Some of the more distinct visual features located within the project study area include:

1. Several prominent mountain ranges to the northwest, northeast, and southwest, including the Palen, Chuckwalla, and Coxcomb Mountains, respectively.

[1] California's geomorphic provinces and the physiographic regions of the U.S. are naturally defined geologic regions that display a distinct landscape or landform. These divisions are based on unique, defining features such as geology, topographic relief, climate, and vegetation. The distinction between California's geomorphic provinces and the physiographic regions of the U.S. is in the scale at which they are defined.

2. Palen Dry Lake and Sand Dunes, immediately west, north, and northeast of the project site.

3. Transmission lines paralleling both the north and south sides of I-10, and several unpaved 4WD/OHV roads.

4. The Community of Desert Center (visual features are increased signage, landscaped trees, and scattered buildings/structures).

The project is likely to be visible from isolated residences in Desert Center, which is the only residential community within viewing distance of the project area. The primary user groups that could have views of the project would be motorists along I-10 and SR 177; visitors to the Desert Lily Preserve and the Palen Dry Lake area, which are located north of the project site; motorists accessing the Corn Springs Campground and Chuckwalla Mountains Wilderness via Chuckwalla Valley and Corn Springs Roads; and dispersed recreational users in the surrounding wilderness areas. The Palen McCoy Wilderness is immediately northeast of the project, but the area with views of the project is not used for recreation and features neither trails nor trailheads (CEC Genesis RSA, 2010). However, since the wilderness area is physically accessible, it may also be visited on rare occasions by backcountry hikers. The portion of Joshua Tree National Park where the project could be visible does not contain visitor-serving facilities such as hiking trails, campgrounds or picnic areas—these occur in the central and western portions of the park, in areas located over 15 miles east of the project site that are unlikely to have views of project. However, the project could be visible from elevated vantage points within the Coxcomb Mountains, which is the eastern-most part of the park.

3.19.2 BLM Visual Resource Management (VRM) Policy

BLM's Visual Resource Management Policy is the agency's implementation of legal requirements for managing scenic resources, established through NEPA (1969) and FLPMA (1976). Under FLPMA, BLM has developed and applied a standard visual assessment methodology to inventory and manage scenic values on lands under its jurisdiction. The BLM manual M-8400-Visual Resource Management, Handbook H-8410-Visual Resource Inventory, and Handbook H-8431-Visual Resource Contrast Rating, set forth the policies and procedures for determining visual resource values, establishing management objectives, and evaluating proposed actions for conformance to the established objectives for BLM administered public lands. The following describes the three primary elements of the BLM's VRM Policy.

Determining Visual Resource Values

The primary means to establish visual resource values are to conduct a Visual Resource Inventory (VRI), as described in BLM Handbook H-8410. There are four VRI Classes (I to IV) assigned as a representation of the relative visual value. VRI Class I has the highest value and VRI Class IV has the lowest. VRI Class I is reserved for special congressional designations or administrative decisions such as Wilderness Areas, visually sensitive ACECs, or Wild and Scenic Rivers, etc. VRI Classes II through IV are determined through a systematic process that documents the landscape's scenic quality, public sensitivity and visibility. Rating units for each of the three factors are mapped individually, evaluated, and then combined through an over-layering analysis. The three considerations are briefly described below.

> *Scenic Quality*: Scenic Quality Rating Units (SQRUs) are delineated based on common characteristics of the landscape. There are seven criteria used for inventorying the landscape's scenic quality within each SQRU: landform, vegetation, water, color, influence of adjacent scenery, scarcity, and degree of cultural modification. Each factor is scored for its respective contribution to the scenic quality, the scores are summed, and the unit is given a rating of A (highest), B, or C (lowest) based on the final score.

> *Sensitivity Level*: Sensitivity Level Rating Units (SLRU) are delineated and evaluated for public sensitivity to landscape change. Criteria used for determining level of sensitivity within each unit includes types of use, amount of use, public interest, adjacent land uses, special areas, and other factors. Each criterion is ranked high, medium, or low and an overall sensitivity level rating then is assigned to the unit.

> *Distance Zones (visibility)*: The third factor is visibility of the landscape evaluated from where people commonly view the landscape. The distance zones are divided into foreground/middleground (three to five miles); background (five to 15 miles); and seldom seen (beyond 15 miles or topographically concealed areas within the closer range distance zones).

The relationships between the rated values of scenic quality, sensitivity level, and visibility are cross-referenced with the Visual Resource Inventory Matrix to determine the Visual Resource Inventory (VRI) Class, as shown in Table 3.19-1. Visual resource inventory classes are informational in nature and provide the basis for considering visual values in the Resource Management Planning (RMP) process. They do not establish management direction and should not be used as a basis for constraining or encouraging surface disturbing activities. They are considered the baseline data for existing conditions.

TABLE 3.19-1
DETERMINING VISUAL RESOURCE INVENTORY CLASSES

		Sensitivity Level								
		High			**Medium**			**Low**		
Special Areas		I	I	I	I	I	I	I	I	I
Scenic Quality	A	II	II	II	II	II	II	II	II	II
	B	II	III	III/IV[a]	III	IV	IV	IV	IV	IV
	C	III	IV	IV	IV	IV	IV	IV	IV	IV
		Fg/mg	Bg	Ss	Fg/mg	Bg	Ss	Fg/mg	Bg	Ss
		Distance Zones								

[a] If adjacent area is Class III or lower assign Class III, if higher assign Class IV

Fg/mg=Foreground/Middleground
Bg=Background
Ss=Seldom seen

SOURCE: BLM Manual H-8410-1

Establishing Management Objectives

VRM Classes (defined in Table 3.19-2) are determined by considering both VRI Class designations (visual values) along with resource allocations or special management decisions made in the applicable RMP. Management objectives for each VRM Class set the level of visual change to the landscape that may be permitted for any surface-disturbing activity. The objective of VRM Class I is to preserve the character of the landscape, whereas VRM Class IV provides for activities that require major modification to the landscape. Thus, the allowable levels of visual change for VRM Classes I through IV are decreasingly restrictive.

TABLE 3.19-2
VISUAL RESOURCE MANAGEMENT CLASSES

VRM Class	Objective
Class I	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention
Class II	The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape
Class III	The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape
Class IV	The objective of this class is to provide for management activities which require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

VRI Classes are not intended to automatically become VRM class designations. Management classes are determined through careful analyses of other land uses and demands. The VRM classes are considered a land use plan decision that guides future land management actions and subsequent site-specific implementation decisions. VRM class designations are to be assigned to all BLM public land. VRM class designations may be different than the VRI classes assigned in the inventory and should reflect a balance between protection of visual values while meeting energy and other land use, or commodity needs. For example, an area with a VRI Class II designation may be assigned a VRM Class IV designation, based on its overriding value for mineral resource extraction or its designation as a utility corridor.

While the applicable RMP for the study area is the CDCA Plan, it does not contain a visual resource element, and has not established VRM Classes. When a project is proposed and there are no RMP-approved VRM objectives, Interim Visual Resource Management (IVRM) Classes must be established. These classes are developed using the process just described, but may be restricted in geographic scope to areas affected by the proposed action. If the area is also without a VRI, then one must be conducted in order to provide a baseline of data by which to analyze impacts and to inform appropriate designation of interim VRM Classes.

Evaluating Proposed Actions

Proposed plans of development are evaluated for conformance to the VRM Class objectives through the use of the Visual Resource Contrast Rating process set forth within BLM Handbook H-8431-1. Because this concerns the environmental consequences of the proposed action, this process is further described and applied in Chapter 4.18.

3.19.3 Visual Resource Inventory

The baseline mapping of landscape units in this assessment is derived from the visual resource inventory and subsequent Interim Visual Resource Management (IVRM) Classes developed in connection with the Devers-Palo Verde No. 2 Transmission Line EIR/EIS (DPV 2 EIR/EIS). In the baseline setting for that document, landscape units were delineated, assessed and rated following the BLM's Visual Resource Inventory (VRI) process. The applicable portions of that document, which include photographs and an evaluation of scenic quality factors is provided in Appendix J. The visual resource inventory mapping and evaluation reflects an assessment of the landscape's *scenic quality*, *viewer sensitivity*, and *distance zone* of observers. Based on these factors, the project site was assigned to VRI Class III, which represents a moderate visual value. The DPV 2 EIR/EIS inventory mapping and analysis of the area affected by the proposed action is incorporated herein by reference, and summarized briefly below.

Scenic Quality Rating

The project is located partly in Scenic Quality Rating Unit (SQRU) 10 and partly in SQRU 12, both of which represent the flat desert floor along the Chuckwalla Valley. The landform of the Chuckwalla Valley SQRU is flat and non-descript with grass and low-growing shrubs of subdued color. Though distant mountain ranges (e.g., the Palen Mountains to the north and the Chuckwalla Mountains to the south) provide backdrops of visual interest (not part of this unit), SQRU 10 and 12 are primarily influenced by the presence of existing utility infrastructure and I-10.

These landscape units are rated as C-Quality scenery, based on the combination of scores for landform, vegetation, water, color, adjacent scenery, scarcity and cultural modifications. The most influential factor in these units' low rating for scenic quality was the abundance of cultural modification along I-10 (roads, transmission lines, 4-wheel drive tracks, etc.) and the flatness and lack of visual variety in landform (although relatively high scores were assigned for adjacent scenery).

Sensitivity-Level Rating

The CDCA was designated by Congress in large part for its visual values and uniqueness in terms of being a fairly undisturbed portion of the California Desert close to large population centers. In recognition of this, VRM inventories within the California Desert Conservation Area (CDCA) have historically regarded the entire CDCA as having a high viewer sensitivity level (BLM, 1980). Thus, the project area is assigned a high visual sensitivity. This rating is a conservative assessment because public interest and special areas are only two of the five factors that influence the sensitivity level of a landscape unit. Types and amounts of use are typically also considered in the assessment of sensitivity which is generally low for the project area.

Distance Zone

The distance zone for all portions of the project is assigned to foreground/middleground (under five miles) due to the distance of I-10 and other local roads to the project (see Figure 3.19-3).

3.19.4 Interim Visual Resource Management Classes

As discussed above, VRM classes typically are assigned by the BLM through its RMPs; but in the case of the project, VRM classes were not established in the CDCA Plan. Instead, BLM land managers must establish “Interim VRM Classes” for each project on a case-by-case basis. The DPV 2 EIR/EIS determined Interim VRM Classes, which were mapped by the consultants and approved by the BLM. Therefore, those Interim VRM Classes will be used for the project. Figure 3.19-4 shows the Interim VRM Classes from the DPV2 EIR/EIS. The entire project site, including the areas encompassing the solar troughs, power blocks, and transmission line corridor, is classified as Interim VRM Class III. In the specific case of the Devers-Palo Verde No. 2 EIR/EIS, the Visual Resource Inventory (VRI) and Interim Visual Resource Management (IVRM) Class mapping were equivalent.

Thus, the project shall be managed in accordance with Interim VRM Class III objectives. The Interim VRM Class III management objective is reasonable because the project area is also under Multiple-Use Class M (Moderate Use), which is based upon a controlled balance between higher intensity use and protection of public lands. This class provides for a wide variety of present and future uses such as mining, livestock grazing, recreation, energy, and utility development. The objective of Interim VRM Class III is to partially retain the existing character of the landscape (see Table 3.19-2).

3.20 Water Resources

The project site is located between the communities of Blythe, California (approximately 35 miles southeast) and Desert Center, California (approximately 9 miles west). It is located in the Mojave Desert Geomorphic Province. The Mojave Desert is a broad interior region of isolated mountain ranges separated by expanses of desert plains. It has an interior enclosed drainage (i.e., there is no outlet to the ocean) and many dry lake beds known as *playas*. Physiographically, the site lies near the toe of alluvial fans emanating from the Chuckwalla Mountains to the south, the Coxcomb Mountains to the north, and the Palen Mountains to the northeast; it is bisected by a broad valley-axial drainage that extends southward between these mountains and drains to the Palen Lake playa located a short distance north of the site (Figure 3.20-1) (CEC/BLM, 2010). The elevation of Chuckwalla Valley ranges from under 400 feet above mean sea level (amsl) at Ford Dry Lake to approximately 1,800 feet amsl west of Desert Center and along the upper portions of the alluvial fans that ring the valley flanks. The surrounding mountains rise to approximately 3,000 and 5,000 feet amsl.

The ground surface in the vicinity of the site generally slopes gently downward to the northeast at an average gradient of 1.33 percent. Ground surface elevations at the site itself range from approximately 680 feet amsl in the southwest to 425 feet amsl in the northeast. Steeper grades are present at isolated sand dunes along the northern portion of the site. Toward the north and central portions of the site, the ground becomes hummocky as it transitions to the flat playa located along the northern portion of the site. On-site drainage is generally to the north (toward the Palen Dry Lake), and occurs in a number of alluvial channels and as unconfined flow (sheetflow) during larger storm events.

3.20.1 Climate and Precipitation

The climate in the Chuckwalla Valley is characterized by high aridity and low precipitation. The region experiences a wide variation in temperature, with very hot summer months with an average maximum temperature of 108 degrees Fahrenheit (ºF) in July and cold dry winters with an average minimum temperature of 66.7 ºF in December.

Average annual precipitation in the project area, based on the gauging station at Blythe Airport, is approximately 3.6 inches, with August recording the highest monthly average of 0.64 inches and June recording the lowest monthly average of 0.02 inches. Most rainfall occurs during the winter months or in association with summer tropical storms (which tend to be of shorter duration and higher intensity than winter storms). Tables 3.20-1 and 3.20-2 display the average monthly and annual minimum and maximum temperatures and precipitation from 1913 to 2008 collected from the Blythe Airport, located approximately 35 miles southeast of the project site. Per the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 for the Southern California area, 3.51 inches of rain fall in the 100-year, 24-hour storm event.

TABLE 3.20-1
CLIMATE TEMPERATURE DATA FOR BLYTHE AIRPORT, CALIFORNIA (1913-2008)

Month	Temperatures °F					Mean Number of Days			
	Monthly Averages			Record Extremes		Max. Temp.		Min. Temp.	
	Daily Max.	Daily Min.	Monthly	Record High	Record Low	90°F & Above	32°F & Below	32°F & Below	0°F & Below
Jan	66.7	41.5	54.1	89	20	0	0	2.7	0
Feb	72	45.4	58.7	93	22	0.2	0	0.8	0
Mar	78.4	50.2	64.3	100	30	3.1	0	0.1	0
Apr	86.4	56.5	71.5	107	38	11.6	0	0	0
May	95.2	64.4	79.8	114	43	23.8	0	0	0
Jun	104.5	72.7	88.6	123	46	29	0	0	0
Jul	108.4	81	94.7	123	62	30.9	0	0	0
Aug	106.6	80.2	93.4	120	62	30.6	0	0	0
Sep	101.3	73	87.2	121	51	28.4	0	0	0
Oct	89.8	60.9	75.3	111	27	17.6	0	0	0
Nov	75.8	48.6	62.2	95	27	0.8	0	0.1	0
Dec	66.7	41.2	53.9	87	24	0	0	1.8	0
Year	87.7	59.6	73.6	123	20	175.9	0	5.5	0

SOURCE: CEC RSA, 2010

TABLE 3.20-2
PRECIPITATION DATA FOR BLYTHE AIRPORT, CALIFORNIA (1913-2008)

Month	Rainfall (inches) [1913-2008]			
	Mean	Highest Month	Lowest Month	Highest Daily
Jan	0.47	2.48	0	1.64
Feb	0.44	3.03	0	1.66
Mar	0.36	2.15	0	1.52
Apr	0.16	3	0	2.67
May	0.02	0.22	0	0.22
Jun	0.02	0.91	0	0.91
Jul	0.24	2.44	0	1.4
Aug	0.64	5.92	0	3
Sep	0.37	2.14	0	1.9
Oct	0.27	1.89	0	1.61
Nov	0.2	1.84	0	1.04
Dec	0.39	3.33	0	1.42
Year[a]	3.59	—	—	3

NOTES:
[a] Totals may not match the data in specific columns due to rounding.

SOURCE: CEC RSA, 2010

Table 3.20-3 presents average monthly evapotranspiration rates for various stations located in the region.

TABLE 3.20-3
MONTHLY AVERAGE EVAPOTRANSPIRATION (ETO) RATES

Month	CIMIS Station #127	CIMIS Station #128	CIMIS Station #135	CIMIS Station #151	CIMIS Station #162	CIMIS Station #175	Regional
	Station: Salton Sea West	Station: Salton Sea East	Station: Blythe NE	Station: Ripley	Station: Indio	Station: Palo Verde II	
Jan (in/mo)	2.40	2.40	2.32	2.44	2.44	2.41	1.55
Feb (in/mo)	3.20	3.20	3.09	3.31	3.31	3.23	2.52
Mar (in/mo)	5.13	5.13	5.00	5.25	5.25	5.59	4.03
Apr (in/mo)	6.78	6.78	6.61	6.85	6.85	7.22	5.70
May (in/mo)	8.62	8.62	8.54	8.67	8.67	8.78	7.75
Jun (in/mo)	9.18	9.18	9.69	9.57	9.57	9.42	8.70
Jul (in/mo)	9.19	9.19	10.13	9.64	9.64	9.58	9.30
Aug (in/mo)	8.63	8.63	8.91	8.67	8.67	8.61	8.37
Sep (in/mo)	6.97	6.97	6.85	6.85	6.85	6.58	6.30
Oct (in/mo)	5.22	5.22	4.64	5.00	5.00	4.74	4.34
Nov (in/mo)	3.08	3.08	2.95	2.95	2.95	2.94	2.40
Dec (in/mo)	2.25	2.25	2.07	2.20	2.20	2.25	1.55
Year (in/yr)	70.65	70.65	70.8	71.4	71.4	71.35	62.50

NOTES: CIMIS monitoring station closest to project site are listed.
Regional evapotranspiration values correspond to CIMIS Reference ETo Zone 16, which includes Westside of San Joaquin Valley and Mountains East & West of Imperial Valley.

SOURCE: CEC RSA, 2010

3.20.2 Groundwater

The site is located within the Chuckwalla Valley Groundwater basin (CVGB; DWR Basin 7-5), which has a surface area of 940 mi^2 (2,435 km^2). The CVGB is bounded upgradient by two other groundwater basins that include the eastern part of the Orocopia Valley (DWR Basin No. 731) and Pinto Valley (DWR Basin No. 7-6) groundwater basins, and downgradient by the Palo Verde Mesa (DWR Basin No. 7-39) groundwater basin (PVMGB). The CVGB also connects to the southern tip of the Ward Valley groundwater basin (DWR Basin No. 7-03). The site location in relation to these features is shown on Figure 3.20-1 (CEC/BLM, 2010). The CVGB is bounded by the consolidated rocks of the surrounding mountains. Three water-bearing Quaternary- and Tertiary-age sedimentary units overlay non-water bearing bedrock in the CVGB (CEC RSA, 2010). DWR reports the maximum thickness of these deposits as about 1,200 feet (CEC RSA, 2010); however, modeling of Bouguer gravity data obtained from USGS suggest greater depths to bedrock exist in some parts of the basin (Figure 3.20-2) (CEC/BLM, 2010).

Groundwater Inflow/Outflow

Natural groundwater recharge to the CVGB includes recharge from precipitation and subsurface inflow from the Pinto Valley Groundwater Basin to the northwest and the Orocopia Valley Groundwater Basin to the Southwest (CEC RSA, 2010). Underflow from the Cadiz Valley Groundwater Basin has also been hypothesized by DWR; however, previous work has reportedly confirmed that the Cadiz Valley Groundwater Basin does not contribute inflow to the CVGB (CEC RSA, 2010). CVGB also shares a boundary with the Ward Valley Groundwater Basin, but groundwater is not reported to flow across this boundary (CEC RSA, 2010). Other sources of recharge to the basin include agricultural return flow and return flow from treated wastewater disposal.

In this part of California, almost all moisture from rain is lost through evaporation or evapotranspiration and runoff occurs principally during intense thunderstorms (CEC RSA, 2010). Most recharge from precipitation occurs when runoff from the surrounding mountains exits bedrock canyons and flows across the coarse sediments deposited in the proximal portions of the alluvial fans that ring Chuckwalla Valley. To a lesser extent, recharge occurs from infrequent precipitation or runoff on the valley floor (CEC RSA, 2010). The area of the Chuckwalla Valley watershed encompasses Chuckwalla Valley (601,543 acres) and the surrounding bedrock mountains (258,825 acres), for a total area of approximately 860,368 acres.

Available estimates of recharge in CVGB are variable and in some cases based on incomplete or incorrect data. DWR has not published an estimated recharge rate for the basin (CEC RSA, 2010). In 1986, Woodward Clyde calculated recharge from precipitation for the Chuckwalla Valley watershed to be 29,530 afy (CEC RSA, 2010). This equates to an average recharge rate of approximately 0.036 feet per year (0.4 inches). Woodward Clyde reported this number as approximately 12.8 percent of an average annual precipitation of 3.39 inches per year across the watershed; however, this was the average annual precipitation in Blythe at the time, and does not consider that the orographic effect of the surrounding mountains which results in precipitation rates of over 6 inches per year in the higher elevation portions of the watershed (CEC RSA, 2010).

In 1992, the average recharge to CVGB was reportedly estimated by BLM and the County of Riverside to be 5,540 to 5,600 afy based upon an assumed 10 percent infiltration of precipitation (CEC RSA, 2010); however, this number evidently considered only a portion of the watershed as it would equate to an average annual precipitation depth of only about 1 inch per year across the watershed. Previous studies have demonstrated recharge rates for nearby desert basins ranging from approximately 3 to 5 percent of the total incident precipitation on the basin catchment area (CEC RSA, 2010). A review of recharge studies in the arid southwest performed by USGS (2007b) cited a wide range of recharge rates, but rates in similar basins ranged from about 3 to 7 percent (CEC RSA, 2010).

For this study, recharge from precipitation was estimated by overlaying isohyetal maps prepared by Hely and Peck on the Chuckwalla watershed boundaries and calculating the volume of average annual precipitation for each of four precipitation zones for the valley and bedrock portions of the watershed. Recharge was then estimated as 2, 3, 5 and 10 percent of total incident precipitation and a reasonable lower bound recharge estimate was adopted. Overlays were performed separately for the western watershed, which encompasses the Palen Detailed Analysis Unit (DAU) designated by DWR, and the eastern watershed, which encompasses the Ford DAU designated by DWR. These sub-watersheds drain to Palen and Ford Dry Lakes, respectively. The calculated average annual precipitation volume for the Palen sub-watershed is 156,000 acre-feet based on an area-weighted average precipitation of 4.462 inches and an area of 419,659 acres. The calculated average annual precipitation volume for the Ford sub-watershed is 159,000 acre-feet based on an area-weighted average precipitation of 4.316 inches and an area of 440,709 acres. Recharge from precipitation for the CVGB is estimated as 3, 5, and 7 percent of total incident precipitation and is therefore calculated to be 8,588, 14,313, and 20,038 afy, respectively. An analysis of infiltration and runoff rates for the CVGB is provided in Table 3.20-4.

Based on the above analysis, approximately 36 percent of precipitation in the watershed falls on the bedrock areas that ring the watershed. This is significant because precipitation that falls on the valley floor is not expected to contribute consistently to recharge. Studies published by USGS report approximately 7 to 8 percent of precipitation falling on mountains in other arid basins goes to mountain front recharge (CEC RSA, 2010).

This would amount to approximately 3 percent of the total precipitation that falls on the watershed. In the absence of more detailed study, 3 percent of total precipitation falling on the Chuckwalla Valley watershed (8,588 afy) is used as a reasonable lower bound estimate of recharge from precipitation to the CVGB.

Subsurface Inflow

Subsurface inflow occurs from the Pinto Valley and Orocopia Valley Groundwater Basins. Inflow from the Colorado River is not expected to occur under natural conditions – under natural conditions the CVGB is upgradient from the Palo Verde Mesa Groundwater Basin (PVMGB), and groundwater flows from the CVGB through the PVMGB, towards the Colorado River. Inflow from the Pinto Valley Groundwater Basin has been calculated to be 3,173 afy (CEC RSA, 2010). Inflow from the Orocopia Valley Groundwater Basin has been estimated to be 1,700 afy (CEC RSA, 2010). CH2M Hill estimated the combined subsurface inflow from both basins to be 6,700 afy. However, recent studies by GeoPentech reportedly indicate that subsurface inflow from Orocopia Valley Groundwater Basin may be as low as several hundred afy. Therefore, a combined subsurface inflow rate of 3,500 afy was assumed for both basins, in support of water budget calculations for the project.

Wastewater Return Flow

Water balance in the CVGB is affected by operation of a State prison complex and residential use including a man-made lake associated with the Lake Tamarisk development, near Desert Center. Chuckwalla State Prison was constructed in 1988, and Ironwood State Prison became operational in 1994. The prisons use an unlined pond to dispose of treated wastewater, and a large percentage of this discharge is reported to infiltrate into the subsurface and recharge the CVGB. For the years

TABLE 3.20-4
ESTIMATED RUNOFF AND INFILTRATION IN CHUCKWALLA VALLEY GROUNDWATER BASIN

Layer[a]	Area (acres)	Mean Annual Precipitation (inches)[2]	Total Volume of Rainwater from Mean Annual Precipitation (af)	Runoff Curve Classification[b]	Runoff Curve Number[b]	Runoff (%of Precipitation)	Total Annual Volume of Infiltration – Hely & Peck (af)	Total Annual Volume of Infiltration (af) based on 3%[c]	Total Annual Volume of Infiltration (af) based on 5%[c]	Total Annual Volume of Infiltration (af) based on 7%[c]
unit1-cw	30,303	5	12,626	Alluvium, Steep Slope	74	3.50%	442	379	631	884
	211,498	4	70,499	Alluvium, Flat Slope	69	2.00%	1,410	2,115	3,525	4,935
	41,073	3.5	11,980	Alluvium, Steep Slope	74	3.50%	419	359	599	839
	12,077	4	4,026	Alluvium, Steep Slope	74	3.50%	141	121	201	282
	910	4	303	Alluvium, Steep Slope	74	3.50%	11	9	15	21
	194	4	65	Alluvium, Steep Slope	74	3.50%	2	2	3	5
	81,233	5	33,847	Alluvium, Steep Slope	74	3.50%	1,185	1,015	1,692	2,369
bedrock chuckwalla	32,001	5	13,334	Mountains	93	29.10%	3,880	400	667	933
	21,456	5	8,940	Mountains	93	29.10%	2,602	268	447	626
	11,050	5	4,604	Mountains	93	29.10%	1,340	138	230	322
	109	5	46	Mountains	93	29.10%	13	1	2	3
	9,246	4	3,082	Mountains	93	29.10%	897	92	154	216
	10,042	4	3,347	Mountains	93	29.10%	974	100	167	234
	282	4	94	Mountains	93	29.10%	27	3	5	7
	3,480	4	1,160	Mountains	93	29.10%	338	35	58	81
	275	4	92	Mountains	93	29.10%	27	3	5	6
	90	4	30	Mountains	93	29.10%	9	1	2	2
	398	4	133	Mountains	93	29.10%	39	4	7	9
	316	4	105	Mountains	93	29.10%	31	3	5	7
	39,340	5	16,392	Mountains	93	29.10%	4,770	492	820	1,147
	194	5	81	Mountains	93	29.10%	24	2	4	6
unit3-cw	28,973	3	7,243	Alluvium, Flat Slope	69	2.00%	145	217	362	507
unit2-cw	198,558	3	49,640	Alluvium, Steep Slope	74	3.50%	1,737	1,489	2,482	3,475
bedrock chuckwalla	89,161	6	44,581	Mountains	93	29.10%	12,973	1,337	2,229	3,121
TOTALS	**822,259**	**---**	**286,250**		**---**	**---**	**33,436**	**8,588**	**14,313**	**20,038**

NOTES:

a See Figure DR-S&W-179-1 in Solar Millennium 2010a.
b From Hely & Peck 1964. Based on a percent of Total Volume of Rainwater from Mean Annual Precipitation (Column 4).

SOURCE: CEC RSA, 2010

1998 through 2001, the California Department of Water Resources – Department of Planning and Local Assistance (CDWR-DPLA) reported that deep percolation of applied urban water in the Chuckwalla Planning Area (assumed to be wastewater return flow) was 500 to 800 afy (CEC RSA, 2010). According to authorities at the State prison complex (CEC RSA, 2010), approximately 600 afy of treated effluent recharges the basin. Water budget information for the proposed Eagle Crest Pumped Storage Project (CEC RSA, 2010) indicates 795 afy of treated effluent are recharged by the prisons. An additional source of wastewater return flow in the basin is approximately 36 afy from the Lake Tamarisk development near Desert Center (CEC RSA, 2010).

Irrigation Return Flow

The amount of applied irrigation water that returns to recharge a groundwater basin depends on the soil, crop type, amount and method of irrigation, and climatic factors. Woodward Clyde reported an irrigation efficiency of 60 percent (return flow of 40 percent) for jojoba crops in Chuckwalla Valley (CEC RSA, 2010). DWR-DPLA reported an irrigation efficiency of 72 percent (return flow of 28 percent) for subtropical crops in the Palen Detailed Analysis Unit (DAU) of the Chuckwalla Planning Area (CEC RSA, 2010). In its water budget calculations for the Chuckwalla Planning Area in support of California Water Plan updates, DWR-DPLA calculated an irrigation return flow of approximately 9 to 11 percent for 1998, 2000 and 2001, respectively. A 10 percent return flow is a reasonable factor for deep percolation from irrigation in the basin, and was applied to the assumed agricultural and landscape water demand in the basin for the purposes of a water budget. Current pumpage associated with activities associated with irrigation return flow is estimated to be approximately 7,700 afy in the CVGB that includes 6,400 afy for agriculture, 215 afy for aquaculture pumping, and 1,090 afy for Tamarisk Lake (CEC RSA, 2010). Return flows are calculated using the mean of DWR-DPLA calculated values, equaling 10 percent (approximately 800 afy) and included in Table 3.20-5.

Groundwater Demand/Outflow

Groundwater provides the only readily available natural water resource in Chuckwalla Valley. While the Colorado River Aqueduct traverses the northern portion of the basin, it does not contribute significant water to the basin (other than leaks and maintenance activities). Designated and potential beneficial uses of groundwater in the basin include domestic, municipal, agricultural and industrial use (CEC RSA, 2010). As such, groundwater demand is a significant contributor to basin outflow. Other sources of basin outflow include subsurface discharge to the Palo Verde Mesa Groundwater Basin, and evapotranspiration at Palen Lake.

Groundwater Extraction

Current and historical groundwater pumping in CVGB includes agricultural water demand, pumping for Chuckwalla and Ironwood State prisons, pumping for the Tamarisk Lake development and golf course, domestic pumping, and a minor amount of pumping by Southern California Gas Company. In addition, historical groundwater pumping included water supply for the Kaiser Corporation Eagle Mountain Mine. With the exception of pumping for Chuckwalla Valley and

Ironwood State Prisons, most of the current groundwater pumping in the basin occurs in the western portion of the basin, near the town of Desert Center. Current groundwater pumping rates are estimated to be approximately 7,900 afy in the western CVGB and 2,605 afy in the eastern basin. Agricultural production is limited to the western portion of the basin (CEC RSA, 2010), with the exception of a relatively limited amount of acreage that is associated with the State prisons.

Subsurface Outflow

Subsurface outflow to Palo Verde Mesa Groundwater Basin was estimated by Metzger in 1973to be 400 afy (CEC RSA, 2010). This calculation was based on a cross sectional profile of the boundary between the two basins derived using geophysical methods and regional data regarding groundwater gradients and hydraulic conductivity. Woodward Clyde revised this estimate based on the results of pump testing in 1986 at Chuckwalla State Prison and calculated the basin outflow to be 870 afy. Engineering Science updated this estimate to 1,162 afy in 1990, presumably as a result of return flow from prison wastewater disposal; however, the rationale for this adjustment was not provided. Using gravity data, Wilson and Owens-Joyce more recently (1994) found that the area through which discharge occurs is significantly more limited than previously thought due to the presence of a buried bedrock ridge. As a result, the most recent available water budget for the basin has adopted an outflow rate of 400 afy (CEC RSA, 2010).

Palen Lake Evapotranspiration

Regional groundwater flow and discharge mapping performed by USGS (CEC RSA, 2010) did not identify Palen Lake as an area where groundwater discharges at the ground surface. Nevertheless, groundwater elevation contour mapping suggests that groundwater may occur near the ground surface beneath approximately the northwestern 25 percent of Palen Lake. It is therefore possible that a portion of Palen Lake is operating as a wet playa. Groundwater levels beneath the southeastern portions of Palen Lake, and a small ancillary playa located approximately one mile southeast of Palen Lake, were reported by Steinemann as being 20 to 30 feet below ground surface (bgs) in 1979, suggesting that Palen Lake would be a dry playa at various times (CEC RSA, 2010).

Review of aerial photography indicates what appears to be a relatively small area of dissected salt pan near the northern and western sides of the playa. Because the salt pan is dissected, it is not clear whether salt deposition is actively occurring or whether this material is residual deposition from surface water evaporation. Immediately northwest of Palen Lake, between Palen Lake and Desert Center-Rice Road, Pleistocene lake bed deposits crop out at the ground surface in the form of dissected, mesa-like prominences that are 5 to 10 feet high (CEC RSA, 2010). These deposits are capped with a layer of caliche and locally support scattered mesquite trees, and alkali sink scrub and honey mesquite are also located between the project site and Palen Dry Lake. For additional discussion of these biological resources, please refer to the Biological Resources section. There does not appear to be any further evidence of shallow groundwater or evapotranspiration visible in aerial photography.

A well located approximately two miles north of Palen Lake, is reported to be completed to a depth of 501 feet bgs and has a ground surface elevation of 500 feet amsl (CEC RSA, 2010). A screened interval for the well is not reported. Groundwater levels in this well were reported to be approximately 20 to 25 feet bgs between 1932 and 1984. Given that the surface elevation at Palen Lake two miles to the south is approximately 460 feet amsl, or 40 feet lower, it appears possible that groundwater levels are very close to the ground surface beneath the northern portion of the playa. In addition, DWR identified the presence of mesquite trees on low mesa-like promontories of Pleistocene lacustrine sediments at the northwest margin of Palen Lake playa in 1963, also suggesting the possible presence of relatively shallow groundwater (CEC RSA, 2010). These data suggest it is possible that an area in the northern portion of Palen Lake is discharging groundwater by evaporation as a wet playa. Groundwater levels beneath the southeastern portions of Palen Lake, and a small ancillary playa located approximately one mile southeast of Palen Lake, are 20 to 30 feet bgs (CEC RSA, 2010), indicating these are dry playa areas.

Review of aerial photography indicates an approximately 700-acre area of dissected salt pan in the northwest portion of the playa (CEC RSA, 2010). This feature is surrounded by an additional approximately 1,300 acres that show evidence of more limited surface salt accumulation. The extent of this area is visible in aerial imagery from November 2005, and was generally confirmed by a reconnaissance performed on December 10 and 30, 2009. Review of the historical progression aerial imagery (CEC RSA, 2010) indicates no or limited salt accumulation in this area from 1996 through 2002, light salt accumulation in March of 2005, and the currently observed salt pan area in November 2005. This suggests that salt pan accumulation in the playa is episodic; however, seasonal, intermittent accumulation cannot be ruled out. Historical precipitation records indicate that 2005 rainfall in Blythe was approximately twice the long term annual average, with 5.10 inches occurring in January and February 2005 (CEC RSA, 2010), just before the March 2005 aerial photograph was taken. These storm events would be expected to have resulted in the accumulation of runoff in Palen Lake, and consequently in dissolution and re-crystallization of salt deposits during evaporation of surface water, and by wetting and subsequent drying of salt containing playa sediments. As such, these rainfall events are likely responsible for at least a portion of the observed salt accumulation; however, groundwater discharge by evaporation at the ground surface also could be responsible.

During a December 10, 2009 site visit by Worley-Parsons, conditions at the northwestern edge of the playa were investigated. Intermittent salt deposits were observed to be located both in low lying areas and on the tops of low, dissected, mesa-like promontories of Pleistocene lacustrine sediments approximately three feet high that extend into the playa (CEC RSA, 2010). Deposition of salt by groundwater evaporation at the surface would be expected to occur on the sides as well as the top of these promontories. The occurrence of salt deposits on the top, but not on the sides, suggests that these deposits are the result of salt dissolution from layers with elevated salt content and redeposition as soil moisture evaporates at the ground surface. The shallow soil beneath the salt deposits was observed to be wetted to a depth of approximately three inches from a recent rain event, but underlying soil to depths of approximately one foot were observed to be generally dry. As such, evidence of salt deposition by evapotranspiration at the playa surface was not observed in this area during Worley-Parsons' reconnaissance (CEC RSA, 2010).

Groundwater dependent vegetation communities observed at or in the vicinity of the project site include mesquite tree groves along the margins of Palen Dry Lake, woodland habitat along dry desert washes, stands of jackass clover, and desert/alkali sink scrub habitats along the margins of Palen Dry Lake. These and other plant species associated with groundwater dependent vegetation communities are dominated or defined by phreatophytes, deep-rooted plants that obtain a significant portion of their water needs from groundwater. The phreatophytes known to occur in the Project area are mostly “facultative phreatophytes”, or deep rooted plant species that tap into groundwater to satisfy at least some portion of their environmental water requirement, but will also inhabit areas where their water requirements can be met by soil moisture reserves alone. Therefore the presence of mesquite and other groundwater dependent vegetation communities is not necessarily indicative of discharging playas.

In December 2009, Worley-Parsons advanced two hand auger borings to approximately 10 feet bgs beneath the salt pan area in the northwest portion of the playa. The moisture content of the soil was observed to increase with depth in both borings, and free groundwater was encountered at a depth of approximately 8 feet bgs in one of the borings. Subsurface soil encountered consisted of alternating layers clay/silt mixtures and sandy sediments. A depth of 2 to 3 meters is generally the maximum depth of free water documented beneath discharging playas. This suggests that groundwater could be shallow enough to discharge at the surface by capillary rise and evaporation to occur at least some of the time (CEC RSA, 2010).

Based on the above data, salt accumulation at Palen Lake is likely the result of dissolution and recrystallization of existing salt deposits during times of surface water inflow, as well as limited episodic and possibly seasonal or intermittent groundwater discharge. The rate of groundwater discharge in a wet playa depends on the depth to groundwater and magnitude of upward vertical gradients, the ability of subsurface materials to facilitate capillary rise, climatic conditions, and the presence and extent of free water, wetlands and salt pans on the playa surface (CEC RSA, 2010). In general, groundwater discharge rates are highest when groundwater is shallow, temperatures are high, and when open water or wetlands are exposed at the playa surface.

Increased depth to groundwater, lower temperatures, the presence of coarse grained material that inhibits capillary rise, and the presence of salt pan (which increases albedo) tends to decrease groundwater discharge rates. Based on these factors, discharge of groundwater at Palen Lake appears to be limited based on the depth to groundwater (including absence of vegetation that indicates consistent shallow groundwater), the presence of coarse grained layers that limit capillary rise and the apparent intermittent or episodic nature of discharge.

Groundwater discharge rates were estimated based on reported groundwater discharge rates at other playas, the area of identified salt accumulation, and the evident episodic or intermittent nature of salt accumulation. Measured evapotranspiration rates at Franklin Lake Playa were used to form a basis for this estimate (CEC RSA, 2010). Franklin Lake Playa is a well developed and extensively characterized wet playa in the Death Valley area (CEC RSA, 2010). Evapotranspiration rates at Franklin Lake Playa are calculated to be 38 to 41 cm/year (1.3 to 1.4 feet/year) based on the Energy-Balance Eddy-Correlation method, which is reported to be the most reliable method by the USGS. These rates would be a conservative measure of evapotranspiration for active wet playa areas at Palen Lake for the following reasons:

1. Franklin Lake Playa is a terminal playa, which is the terminal discharge point of the local groundwater flow system; whereas, Palen Lake is a bypass playa, with most groundwater flowing laterally past the playa.
2. Franklin Lake Playa includes extensive groundwater discharge features (e.g., saltpan, puffy ground and halophyte wetlands) that are generally less developed or lacking at Palen Lake, indicating less groundwater discharge would be expected at Palen Lake.
3. Evapotranspiration rates at wet playas are temperature dependant, with maximum rates occurring during the summer months. Franklin Lake Playa occurs in Death Valley, where mean annual and summer high temperatures typically exceed those at Palen Lake.
4. The available data suggest that groundwater discharge, if it is occurring at Palen Lake, is episodic or intermittent; whereas groundwater discharge at Franklin Lake Playa occurs throughout the year.

The total area of potential groundwater discharge at Palen Lake is estimated to be approximately 2,000 acres, with salt pan occupying approximately 700 acres of this total. Given the differences between Palen Lake and Franklin Lake Playa previously discussed, a groundwater discharge rate that is approximately half that at Franklin Lake Playa was adopted (approximately 0.0583 feet/acre/month of water) and was believed to occur. Over an area of 2,000 acres for three months of the year, this equates to approximately 350 afy.

Groundwater Budget

The perennial yield (the maximum quantity of water that can be annually withdrawn from a groundwater basin over a long period of time without developing an overdraft condition of CVGB was estimated to be between 10,000 and 20,000 afy (CEC RSA, 2010). A perennial yield of 12,200 afy was adopted in the EIS for the Eagle Crest Landfill project in 1992 (CEC RSA, 2010); however, the amount of recharge from precipitation used to derive this number appears to be based on recharge to only a portion of the basin, so the perennial yield may be underestimated.

A comprehensive water budget was compiled based on published literature, water budget information collected by the DWR for updates to the California Water Plan, information obtained from the California State Prison Authority, and the analysis of basin inflow and outflow discussed in the previous two sections. This information is summarized in Table 3.20-5, and is presented in greater detail in the Staff Assessment for the PSPP (CEC RSA, 2010).

The analysis suggests that the CVGB is in positive balance (inflow exceeds outflow) by approximately 2,600 afy under average conditions.

Water Bearing Units

The following water-bearing formations have been identified in the CVGB. The extent and relationship of these formations is presented in hydrostratigraphic cross sections A-A' included as Figure 3.20-3. The location of the cross section is shown on Figure 3.20-4 (CEC/BLM, 2009).

TABLE 3.20-5
GROUNDWATER BUDGET (AFY)

Budget Components	Totals
Inflow	
Recharge from precipitation	8,588
Underflow from Pinto Valley and Orocopia Valley Groundwater Basins	3,500
Irrigation return flow	800
Wastewater return flow	831
Total inflow	13,719
Outflow	
Groundwater extraction	-10,361
Underflow to Palo Verde Mesa Groundwater Basin	-400
Evapotranspiration at Palen dry lake	-350
Total outflow	-11,111
Budget balance (net Inflow)	2,608

Quaternary Alluvium

Quaternary alluvial fill in the basin consists of Holocene to Pleistocene alluvial fan and fluvial (stream) deposits, as well as lacustrine (lake) and playa (ephemeral lake) deposits (CEC RSA, 2010). These deposits consist of gravel, sand, silt and clay (CEC RSA, 2010). In general, coarser alluvial fan deposits are expected near the valley edges and grade into finer distal fan deposits that interfinger with fine grained lacustrine and playa deposits near the center of the basin. These deposits are typically heterogeneous. Valley axial drainages tend to be more uniform and continuous, and contain a greater proportion of sand and fine gravel. Portions of the basin are also occupied by aeolian (wind-blown) sand deposits, but the identified aeolian deposits occur at the ground surface and are of limited thickness. Therefore, they are not believed to be an important water bearing unit.

The Quaternary sediments include the Pleistocene-age Pinto Formation, which consists of coarse fanglomerate (cemented, consolidated or semi-consolidated alluvial fan gravels) containing boulders and lacustrine clay with some interbedded basalt (CEC RSA, 2010). The fanglomerate would likely yield water freely to wells, but the basalt would likely yield only small amounts of water (CEC RSA, 2010). AECOM (2010 as cited in the CEC RSA, 2010) did not report the estimated thickness of the Quaternary Alluvium but suggested the thickness of saturated sediments beneath the site is at least 560 feet and that saturated sediments to a depth of 758 feet consisted of a mixture of fine-grained sands with interbedded silt and clay layers. AECOM suggested that these sediments are likely to be the older alluvium/Bouse Formation sediments described in Bulletin 91-7 (CEC RSA, 2010).

Pliocene Bouse Formation

The Pliocene Bouse Formation underlies the Quaternary sediments. The Bouse Formation includes a marine to brackish-water estuarine sequence deposited in an arm of the proto-Gulf of

California (CEC RSA, 2010). This formation has alternatively been interpreted as, or may include, lacustrine sediments deposited in a closed, brackish basin (CEC RSA, 2010). The Bouse Formation is reported widely in the Colorado Valley and tributary basins in southeastern California and descriptions of this formation come from occurrences outside of Chuckwalla Valley. It is reported to be composed of a basal limestone (marl) overlain by interbedded clay, silt, sand, and tufa. The top of the Bouse Formation is relatively flat lying with a reported dip of approximately 2 degrees south of Cibola (CEC RSA, 2010). The Bouse Formation in the CVGB is estimated to extend to approximately 1,900 feet bgs (approximately –1,500 feet msl) beneath the site based on geophysical modeling (Figure 3.20-2) (CEC/BLM, 2010). These unconsolidated to semi-consolidated sediments are reported to yield several hundred gallons per minute (gpm) to wells perforated in coarse grained units (CEC RSA, 2010).

Miocene Fanglomerate

The Bouse Formation is unconformably underlain by a fanglomerate composed chiefly of angular to subrounded and poorly sorted partially to fully cemented pebbles with a sandy matrix (CEC RSA, 2010). The Fanglomerate is likely Miocene-age; however, it may in part be Pliocene-age (CEC RSA, 2010). The Fanglomerate represents composite alluvial fans built from the mountains towards the valley and the debris of the Fanglomerate likely represent a stage in the wearing down of the mountains following the pronounced structural activity that produced the basin and range topography in the area (CEC RSA, 2010). Bedding surfaces generally dip from the mountains towards the basin. The Fanglomerate reportedly dips between 2 and 17 degrees near the mountains due to structural warping (CEC RSA, 2010). The amount of tilting indicates a general decrease in structural movements since its deposition (CEC RSA, 2010). The Fanglomerate is estimated to extend to approximately 2,600 feet bgs (-2,000 feet msl) beneath the site based on geophysical modeling by Worley-Parsons in 2009 (CEC RSA, 2010).

Bedrock

Bedrock beneath the site consists of metamorphic and igneous intrusive rocks of pre-Tertiary age that form the basement complex (CEC RSA, 2010). In some areas of the basin, volcanic rocks of Tertiary age overlie the basement complex (CEC RSA, 2010). These rocks are considered nonwater bearing. The bedrock topography in the study area as interpreted by modeling of Bouger gravity data obtained from USGS is illustrated in Figure 3.20-2 (CEC/BLM, 2010).

Groundwater Occurrence and Movement

In general, groundwater flow in the basin is south-southeastward (Figure 3.20-5) (CEC/BLM, 2010). Groundwater flow is directed southward from the basin's boundary with the Cadiz Valley Basin and east-southeastward from its boundary with the Pinto Valley Basin, toward the eastern basin boundary where it flows into the adjacent Palo Verde Mesa Basin (CEC RSA, 2010). The groundwater gradient is steepest in the western half of the basin and is nearly flat in the central portion of the basin (CEC RSA, 2010). Near Ford Dry Lake and east of Ford Dry Lake the gradient becomes steeper as groundwater approaches the narrows in the southeast portion of the basin (CEC RSA, 2010).

Groundwater levels exceed 500 feet amsl in the western portions of the basin and fall to less than 275 feet amsl near the eastern end of the basin in the narrows between the Mule and McCoy Mountains (CEC RSA, 2010). Near Palen Lake, groundwater occurs near the ground surface, resulting in groundwater discharge by evapotranspiration at the land surface. Near Ford Dry Lake, groundwater is reported at depths of 50 feet bgs. Beneath the project site, groundwater occurs at depths of approximately 180-200 feet bgs (approximately 400 feet amsl) based on site-specific investigation (Solar Millennium 2009a).

The DWR reports that groundwater levels in the basin are generally stable (CDWR, 2004). Figure 3.20-6 shows hydrographs for selected wells within the Chuckwalla Valley from 1958 to 2009 (CEC/BLM, 2010). The wells selected to present the hydrograph data were chosen to present the most complete set of historic water level elevation data across the Chuckwalla Valley. The hydrographs show that the water level has been generally stable over the last 40 years in the central and eastern parts of the basin. This area includes the project site. The hydrograph for well 7/20-18H1 in the eastern part of the basin shows a decrease in water level elevation occurred between 1985 and 1990. This well is associated with the Chuckwalla and Ironwood State prisons and the decline in water level is likely due to increased water use at the prisons. The hydrograph for well Township7S Range 18E-14H1 shows a slight (approximately 20 foot) increase in the water level between 1983 and 1992. This well and the three other wells at this location are associated with agriculture activities and the water level increase is likely due to the fallowing of the land.

The hydrographs for wells in the Desert Center area along Highway 177 show local effects of water level decline, attributable to increased agricultural pumping beginning in the early 1980s and ending in the mid 1980s. GEI estimated groundwater pumping in 1986 was about 20,000 afy, significantly up from the 1963 DWR estimate of 9,100 afy. Basin wide pumping declined rapidly since 1986 with recent estimates placing it at about 6,000 afy.

The inconsistency in groundwater level measurements makes it difficult to establish a specific year for the groundwater decline to have started. However, the hydrograph for well 4/16-32M1 suggests the decline started in 1980 and the water level had dropped approximately 50 feet at the time of the last water level measurement. The hydrograph for well 5/15-12N1, located approximately four miles to the southwest of well 4/16-32M1, shows only a small decline (approximately five feet) in the water table elevation. The water level readings in well 5/15-12N1 suggest the water level, at this well, has recovered to pre-pumping levels. The data presented in the hydrographs suggest that pumping around Desert Center induced a local cone of depression in that area that did not extend eastward into the area of the project site. The differential response and recovery to pumping in this area would suggest some compartmentalization of the aquifer system, which is expected since it is comprised of both interconnected and isolated alluvial fan deposits.

Aquifer Characteristics

The basin fill sediments within the CVGB include three aquifers: the alluvium, the Bouse Formation, and the Fanglomerate. Groundwater in the alluvium likely occurs under unconfined conditions but could locally be semi-confined. Groundwater in the Bouse Formation and the Fanglomerate was reported to be under semi-confined to confined conditions based on stratigraphic data and storativity values derived from aquifer pumping tests approximately 17 miles southeast of the project site (CEC RSA, 2010). Table 3.20-6 summarizes the reported and estimated aquifer properties for these aquifers based on data from specific capacity tests and aquifer pumping tests performed on wells in the CVGB.

Groundwater Quality

Groundwater quality varies markedly in the basin. Groundwater in the western portion of the basin near Desert Center generally contains lower concentrations of total dissolved solids (TDS) than groundwater in the eastern, downgradient portion of the basin near Ford Dry Lake (CEC RSA, 2010). Groundwater to the south and west of Palen Lake is typically sodium chloride to sodium sulfate-chloride in character (CEC RSA, 2010). The detected concentrations of TDS in the basin range from 274 mg/L to 8,150 mg/L with an average concentration of 2,100 mg/L (CEC RSA, 2010). In general, the groundwater in the basin has concentrations of sulfate, chloride, fluoride, and dissolved solids too high for domestic use and concentrations of sodium, boron and dissolved solids too high for irrigation use (CEC RSA, 2010). Several of the wells sampled in the basin contain high levels of fluoride and boron.

Groundwater Wells in Proximity to the Project

A total of 88 water supply wells were identified in online databases in the CVGB (Appendix J of Solar Millennium 2009a). A field survey was conducted by AECOM (Solar Millennium 2009a) in July 2009 to identify well locations, confirm operational status, and estimate uses within the basin. The wells were categorized as either domestic, industrial, agricultural or municipal wells based on land use or information provided by the property owner.

A total of 15 wells were identified, most of which supported historic agricultural operations and many of which have been discontinued. Available information for water supply wells located within a one-mile radius of the project site is summarized in Table 3.20-7 and shown in Figure 3.20-7 (CEC/BLM, 2010).

3.20.3 Surface Water Hydrology

The project site is located within the Chuckwalla Valley Drainage Basin. There are no perennial streams in this drainage basin. Chuckwalla Valley is an internally drained basin, and all surface water flows to Palen Dry Lake in the western portion of the valley and Ford Dry Lake in the eastern portion of the valley. Palen Dry Lake is a “wet playa” with possibly significant shallow groundwater discharge at the ground surface by evaporation; whereas, Ford Dry Lake is a “dry playa,” with groundwater occurring well below the ground surface. Palen Dry Lake is located in the central portion of Chuckwalla Valley about 1 mile north of the project site.

Off-site stormwater flows impacting the site are from a large watershed area to the west and north which covers approximately 44 square miles. FEMA flood insurance rate maps have not been prepared for the project site or surrounding lands and the site does not lie within a federally mapped floodplain. The upstream extents of the contributing watersheds extend into the Chuckwalla

TABLE 3.20-6
AQUIFER CHARACTERISTICS

Geologic Unit	Well ID	Well Depth	Specific Capacity (gpm/ft)	Transmissivity (gpd/ft)	Hydraulic Conductivity (ft day)	Storativity	Basis
Alluvium (Western Basin)	OW-2	---		224,400	100	0.05	Aquifer test near Desert Center (Eagle Crest Energy Company 2009)
	CW-1 to CW-4			56,000	50	0.05	Aquifer test of Eagle Mountain Iron Mine wells (Eagle Crest Energy Company 2009)
				1,100-16,000	19.6-42	10^2-10^4	Aquifer test conducted for the project
	Average			**74,000**	**53**	**0.05**	---
Bouse Formation (Eastern Basin)	TW-1	50		21,542	3 to 16		Aquifer test and lab analysis conducted for the Genesis Solar project
	3	957	5	10,000	4		Specific Capacity Test
	26	1,000	1.5	3,000	1		Specific Capacity Test
	29	985	1.6	3,200	1		Specific Capacity Test
	43	830	35	70,000			Specific Capacity Test
	Average			21,500	12 to 14		—
Bouse Formation/ Fanglomerate (Eastern Basin)	33	1,200	14.8	29,600	8	---	Specific Capacity Test
	34	1,200	26.7	53,400	14	---	Specific Capacity Test
	35	1,200	51.6	103,200	28	---	Specific Capacity Test
	36	1,200	15.6	31,200	8	---	Specific Capacity Test
	37	1,050	12.9	25,806	11	0.0002	Aquifer test conducted at State prison
	39	1,139	11.1	22,222	13	---	Specific Capacity Test
	40	1,200	10.3	20,600	5	---	Specific Capacity Test
	42	1,100	19.7	39,444	15	---	Specific Capacity Test
	Average			40,684	13	0.0002	---
Fanglomerate	14	982	2.6	5,200	14		Specific Capacity Test

NOTES: Source: CEC RSA, 2010

Transmissivity from Specific Capacity Tests calculation by multiplying value by 2,000 for confined aquifers and by 1,500 for unconfined aquifers (Driscoll 1986).

TABLE 3.20-7
SUMMARY OF GROUNDWATER QUALITY DATA[a,b]
(ALL VALUES REPORTED IN MG/L UNLESS OTHERWISE INDICATED)[c]

Analyte	Well 5/17-33N1 (2009)	Well 5/17-20F1 (May 1957)	Well 5/17-30F1 (January 1960)	Well 5/17-30P1 (October 1958)	All Chuckwalla Valley Wells[a]
Arsenic	0.0157	—	—	—	—
Bicarbonate (HCO_3)	122	104	90	420	21–1,950
Boron	1.82	0.0001	0.0006	0.0004	—
Calcium	31	50	30	12	5–585
Carbonates (CO_3)	ND[c]	ND	ND	ND	0–129
Fluoride	6.1	1.8	—	0.3	0–12
Chloride	200	203	225	150	8–2,780
Iron	ND<0.1	—	—	—	—
Magnesium	4.72	6		2	0–208
Manganese	0.0127	—	—	—	—
Nitrate (NO_3)	0.17[d]	—	—	—	—
Selenium	ND<0.015	—	—	—	—
Sodium	352	225	240	240	2–6,720
Sulfate	380	241	155	89	9–1,110
Total Hardness ($CaCO_3$)	830	150	75	38	3–2,300
TDS	1,010	803	695	783	274–12,300
pH (units)	—	7.4	8.1	8	7–8.7

NOTES:
[a] Geochemical data for all wells within the Chuckwalla Groundwater Basin from available information in online databases and historic reports is provided in Solar Millennium 2009.
[b] Metals data reported from the unfiltered ("total") sample
[c] mg/L = milligrams per liter; ND – not detected at the practical quantitation limit
[d] Nitrate as Nitrogen.

Mountains to the southwest. The approximate extent of sub-basin boundaries within the overall watershed impacting the project were delineated utilizing a combination of USGS 7.5 minute quadrangle sheets and site specific aerial topography.

The overall watershed boundaries and sub-basin delineations, as well as the 100-year peak discharges for each sub-basin, are shown on Figure 3.20-8. Peak discharges for each sub-basin were calculated using the HEC-HMS model and generally followed the guidelines presented in the *Riverside County Flood Control and Water Conservation District Hydrology Manual*, and are summarized in Table 3.20-8. There is a potential issue of concern related to the watershed delineation of the Corn Springs Wash: A portion of the flow which reaches the Corn Spring Wash crossing at I-10 is diverted to that location by a berm and adjacent incised channel which extends from that crossing to the southeast for a distance of 2500 feet. Is has been assumed this berm is not an engineered or routinely maintained structure. Failure of this berm could result in significant increase in flow coming under I-10 and into the Central Channel.

TABLE 3.20-8
SUMMARY OF OFFSITE PEAK DISCHARGES

Sub-basin ID	Sub-basin Area	Q100 (cfs) (HEC-HMS)	Q100 (cfs) (Regression)[a]
OA	31.24	13,705	12,435
OB	6.31	2,108	3,994
OC	3.61	1,491	2,686
OD	1.04	287	1,110
OE	0.59	173	742
OF	0.95	172	1,041

NOTES:
[a] The regional regression equation used in the analysis above was taken from the U.S. Geological Survey Water-Resources Investigations Report 94 4002: Nationwide Summary of U.S. Geological Survey regional Regression Equations for Estimating Magnitude and Frequency of Floods for Ungaged Sites, 1993. The equation provided was Q100=1080A0.71 for the South Lahontan-Colorado Desert Region.

A comparison was made between the discharge data provided as part of the Drainage Report and discharges obtained using the USGS Regional Regression Equation for the region. The purpose of the comparison was to provide some insight into the reasonableness of the calculated discharges when compared to some other regionally accepted methodology. In general, it appears that the HEC-HMS model and regional regression equations are well-correlated for the largest watershed but are significantly higher in the regional regression equation for the smaller watersheds. The subject area is likely flatter with more dispersed flow than the “average” watershed used in the derivation of the regional regression equation, which could account for lower discharges for the larger watersheds. Overall, the reported discharges appear to be reasonable for the purpose of design, with the exception of the potential for breakout from Corn Springs Wash watershed, which may increase flows in the adjacent watershed.

Dry Washes

There are no perennial streams in the Palen Dry Lake or Ford Dry Lake watersheds which could impact the project site. The vast majority of the time, the area is dry and devoid of any surface flow. Water runoff occurs only in response to infrequent intense rain storms. There are approximately100 minor washes that cross the site from southwest to northeast, draining the area downstream of I-10 towards Palen Dry Lake. Many of these channels do not reach the dry lake but fade out on the vegetated sand dune surface. These channels are typically very subtle, with a width of 2-10 feet and a depth of 3-9 inches. They are found approximately every 100 feet when traversing across the project site perpendicular to the predominant flow direction, which is to the northeast.

Two significant ephemeral wash complexes cross the site from southwest to northeast, draining the area downstream of I-10 towards Palen Dry Lake. Both washes were traceable from the western project boundary to Palen Dry Lake. These major washes are observed as complexes of braided channels, with each channel being approximately 10-50 feet wide. The wash complexes widen out from their constriction at I-10 and are approximately 1,500 feet wide after approximately a mile, after which they become very dispersed, lose definition and resemble minor washes. Within a mile of I-10, the major washes have created sandy zones approximately 1,500 feet wide on the less sandy alluvial gravel or thin sand sheets.

Springs, Seeps and Playa Lakes

One spring is listed in the CVGB in the vicinity of the project site, according to the National Water Information System (NWIS) database of Water Resources of the United States, which is maintained by the USGS. “Corn Spring” is shown on a geologic map of the area (CEC RSA, 2010). Corn Spring is approximately five to six miles southwest of the project site in the center of the Chuckwalla Mountains, at an elevation of approximately 1,600 ft. The spring discharges into Corn Spring Wash, an ephemeral dry wash where surface water flows towards the northeast and onto the project site. Corn Spring appears to derive its water from precipitation falling onto the Chuckwalla Mountains, and movement of groundwater under pressure along a historically active fault that bisects the mountains.

Two perennial springs are located in the eastern portion of Chuckwalla Valley, but are at a greater distance from the project site. These are McCoy Spring, located at the foot of the McCoy Mountains approximately 19 miles northeast of the site at an elevation of approximately 980 ft, and Chuckwalla Spring, located approximately 16 miles south of the site near the foot of the Chuckwalla Mountains, at an elevation of approximately 1,950 ft.

According to the NWIS database, seeps and surface discharge/outfall (along with streams, lakes, wetlands, and diversions) are categorized as “surface water sites” and four sites are located in the CVGB. One of the four locations is the aforementioned Corn Spring Wash. Two other sites are located near the northern edge of the Chuckwalla Mountains approximately eight and 13 miles west of the project site. Water in these three sites appears to originate from infiltration of precipitation that falls on the Chuckwalla Mountains as all three sites are located either within the Chuckwalla Mountains or are less than one mile downslope from the Chuckwalla Mountains.

The fourth surface water site listed in the NWIS database for the CVGB is Coxcomb Wash, located approximately eight miles northwest of the project site. Coxcomb Wash is an ephemeral dry wash that flows southeastward from the Coxcomb Mountains. As a result, groundwater extracted from the project site would not affect the flow of water in Coxcomb Wash. The locations of Corn Spring and other surface water sites identified in the NWIS database and through the several other data sources are shown on Figure 3.20-9 (CEC/BLM, 2010). The sites are listed on Table 3.20-9.

Tenajas are defined as seasonal precipitation-fed or ephemeral stream basins which can hold significant quantities of water. By definition (CEC RSA, 2010), ephemeral streams are a stream or reach of a stream that “flows briefly only in direct response to precipitation in the immediate locality and whose channel is at all times above the water table.” Tenajas act as natural cisterns along an ephemeral stream, and are by definition perched at all times above the groundwater table. Two tenaja locations were located in the study area and are noted, but will not be affected by groundwater extraction because they are not sustained by shallow groundwater. Similarly,

TABLE 3.20-9
SPRINGS AND SURFACE WATER SITES IN CHUCKWALLA VALLEY IN THE VICINITY OF THE SITE

Site No.	Location Number	Location Name	Type	Distance from Project Site (miles)
1	USGS 10253750	Monument Wash near Desert Center, CA	Stream	7.2
2	USGS 10253540	Corn Springs Wash near Desert Center, CA	Stream	6.2
3	USGS 333731115193001	006S016E28DS01S (Corn Spring)	Spring	6.3
4	USGS 10253700	Palen Dry Lake near Desert Center, CA	Stream	13.8
5	USGS 10253800	Coxcomb Wash near Desert, Center CA	Stream	7.1
6	WHIPs ID S-376	Spring Tank	Spring	8.1
7	N/A	Tenaja	Pond	6.8
8	WHIPs ID S-375	Long Tank Tenaja	Pond	8.9
9	N/A	Desert Center Sewer Pond	Pond	8.5

SOURCE: CEC RSA, 2010

numerous wildlife water guzzlers (devices used to collect and store water derived from snow and/or rainwater for later use by wildlife in the area) for small and large game are identified, but these man-made structures are designed to store precipitation and would not be affected by groundwater pumping.

Playas are shallow, centrally located basins in which water gathers after a rain and quickly evaporates. Two playas in the form of Palen Dry Lake and Ford Dry Lake are present in the CVGB. Palen Dry Lake, which is three miles wide and about four miles long, is one mile north of the project site. Ford Dry Lake is about two miles wide and seven miles long and is located about seven miles southeast of the project site.

Stormwater Flow

Stormwater flow across and adjacent to the project site occurs in a network of generally shallow and moderately expressed alluvial channels, and during larger events, as more widespread sheetflow. In general, the channels become shallower and less defined the further they are from the Chuckwalla Mountains. I-10 is an important local control on drainage across the project site, as it intercepts a large number of ephemeral washes draining towards the site from upstream (southwest) of the interstate. These channels are captured by a series of berms and interceptor channels that run parallel with I-10, periodically passing the collected water under I-10 at bridges and creating larger washes that pass under the interstate. There are three distinct locations where this occurs upstream of the project. These flows are relatively concentrated near the southern project boundary, but quickly disperse into a network of smaller and less defined channels under existing conditions.

The Applicant provided graphical results of FLO-2D modeling for existing conditions that confirm the presence of some more defined drainages across the project site as well the occurrence of widespread and shallow sheet flooding across and adjacent to it.

Surface and Groundwater Beneficial Uses

The water quality control plan (or "Basin Plan") of the Colorado River Basin Regional Water Quality Control Board (CRBRWQCB) establishes water quality objectives, including narrative and numerical standards that protect the beneficial uses of surface and ground waters in the region. The Basin Plan describes implementation plans and other control measures designed to ensure compliance with Statewide plans and policies and documents comprehensive water quality planning.

Beneficial water uses are of two types—consumptive and non-consumptive. Consumptive uses are those normally associated with people's activities, primarily municipal, industrial and irrigation uses that consume water and cause corresponding reduction and/or depletion of water supply. Non-consumptive uses include swimming, boating, waterskiing, fishing, hydropower generation, and other uses that do not significantly deplete water supplies.

1. Past or Historical Beneficial Uses
    a. Historical beneficial uses of water within the Colorado River Basin Region have largely been associated with irrigated agriculture and mining. Industrial use of water has become increasingly important in the Region, particularly in the agricultural areas.

2. Present Beneficial Uses
    a. Agricultural use is the predominant beneficial use of water in the Colorado River Basin Region, with the major irrigated acreage being located in the Coachella, Imperial and Palo Verde Valleys. The second in quantity of usage is the use of water for municipal and industrial purposes. The third major category of beneficial use, recreational use of surface waters, represents another important segment of the Region's economy.

3. Sources of Drinking Water Policy
    a. All surface and ground waters are considered to be suitable, or potentially suitable, for municipal or domestic water supply with the exception of:
        i. Surface and ground waters where: the total dissolved solids (TDS) exceed 3,000 mg/L, and it is not reasonably expected by the Regional Board to supply a public water system, or
        ii. There is contamination, either by natural process or by human activity, that cannot be treated for domestic use using either Management Practices or best economically achievable treatment practices, or
        iii. The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day.

Existing uses of waters from springs in the Colorado River Basin include the Box Spring, Crystal Spring, Old Woman Spring, Cove Spring, Mitchell Caverns Spring, Bonanza Spring, Agua

Caliente Spring, Kleinfelter Spring, Von Trigger Spring, Malpais Spring, and Sunflower Spring. Based on a review of available information include the USGS NWIS database, USGS quadrangle maps and data provided by the BLM, none of these springs are within the area that would be influenced by the project. Existing uses of water from springs in the Colorado River Basin include Bousic Spring, Veale Spring, Nett Spring, Gordon Spring, and Arctic Canyon Spring. None of these springs are within the area that would be influenced by the project.

Water quality objectives are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area.

1. General Surface Water Objectives (CRBRWQCB)

   a. *Aesthetic Qualities* – All waters shall be free from substance attributable to wastewater of domestic or industrial origin or other discharges which adversely affect beneficial uses not limited to: setting to form objectionable deposits; floating as debris, scum, grease, oil, wax, or other matter that may cause nuisances; and producing objectionable color, odor, taste, or turbidity.

   b. *Tainting Substances* – Waters shall be free of unnatural materials which individually or in combination produce undesirable flavors in the edible portions of aquatic organisms.

   c. *Toxicity* – All waters shall be maintained free of toxic substances in concentrations which are toxic to, or which produce detrimental physiological responses in human, plant, animal, or indigenous aquatic life. Compliance with this objective will be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, 96-hour bioassay or bioassays of appropriate duration or other appropriate methods as specified by the CRBRWQCB. Effluent limits based upon bioassays of effluent will be prescribed where appropriate, additional numerical receiving water objectives for specific toxicants will be established as sufficient data to become available, and source control of toxic substances will be encouraged. The survival of aquatic life in surface waters subjected to a waste discharge or other controllable water quality factors, shall not be less than that for the same water body in areas unaffected by the waste discharge, or other control water which is consistent with the requirements for “experimental water” as described in Standards Methods for the Examination of Water and Wastewater.

   d. *Temperature* – temperature shall not be altered.

   e. *pH* – shall range from 6.0 to 9.0

   f. *Dissolved Oxygen* – shall not be reduced below the following minimum levels at any time: warm – 5.0 mg/L, cold – 8.0 mg/L, and warm and cold – 8.0mg/L

   g. *Total Dissolved Solids* – discharges of wastes or wastewater shall not increase the total dissolved solids content of receiving waters, unless it can be demonstrated to the satisfaction of the Regional Board that such an increase in total dissolved solids does not adversely affect beneficial uses.

   h. *Bacteria* – The geometric mean of the indicated bacterial densities should not exceed one or the other of the following: E. coli – 630 colonies (col) per 100 ml and enterococci – 165 col per 100 ml. Nor shall any sample exceed one other following maximum allowable: E. coli 2000 col per 100 ml and enterococci 500 col per 100 ml.

Any discharge, except from agricultural, shall not cause concentration of total dissolved solids in surface waters to exceed the following limits:

TDS (mg/L)	Annual Average	Maximum
Coachella Valley Drains	2,000	2,500
Palo Verde Valley Drains	2,000	2,500

2. General Groundwater Objectives: Establishment of numerical objectives for groundwater involves complex considerations and it is acknowledged that the quality of groundwater varies significantly throughout the CVGB and varies with depth. It is the CRBRWQCB's goal to maintain the existing quality of non-degraded groundwater basins and to minimize the quantities of contaminants reaching any groundwater basin.

   a. Groundwater designated for domestic or municipal supply shall not contain taste or odor producing substances

   b. Groundwater designated for domestic or municipal supply shall not contain coliform organisms in excess of limits specified in the regulations.

   c. Groundwater designated for domestic or municipal supply shall not contain concentrations of chemical constituents in excess of the limits specified in California Code of Regulations, Title 22 regulations.

   d. Discharges of water softeners regeneration brines, other mineralized wastes, and toxic wastes to disposal facilities which ultimately discharge in areas where such waste can percolate to ground waters useable for domestic and municipal purposes, are prohibited.

Wastewater reclamation and reuse is encouraged, however, such use must meet applicable water quality standards.

3.21 Wild Horse and Burros

As shown on Map 2-26 of the approved Northern and Eastern Colorado Desert Coordinated Management Plan (BLM CDD, 2002), there are no Wild Horse and Burro Herd Areas or Herd Management Areas within or adjacent to the project area or right-of-way application area.

3.22 Wildland Fire Ecology

The Biological Resources Study Area (Study Area) is located within the boundaries of BLM's NECO Plan. The NECO Plan boundary is shown in Figure 3.18-1. Compared to other parts of the State, there are relatively few fires in the planning area and most are small. In the 15 years between 1980 and 1995, a handful of fires burned a total of about 6,000 acres, all outside the project study area. Of this amount, about 900 acres in the Chemehuevi Critical Habitat Unit and about 11 acres in the Chuckwalla Critical Habitat Unit burned. Most fires in the desert are caused by lightning or vehicles.

The BLM and National Park Service (NPS) have collaborated in the development of the Fire Management Activity Plan (FMAP) 1996 for the California Desert. The FMAP brings together fire management goals for biological resources, wilderness, and other sources and establishes fire management standards and prevention and protection programs. The FMAP includes limitations on fire suppression methods in critical habitat and other tortoise habitat; the limitations are designed to limit habitat disturbance while keeping fires small.

The vegetation-fuel types in the project study area, Sonoran creosote bush scrub, desert dry wash woodland, unvegetated ephemeral dry wash, desert sink scrub, and desert dunes, are not fire-adapted. Fire, particularly repeated wildfire, is deleterious to these plant communities and tends to deplete the native woody shrubs that characterize and dominate these communities in favor of exotic weedy annuals (see Figure 3.18-1).

Exotic and invasive weedy annual plants such as Mediterranean splitgrass and red brome form a complete ground cover in some places, where they have displaced native annual and perennial grasses and forbs. There are indications that the increase in exotic annual grasses might be enhanced by nitrogen deposition from air pollution originating outside of the planning area (e.g., Los Angeles Basin, Coachella Valley) (BLM CDD, 2002). There is some evidence that disturbances such as livestock grazing, OHV use, and fire have contributed to the spread of exotic annuals (BLM CDD, 2002).

Disturbed areas are more likely to support exotic annual weeds. There are two of these cover types in the project study area: Developed and Agricultural land, totaling 900 acres (see Section 3.18, *Vegetation Resources*). These areas are most likely to support or carry wildfires in the project study area. The amount and extent of vehicle use and the amount and extent of disturbed areas are the primary variables in predicting changes to wildfire size and frequency.

Sonoran Desert Scrub is the dominant community type within the NECO Planning Area, covering 3.8 million acres, or 69 percent of the total area. The large majority of its distribution (86 percent) is on public lands. Major threats to this community type include fire, grazing, off-road vehicles, and invasions of alien species. Sonoran creosote bush scrub occupies approximately 74 percent of the project study area.

Wildfire suppression occurs with the minimum surface disturbance practical in all habitats. Wildfires are suppressed using a mix of only the following methods in order to minimize habitat disturbance:

1. Aerial attack,
2. Crews using hand tools to create fire breaks,
3. Mobile attack engines limited to public roads, designated open routes, and routes authorized for limited-use,
4. Use of foam and/or fire retardant, and
5. Use of earth-moving equipment or tracked vehicles (such as bulldozers) in critical situations to protect life, property, or high-value resource.

Post fire-suppression mitigation includes rehabilitation of firebreaks and other ground disturbances and obliteration of vehicle tracts sufficient to discourage future casual use. Hand tools are used for rehabilitation activities whenever feasible.

3.23 Wildlife Resources

This section is based on, and draws heavily from, the CEC's Staff Assessment and Revised Staff Assessment for the Palen Solar Power Project (PSPP) (CEC/BLM, 2010; CEC RSA, 2010). The PSPP would be located in the Chuckwalla Valley between the Chuckwalla and Palen mountains in eastern Riverside County (DTPC, 2006 as cited in the CEC RSA, 2010). The Biological Resources Study Area (Study Area) consists of a 14,771-acre area that encompasses the Project Disturbance Area (including the transmission Disturbance Area) and a surrounding buffer area. The project site would be located within the central portion of Chuckwalla Valley, an area east of Palm Springs in the remote Colorado Desert, a subsection of the Sonoran Desert.

The project site is located within two areas designated in the NECO plan as wildlife habitat management areas (WHMA): Palen-Ford WHMA and Desert Wildlife Management Area (DWMA) Connectivity WHMA. Management emphasis for the Palen-Ford WHMA is on the management of the dunes and playas within the Palen-Ford dune system. Management emphasis for the DWMA Connectivity WHMA is on the geographic connectivity for the desert tortoise for the conservation areas east of Desert Center (i.e., connectivity between the Chuckwalla DWMA and the wilderness area north of I-10). The Palen-McCoy Wilderness is approximately 3 miles to the northeast of the project site, the Chuckwalla Desert Wildlife Habitat Management Area (DWMA) is located approximately 2 miles to the south, and the Palen Dry Lake ACEC borders the project site to the east.

Examples of common animal species observed or detected in the Study Area included house finch (*Carpodacus mexicanus*), white-crowned sparrow (*Zonotrichia leucophrys*), northern flicker (*Colaptes auratus*), Say's phoebe (*Sayornis saya*), kangaroo rat (*Dipodomys sp.*), round-tailed ground squirrel and antelope ground squirrel (*Spermophilus tereticaudus*, *Ammospermophilus leucurus*), desert cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), desert kit fox (*Vulpes macrotis arsipus*), and coyote (*Canis latrans*)(HELIX, 2010 as cited in the CEC RSA, 2010).

3.23.1 Special Status Wildlife

Special-status wildlife are species that have been afforded special recognition by Federal, State, or local resource agencies or organizations. Listed and special-status species are often of relatively limited distribution and typically require unique habitat conditions. Special-status wildlife are defined as meeting one or more of the following criteria:

1. Listed as threatened or endangered or candidates for future listing as threatened or endangered under FESA or CESA;
2. Protected under other statutes or regulations (e.g., Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, etc.);
3. Listed as species of concern by CDFG;

4. Considered a locally significant species. That is, a species that is not rare from a State-wide perspective, but is rare or uncommon in a local context such as within a county or region, or is so designated in local or regional plans, policies, or ordinances; or

5. For consistency with the SA/DEIS, any other species receiving consideration during environmental review under CEQA.

The BLM designates Sensitive species as those requiring special management considerations to promote their conservation and reduce the likelihood and need for future listing under FESA. BLM Sensitive species include all Federal Candidate and Federally Delisted species which were so designated within the last 5 years, and CNPS List 1B species that occur on BLM lands. For the purposes of this document, all BLM Sensitive species are analyzed as special-status species.

Wildlife Resources Table 3.23-1 lists all special-status wildlife species evaluated during the analysis that are known to occur, or could potentially occur in the study area and vicinity. Special-status wildlife species detected, considered possible, or likely to occur based on known occurrences in the vicinity and suitable habitat present within the Study Area, are discussed in more detail below. Special-status species observed during the 2009 field surveys are indicated by **bold-face type** (Solar Millennium, 2009a; AECOM, 2010a as cited in the CEC RSA, 2010).

3.23.2 Desert Tortoise

The desert tortoise was State-listed in California as threatened on August 3, 1989. The Mojave population was listed as threatened under FESA on April 2, 1990, and critical habitat was designated on February 8, 1994. The Mojave population of the desert tortoise includes those animals living north and west of the Colorado River in the Mojave Desert of California, Nevada, Arizona, and southwestern Utah, and in the Sonoran (Colorado) Desert in California (USFWS, 1990; USFWS, 1994a as cited in the CEC RSA, 2010). The desert tortoise’s range, outside the listed Mojave population, extends into the Sonoran Desert, where tortoises occur in the lower Colorado River Valley, Arizona uplands, plains of Sonora, and Sonora’s central Gulf Coast; the species has not been documented in northeastern Baja California (Germano et al., 1994 as cited in the CEC RSA, 2010) (Figures 3.23-1 and 3.23-2).

Desert tortoises are well adapted to living in a highly variable and often harsh desert environment. They spend much of their lives in burrows, even during their seasons of activity, which generally coincides with the greatest annual forage availability. In late winter or early spring, they emerge from over-wintering burrows and typically remain active through fall. Activity does decrease in summer, but tortoises often emerge after summer rain storms to drink (Henen et al., 1998 as cited in the CEC RSA, 2010).

During activity periods, desert tortoises eat a wide variety of herbaceous vegetation, particularly grasses and the flowers of annual plants (Berry, 1974; Luckenbach, 1982; Esque, 1994 as cited in the CEC RSA, 2010). During periods of inactivity, they consume very little food and their metabolism and water loss are reduced. Adult desert tortoises lose water at such a slow rate that they can survive for more than a year without access to free water of any kind and can apparently

TABLE 3.23-1
SPECIAL-STATUS WILDLIFE KNOWN OR WITH POTENTIAL TO OCCUR IN THE BIOLOGICAL RESOURCES STUDY AREA

WILDLIFE		
Common Name	**Scientific Name**	**Status State/Federal**
Reptiles/Amphibians		
Desert tortoise	***Gopherus agassizii***	**ST/FT/_**
Couch's spadefoot toad	*Scaphiopus couchii*	CSC/__/BLM Sensitive
Mojave fringe-toed lizard	***Uma scoparia***	**CSC/_/BLM Sensitive**
Birds		
Western burrowing owl	***Athene cunicularia hypugaea***	**CSC/BCC/BLM Sensitive**
Golden eagle	*Aquila chrysaetos*	CFP/__/BLM Sensitive
Short-eared owl	*Asio flammeus*	CSC/__/__
Ferruginous hawk	*Buteo regalis*	WL/__/BLM Sensitive
Swainson's hawk	***Buteo swainsoni***	**ST**/__/__
Prairie falcon	***Falco mexicanus***	**WL**/__/__
American peregrine falcon	*Falco peregrinus anatum*	CFP/__/__
Vaux's swift	***Chaetura vauxi***	**CSC**/__/__
Mountain plover	*Charadrius montanus*	CSC/__/BLM Sensitive
Northern harrier	***Circus cyaneus***	**CSC**/__/__
Gilded flicker	*Colaptes chrysoides*	SE/__/__
Yellow warbler	*Dendroica petechia sonorana*	CSC/__/__
California horned lark	***Eremophila alpestris actia***	**WL**/__/__
Yellow-breasted chat	*Icteria virens*	CSC/__/__
Loggerhead shrike	***Lanius ludovicianus***	**CSC/BCC**/__
Gila woodpecker	*Melanerpes uropygialis*	SE/__/__
Black-tailed gnatcatcher	*Polioptila melanura*	__/__/__
Purple martin	***Progne subis***	**CSC**/__/__
Vermilion flycatcher	*Pyrocephalus rubinus*	CSC/__/__
Bendire's thrasher	*Toxostoma bendirei*	CSC/__/BLM Sensitive
Crissal thrasher	*Toxostoma crissale*	CSC/__/__
Le Conte's thrasher	***Toxostoma lecontei***	**WL/BCC/BLM Sensitive**
Mammals		
Pallid bat	*Antrozous pallidus*	CSC/__/BLM Sensitive
Townsend's big-eared bat	*Corynorhinus townsendii*	CSC/__/BLM Sensitive
Spotted bat	*Euderma maculatum*	CSC/__/BLM Sensitive
Western mastiff bat	*Eumops perotis californicus*	CSC/__/BLM Sensitive
Hoary bat	*Lasiurus cinereus*	__/__
California leaf-nosed bat	*Macrotus californicus*	CSC/__/BLM Sensitive
Arizona myotis	*Myotis occultus*	CSC/__/__
Cave myotis	*Myotis velifer*	CSC/__/BLM Sensitive
Yuma myotis	*Myotis yumanensis*	__/__/BLM Sensitive
Colorado Valley woodrat	*Neotoma albigula venusta*	__/__

**TABLE 3.23-1 (Continued)
SPECIAL-STATUS WILDLIFE KNOWN OR WITH POTENTIAL TO OCCUR IN THE BIOLOGICAL RESOURCES STUDY AREA**

Common Name	Scientific Name	Status State/Federal
WILDLIFE		
Mammals (cont.)		
Pocket free-tailed bat	*Nyctinomops femorosaccus*	CSC/__/__
Big free-tailed bat	*Nyctinomops macrotis*	CSC/__/__
Burro deer	***Odocoileus hemionus eremicus***	**CPGS__/__/__**
Nelson's bighorn sheep	*Ovis canadensis nelson*	__/BLM Sensitive
Yuma mountain lion	*Puma concolor browni*	CSC/__/__
American badger	***Taxidea taxus***	**CSC/__/__**
Desert kit fox	***Vulpes macrotis arsipus***	**CPF/__/__**

Status Codes:

Federal FE = Federally listed endangered: species in danger of extinction throughout a significant portion of its range
FT = Federally listed, threatened: species likely to become endangered within the foreseeable future
BCC = Fish and Wildlife Service: Birds of Conservation Concern: Identifies migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent highest conservation priorities, www.fws.gov/migratorybirds/reports/BCC2002.pdf

State CSC = California Species of Special Concern Species of concern to CDFG because of declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction.
CFP = California Fully Protected
SE = State listed as endangered
ST = State listed as threatened
WL = State watch list
CPF = California Protected Furbearing Mammal
CPGS = California Protected Game Species

Bureau of Land Management
BLM Sensitive = Species that require special management consideration to avoid potential future listing under the FESA and that have been identified in accordance with procedures set forth in BLM Manual 6840, the Special Status Species Management Manual for the Bureau of Land Management (Dec. 12, 2008).

SOURCE: CNDDB, 2010 as cited in the CEC RSA, 2010

tolerate large imbalances in their water and energy budgets (Nagy and Medica, 1986; Peterson, 1996a,b; Henen et al., 1998 as cited in the CEC RSA, 2010).

The size of desert tortoise home ranges varies with respect to location and year (Berry, 1986a as cited in the CEC RSA, 2010), and also serves as an indicator of resource availability and opportunity for reproduction and social interactions (O'Connor et al., 1994 as cited in the CEC RSA, 2010). Females have long-term home ranges that may be as little as or less than half that of the average male, which can range to up to 200 acres (Burge, 1977; Berry, 1986a; Duda et al., 1999; Harless et al., 2009 as cited in the CEC RSA, 2010). Core areas used within tortoises' larger home ranges depend on the number of burrows used within those areas (Harless et al., 2009 as cited in the CEC RSA, 2010). Over its lifetime, each desert tortoise may use more than 1.5 square miles of habitat and may make periodic forays of more than 7 miles at a time (Berry, 1986a as cited in the CEC RSA, 2010).

Tortoises are long-lived and grow slowly, requiring 13 to 20 years to reach sexual maturity. They have low reproductive rates during a long period of reproductive potential (Turner et al., 1984a; Bury, 1987; Germano, 1994 as cited in the CEC RSA, 2010). Mating occurs both during spring and fall (Black, 1976; Rostal et al., 1994 as cited in the CEC RSA, 2010), and the number of eggs as well as the number of clutches (set of eggs laid at a single time) that a female desert tortoise can produce in a season is dependent on a variety of factors including environment, habitat, availability of forage and drinking water, and physiological condition (Turner et al., 1986, 1987; Henen, 1997; McLuckie and Fridell, 2002 as cited in the CEC RSA, 2010). Egg-laying occurs primarily from April to July (Rostal et al., 1994; USFWS, 1994a as cited in the CEC RSA, 2010); the female typically lays 2-14 eggs (average 5-6) eggs in an earthen chamber excavated near the mouth of a burrow or under a bush (Woodbury and Hardy, 1948; USFWS, 1994a as cited in the CEC RSA, 2010). The eggs typically hatch 90 to 120 days later, between August and October. The success rate of clutches has proven difficult to measure, but predation, while highly variable (Bjurlin and Bissonette, 2004 as cited in the CEC RSA, 2010), appears to play an important role in clutch failure (Germano, 1994 as cited in the CEC RSA, 2010).

The majority of threats to the desert tortoise and its habitat are associated with human land uses. Many of those identified in the Desert Tortoise (Mojave Population) Recovery Plan (1994 as cited in the CEC RSA, 2010), and that formed the basis for listing the species as threatened, continue to affect the tortoise today (USFWS, 2008a as cited in the CEC RSA, 2010). Some of the threats identified at the time of listing include urbanization, upper respiratory tract disease and possibly other diseases, predation by common ravens and domestic and feral dogs, unauthorized off-road vehicle activity, authorized vehicular activity, illegal collecting, mortality on paved roads, vandalism, drought, livestock grazing, feral burros, non-native plants, changes to natural fire regimes, and environmental contaminants (USFWS, 1994a as cited in the CEC RSA, 2010).

Even though a wide range of threats are known to affect desert tortoises and their habitat, very little is known about their demographic impacts on tortoise populations or the relative contributions each threat makes to tortoise mortality (Boarman, 2002a as cited in the CEC RSA, 2010). Extensive research shows that all of these threats can directly kill or indirectly affect tortoises; research has also clarified many mechanisms by which these threats act on individuals. While current research results can lead to predictions about how local tortoise abundance should be affected by the presence of threats, quantitative estimates of the magnitude of these threats, or of their relative importance, have not yet been developed. Thus, the revised recovery plan focuses on expanding the knowledge of individual threats and places emphasis on understanding their multiple and combined effects on tortoise populations (USFWS, 2008a as cited in the CEC RSA, 2010).

The original Desert Tortoise (Mojave Population) Recovery Plan identified 6 recovery units (Upper Virgin River, Northeastern Mojave, Eastern Mojave, Eastern Colorado, Northern Colorado, and Western Mojave) and recommended the establishment of 14 DWMAs throughout the recovery units (USFWS, 1994a as cited in the CEC RSA, 2010)(Figure 3.23-1). Since 1994, greater insight into patterns of both ecological and genetic variation within the Mojave tortoise population has been gained. While the revised recovery plan has not yet been finalized, based on this new information, the revision redefines the recovery units to balance both distinctiveness and variability within the population. Given the generally continuous variation in genetic structure and biomes across the Mojave desert tortoise's range, the approach in delineating revised recovery units stresses identification of geographic discontinuities or barriers that coincide with any observed variation among tortoise populations. Several potential barriers are evident from topographic maps, the U.S. Geological Survey habitat model (Nussear et al., 2009 as cited in the CEC RSA, 2010), and landscape genetic analyses (Hagerty, 2008 as cited in the CEC RSA, 2010). Differences in genetic, ecological, and physiological characteristics to help highlight boundaries or other differences between units were used in the delineation. In doing this, the USFWS considered demographic, ecological, and behavioral considerations to be of greater importance than genetic issues alone, as have been suggested by researchers providing recommendations on the formulation of conservation plans for threatened or endangered species (Avise, 2004, pp. 486, 487; Mace and Purvis, 2008 as cited in the CEC RSA, 2010). The draft revised recovery plan reduces the number of recovery units from six to five, which reflects the newly obtained information and ensures that local adaptations and critical genetic diversity are maintained (USFWS, 2008a as cited in the CEC RSA, 2010).

According to the 1994 Recovery Plan, the project would be located within Eastern Colorado Recovery Unit, which was merged with the Northern Colorado Recovery Unit in the draft revised recovery plan and referred to simply as the Colorado Desert Recovery Unit (USFWS, 2008a as cited in the CEC RSA, 2010). Within this recovery unit, desert tortoise are found primarily in "well-developed washes, desert pavements, piedmonts, and rocky slopes characterized by relatively species-rich succulent scrub, creosote bush scrub, and blue palo verde-ironwood-smoke tree communities" (USFWS, 1994a as cited in the CEC RSA, 2010). Habitat within this recovery unit has been described as being in excellent condition despite declines in tortoise densities over the past several decades; disturbance was estimated at less than 1.3 percent throughout (USFWS, 2005 as cited in the CEC RSA, 2010). The highest desert tortoise densities within this recovery unit occur in Chemehuevi and Ward valleys (approximately 60 miles north of the project site), on the Chuckwalla Bench within the Chuckwalla Desert Wildlife Management Area (DWMA and associated Critical Habitat Unit are shown in Figure 3.23-1) and in Joshua Tree National Park (approximately 40 miles northwest of the project site). Desert tortoise densities at the Chuckwalla Bench in 1992 were estimated between 22 and 49 adults per square kilometer (approximately 57–127 adults per square mile) but have shown declining trends (Berry, 1997; Tracey et al., 2004 as cited in the CEC RSA, 2010). According to the 1994 Recovery Plan, tortoise densities in the Eastern Colorado Recovery Unit were estimated between 5 and 175 adult tortoises per square mile and the area was given a threat level of 4 out of 5 (5 = extremely high) (USFWS, 1994a as cited in the CEC RSA, 2010). Density estimates based on range-wide line distance sampling monitoring from 2001–2005 (USFWS, 2006 as cited in the CEC RSA, 2010) are lower than estimates from earlier studies (Luckenbach, 1982; Berry, 1984 as cited in the CEC RSA, 2010), but these simple comparisons cannot be taken at face value when the historical monitoring efforts were conducted using different techniques and with different goals. Differences may also reflect a difference in scale between methods, with relatively large historical tortoise densities estimated in small, local areas being smoothed over larger areas with range-wide sampling. However, low tortoise densities across recovery units from 2001-2005 also may represent continued decline of populations throughout the Mojave Desert since the species was listed (USFWS, 2006 as cited in the CEC RSA, 2010).

Protocol-level surveys of the Study Area were conducted between March 17 and May 22, 2009 (Study Area except substation) and October 24 to 25, 2009 (substation site and buffer). Survey results of the Project Disturbance Area include 17 burrows (Class 3–5), 15 pallets (Class 4 or 5), and 19 tortoise shell remains (Class 5) (AECOM, 2010a as cited in the CEC RSA, 2010). Preliminary spring survey results identified seven tortoises (adult and juvenile) in the project area; four along the generation tie line and three other tortoises south of I-10, the latter being outside of the Project Disturbance Area and buffer area. Only one of these occurrences was within the Project Disturbance Area along the gen-tie line (Solar Millennium, 2010k, Table 1). Additional observations from project area buffers are included in the Applicant's Revised Desert Tortoise Technical Report (Galati & Blek, 2010b as cited in the CEC RSA, 2010). In addition, resource agency staff located a possible desert tortoise burrow near the bridge associated with the large wash that flows into the center of the Project Disturbance Area (LaPre, pers. comm. as cited in the CEC RSA, 2010).

The Applicant has indicated that the Project Disturbance Area north of I-10 (including the Chuckwalla Critical Habitat Unit [CHU]) supports lower quality desert tortoise habitat and the only moderate quality habitat within the Project Disturbance Area is south of I-10 (Galati & Blek, 2010b; Solar Millennium, 2010m, Table 5 as cited in the CEC RSA, 2010). The Applicant has indicated that approximately 3,738 acres of suitable habitat occurs in the Project Disturbance Area, which encompasses all habitats excluding developed, agriculture, and stabilized and partially stabilized desert dunes (Solar Millennium 2010m, Table 5 as cited in the CEC RSA, 2010). Aside from developed areas and sand dunes, the entire Project Disturbance Area contains suitable habitat of this species. Higher value habitat is found south of I-10 corresponding with higher elevation alluvial fan plant communities.

3.23.3 Mojave Fringe-toed Lizard

The Mojave fringe-toed lizard is endemic to southern California and a small area of western Arizona, where it is restricted to aeolian sand habitats in the deserts of Los Angeles, Riverside, and San Bernardino Counties in California and La Paz County in Arizona (Hollingsworth and Beaman, 1999; Stebbins, 1985 as cited in the CEC RSA, 2010)(Figures 3.23-3 and 3.23-4). Nearly all records for this species are associated with present-day and historical drainages and associated sand dune complexes of the Mojave and Amargosa Rivers (Norris, 1958 as cited in the CEC RSA, 2010).

The distribution of Mojave fringe-toed lizards is naturally fragmented because of its obligate habitat specificity to loose sand, a patchy habitat type (Murphy et al., 2007 as cited in the CEC RSA, 2010). Many local populations of this species are quite small, with small patches of sand supporting small populations of lizards. This fragmented pattern of distribution leaves the species vulnerable to local extirpation from additional habitat disturbance and fragmentation (Murphy et al., 2007 as cited in the CEC RSA, 2010). The loose wind-blown sand habitat, upon which the species is dependent, is a fragile ecosystem requiring the protection against both direct and indirect disturbances (Weaver, 1981; Barrows, 1996 as cited in the CEC RSA, 2010). Environmental changes that stabilize sand, affect sand sources, or block sand movement corridors will affect this species (Turner et al., 1984; Jennings and Hayes, 1994 as cited in the CEC RSA, 2010). Additional threats to this species include habitat loss or damage from urban development, off-highway vehicles (OHV), and agriculture. Aside from the direct loss of land, development can also increase predators, such as the common raven or coyote, to occupied habitat.

Murphy et al. (2006 as cited in the CEC RSA, 2010) identified two maternal lineages of this species; the northern lineage is associated with the Amargosa River drainage system, and the southern with the Mojave River drainage system, Bristol Trough, Clark's Pass (including Palen Lake and Pinto Wash), and the Colorado River sand transport systems.

The Mojave fringe-toed lizard is found in arid, sandy, sparsely vegetated habitats and is associated with creosote scrub throughout much of its range (Norris, 1958; Jennings and Hayes, 1994 as cited in the CEC RSA, 2010). This species is totally restricted to habitats of fine, loose, aeolian sand, typically with sand grain size no coarser than 0.375 mm in diameter (Turner et al., 1984; Jennings and Hayes, 1994; Stebbins, 1944 as cited in the CEC RSA, 2010). It burrows in the sand for both cover from predators and protection from undesirable temperatures (Stebbins, 1944 as cited in the CEC RSA, 2010), though it also will seek shelter in rodent burrows. They are primarily insectivorous, but also eat plant food including leaves, seeds and buds (Stebbins, 1944 as cited in the CEC RSA, 2010).

Mojave fringe-toed lizards normally hibernate from November to February, emerging from hibernation sites from March to April. The breeding season is April to July. Adult Mojave fringe-toed lizards reach sexual maturity two summers after hatching. Females deposit 2-5 eggs in sandy hills or hummocks in May through July (Mayhew, 1964, Jennings and Hayes, 1994 as cited in the CEC RSA, 2010). April to May, while temperatures are relatively cool, this species is active during mid-day. From May to September, they are active in mornings and late afternoon, but seek cover during the hottest parts of the day. Common predators of the Mojave fringe-toed lizard include burrowing owls, leopard lizards, badgers, loggerhead shrikes, roadrunners, various snakes, and coyotes (Jennings and Hayes, 1994 as cited in the CEC RSA, 2010).

Nearly half of the Project Disturbance Area, or approximately 1,781 acres (Solar Millennium, 2009m), contains suitable Mojave fringe-toed lizard habitat, including stabilized and partially stabilized sand dunes, some wash habitat, and other areas within Sonoran creosote bush scrub habitat with appropriate soils (Solar Millennium, 2009a-AFC Volume II, Appendix F as cited in the CEC RSA, 2010). Numerous Mojave fringe-toed lizards were found in the northeastern half of the Study Area during spring 2009 and 2010 surveys, including 112 within the Project Disturbance Area during 2009 (Solar Millennium, 2009a-AFC Volume II, Appendix F as cited in the CEC RSA, 2010). During 2010 spring surveys, five Mojave fringe-toed lizards were observed within the project Study Area for a total of 117 observations of this species within the Project Disturbance Area from 2009 and 2010 (Solar Millennium, 2010m, Table 6; Solar Millennium, 2010k, Table 3 as cited in the CEC RSA, 2010). An additional 62 Mojave fringe-toed lizards were observed within the buffer area according to preliminary spring 2010 survey results (Solar Millennium 2010k, Table 3 as cited in the CEC RSA, 2010).

3.23.4 Couch's Spadefoot Toad

Couch's spadefoot toad is found in southeastern California east through Arizona, New Mexico, Texas, and Oklahoma, south to San Luis Potosi, Nayarit, Mexico, at the southern tip of Baja California, Mexico, and an isolated population in Colorado. In California, it is found in the extreme southeast, including southeastern San Bernardino County and eastern Riverside and Imperial Counties (Jennings and Hayes, 1994 as cited in the CEC RSA, 2010). The project area is west of the range for this species as the range is described in the NECO plan (BLM CDD, 2002 as cited in the CEC RSA, 2010) and Amphibian and Reptile Species of Special Concern in California (Jennings and Hayes, 1994 as cited in the CEC RSA, 2010) (Figure 3.23-5); however, Dimmitt (1977 as cited in the CEC RSA, 2010) identifies the Palen Dry Lake area as a place of interest for further surveys.

Couch's spadefoot toad is found in a variety of plant communities, including desert dry wash woodland, shortgrass plains, creosote bush scrub, and alkali sink scrub. The species requires habitat with substrate capable of sustaining temporary pools for breeding, and loose enough to permit burial in subterranean burrows (Jennings and Hayes, 1994; BLM CDD, 2002 as cited in the CEC RSA, 2010). Breeding habitat includes temporary impoundments at the base of dunes as well as road or railroad embankments, temporary pools in washes or channels, pools that form at the downstream end of culverts, and playas (Morey, 2005; Morey, pers. comm.; Mayhew, 1965 as cited in the CEC RSA, 2010). Natural scour sites in washes with breeding toads (included in Dimmitt 1977 as cited in the CEC RSA, 2010) can wash down to a hardpan, enabling ponding (Dimmitt, pers. comm. as cited in the CEC RSA, 2010). The majority of known breeding ponds are artificial possibly because of the difficulty of locating natural ponds within the limited amount of time ponds may retain water. Couch's spadefoot toads primarily eat termites, but they also eat beetles, ants, grasshoppers, solpugids, scorpions, and centipedes.

This species is dormant from 8-10 months of the year, emerging from burrows at the onset of warm summer rains. Emergence appears to be triggered by the low frequency sound caused by falling rain, though it appears to be inhibited by low soil temperatures (CEC RSA, 2010 as cited in the CEC RSA, 2010).

Threats to Couch's spadefoot include loss of habitat from urbanization, agriculture, and impacts from off-highway vehicles, which can destroy potential pool habitat. There are also indications that the low-frequency sound created by off-highway vehicles may create emergence cues, and result in emergence during poor environmental conditions (Jennings and Hayes, 1994 as cited in the CEC RSA, 2010). Emergence also may be triggered by construction vehicle noise (Dimmitt, pers. comm. as cited in the CEC RSA, 2010).

No Couch's spadefoot toads were observed during surveys; however, because of the short time this species is above ground, and because the surveys were not conducted during the proper season (i.e., after summer rains), the lack of observations does not suggest the species is absent from the project site. The closest known record for this species is from Dimmitt (1977 as cited in the CEC RSA, 2010) from a breeding pond in a borrow pit near the east end of Chuckwalla Road, south of I-10 (about 15 miles east of the project site). The project area is west of the range for this species as described in the NECO plan and Jennings and Hayes (1994) as cited in the CEC RSA, 2010; however, Dimmitt (1977 as cited in the CEC RSA, 2010) indicates that the Palen Mountains and surrounding bajadas could support marginal populations and should be surveyed. Couch's spadefoot toads could potentially occur wherever friable soils occur in the project site, and breeding habitat could occur wherever there is the potential for sustained ponding.

Couch's spadefoot toads require substrates capable of sustaining ponding for at least nine days (Morey, 2005), but the general characterization of soils at the project (?) site as permeable is insufficient to eliminate the possibility of suitable habitat occurring onsite. Micro-site characteristics within the landscape, that may not be detectable other than by specific surveys, may allow for ponding and provide suitable breeding habitat. Review of aerial photographs of the project area did not identify any areas of obvious ponding. In comparing site aerials to aerial photographs of a known historical location (i.e., the intersection of Wiley Well Road and I-10) and from limited reconnaissance surveys, it appears that there is limited potential for breeding habitat at the project site. Adult dispersal distance is largely unknown (Dimmitt, pers. comm.); if breeding ponds occur off-site (such as the Palen Lake area) within adult dispersal distance, adults could occur on the project site wherever there are friable soils suitable for burrowing. Based on review of an analysis of the ponding potential on the project site, it appears that the site does not have the potential due to the permeability of site soils or show evidence of sustained ponding, and that the species is not expected to occur on the project site (AECOM, 2010t as cited in the CEC RSA, 2010). Consequently, it appears that there is limited potential for Couch's spadefoot toad breeding habitat on the project site.

3.23.5 Western Burrowing Owl

The western burrowing owl inhabits arid lands throughout much of the western United States and southern interior of western Canada (Haug et al., 1993 as cited in the CEC RSA, 2010) and is typically a year-round resident in much of California (Gervais et al., 2008 as cited in the CEC RSA, 2010).

Burrowing owls are unique among the North American owls in that they nest and roost in abandoned burrows, especially those created by California ground squirrels, kit fox, desert tortoise, and other wildlife. Burrowing owls have a strong affinity for previously occupied nesting and wintering habitats. They often return to burrows used in previous years, especially if they were successful at reproducing there in previous years (Gervais et al., 2008 as cited in the CEC RSA, 2010) (Figure 3.23-6). The southern California breeding season (defined as from pair bonding to fledging) generally occurs from February to August with peak breeding activity from April through July (Haug et al., 1993 as cited in the CEC RSA, 2010).

In the Colorado Desert, western burrowing owls generally occur at low densities in scattered populations, but they can be found in much higher densities near agricultural lands, including along the lower Colorado River, where rodent and insect prey tend to be more abundant (Gervais et al., 2008 as cited in the CEC RSA, 2010). Western burrowing owls tend to be opportunistic feeders. Large arthropods, mainly beetles and grasshoppers, comprise a large portion of their diet. Small mammals, especially mice and voles (*Microtus, Peromyscus* and *Mus spp.*), also are important food items for this species. Other prey animals include small reptiles and amphibians, young cottontail rabbits, bats, and birds such as sparrows and horned larks. Consumption of insects increases during the breeding season (Haug et al., 1993 as cited in the CEC RSA, 2010).

Threats to burrowing owls include habitat modification and destruction of ground squirrel burrows. Other threats include pesticide accumulation, burrow destruction from farming practices and canal and road maintenance, roadside shooting, and direct mortality from squirrel poisons (BLM CDD, 2002; Gervais et al., 2008).

Phase I through III protocol-level surveys of part of the Project Disturbance Area (except the substation) were conducted in spring and summer 2009. A habitat assessment was completed for this site in fall 2009. Part of the northern end of the Project Disturbance Area is densely covered in Sahara mustard; other than this area, the entire Project Disturbance Area is suitable western burrowing owl habitat. Two pairs with juveniles and four active burrows with sign were identified during 2009 protocol surveys (Solar Millennium, 2009b, Appendix F, Attachment J as cited in the CEC RSA, 2010). Survey results from 2010 indicate that a total of 4 burrowing owls with active burrows have been observed within the Project Disturbance Area to date (Solar Millennium, 2010m, Table 6 as cited in the CEC RSA, 2010).

3.23.6 Golden Eagle

Golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668a - d, as amended), and are typically year-round residents throughout most of their western United States range. They breed from late January through August with peak activity March through July (Kochert et al., 2002 as cited in the CEC RSA, 2010). Migratory patterns are usually fairly local in California where adults are relatively sedentary, but dispersing juveniles sometimes migrate south in the fall. This species is generally considered to be more common in southern California than in the northern part of the state (USFS, 2008 as cited in the CEC RSA, 2010).

Habitats for this species typically include rolling foothills, mountain areas, and deserts. Golden eagles need open terrain for hunting and prefer grasslands, deserts, savanna, and early successional stages of forest and shrub habitats. Golden eagles primarily prey on lagomorphs and rodents but will also take other mammals, birds, reptiles, and some carrion (Kochert et al., 2002 as cited in the CEC RSA, 2010). This species prefers to nest in rugged, open habitats with canyons and escarpments, often with overhanging ledges and cliffs or large trees used as cover. (Figures 3.23-7 and 3.23-8)

The status of golden eagle populations in the United States is not well known, although there are indications that populations may be in decline (USFWS, 2009b, Kochert et al., 2002 as cited in the CEC RSA, 2010). Accidental death from collision with man-made structures, electrocution, gunshot, and poisoning are the leading causes of mortality for this species, and loss and degradation of habitat from agriculture, development, and wildfire continues to put pressure on golden eagle populations (Kochert et al., 2002; USFWS, 2009b as cited in the CEC RSA, 2010).

In the absence of interference from humans, breeding density is determined by either prey density or nest site availability, depending upon which is more limiting (USFWS, 2009b as cited in the CEC RSA, 2010). A compilation in Kochert (2002 as cited in the CEC RSA, 2010) of breeding season home ranges from several western United States studies showed an average home range of 20–33 square kilometers (7.7 to 12.7 square miles) that ranged from 1.9 to 83.3 square kilometers (0.7 to 32.2 square miles). In San Diego, a study of 27 nesting pairs found breeding ranges to be an average of 36 square miles with a range from 19 to 59 square miles (Dixon, 1937 as cited in the CEC RSA, 2010). Other studies from within and outside the United States include ranges from 9 to 74.2 square miles (McGahan, 1968; Watson et al., 1992 as cited in the CEC RSA, 2010 [range of 14.7 to 26.1 pairs per 1,000 square kilometers, or 386 square miles]). The USFWS issued an Environmental Assessment (EA) and Implementation Guidance for take permits under the Bald Eagle and Golden Eagle Protection Act in November 2009 (USFWS, 2009b as cited in the CEC RSA, 2010).

In spring 2010, golden eagle helicopter surveys were conducted to cover the project area, as well as a 10-mile radius from the PPSP boundaries. Three other proposed solar projects (Solar Millennium, 2010u; TTEC, 2010a as cited in the CEC RSA, 2010) were also surveyed at this time. The surveys covered 11 mountain ranges between and around Blythe and Desert Center (TTEC, 2010a as cited in the CEC RSA, 2010) and were conducted following the USFWS's February 2010 Interim Golden Eagle Inventory and Monitoring Protocols (Pagel et al., 2010 as cited in the CEC RSA, 2010). The surveys found two active golden eagle nests within one territory, approximately 7 miles southwest of the project site in the Chuckwalla Mountains. Additionally, three inactive nests were located approximately 6 miles southwest of the site in the Chuckwalla Mountains; two of these nests were associated with the territory discussed above, the other is likely associated with a territory located further south of the project site (Solar Millennium, 2010u as cited in the CEC RSA, 2010).

3.23.7 Loggerhead Shrike

Loggerhead shrikes are small predatory birds that are uncommon residents throughout most of the southern portion of their range, including southern California. In southern California, they are generally much more common in interior desert regions than along the coast (Humple, 2008 as cited in the CEC RSA, 2010). Loggerhead shrikes initiate their breeding season in February and may continue with raising a second brood as late as July; they often re-nest if their first nest fails or to raise a second brood (Yosef, 1996 as cited in the CEC RSA, 2010).

This species can be found within lowland, open habitat types, including creosote scrub and other desert habitats, sage scrub, non-native grasslands, chaparral, riparian, croplands, and areas characterized by open scattered trees and shrubs. Fences, posts, or other potential perches are typically present. In general, loggerhead shrikes prey upon large insects, small birds, amphibians, reptiles, and small rodents over open ground within areas of short vegetation, usually impaling prey on thorns, wire barbs, or sharp twigs to cache for later feeding (Yosef, 1996). Loss of habitat to agriculture, development, and invasive species is a major threat; this species has shown a significant decline in the Sonoran Desert (Humple, 2008 as cited in the CEC RSA, 2010).

The entire Project Disturbance Area contains suitable habitat for loggerhead shrike. This species, including an adult with fledglings, was observed on the project site, though it appeared less common on the project site than in surrounding areas (Solar Millennium, 2009a-AFC Volume II, Appendix F, Attachment H as cited in the CEC RSA, 2010). Loggerhead shrikes also were observed within the project area during spring 2010 surveys (Solar Millennium, 2010k as cited in the CEC RSA, 2010).

3.23.8 Le Conte's Thrasher

In California, Le Conte's thrasher is a resident in the San Joaquin Valley and the Mojave and Colorado Deserts (Figure 3.23-9). This pale gray bird occurs in desert flats, washes and alluvial fans with sandy and/or alkaline soil and scattered shrubs. It rarely occurs in monotypic creosote scrub habitat, because creosote bush is unable to support a nest, or in massive Sonoran Desert woodlands (Prescott, 2005 as cited in the CEC RSA, 2010). Preferred nest substrate includes thorny shrubs and small desert trees. Breeding activity occurs from January to early June, with a peak from mid-March to mid-April (BLM CDD, 2002 as cited in the CEC RSA, 2010). Le Conte's thrashers forage for food by digging and probing in the soil. They eat arthropods, small lizards and snakes, and seeds and fruit; the bulk of their diet consists of beetles, caterpillars, scorpions, and spiders.

This species was observed during project surveys, including avian surveys conducted over a period of four weeks in the spring of 2009. Because the Sonoron cresosote bush scrub in this area is fairly monotypic, suitable habitat for this species in the Project Disturbance Area is confined to the 141 acres of desert dry wash woodland. The closest CNDDB record for this species is about 3 miles south of the project site (CNDDB, 2010 as cited in the CEC RSA, 2010).

3.23.9 California horned lark

The California horned lark is found throughout California except the north coast, and is less common in mountainous areas. This species prefers open areas that are barren or with short vegetation including deserts, brushy flats, and agricultural areas. Eggs are laid March to early June, and this species frequently lays a second clutch.

The project site contains suitable habitat for this species, especially in creosote bush scrub. This species was observed frequently in the Project Disturbance Area during surveys. There are numerous CNDDB (2010 as cited in the CEC RSA, 2010) records for this species in western Riverside County.

3.23.10 Prairie Falcon

The prairie falcon inhabits dry environments in the North American west from southern Canada to central Mexico. It is found in open habitat from annual grasslands to alpine meadows at all elevations up to 3,350 m, but is associated primarily with perennial grasslands, savannahs, rangeland, some agricultural fields, and desert scrub areas. They require cliffs or bluffs for nesting though will sometimes nest in trees, on power line structures, on buildings, or inside caves or stone quarries. Ground squirrels and horned larks are the primary food source, but prairie falcon will also prey on lizards, other small birds, and small rodents.

Prairie falcons were observed several times during project surveys both as flyovers and perched in the Project Disturbance Area. The entire Project Disturbance Area (approximately 4,024 acres) contains suitable foraging habitat for this species. The project site does not contain suitable nesting habitat, although adjacent mountains may. There are numerous CNDDB (2010 as cited in the CEC RSA, 2010) records in the region for this species, including eight records from Little Maria Mountains to the northeast (1977 as cited in the CEC RSA, 2010) and the Chuckwalla Mountains to the southwest (1978 as cited in the CEC RSA, 2010). During golden eagle Phase 2 nest surveys performed jointly for neighboring proposed energy projects, a pair of prairie falcons was documented to be nesting on the same cliff on which the golden eagle nest was located in the Palen Mountains (TTEC, 2010a as cited in the CEC RSA, 2010).

3.23.11 American Badger

American badgers once were fairly widespread throughout open grassland habitats of California. Badgers are an uncommon permanent resident with a wide distribution across California, except in the North Coast area. The American badger is a resident species and is most abundant in the drier open stages of most shrub, forest, and herbaceous habitats with friable soils. Badgers generally are associated with treeless regions, prairies, parklands, and cold desert areas (Zeiner et al., 1990). Badgers inhabit burrows and often predate and forage on other small mammals that inhabit burrows, as evidenced by claw marks along the edges of existing burrows. Most of the CNDDB records from the Palo Verde Valley area of Riverside County are prior to 1960; the closest to the project site is northwest of Palo Verde approximately 12 miles southeast of the project site (CNDDB, 2010 as cited in the CEC RSA, 2010).

The entire Study Area is considered suitable habitat for badgers (Figure 3.23-10). Badger sign was found during spring 2009 field surveys; burrow predation evidence by badgers was found throughout the Project Disturbance Area habitats and Study Area. Surveyors observed five badger dens and over 10 small mammal burrows showing evidence of predation by badgers (Solar Millennium, 2009b as cited in the CEC RSA, 2010). In addition, a badger skull was observed within the Study Area, south of I-10 (Solar Millennium, 2009b as cited in the CEC RSA, 2010). The entire Study Area is considered suitable habitat for badgers.

3.23.12 Desert Kit Fox

Desert kit fox is an uncommon to rare permanent resident of arid regions of the southern California deserts. Kit fox occur in annual grasslands, or grassy open, arid stages of vegetation dominated by scattered herbaceous species. Kit fox occur in association with their prey base which is primarily cottontail rabbits, ground squirrels, kangaroo rats and various species of insects, lizards, or birds (Zeiner et al., 1990 as cited in the CEC RSA, 2010). Title 14 of the California Code of Regulations, Section 460, stipulates that desert kit fox may not be taken at any time. Kit fox dens are used as shelter, escape, cover, and reproduction and are vital to the survival of the species.

Desert kit fox burrows, burrow complexes and scat were observed throughout the Study Area within desert wash and upland scrub habitats during spring 2009. The entire Study Area is suitable habitat (Figure 3.23-10). Approximately 71 kit fox burrows and burrow complexes were recorded within the Study Area, most of which occur in the Project Disturbance Area (Solar Millennium, 2009a as cited in the CEC RSA, 2010). Kit fox scat was observed within the transmission line Disturbance Area in Fall 2009, and a kit fox burrow was observed there in spring 2009 (Solar Millennium, 2009b as cited in the CEC RSA, 2010). During spring 2010 field surveys, two kit fox complexes were found in the Project Disturbance Area and four burrow complexes were found in the buffer area (Solar Millennium, 2010k as cited in the CEC RSA, 2010). The entire Study Area is suitable habitat for desert kit fox.

3.23.13 Nelson's Bighorn Sheep

Nelson's bighorn sheep includes bighorns from the Transverse Ranges through most of the desert mountain ranges of California, Nevada, northern Arizona to Utah. Essential habitat for bighorn sheep includes steep, rocky slopes of desert mountains, termed "escape terrain." Their agility on steep rocky terrain is an adaptation used to escape predators such as coyotes, eagles, and cougars (Wehausen, 1992 as cited in the CEC RSA, 2010). Surface water is another element of desert bighorn habitat considered essential to population health. Male and female bighorn sheep inhabiting desert ecosystems can survive without consuming surface water (Krausman et al., 1985 as cited in the CEC RSA, 2010) although males appear to drink infrequently in many situations; however, there are no known large populations of bighorn sheep in the desert region that lack access to surface water. In the spring, when annual plants are available, bighorn tend to disperse downhill to bajadas and alluvial fans to forage. Desert bighorn have a long lambing season that can begin in December and end in June in the Mojave Desert, and a small percentage of births commonly occur in summer as well (Wehausen, 1992 as cited in the CEC RSA, 2010). Lambing season dates for this part of the Colorado Desert would be similar to those reported above.

Over the past 140 years, bighorn sheep have suffered considerable population declines throughout their range and meta-populations have been fragmented by roads and other barriers, with a resulting decline in genetic diversity (Bleich et al., 1996, Epps et al., 2005 as cited in the CEC RSA, 2010). Disease, sometimes brought about by contacts with domestic sheep, drought and predation, interacting with other anthropogenic factors also may have contributed to declines in bighorn sheep populations (Wehausen, 2005 as cited in the CEC RSA, 2010). Loss of surface water sources also may diminish the viability of existing populations (Wehausen, 2005 as cited in the CEC RSA, 2010).

Two metapopulations of bighorn sheep occur within the NECO planning area, the Southern Mojave and Sonoran. Within these metapopulations, there are smaller, isolated subpopulations of bighorn sheep known as demes. Nine demes occur in the Sonoran metapopulation (BLM CDD, 2002 as cited in the CEC RSA, 2010). The NECO Plan addresses the conservation of the bighorn sheep through the designation of Bighorn Sheep Wildlife Habitat Management Areas (WHMAs), which overlay the entire range of their occurrence and movement corridors. See Figure 3.23-11. Bighorn sheep metapopulations have been fragmented by highways, roads, railroads, and aqueducts primarily by the construction of I-10 and Interstate 40 which are major barriers to bighorn sheep movements. Transportation corridors of Highways 66, 62, 177, 95, and 78, the AT&SF Railroad (parallel to Old Highway 66) and the Eagle Mountain Railroad (scheduled for reactivation) inhibit bighorn sheep movements between demes. Nevertheless, bighorn sheep are known to cross these and other linear features such as transmission lines and fences.

The project site is located south of occupied Bighorn sheep WHMAs in the Palen, Granite, and Coxcomb Mountains (BLM CDD, 2002 as cited in the CEC RSA, 2010). Recent surveys also suggest bighorn sheep may occur in the Little Maria Mountains, farther northeast of the Project area (Wehausen, 2009 as cited in the CEC RSA, 2010). The CNDDB records for this species from the Project area indicate that bighorn sheep disperse through these mountain ranges typically whenever forage and water conditions are suitable.

No sign or evidence of Nelson’s bighorn sheep were found during field surveys performed within the Study Area; however, bighorn sheep have been documented in the Chuckwalla Mountains southwest of the project site and the Palen, Granite, Coxcomb, and Eagle mountain ranges to the north, west, and east. Six rams were observed in the Coxcomb Mountains during Phase 2 golden eagle surveys performed jointly for various energy projects during 2010 (Tetra Tech, 2010a as cited in the CEC RSA, 2010). The Study Area does not occur in a known movement corridor as identified in the NECO. All vegetation communities within the Study Area are considered suitable for bighorn sheep.

3.23.14 Burro Deer

Burro deer is a subspecies of mule deer (*Odocoileus hemionus*) found in Colorado region of the Sonoran Desert near the Colorado River and within desert dry wash woodland communities (Figure 3.23-12). Some burro deer are resident along the Colorado River, but a significant portion move into desert areas in response to increases in water and forage. During hot summers, water is critical, and burro deer concentrate along the Colorado River or the Coachella Canal where water developments have been installed and where microphyll woodland is dense and provides good forage and cover. With late summer thundershowers and cooler temperatures, deer move away from the Colorado River and Coachella Canal into larger washes or wash complexes in the foothills and nearby mountains (BLM CDD, 2002 as cited in the CEC RSA, 2010).

During spring 2009 and December 2009 field surveys, deer scat and tracks were observed in rocky substrate and deep washes including the western, central, and eastern desert washes that transect the project site. Deer sign was found within the washes and 150 foot-wide box culverts that convey the washes underneath I-10 (Solar Millennium, 2009a; AECOM, 2009a as cited in the CEC RSA, 2010). Burro deer are known to use a culvert associated with the western-most project area wash to access a water source at a nearby orchard. Other species sign observed in these washes include coyote (*Canis latrans*), cottontail rabbit (*Sylvilagus audubonii*), bobcat (*Lynx rufus*), badger, and kit fox. The entire project site supports suitable habitat for burro deer.

3.23.15 Other Special Status Wildlife

Table 3.23-2 lists the other special status wildlife that were not detected and not expected in the Study Area. These additional species were considered to have a lower potential for occurrence on the project site than the species discussed above because the general or micro-habitats known to support them were not found on the site, and/or because there are no known occurrences in the project vicinity.

TABLE 3.23-2
SPECIAL-STATUS WILDLIFE WITH LOW TO MODERATE POTENTIAL TO OCCUR IN THE PROJECT STUDY AREA

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
Birds		
Bendire's thrasher *Toxostoma bendirei*	Bendire's thrashers are known in California from scattered locations in Kern, Inyo, San Bernardino, and Riverside Counties. This species is a summer resident in southeastern California, and arrives at breeding grounds from mid-March through May, and departs by late August. This species favors open grassland, shrubland, or woodland with scattered shrubs, primarily in areas that contain large cholla, Joshua tree, Spanish bayonet, Mojave yucca, palo verde, mesquite, catclaw, desert-thorn, or agave. The status of populations of this species is poorly understood, but threats are believed to be loss of habitat due to urbanization, harvesting of yucca and Joshua trees, overgrazing, and off-road vehicle activity. In parts of the range, grazing may increase habitat suitability by increasing the area with scattered junipers.	The desert dry wash vegetation community provides potential habitat for this species (141 acres), although this species was not observed during surveys. There are CNDDB (2010 as cited in the CEC RSA, 2010) records from near Desert Center, approximately 8 miles west of the project site, from 2004.
Black-tailed gnatcatcher *Polioptila melanura*	A year round resident in southwestern United States and central and northern Mexico, in California the black-tailed gnatcatcher is found in the southeast desert wash habitat from Palm Springs and Joshua Tree National Park south, and along the Colorado River. It is now rare in eastern Mojave Desert north to the Amargosa River, Inyo County. This species nests primarily in wooded desert wash habitat, but also occurs in creosote scrub habitat during the non-breeding season.	Based on a review of the vegetation community descriptions provided by the Applicant, the project site contains little, if any, of the dense scrub habitat preferred by this species. They are known from the area, including from McCoy Spring, Palen Valley, and Chuckwalla Well (Fitton, 2008 as cited in the CEC RSA, 2010). The closest occurrence based on the CNDDB (2010 as cited in the CEC RSA, 2010) is from 1977 and is approximately 16.5 miles east of the project site.
Crissal thrasher *Toxostoma crissale*	Crissal thrashers are non-migratory residents ranging from southern Nevada and southeastern California to western Texas and central Mexico. This species prefers habitats characterized by dense, low scrubby vegetation, which, at lower elevations, includes desert and foothill scrub and riparian brush. Nests of this species typically consist of an open cup of twigs, lined with finer vegetation, and are placed in the middle of a dense shrub.	Based on a review of the vegetation community descriptions provided by the Applicant, the project site contains little, if any, of the dense scrub habitat preferred by this species. They are known from the area, including from McCoy Spring, Palen Valley, and Chuckwalla Well (Fitton, 2008 as cited in the CEC RSA, 2010). The closest occurrence based on the CNDDB (2010 as cited in the CEC RSA, 2010) is from 1977 and is approximately 16.5 miles east of the project site.
Ferruginous hawk *Buteo regalis*	Ferruginous hawks do not breed in California, but are winter residents and in California are most common in grassland and agricultural areas in the southwest. Ferruginous hawks are found in open terrain from grasslands to deserts, and are usually associated with concentrations of small mammals. Threats to this species include loss of wintering habitat from urbanization and cultivation.	The project site contains suitable wintering habitat for this species. There are nine CNDDB (2010 as cited in the CEC RSA, 2010) records for this species in western Riverside County.
Gila woodpecker *Melanerpes uropygialis*	The Gila woodpecker's range is limited to a small area of southwestern United States and northwestern Mexico. In California, this species is found only along the Colorado River and in small numbers in Imperial County. In southeastern California, Gila woodpeckers formerly were associated with desert washes extending up to 1 mile from the Colorado River. Currently, they are found only in riparian areas along the Colorado River.	In California, this species is currently known only from the Colorado River; therefore this species is not expected in the project site. The project site does not contain suitable nesting habitat for this species. The closest CNDDB (2010 as cited in the CEC RSA, 2010) record for this species is a 1986 record east of the project site at the Colorado River.

TABLE 3.23-2 (Continued)
SPECIAL-STATUS WILDLIFE WITH LOW TO MODERATE POTENTIAL TO OCCUR IN THE PROJECT STUDY AREA

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
Birds (cont.)		
Gilded flicker *Colaptes chrysoides*	In California, the gilded flicker is known from the southeast; habitat includes stands of giant cactus, Joshua tree, and riparian groves of cottonwoods and tree willows in warm desert lowlands and foothills. Until the mid-1990's, this species was considered a subspecies of northern flicker (*C. atratus*). This species nests primarily in cactus, but also will use cottonwoods and willows of riparian woodlands. This species may be nearly extinct in California.	This species is not expected to regularly use the project site due to lack of suitable habitat. The closest CNDDB (2010 as cited in the CEC RSA, 2010) records for this species are along the Colorado River.
Mountain plover *Charadrius montanus*	Mountain plovers do not breed in California, but are winter visitors primarily from September to mid-March. In California they are found in the Central Valley, Antelope Valley, San Jacinto Valley, Imperial Valley, and Palo Verde Valley. Mountain plover habitat includes short-grass prairie or their equivalents, and in southern California deserts are associated primarily with agricultural areas, though use of these areas is suspected to be because of loss of native grassland and playa habitats.	This species may use the dry lakebed and nearby agricultural areas as winter habitat. The closest CNDDB (2010 as cited in the CEC RSA, 2010) record for this species is in Imperial County at the southern end of the Salton Sea.
Northern harrier *Circus cyaneus*	In western North America, the northern harrier breeds from northern Alaska south to Baja California, Mexico. This species does not commonly breed in desert regions of California, where suitable habitat is limited, but winters broadly throughout California in areas with suitable habitat. Northern harriers forage in open habitats including deserts, pasturelands, grasslands, and old fields.	The project site contains suitable wintering habitat for the northern harrier, and this species was observed during project site surveys (Solar Millennium, 2009a as cited in the CEC RSA, 2010). There are CNDDB (2010 as cited in the CEC RSA, 2010) nesting records for this species in eastern Riverside County.
Peregrine falcon *Falco peregrines*	The Peregrine falcon's year-round range includes coastal and northwestern California and the Sierra Nevada and other California mountains. Additionally, this species winters inland throughout the Central Valley and in northeastern California. They are rare in the arid southeast, but they occur and are suspected to breed in the lower Colorado River Valley. Peregrine falcons require open habitat for foraging, and prefer breeding sites near water. Nesting habitat includes cliffs, steep banks, dunes, mounds, and some human-made structures.	This species may forage on the project site and nest in nearby mountains, but was not observed on the project site during project surveys. There are no CNDDB (2010 as cited in the CEC RSA, 2010) records for Riverside County.
Purple martin *Progne subis*	The historical breeding range of the purple martin includes southern California, though populations have shrunk dramatically. Neither the historical or current breeding range, however, includes the Colorado Desert. Purple martins habitat requirements include adequate nest sites and availability of large aerial insects, and therefore are most abundant near wetlands and other water sources. Threats to this species include loss of large tree and snags and competition from European starlings.	This species was observed migrating through the project site, but is not expected to extensively use the project site. There are six CNDDB (2010 as cited in the CEC RSA, 2010) records for this species from western Riverside County, the most recent of which include nesting records from 1983 and 1993.
Short-eared owl *Asio flammeus*	Short-eared owls breed through much of northern North America, and are year-round residents in some areas of California. Historically, this species occurred throughout much of California, west of the southern deserts, in low numbers. Currently, small populations breed in regularly in the Great Basin and in the Sacramento/San Joaquin River Delta area, but sporadically in other parts of its former range. Short-eared owls require open country that supports small mammal	The project site contains suitable wintering habitat for the short-eared owl. Although this species was not observed during surveys for the project, it was observed during surveys for a nearby proposed energy facility immediately west of the McCoy Mountains. There are no Riverside County CNDDB (2010 as cited in the CEC RSA, 2010) records for this species.

TABLE 3.23-2 (Continued)
SPECIAL-STATUS WILDLIFE WITH LOW TO MODERATE POTENTIAL TO OCCUR IN THE PROJECT STUDY AREA

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
Birds (cont.)		
Short-eared owl *Asio flammeus* (cont.)	populations, and that also provides adequate vegetation to provide cover for nests. This includes salt- and freshwater marshes, irrigated alfalfa or grain fields, and ungrazed grasslands and old pastures.	
Swainson's hawk *Buteo swainsoni*	Swainson's hawks require large areas of open landscape for foraging, including grasslands and agricultural lands that provide low-growing vegetation for hunting and high rodent prey populations. Swainson's hawks typically nest in large native trees such as valley oak, cottonwood, walnut, and willow, and occasionally in nonnative trees, such as eucalyptus within riparian woodlands, roadside trees, trees along field borders, isolated trees, small groves, and on the edges of remnant oak woodlands. While there are historical breeding records of this species from the Colorado Desert, this species now is known from southern California only as a spring and fall migrant. This reduction in breeding range is believed to be from loss of nesting habitat.	The project site may provide foraging habitat for migrating individuals, and this species was observed in the project site during surveys. There are no CNDDB (2010 as cited in the CEC RSA, 2010) records for this species in Riverside County.
Vaux's swift *Chaetura vauxi*	This species is not known to breed in Riverside County or elsewhere in southern California. Very few nests have been found so their breeding range has been inferred from sightings of birds flying over potential nesting areas during their nesting season, in June and July. Vaux's swifts prefer to nest in the hollows formed naturally inside of large old conifer trees, especially snags, which are entirely lacking from the project site.	This species was observed during surveys, but occurrences are expected to be of migrants, only.
Vermilion flycatcher *Pyrocephalus rubinus*	Vermilion flycatchers are rare breeders or residents in localized areas of southern California, including along the Colorado River. They are usually found near water in arid scrub, farmlands, parks, golf courses, desert, savanna, cultivated lands, and riparian woodlands; nesting substrate includes cottonwood, willow, and mesquite.	Within the project vicinity, occurrences of this species are limited to the Colorado River. This species is not expected in the project site. The closest CNDDB (2010 as cited in the CEC RSA, 2010) records include a 1983 record from the Blythe golf course.
Yellow warbler *Dendroica petechia*	Yellow warblers historically bred throughout much of California except for high elevations, the Colorado Desert, and most of the Mojave Desert. Breeding abundance for this species has declined in much of California, as has the breeding range, especially in the Central Valley and parts of Owens Valley. In southeastern California, this species is known only from the lower Colorado River Valley from the middle of San Bernardino County through Riverside and Imperial Counties. Currently, this species no longer breeds in much of the Riverside County segment of the lower Colorado River Valley. This species commonly uses wet, deciduous thickets for breeding, and seeks a variety of wooded, scrubby habitats in winter.	This species was not observed during surveys, and is not expected to nest in the project site due to lack of suitable habitat. The closest CNDDB (2010 as cited in the CEC RSA, 2010) records for this species are two 1986 records east of the project site at the Colorado River.
Yellow-breasted chat *Icteria virens*	The yellow-breasted chat occurs as a summer resident and migrant in California. In the southeastern California, the yellow-breasted chat breeds primarily in scattered locations in Owen's Valley and the Mojave, from the Salton Sea, and from the lower Colorado River Valley. This species occupies shrubby riparian habitat with an open canopy, and will next in non-native species, including tamarisk. Threats to this species include loss of riparian habitat, and, it is suspected, pressure from cowbird parasitism.	In this region, this species is associated with the Colorado River only. The project site does not contain suitable habitat for this species. CNDDB (2010 as cited in the CEC RSA, 2010) records in the region are associated with the Salton Sea or the Colorado River. The closest CNDDB records for this species are two 1986 records east of the project site at the Colorado River.

TABLE 3.23-2 (Continued)
SPECIAL-STATUS WILDLIFE WITH LOW TO MODERATE POTENTIAL TO OCCUR IN THE PROJECT STUDY AREA

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
Mammals		
Arizona myotis *Myotis occultus*	This species has been found from southeastern California through Arizona, New Mexico, and south into Chihauhau, Mexico. Arizona myotis is most commonly known from conifer forests from 6,000 to 9,000 feet in elevation, although maternity roosts are known from much lower elevations including areas along the Colorado River in California.	This species is not expected to occur due to lack of coniferous forests and low elevation of the Study Area. The closest CNDDB (2010 as cited in the CEC RSA, 2010) record is a historical occurrence from 1945 approximately 10 miles south of the Study Area near the town of Ripley.
Big-free tailed bat *Nyctinomops macrotis*	This species ranges from most of South America northward to include Mexico, Arizona, New Mexico, southern and western Texas, southern California, southeastern Nevada, southern Utah, and north and western Colorado from generally sea level to 8,000 feet in elevation. This species occurs in desert shrub, woodlands, and coniferous forests. It roosts mostly in the crevices of rocks although big free-tailed bats may roosts in buildings, caves, and tree cavities	This species has the potential to roost and forage within the project area. The nearest occurrences for this species in Riverside County are from the vicinity of Palm Springs and Joshua Tree National Park (CNDDB 2010 as cited in the CEC RSA, 2010). A single bat of an unidentified species was observed roosting beneath a bridge near Corn Springs Road near the location of the proposed substation during December 2009 surveys (AECOM, 2010a as cited in the CEC RSA, 2010).
California leaf-nosed bat *Macrotus californicus*	California leaf-nosed bat is a species of concern and a BLM Sensitive species; it is covered under the NECO plan. California leaf-nosed bats occur in the deserts of California, southern Nevada, Arizona and south to northwestern Mexico. In California, they now are found primarily in the mountain ranges bordering the Colorado River Basin. In California, the two largest roosts (each sheltering 1,500 bats during winter months) are in mines in extreme southeastern California. This species depends on either caves or mines for roosting habitat. All major maternity, mating, and overwintering sites are in mines or caves (BLM CDD, 2002 as cited in the CEC RSA, 2010). Radio-telemetry studies of Macrotus in the California desert show that the California leaf-nosed bat forage almost exclusively among desert wash vegetation within 10 km of their roost (WBWG, 2005-2009 as cited in the CEC RSA, 2010).	All habitats within the Project Disturbance Area are suitable habitats for this species. A single bat of an unidentified species was observed roosting beneath a bridge near Corn Springs Road near the location of the proposed substation during December 2009 surveys (AECOM, 2010a as cited in the CEC RSA, 2010). There are several CNDDB records in the vicinity of the Study Area. The nearest record is from 1993 near the McCoy Mountains area in creosote bush scrub habitat approximately where approximately 300 adults were observed roosting (CNDDB, 2010 as cited in the CEC RSA, 2010).
Cave myotis *Myotis velifer*	The cave myotis occurs from western Texas, to southern Nevada, southeastern California (only along the Colorado River), southward into Mexico, and is also widely distributed in Arizona. This species is found primarily at lower elevations (the Sonoran and Transition life zones) of the arid southwest in areas dominated by creosote bush, palo verde, and cactus. This species is a “cave dweller” and caves are the main roosts although this species may also use mines, buildings, and bridges for roosts.	This species has a potential to occur within the Study Area, more likely as a foraging species than a roosting bat species. The nearest CNDDB record for this species is from 2002 near the I-15 bridge over the Colorado River in Blythe where individual bats of this species were detected acoustically during April 2002 (CNDDB, 2010 as cited in the CEC RSA, 2010).
Colorado Valley woodrat *Neotoma albigula venusta*	This species occurs from southern Nevada, southeastern California, northeastern Baja California, to western Arizona. Colorado Valley woodrats are found in a variety of habitats including low desert, pinyon-juniper woodlands, and desert-transition chaparral. Suitable habitat elements for this species include washes where organic debris gathers, areas of prickly pear cactus and mesquite, rocky areas, and crevices in boulders which are used for cover and nest sites.	This species is not expected to occur at the project site due to coarse soils and disturbance of the site from past agricultural activities. The nearest CNDDB record is from 1934 near Blythe (CNDDB, 2010 as cited in the CEC RSA, 2010).

TABLE 3.23-2 (Continued)
SPECIAL-STATUS WILDLIFE WITH LOW TO MODERATE POTENTIAL TO OCCUR IN THE PROJECT STUDY AREA

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
Mammals (cont.)		
Hoary bat *Lasiurus cinereus*	Hoary bat is the most widespread of North American bats and is highly associated with forested habitats in the west. Hoary bat roosts usually are located at the edge of a clearing, although more unusual roosting sites have been reported in caves, beneath rock ledges, woodpecker holes, squirrel nests, and building sides.	This species may occur in the area as a forage and roost habitat occurs within the project area. The closest CNDDB (2010 as cited in the CEC RSA, 2010) record is a historical occurrence approximately from the town of Neighbors during 1919. A single bat of an unidentified species was observed roosting beneath a bridge near Corn Springs Road near the location of the proposed substation during December 2009 surveys (AECOM, 2010a as cited in the CEC RSA, 2010).
Pallid bat *Antrozous pallidus*	The pallid bat is a California species of concern and a BLM Sensitive species that is covered under the NECO plan. Pallid bats inhabit low elevation (less than 6,000 feet) rocky, arid deserts and canyonlands, shrub/steppe grasslands, but also occur in higher elevation coniferous forests, greater than 7,000 feet in elevation. This species is most abundant in xeric landscapes including the Great Basin, Sonoran, and Mojave deserts (WBWG, 2005-2009 as cited in the CEC RSA, 2010). Pallid bats are known from Cuba, Mexico, and throughout the southwestern and western United States. Population trends are not well known, but there are indications of decline. Pallid bats roost alone, in small groups (2 to 20 bats), or gregariously (100s of individuals). Day and night roosts include crevices in rocky outcrops and cliffs, caves, mines, trees with exfoliating bark, and various human structures such as bridges, barns, porches, bat boxes, and human-occupied as well as vacant buildings (WBWG, 2005-2009 as cited in the CEC RSA, 2010).	This species has a potential to roost and forage within the project area. A single bat of an unidentified species was observed roosting beneath a bridge near Corn Springs Road near the location of the proposed substation during December 2009 surveys (AECOM, 2010a as cited in the CEC RSA, 2010). Anabat/Sonobat surveys were not conducted in conjunction of these surveys which allows for more precise identification of bat species based on the recording of echolocation frequencies. The nearest CNDDB record is approximately 5 miles southeast of the project site (CNDDB, 2010 as cited in the CEC RSA, 2010).
Pocketed free-tailed bat *Nyctinomops femorosaccus*	Pocketed free-tailed bat is a California species of concern. This species occurs in western North America, from southern California, central Arizona, southern New Mexico, western Texas, south into Mexico and Baja, California (WBWG, 2005-2009). Despite only a limited number of records, pocketed free-tailed bats are known to occur in the desert from March through August, when they then migrate out of the area. In California, they are found primarily in creosote bush and chaparral habitats in proximity to granite boulders, cliffs, or rocky canyons.	This species has a potential to roost and forage within the project site based on what is understood of its habitat requirements and roosting habits. The nearest CNDDB record for this species is from 2002 near the I-15 bridge over the Colorado River in Blythe. Individual bats of this species were detected acoustically during April 2002 (CNDDB, 2010). A single bat of an unidentified species was observed roosting beneath a bridge near Corn Springs Road near the location of the proposed substation during December 2009 surveys (AECOM, 2010a).
Spotted bat *Euderma maculatum*	This species is known from all the states west of and including Montana, Wyoming, Colorado, New Mexico and Texas. Although broadly distributed, this species is rarely common, but may occur locally from southern British Columbia, northern Arizona, Arizona/Utah border, and western Texas from below sea level to 8,100 feet above mean sea level. Spotted bats occur in arid, low desert habitats to high elevation conifer forests and prominent rock features appear to be a necessary feature for roosting.	This species has a potential to roost and forage within the project site based on what is understood of its habitat requirements and roosting habits. The nearest CNDDB record is a historical occurrence from 1907 in the Colorado Desert near Mecca (CNDDB, 2010 as cited in the CEC RSA, 2010). A single bat of an unidentified species was observed roosting beneath a bridge near Corn Springs Road near the location of the proposed substation during December 2009 surveys (AECOM, 2010a as cited in the CEC RSA, 2010).

TABLE 3.23-2 (Continued)
SPECIAL-STATUS WILDLIFE WITH LOW TO MODERATE POTENTIAL TO OCCUR IN THE PROJECT STUDY AREA

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
Mammals (cont.)		
Townsend's big-eared bat *Corynorhinus townsendii*	This species has been reported in a wide variety of habitat types ranging from sea level to approximately 9,000 feet above MSL. Habitat associations include coniferous forests, deserts, native prairies, riparian communities, active agricultural areas, and coastal habitat types. Foraging associations include edge habitats along streams, adjacent to and within a variety of wooded habitats.	This species has a potential to forage within the Study Area, although roosting is unlikely to occur since cave and abandoned buildings do not occur within the Study Area. A single bat of an unidentified species was observed roosting beneath a bridge near Corn Springs Road near the location of the proposed substation during December 2009 surveys (AECOM, 2010a as cited in the CEC RSA, 2010).
Western mastiff bat *Eumops perotis*	The subspecies that occurs in North America, *E. p. californicus*, ranges from central Mexico across the southwestern United States including parts of California, southern Nevada, Arizona, southern New Mexico and western Texas. Recent surveys have extended the previously known range to the north in both Arizona with several localities near the Utah border and California. It is found in a variety of habitats, from desert scrub to chaparral to oak woodland and into the ponderosa pine belt and high elevation meadows of mixed conifer forests. Surveys in northern Arizona have documented roosts at approximately 3,600 feet elevation and foraging bat species at 7,500 feet above MSL (WBWG, 2005-2009 as cited in the CEC RSA, 2010).	The project site does not support suitable roosting habitat for western mastiff bat but this species may utilize the Study Area for foraging. The nearest CNDDB record is approximately 5 miles southwest of the Study Area (CDFG, 2010). A single bat of an unidentified species was observed roosting beneath a bridge near Corn Springs Road near the location of the proposed substation during December 2009 surveys (AECOM, 2010a as cited in the CEC RSA, 2010).
Yuma myotis *Myotis yumanensis*	This species ranges across the western third of North America from British Columbia, Canada, to Baja California and southern Mexico. Yuma myotis is usually associated with permanent sources of water, typically rivers and streams, feeding primarily on aquatic emergent insects, but Yuma myotis also use tinajas in the arid west. It occurs in a variety of habitats including riparian, arid scrublands and deserts, and forests. The species roosts in bridges, buildings, cliff crevices, caves, mines, and trees.	This species has a potential to roost and forage within the project site. The nearest CNDDB record is from 2002 near the Blythe bridge over the Colorado River where individual bats of this species were detected acoustically during April 2002 (CNDDB, 2010 as cited in the CEC RSA, 2010).
Yuma mountain lion *Puma concolor browni*	In the NECO planning area, mountain lions primarily inhabit the low mountains and extensive wash systems in and around Chuckwalla Bench, Chuckwalla Mountains, Chocolate Mountains, Picacho Mountains, Milpitas Wash, Vinagre Wash, and other washes in that area. Mountain lions typically occur in habitat areas with extensive, well-developed riparian or shrubby vegetation interspersed with irregular terrain, rocky outcrops, and community edges. Mountain lions are restricted to the southern Colorado Desert from Joshua Tree National Park south and east to the Colorado River. Burro deer, the primary prey item, are known to spend the hot summer and fall in riparian areas along the Colorado River and in dense microphyll woodlands near the Coachella Canal.	Mountain lion likely use the Study Area, but no definitive sign for this species was observed during 2009 spring surveys.

CHAPTER 4
Environmental Consequences

4.1 Introduction

This chapter assesses environmental consequences or impacts that would result from the implementation of the proposed action or the alternatives described in Chapter 2, *Proposed Action and Alternatives*. This analysis considers both short-term impacts during construction and decommissioning, and long-term impacts during operation and maintenance. The scope of the impact analysis presented in this chapter is commensurate with the level of detail for the proposed action and alternatives provided in Chapter 2 and the availability and/or quality of data necessary to assess impacts. Baseline conditions for assessing the potential environmental impacts are described in Chapter 3, *Affected Environment*.

The impact assessment that follows focuses on the general impacts that could occur as a result of implementing each of the alternatives. The methodology for this assessment conforms with the guidance found in the BLM's NEPA Handbook H-1790-1 (January 2008) as well as the following sections of the CEQ regulations for implementing NEPA: 40 CFR Section 1502.24, *Methodology and Scientific Accuracy*; 40 CFR Section 1508.7, *Cumulative Impacts*; and 40 CFR Section 1508.8, *Effects*. The CEQ regulations require agencies to "rigorously explore and objectively evaluate" the impacts of the alternatives. This chapter discusses short-and long-term direct, indirect and cumulative impacts of the proposed action and alternatives; identifies mitigation measures to address adverse impacts; and summarizes the residual and unavoidable adverse impacts on an issue-by-issue basis. Where used in this analysis, the word "significantly" is intended strictly to mean the legal term of art defined in NEPA (40 CFR 1508.27; BLM NEPA Handbook Section 7.3).

This Section 4.1, *Introduction*, describes the analytical assumptions relied upon in analyzing the environmental consequences of the proposed action and alternatives (Section 4.1.1), defines the types of effects that may result (Section 4.1.2), and identifies the resources and issue areas that either are not present or are not affected by the proposed action and alternatives (Section 4.1.3). It also describes the projects and approach used for the cumulative scenario (Section 4.1.4), the mitigation measures identified to address adverse impacts on the resources and issue areas analyzed (Section 4.1.5), and the general terms and conditions required for all public land ROWs.

Finally, Section 4.1.7, *Incorporation of the Analysis of the Red Bluff Substation Project by Reference*, summarizes those portions of the *Desert Sunlight Solar Farm Project California Desert Conservation Area Plan Amendment and Final Environmental Impact Statement prepared by the BLM* (April 2011) (Desert Sunlight EIS) that are relevant to the Red Bluff

Substation Project. Southern California Edison's proposed Red Bluff Substation Project is identified in Chapter 2, *Proposed Action and Alternatives*, as a connected action for the proposed action. Incorporation of the analysis of the Red Bluff Substation Project by reference in this PA/FEIS provides an opportunity to reduce paperwork and redundant analysis in the NEPA process. The Desert Sunlight EIS is available on the BLM's website and covers the same issues, effects and/or resources affected by the Red Bluff Substation Project that otherwise would be considered independently in the PA/FEIS for the PSPP (see, http://www.blm.gov/ ca/st/en/fo/palmsprings/Solar_Projects/Desert_Sunlight.html).

4.1.1 Analytical Assumptions

The following impacts analysis was conducted with the following assumptions:

1. The laws, regulations, and policies applicable to BLM authorizing ROW grants for renewable energy development facilities would be applied consistently for all action alternatives.

2. The proposed facility would be constructed, operated, maintained and decommissioned as described in each action alternative.

3. Short-term impacts are those expected to occur during the construction phase and the first five years of the operation and maintenance phase, as well as the end-of-project-life decommissioning phase. Long-term impacts are those that would occur after the first five years of operation.

4.1.2 Types of Effects

The potential impacts from those actions that would have direct, indirect, residual and cumulative effects were considered for each resource. Effects and impacts as used in this document are synonymous and could be beneficial or detrimental (40 CFR 1508.7, 1508.8; BLM NEPA Handbook Section 6.8).

Direct effects are caused by the action and occur at the same time and place as the action; indirect effects are caused by the action and occur later in time or further in distance, but are still reasonably foreseeable. Residual effects are effects that remain after mitigation measure have been applied. Cumulative impacts are those effects resulting from the incremental impacts of an action when combined with other past, present, and reasonably foreseeable future actions (regardless of which agency or person undertakes such actions). Cumulative impacts could result from individually insignificant but collectively significant actions taking place over a period of time. Short-term impacts occur only for a short time after implementation of a management action; for example, construction noise impacts from construction activities would be considered short-term. By contrast, long-term effects occur for an extended period after implementation of a management action; for example, operational noise during power plant operations would be a long-term impact, as it would last for as long as the solar energy plant is in operation.

Section 1502.16 of the CEQ regulations establishes the scientific and analytic basis for the comparison of alternatives (including the proposed action) as described in Section 1502.14 of Title 40 of the Code of Federal Regulations. PA/FEIS Chapter 4, *Environmental Consequences*, consolidates the discussions of those elements required by sections 102(2)(C)(i), (ii), (iv), and (v) of NEPA which are within the scope of this EIS and as much of Section 102(2)(C)(iii) as is necessary to support the comparisons. The discussion includes the environmental impacts of the alternatives, including any adverse environmental effects which cannot be avoided, the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources that would be involved in the proposal should it be implemented.

4.1.3 Resources and Resource Uses Not Affected or Present in the Action Area

Resources, resource uses, and BLM program areas that are not affected by the proposed action or present within the impacts assessment area include: environmental justice; wild and scenic rivers; national monuments; recreation areas, or conservation areas; cooperative management and protection areas; outstanding natural areas; forest reserves; back country byways; wetlands; livestock grazing; and wild horse and burros.

4.1.4 Cumulative Scenario Approach

This PA/FEIS analyzes the cumulative impact of the construction, operation and maintenance, closure and decommissioning of the project within the ROW application area and all other elements of the proposed action, taking into account the effects in combination with past, present and reasonably foreseeable future actions. The cumulative effects analysis highlights past actions that are closely-related either in time or space (i.e., temporally or in geographic proximity) to the proposed action that could have ongoing impacts that could interact with those of other projects, present actions the review of which is in progress at the same time this EIS was being prepared; and reasonably foreseeable future actions, including those for which there are existing decisions, funding, formal proposals, or which are highly probable, based on known opportunities or trends.

The intensity, or severity, of the cumulative impacts analysis considers the magnitude, geographic extent, duration and frequency of the effects (CEQ, 1997). The magnitude of the effect reflects the relative size or amount of the effect; the geographic extent considers how widespread the effect may be; and the duration and frequency refer to whether the effect is a one-time event, intermittent or chronic (CEQ, 1997). Varying degrees of information exist about projects within the cumulative scenario. Therefore, for resource areas where quantitative information is available, a quantitative analysis is provided. By contrast, where quantitative information is not available, a qualitative analysis is provided. Consistent with BLM Handbook Section 6.8.3.1, if the proposed action and alternatives would have no direct or indirect effects on a resource, resource use or program area, the PA/FEIS does not analyze potential cumulative effects related to that issue. See, for example, Section 4.1.3, *Resources and Resource Uses Not Affected or Present in the Action Area*.

The cumulative scenario includes projects identified in Table 4.1-1, *Cumulative Scenario*, and shown in Figure 4.1-1. Table 4.1-1 identifies the following for each resource, resource use or BLM program area: the cumulative assessment impact area (i.e., the geographic scope for the

TABLE 4.1-1
CUMULATIVE SCENARIO

Resource or BLM Program	Cumulative Analysis Impact Area	Elements to Consider	BLM Renewable Energy Projects	Other BLM Authorized Actions	Other Known Actions/Activities
Air Resources	Mojave Desert Air Basin	PM2.5, PM10, ozone	Blythe, Genesis, Rice, Palen, Desert Sunlight, Chuckwalla, Eagle Crest Pump Storage, Nextera McCoy, Desert Quartzite, enXco McCoy Soleil, NextEra McCoy, enXco Desert Harvest Solar, enXco Mule Mountain Soleil, Associated Gen-tie Trans Lines, etc.	Eagle Mtn Landfill, D-PV2, Colorado River Substation, Red Bluff Substation, DSW Trans Line, OHV, LTVAs, etc.	I-10, Blythe Airport Solar 1, Chuckwalla Valley Raceway, various commercial and residential projects, etc.
Global Climate Change	International, national and regional	CO2e	All		
Cultural Resources	Cultural sites, traditional use areas, and cultural landscapes on the plant site, along the linear facilities corridor and in the general vicinity of the site, including along the I 10 corridor	Ground-disturbing activities and the cultural character of the site and its vicinity Cultural resources, including archaeological (prehistoric and historic), and ethnographic resources	Blythe, Genesis, Rice, Palen, Desert Sunlight, Chuckwalla, Eagle Crest Pump Storage, Nextera McCoy, Desert Quartzite, Mule Mountain Soleil, Associated Gen-tie Trans Lines, etc.	Eagle Mtn Landfill, D-PV2, Colorado River Substation, Red Bluff Substation, DSW Trans Line, OHV, LTVAs, etc.	Blythe Airport Solar 1, Chuckwalla Valley Raceway, various commercial and residential projects, etc.
Lands and Realty	Eastern Riverside County	Designated utility corridors (e.g., transmission lines, cellular telephone towers, poles), existing ROWs, I-10	Blythe, Genesis, Rice, Palen, Desert Sunlight, Chuckwalla, Eagle Crest Pump Storage, Nextera McCoy, Desert Quartzite, Mule Mountain Soleil, Associated Gen-tie Trans Lines, etc.	Eagle Mtn Landfill, D-PV2, Colorado River Substation, Red Bluff Substation, DSW Trans Line, OHV, LTVAs, etc.	Blythe Airport Solar 1, Chuckwalla Valley Raceway, various commercial and residential projects, etc.
Multiple Use Classes	CDCA Plan areas bearing the multiple use class designation "Moderate"	Restriction or preclusion of otherwise allowable use opportunities	Desert Quartzite, Mule Mountain Solar, Mule Mountain Soleil,Genesis, Chuckwalla Solar, etc.		
Noise	See Figure 4.9-1 Noise Measurement Locations and Noise Contours	Equipment, motor vehicles, high pressure steam blow	None	None	None
Paleontological Resources	Eastern Riverside County	Ground-disturbing activities; rock units with potential high sensitivity or known paleontological resources	Blythe, Genesis, Rice, Palen, Desert Sunlight, Chuckwalla, Eagle Crest Pump Storage, Nextera McCoy, Desert Quartzite, Mule Mountain Soleil, Associated Gen-tie Trans Lines	Eagle Mtn Landfill, D-PV2, Colorado River Substation, Red Bluff Substation, DSW Trans Line, OHV, LTVAs	Blythe Airport Solar 1, Chuckwalla Valley Raceway
Public Health and Safety					
Hazardous materials/ hazardous waste	Mojave Desert Air Basin, watershed, groundwater basin, with focus on and in the vicinity of the site	Releases, spills, emissions, bacteria; ground disturbance that exposes existing subsurface conditions; engineering and administrative controls; health risks	See Air Resources, above; see also, Water Resources, below, in this Table 4.1-1.		

TABLE 4.1-1 (Continued)
CUMULATIVE SCENARIO

Resource or BLM Program	Cumulative Analysis Impact Area	Elements to Consider	BLM Renewable Energy Projects	Other BLM Authorized Actions	Other Known Actions/Activities
Public Health and Safety (cont.)					
Waste management	California Desert, with emphasis on Riverside County	Solid and liquid wastes	Blythe, Genesis, Rice, Palen, Desert Sunlight, Chuckwalla, Eagle Crest Pump Storage, Nextera McCoy, Desert Quartzite, Mule Mountain Soleil, Associated Gen-tie Trans Lines	Eagle Mtn Landfill, D-PV2, Colorado River Substation, Red Bluff Substation, DSW Trans Line, OHV, LTVAs	Blythe Airport Solar 1, Chuckwalla Valley Raceway
Transmission line safety and nuisance	Immediate vicinity of the proposed line	Interference with radio-frequency communication; noise; fire hazards; hazardous shocks; nuisance shocks; and electric and magnetic field (EMF) exposure	Blythe Energy Project Transmission Line, Colorado River Substation and Expansion, Desert Quartzite, Palen, Chuckwalla Solar I	West-wide Section 368 Energy Corridors, Devers-Palo Verde Transmission Line, Blythe Energy Project	Interstate 10
Aviation safety	Air space governed by the Blythe Airport Land Use Compatibility Plan	Navigable airspace; reflectivity and temporary flash occurrences; radio frequency emissions and potential interference; thermal plumes; height and location of structures; clear space within Compatibility Zone D; bird strike and avian-aviation incompatibilities	All		
Traffic and transportation safety	I-10 corridor	Equipment that exceeds roadway load or size limits; hazardous materials transport	Same as Cultural Resources, above.		
Worker safety and fire protection	Project site and linear facilities corridor; jurisdictional boundary of the Riverside County Fire Department (RCFD) plus mutual aid agencies	Site access; fire response; hazardous materials response; advanced life support/paramedic services; disaster preparedness	Blythe, Genesis, Rice, Palen, Desert Sunlight, Chuckwalla, Eagle Crest Pump Storage, Nextera McCoy, Desert Quartzite, Mule Mountain Soleil, Associated Gen-tie Trans Lines	Eagle Mtn Landfill, D-PV2, Colorado River Substation, Red Bluff Substation, DSW Trans Line, OHV, LTVAs	Blythe Airport Solar 1, Chuckwalla Valley Raceway
Geologic hazards	Project site and linear facilities corridor	Accelerated and/or environmentally harmful soil erosion; corrosive soils; earthquake fault ruptures; earthquake induced ground deformations (e.g. lateral spreading, subsidence, liquefaction, or collapse), or otherwise unstable soils; landslides	Blythe Energy Project Transmission Line, Colorado River Substation and Expansion, Desert Quartzite, Palen, Chuckwalla Solar I	West-wide Section 368 Energy Corridors, Devers-Palo Verde Transmission Line, Blythe Energy Project	Interstate 10

TABLE 4.1-1 (Continued)
CUMULATIVE SCENARIO

Resource or BLM Program	Cumulative Analysis Impact Area	Elements to Consider	BLM Renewable Energy Projects	Other BLM Authorized Actions	Other Known Actions/Activities
Public Health and Safety (cont.)					
Recreation	California Desert, with emphasis on eastern Riverside County	Dispersed recreational opportunities and experiences, ACECs, LTVAs	Blythe, Genesis, Rice, Palen, Desert Sunlight, Chuckwalla, Eagle Crest Pump Storage, Nextera McCoy, Desert Quartzite, Mule Mountain Soleil, Associated Gen-tie Trans Lines	Eagle Mtn Landfill, D-PV2, Colorado River Substation, Red Bluff Substation, DSW Trans Line, OHV, LTVAs	Blythe Airport Solar 1, Chuckwalla Valley Raceway
Social Economics	Social: Eastern Riverside County Economic: Riverside County	Flow of goods and services; impacts to local infrastructure and services; ability to meet housing demand; employment/labor demand; possible positive impacts to regional economic sectors and/or adverse community impacts; severance or other tax benefits; ability of communities to absorb impacts	Blythe, Genesis, Rice, Palen, Desert Sunlight, Chuckwalla, Eagle Crest Pump Storage, Nextera McCoy, Desert Quartzite, Mule Mountain Soleil, Associated Gen-tie Trans Lines	Eagle Mtn Landfill, D-PV2, Colorado River Substation, Red Bluff Substation, DSW Trans Line, OHV, LTVAs	Blythe Airport Solar 1, Chuckwalla Valley Raceway
Soil Resources	Mojave Desert Air Basin and watershed	Erosion	See Air Resources, above; see also, Water Resources, below, in this Table 4.1-1.		
Special Designations	Wilderness Areas within sight or hearing distance of the site (i.e., Palen/McCoy, Big Maria Mountains and Little Chuckwalla Mountains Wilderness Areas); more generally, the I-10 corridor	Views, glint, glare, noise, recreation	See related resource sections in this Table 4.1-1.		
Transportation and Public Access	Transportation: Eastern Riverside County, focusing on the I-10 corridor. Public Access: NECO Plan area.	Construction traffic – materials and workers OHV recreation opportunities, changes in viewscape, unauthorized routes	I-10 Corridor: Same as Cultural Resources, above. NECO Plan Area: including Genesis, Chuckwalla, First Solar/Desert Sunlight, etc.; see also cumulative projects identified for Vegetation Resources, below.		
Vegetation Resources	NECO Plan area.	Ephemeral drainages and natural communities; special status plants; stabilized and partially stabilized dunes and sand transport corridors; invasive plants	Blythe, Genesis, Rice, Palen, Desert Sunlight, Chuckwalla, Eagle Crest Pump Storage, Nextera McCoy, Desert Quartzite, Mule Mountain Soleil, Associated Gen-tie Trans Lines	Eagle Mtn Landfill, D-PV2, Colorado River Substation, Red Bluff Substation, DSW Trans Line, OHV, LTVAs	Blythe Airport Solar 1, Chuckwalla Valley Raceway
Visual Resources	I-10 corridor**.**	Proposed Action appearance; construction-related dust, light, glint and glare; views from key observation points	Blythe, Genesis, Rice, Palen, Desert Sunlight, Chuckwalla, Eagle Crest Pump Storage, Nextera McCoy, Desert Quartzite, Mule Mountain Soleil, Associated Gen-tie Trans Lines	Eagle Mtn Landfill, D-PV2, Colorado River Substation, Red Bluff Substation, DSW Trans Line, OHV, LTVAs	Blythe Airport Solar 1, Chuckwalla Valley Raceway

TABLE 4.1-1 (Continued)
CUMULATIVE SCENARIO

Resource or BLM Program	Cumulative Analysis Impact Area	Elements to Consider	BLM Renewable Energy Projects	Other BLM Authorized Actions	Other Known Actions/Activities
Public Health and Safety (cont.)					
Surface water	Watershed	Hydrology and quality	Blythe, Nextera McCoy, Desert Quartzite, Mule Mountain Solar, Associated Gen-tie Trans Lines	D-PV2, Colorado River Substation, DSW Trans Line, OHV, LTVAs	First Solar Blythe, Blythe Airport Solar 1
Groundwater	Palo Verde Mesa Groundwater Basin	Basin balance, levels and quality	Blythe, Nextera McCoy, Desert Quartzite, Mule Mountain Soleil	Colorado River Substation, DSW Trans Line, OHV, LTVAs	First Solar Blythe, Blythe Airport Solar 1
Wildland and Fire Ecology	Eastern Riverside County	Mortality of plants and wildlife, loss of forage and cover; changes to the vegetation communities; spread of invasive plants; consequences of subsequent extreme weather events; air quality	Blythe, Genesis, Rice, Palen, Desert Sunlight, Chuckwalla, Eagle Crest Pump Storage, Nextera McCoy, Desert Quartzite, Mule Mountain Soleil, Associated Gen-tie Trans Lines	Eagle Mtn Landfill, D-PV2, Colorado River Substation, Red Bluff Substation, DSW Trans Line, OHV, LTVAs	Blythe Airport Solar 1, Chuckwalla Valley Raceway
Wildlife Resources	Recovery Plan Area defined by NECO; Critical Habitat Unit defined by USFWS/CDFG; existing range or eastern Riverside County	Desert Tortoise, Mojave fringe-toed lizard, Couch's spadefoot toad, migratory birds, golden eagle, western burrowing owl, American badger, kit fox, Nelson's big horn sheep. Also, mortality and injury; special status wildlife; wildlife movement and connectivity; indirect impacts, including from lighting, collisions and climate change.	Blythe, Genesis, Rice, Palen, Desert Sunlight, Chuckwalla, Eagle Crest Pump Storage, Nextera McCoy, Desert Quartzite, Mule Mountain Soleil, Associated Gen-tie Trans Lines	Eagle Mtn Landfill, D-PV2, Colorado River Substation, Red Bluff Substation, DSW Trans Line, OHV, LTVAs	Blythe Airport Solar 1, Chuckwalla Valley Raceway

corresponding resource, resource use, or BLM program area); elements to consider; BLM renewable energy projects; other BLM authorized actions; and other known actions or activities within the geographic scope that are not under BLM's jurisdiction. Most of the actions and projects listed have undergone, are undergoing, or would be required to undergo their own independent environmental review under NEPA or CEQA or both, as applicable. Table 4.1-2 identifies projects in the immediate vicinity of the I-10 corridor; these projects are shown in Figure 4.1-1.

TABLE 4.1-2
RENEWABLE ENERGY PROJECTS IN THE CALIFORNIA DESERT DISTRICT

BLM Field Office	Number of Projects & Acres	Total MW
Solar Energy		
Barstow Field Office	18 projects 132,560 acres	12,875 MW
El Centro Field Office	7 projects 50,707 acres	3,950 MW
Needles Field Office	17 projects 230,480 acres	15,700 MW
Palm Springs Field Office	17 projects 123,592 acres	11,873 MW
Ridgecrest Field Office	4 projects 30,543 acres	2,835 MW
TOTAL – CA Desert District	***63 projects 567,882 acres***	***47,233 MW***
Wind Energy		
Barstow Field Office	25 projects 171,560 acres	n/a
El Centro Field Office	9 projects (acreage not given for 3 of the projects) 48,001 acres	n/a
Needles Field Office	8 projects 115,233 acres	n/a
Palm Springs Field Office	4 projects 5,851 acres	n/a
Ridgecrest Field Office	16 projects 123,379 acres	n/a
TOTAL – CA Desert District	***62 projects 433,721 acres***	n/a

SOURCE: CEC RSA, 2010 Section B.3.4, Table 1A; BLM, 2011

With the exception of climate change, which is a global issue, the BLM has identified the California desert as the largest area within which cumulative effects should be assessed for all disciplines. However, within the desert region, the specific area of cumulative effect varies by resource. For each resource, the geographic scope of analysis is based on the topography surrounding the project site and the natural boundaries of the resource affected, rather than jurisdictional boundaries. The geographic scope of cumulative effects often extends beyond the scope of the direct effects, but not beyond the scope of the direct and indirect effects of the proposed action and alternatives.

In addition, each project in a region would have its own implementation schedule, which may or may not coincide or overlap with the proposed action's schedule. This is a consideration for short-term impacts from the project. However, to be conservative, the cumulative analysis assumes that all projects in the cumulative scenario are built and operating during the operating lifetime of the proposed action.

Renewable Energy Projects Included in the Cumulative Scenario

A large number of renewable projects have been proposed on BLM-administered land, State land, and private land in California. As of January 2010, there were 244 renewable projects proposed in California in various stages of the environmental review process or under construction. As of December 2009, 49 of these projects, representing approximately 10,500 MW, were planning on requesting American Recovery and Reinvestment Act funds from the Federal government. Solar, wind, and geothermal development applications have requested use of BLM land, including approximately one million acres of the California desert. State and private lands have also been targeted for renewable solar and wind projects. In addition, nearly 80 applications for solar and wind projects are being considered on BLM land in Nevada and Arizona. (CEC RSA, 2010) Renewable energy projects in BLM's California Desert District are identified in Table 4.1-2.

Large renewable projects now described in applications to the BLM and on private land are competing for utility Power Purchase Agreements, which will allow utilities to meet State-required Renewable Portfolio Standards. Not all of the projects listed will complete the environmental review process, and not all projects will be funded and constructed. It is unlikely that all of these projects will be constructed for the following reasons:

1. Not all developers will develop the detailed information necessary to meet BLM and Energy Commission standards. Most of the solar projects with pending applications are proposing generation technologies that have not been implemented at large scales. As a result, preparing complete and detailed plans of development (PODs) is difficult, and completing the required NEPA and CEQA documents is especially time-consuming and costly.

2. As part of approval by the appropriate Lead Agency under NEPA and/or CEQA (generally the BLM and/or Energy Commission), all regulatory permits must be obtained by the applicant or the prescriptions required by the regulatory authorities incorporated into the Lead Agency's license, permit or ROW grant. The large size of these projects may result in permitting challenges related to endangered species, mitigation measures or requirements, and other issues.

3. Also after project approval, construction financing must be obtained (if it has not been obtained earlier in the process). The availability of financing will be dependent on the status of competing projects, the laws and regulations related to renewable project investment, and the time required for obtaining permits.

The BLM reviewed the list of renewable energy projects on State and private lands that the Energy Commission evaluated (CEC RSA, 2010, Table 1B) and determined that several among them do not meet the standard for consideration within the NEPA Cumulative Analysis. Reasons include: (i) BLM's NEPA Handbook H-1790-1 states, "Analyzing future actions, such as speculative developments, is not required;"(ii) where information about the status of a potential upcoming project is not available, it is impossible to determine what impacts would result from its construction, operation, maintenance or ultimate decommissioning and, without this data, there can be no reasoned analysis of additive, countervailing or synergistic effects; and (iii) a cumulative impact analysis appropriately is concerned with impacts that are sufficiently likely to occur and not with guesswork about possible projects that can be conceived of or imagined. Accordingly, two of the renewable energy projects in Kern County that were considered by the Energy Commission are not considered by the BLM in this PA/FEIS: T, squared, Inc. (19 MW solar PV) and Man-Wei Solar (MW information is not available for this solar PV project).

Solar, wind and geothermal energy projects identified and analyzed by the Energy Commission as being on State and private lands that also are considered by the BLM are identified in Table 4.1-3. As shown on Table 4.1-3, the 60 solar projects total 5,979.4 MW; the 31 new wind projects total 6,361.5 MW; the six repowering projects total 702.2 MW; and the 17 geothermal projects total 757.3 MW. Proposed solar energy projects within BLM's cumulative scenario also are shown on Figure 4.1-1.

TABLE 4.1-3
RENEWABLE ENERGY PROJECTS ON STATE AND PRIVATE LANDS

Project Name	Location	Status
Solar Projects – 60 Projects (5979.4 MW)		
Solargen Panoche Valley Solar Farm (420 MW Solar PV)	San Benito County	Under environmental review
San Joaquin Solar 1 and 2 (107 MW Solar hybrid)	Fresno	Under environmental review
Palmdale Hybrid Power Project Unit 1 (50 MW solar thermal, part of a hybrid project)	City of Palmdale	Under environmental review
Lucerne Valley Solar (50 MW solar PV)	San Bernardino	Under environmental review
Abengoa Mojave Solar Project (250 MW solar thermal)	San Bernardino County, Harper Lake	Under environmental review
Rice Solar Energy Project (150 MW solar thermal)	Riverside County, north of Blythe	Under environmental review
Sun City (20 MW solar PV)	Avenal, Kings County	Approved
Sand Drag (19 MW solar PV)	Avenal, Kings County	Approved
Avenal Park (9 MW solar PV)	Avenal, Kings County	Approved
Corcoran I (20 MW solar PV)	Avenal, Kings County	Under environmental review
Corcoran II (20 MW solar PV)	Avenal, Kings County	Under environmental review
GWF (125 MW solar PV)	Avenal, Kings County	Under environmental review
Maricopa Sun Solar Complex (700 MW Solar PV)	Kern County	Under environmental review
Monte Vista (126 MW Solar PV)	Kern County	Under environmental review
Lost Hills (32.5 solar PV)	Kern County	Under environmental review
Tehachapi Photovoltaic Project (20 MW solar PV)	Kern County	Under environmental review
Ridge Rider Solar Park by Global Real Estate Investment Partners, LLC (38 MW solar PV)	Kern County	Under environmental review
Rio Grande by Recurrent Energy (5 MW solar PV);	Kern County	Under environmental review
Rosamond 1 by Recurrent Energy (20 MW solar PV)	Kern County	Under environmental review

TABLE 4.1-3 (Continued)
RENEWABLE ENERGY PROJECTS ON STATE AND PRIVATE LANDS

Project Name	Location	Status
Solar Projects – 60 Projects (5979.4 MW) (cont.)		
Rosamond 2 by Recurrent Energy (20 MW solar PV)	Kern County	Under environmental review
Old River I by Recurrent Energy (16 MW solar PV)	Kern County	Under environmental review
Old River II by Recurrent Energy (17 MW solar PV)	Kern County	Under environmental review
Columbia II by Recurrent Energy (20 MW solar PV)	Kern County	Under environmental review
Columbia III by Recurrent Energy (10 MW solar PV)	Kern County	Under environmental review
Great Lakes II Solar by Recurrent Energy (5 MW solar PV)	Kern County	Under environmental review
North Muroc Solar Project by Nautilus (9 MW solar PV)	Kern County	Under environmental review
Regenesis Power for Kern County Airports Dept (0.9 MW PV)	Kern County	Complete
LADWP (10 MW)	Jawbone Canyon Rd, Kern County	Approved
GE Energy LLC (40 MW)	Chantico Rd, Kern County	Approved
Rosamond Solar Array by First Solar (155 MW)	Kern County	Under environmental review
Willow Springs Solar Array by First Solar (160 MW)	Kern County	Under environmental review
Elk Hills Solar by Enxco (7 MW)	Kern County	Under environmental review
Goose Lake Solar by Enxco (15 MW)	Kern County	Under environmental review
San Bernard Solar by Enxco (6 MW)	Kern County	Under environmental review
Smyrna Solar by Enxco (20 MW)	Kern County	Under environmental review
Antelope Valley Solar Project by Renewable Resources (650 MW)	Kern County	Under environmental review
Rosamond Solar Project by SGS Antelope Valley, LLC (120 MW)	Kern County	Under environmental review
Weldon Solar Project by Renewable Resources (60 MW)	Kern County	Under environmental review
Cantil Solar Project by Nautilus (9 MW)	Kern County	Under environmental review
Sunshine Solar by Congentrix (40 MW)	Kern County	Under environmental review
Kramer Junction Solar Energy Center by Boulevard Associates (20 MW solar PV)	U.S. Highway 395 and Highway 58, San Bernardino County	Under environmental review
Gray Butte Solar PV (139 MW Solar PV)	Los Angeles County	Under environmental review
NRG Alpine Suntower (66 MW solar PV)	Lancaster, Los Angeles County	Under environmental review
Rancho Seco Solar Thermal (200 MW)	Sacramento County	Under environmental review
Stanislaus Solar Project I (20 MW PV)	Stanislaus County	Under environmental review
Stanislaus Solar Project II (20 MW PV)	Stanislaus County	Under environmental review
3 MW solar PV energy generating facility	San Bernardino County, Newberry Springs	MND published for public review
Blythe Airport Solar 1 Project (100 MW solar PV)	Blythe, California	MND published for public review
First Solar's Blythe (21 MW solar PV)	Blythe, California	Under construction
California Valley Solar Ranch (SunPower) (250 MW solar PV)	Carrizo Valley, San Luis Obispo County	Under environmental review

**TABLE 4.1-3 (Continued)
RENEWABLE ENERGY PROJECTS ON STATE AND PRIVATE LANDS**

Project Name	Location	Status
Solar Projects – 60 Projects (5979.4 MW) (cont.)		
Topaz Solar Farm (First Solar) (550 MW solar PV)	Carrizo Valley, San Luis Obispo County	Under environmental review
AV Solar Ranch One (230 MW solar PV)	Antelope Valley, Los Angeles County	Under environmental review
Imperial Solar Energy Center West (200 MW)	Imperial County	Under environmental review
Imperial Solar Energy Center South (250 MW)	Imperial County	Under environmental review
Bethel Solar X Hybrid (30 MW solar, 30 MW biomass)	Imperial County	Under environmental review
Centinela Solar (170 MW solar PV)	Imperial County	Under environmental review
Keystone Solar (6.1 MW)	Imperial County	Under environmental review
Frank Road Solar (30 MW)	Imperial County	Under environmental review
Chocolate Mountain Solar Farm (49.9 MW solar PV)	Imperial County	Approved
IV Solar (23 MW)	Imperial County	Under environmental review
Wind Projects – 31 Projects (6,361.5 MW) Plus 6 Repowering Projects (702.2 MW)		
NextEra Energy Resources (135.7 MW repowering project)	Alameda County, Altamont Pass Wind Resource Area	Under environmental review
Summit Wind Project (95 MW repowering project)	Alameda County, Altamont Pass Wind Resource Area	Under environmental review
Tres Vaqueros Windfarm Repowering Project (41 MW repowering project)	Contra Costa County, Altamont Pass Wind Resource Area	Under environmental review
Vasco Winds Repowering Project (80.5 MW repowering project)	Contra Costa County, Altamont Pass Wind Resource Area	Under environmental review
Bear River Ridge Wind Power Project (50 MW)	Humboldt County	Under Environmental Review
Padoma Wind Energy (175 MW)	Shasta County, South of Highway 299	Under Environmental Review
Alta-Oak Creek Mojave Project (up to 800 MW)	Kern County, west of Mojave	Under environmental review
PdV Wind Energy Project (up to 300 MW)	Kern County, Tehachapi Mountains	Approved
Iberdrola Tule Wind (200 MW)	San Diego County, McCain Valley	EIR/EIS in progress
Pine Tree Wind Project by LADWP (120 MW)	Kern County	Complete
Pine Canyon Wind Project by LADWP (150 MW)	Kern County	Under environmental review
Manzana Wind Project (300 MW)	Kern County	Approved (2008)
Aero Tehachapi (65 MW)	Kern County	Under environmental review
Alta by Terra-Gen (800 MW)	Kern County	Approved (2009)
Alta II by Terra-Gen (330 MW)	Kern County	Under environmental review
Windstar by Western Wind (65 MW)	Kern County	Approved (2009)
Coram, Inc. (3 MW)	Kern County	Approved (2008)
Coram, Inc. (3 MW)	Kern County	Approved (2009)
Pacific Wind by Enxco (151 MW)	Kern County	Under environmental review
North Sky River Project by Nextera (292 MW)	Kern County	Under environmental review
Windswept Energy by Western Wind (72 MW)	Kern County	Under environmental review
Avalon by Enexco (610 MW)	Kern County	Under environmental review

TABLE 4.1-3 (Continued)
RENEWABLE ENERGY PROJECTS ON STATE AND PRIVATE LANDS

Project Name	Location	Status
Wind Projects – 31 Projects (6,361.5 MW) Plus 6 Repowering Projects (702.2 MW) (cont.)		
Bent Tree by Horizon Wind (350 MW)	Kern County	Under environmental review
Sun Creek by Terra-Gen (300 MW)	Kern County	Under environmental review
CHiPs Southwest by Terra-Gen (200 MW)	Kern County	Under environmental review
Shiloh II (150 MW repower) by Shiloh Wind Partners LLC (enXco)	Montezuma Hills, Solano County	Completed (12/08)
Shiloh III (200 MW repower) by Shiloh Wind Partners LLC (enXco)	Montezuma Hills, Solano County	Under environmental review
Montezuma Hills (37 MW)	Montezuma Hills, Solano County	Under environmental review
Montezuma Hills Wind II (60 MW)	Montezuma Hills, Solano County	Under environmental review
SMUD-Solano Phase 2B (63 MW)	Montezuma Hills, Solano County	Completed (12/07)
AES Daggett Ridge (84 MW)	San Bernardino	EIS in progress
Granite Wind, LLC (81 MW)	San Bernardino	EIR/EIS in progress
Solano Wind Project Phase 3 (up to 128 MW)	Montezuma Hills, Solano County	Under environmental review
Hatchet Ridge Wind Project (100 MW)	Shasta County, Burney	Under construction
Lompoc Wind Energy Project (97.5 MW)	Lompoc, Santa Barbara County	Approved
Pacific Wind (Iberdrola) Tule Wind (200 MW)	McCain Valley, San Diego County	Under environmental review
City of Vernon Wind Energy Project (175 MW)	Kern County	Under environmental review
Geothermal Projects – 17 Projects (757.3 MW)		
Buckeye Development Project by Calpine (30 MW)	Geyserville, Sonoma	Under environmental review
Casa Diablo #1-3 (37 MW)	Mono County	Completed
Casa Diablo #4 (30 MW)	Mono County	Under environmental review
Surprise Valley (38 MW)	Modoc County	Under environmental review
Truckhaven I (49 MW)	Imperial County	Under environmental review
The Geysers Field (22 power plants, 35 MW)	Sonoma County	Completed
Hudson Ranch I, Char, LLC (49.9 MW)	Calipatria, Imperial County	Under Construction
Wildhorse North Geysers, Calpine (30 MW)	Sonoma County	Under environmental review
Telephone Flat-Glass Mountain (49.9 MW)	Siskiyou County	Under environmental review
Fourmile Hill-Glass Mountain (49.9 MW)	Siskiyou County	Under environmental review
Black Rock Geothermal 1 (53 MW)	Brawley, Imperial County	Under environmental review
Black Rock Geothermal 2 (53 MW)	Brawley, Imperial County	Under environmental review
Black Rock Geothermal 3 (53 MW)	Brawley, Imperial County	Under environmental review
Orni 18, LLC Geothermal Power Plant (49.9 MW)	Brawley, Imperial County	Approved
Orni 19, LLC Geothermal Power Plant (49.9 MW)	Brawley, Imperial County	Under environmental review
Hudson Ranch 1 (49.9 MW)	Imperial County	Approved
Hudson Ranch 2 (49.9 MW)	Imperial County	Under environmental review

SOURCE: CEC RSA, 2010 Section B.3.4, Table 1B. The CEC compiled this list from the projects on CEQAnet as of November 2009 and the projects located on private or State lands that are listed on the Energy Commission Renewable Action Team website as requesting ARRA funding. Additional renewable projects proposed on private and State lands but not requesting ARRA funds are listed on the website. The CEC RSA's Table 1B has been modified to remove projects not considered by the BLM, identified above. This list was supplemented by these additional sources: Humboldt County 2010; Kinney 2010; Kopp 2010; Kern County 2010; Cabanilla 2010; Solano County 2010; Public Utilities Commission 2010; Geothermal Energy Association 2009; Geothermal Magazine 2010.

Other BLM-Authorized Actions and Known Actions/Activities in the Cumulative Scenario

Other existing BLM authorized actions and other known actions/activities along the I-10 corridor in Eastern Riverside County are identified in Table 4.1-4.

Other future foreseeable projects along the I-10 corridor in Eastern Riverside County are identified in Table 4.1-5.

4.1.5 Mitigation Measures Included in the Analysis

For impacts identified in the following resource sections, mitigation measures have been developed that would be implemented during all appropriate phases of the project from initial ground breaking to operations, and through closure and decommissioning. The mitigation measures include a combination of the following:

1. Measures that have been proposed by the applicant;
2. Conditions of Certification (COCs) proposed by the California Energy Commission;
3. Regulatory requirements of other Federal, State, and local agencies;
4. USFWS terms and conditions identified in the Biological Opinion;
5. Terms and conditions identified in the Programmatic Agreement reached pursuant to National Historic Preservation Act Section 106; and
6. Additional BLM-proposed mitigation measures, standard right-of-way (ROW) grant terms and conditions, and best management practices.

These requirements are generically referred to as “Mitigation Measures” throughout this PA/FEIS. Because these Mitigation Measures are derived from a variety of sources, they also may be required, and their implementation regulated, by other agencies. For example, the project description included in Chapter 2 has been presented to the USFWS for consultation and is the basis upon which the terms and conditions of the Biological Opinion will be based. The Applicant would be required to comply with the terms and conditions of the Biological Opinion. Similarly, compliance with the terms and conditions of the National Historic Preservation Act Section 106 Programmatic Agreement will be required as a mitigation measure. The Applicant would be required by the ROD and the ROW grant to comply with the applicable requirements of other agencies; for example, see 43 CFR 2805.12(a) (Federal and state laws and regulations) and (i)(6) (more stringent state standards for public health and safety, environmental protection and siting, constructing, operating, and maintaining any facilities and improvements on the ROW). Any non-compliance with implementation of these other Federal or State requirements could affect the approval status of the ROD and ROW grant.

As noted above, the BLM recognizes that the Energy Commission conditions of certification are not generally within the enforcement authority of the BLM since these conditions are requirements originating in State law and regulation. While the Applicant must comply with such conditions, they

TABLE 4.1-4
EXISTING PROJECTS ALONG THE I-10 CORRIDOR (Eastern Riverside County)

ID #	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
1	Interstate 10	Linear interstate highway running from Santa Monica to Blythe (in California)	Caltrans	Existing	N/A	Interstate 10 (I-10) is a major east-west route for trucks delivering goods to and from California. It is a four-lane divided highway in the project region.
2	Chuckwalla Valley State Prison	19025 Wiley's Well Rd. Blythe, CA	CA Dept. of Corrections & Rehabilitation	Existing	1,080	State prison providing long-term housing and services for male felons classified as medium and low-medium custody inmates jointly located on 1,720 acres of state-owned property. APN 879040006, 008, 012, 027, 028, 029, 030
3	Ironwood State Prison	19005 Wiley's Well Rd. Blythe, CA	CA Dept. of Corrections & Rehabilitation	Existing	640	ISP jointly occupies with Chuckwalla Valley State Prison 1,720 acres of state-owned property, of which ISP encompasses 640 acres. The prison complex occupies approximately 350 acres with the remaining acreage used for erosion control, drainage ditches, and catch basins. APNs 879-040-001, 004, 009, 010, 011, 015, 016, 017, 018, 019, 020
4	Devers-Palo Verde 1 Transmission Line	From Palo Verde (Arizona) to Devers Substation	SCE	Existing	N/A	Existing 500 kV transmission line parallel to I-10 from Arizona to the SCE Devers Substation, near Palm Springs. DPV1 will loop into the approved Midpoint Substation (now called Colorado River Substation), which will be located 10 miles southwest of Blythe. See D and E in Table 3.18-3.
5	Blythe Energy Project	City of Blythe, north of I-10, 7 miles west of the CA /AZ border	Blythe Energy, LLC	Existing	76	520 MW combined-cycle natural gas-fired electric-generating facility. Project is connected to the Buck Substation owned by WAPA.
6	West-wide Section 368 Energy Corridors	Riverside County, parallel to DPV corridor	BLM, DOE, US Forest Service	Approved by BLM and US Forest Service	N/A	Designation of corridors on federal land in the 11 western states, including California, for oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities (energy corridors). One of the corridors runs along the southern portion of Riverside County.
7	Eagle Mountain Pumping Plant	Eagle Mountain Road, west of Desert Center	Metropolitan Water District of Southern California	Existing		144-foot pumping plant that is part of the Metropolitan Water District of Southern California’s facilities. APNs 807-150-007, 807-150-009, 807-150-010

TABLE 4.1-4 (Continued)
EXISTING PROJECTS ALONG THE I-10 CORRIDOR (Eastern Riverside County)

ID #	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
8	Recreational Opportunities	Eastern Riverside County	BLM	Existing	N/A	BLM has numerous recreational opportunities on lands in eastern Riverside County along the I-10 corridor including the Wiley's Well Campground, Coon Hollow Campground, and Midland Long-Term Visitor Area.
9	Kaiser Mine	Eagle Mountain, north of Desert Center	Kaiser Ventures, Inc.	Existing		Kaiser Steel mined iron ore at Kaiser Mine in Eagle Mountain and provided much of the Pacific Coast steel in the 1950s. Mining project also included the Eagle Mountain Railroad, 51 miles long. Imported steel captured market share in the 1960s and 1970s and primary steelmaking closed in the 1980s. 701380031
10	Blythe Energy Project Trans-mission Line	From the Blythe Energy Project (Blythe, CA) to Julian Hinds Substation	Blythe Energy, LLC	Existing	N/A	Transmission line modifications including upgrades to Buck Substation, approximately 67.4 miles of new 230 kV transmission line between Buck Substation and Julian Hinds Substation, upgrades to the Julian Hinds Substation, installation of 6.7 miles of new 230 kV transmission line between Buck Substation and SCE's DPV 500 kV transmission line.
11	Blythe PV Project	Blythe	First Solar	CPUC approved project terms of a 20 year power purchase agreement for sale of 7.5 MW, Under construction in fourth quarter, 2009	200	7.5 MW solar photovoltaic project located on 200 acres. Project was constructed by First Solar and sold to NRG Energy.
12	Chuckwalla Valley Raceway	Desert Center Airport (no longer a community airport)	Developer Matt Johnson	Existing	400	Proposed 500-mile race track located on 400 acres of land that used to belong to Riverside County and was used as the Desert Center Airport. APNs 811-142-016, 811-142-006. Small private airstrip kept as part of project. Construction completed in March 2010.

SOURCE: CEC RSA, 2010 Section B.3.4, Table 2; BLM, 2011

TABLE 4.1-5
FUTURE FORESEEABLE PROJECTS ALONG THE I-10 CORRIDOR (Eastern Riverside County)

ID #	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
A	Four Commercial Projects	Blythe, CA	Various	Approved	N/A	Four commercial projects have been approved by the Blythe Planning Department including the Agate Road Boat & RV Storage, Riverway Ranch Specific Plan, Subway Restaurant and Motel, and Agate Senior Housing Development.
B	Intake Shell	Blythe, CA		Under Construction	N/A	Reconstruction of a Shell facility located at Intake & Hobson Way. Demolition occurred in 2008, reconstruction planned for 2009-2010.
C	Fifteen residential developments	Blythe, CA	Various	Approved or Under Construction	N/A	Twelve residential development projects have been approved by the Blythe Planning Department including: Vista Palo Verde (83 Single Family Residential [SFR]), Van Weelden (184 SFR), Sonora South (43 SFR), Ranchette Estates (20 SFR), Irvine Assets (107 SFR), Chanslor Village (79 SFR), St. Joseph's Investments (69 SFR), Edgewater Lane (SFR), The Chanslor Place Phase IV (57 SFR), Cottonwood Meadows (103 Attached SFR), Palo Verde Oasis Phase IV (29 SFR). Three residential development projects have been approved and are under construction including: The Chanslor Phase II & III (78 SFR), River Estate at Hidden Beaches, Mesa Bluffs Villas (26 Attached SFR).
D	Devers-Palo Verde 2 Trans-mission Line Project	From the Midpoint Substation to Devers Substation (CA-only portion)	SCE	CPUC Petition to Modify Request to construct CA-only portion was approved by CPUC 11/2009. DPV2 to Arizona was originally approved by CPUC in 6/2007. BLM ROD not yet issued.	N/A	New 500 kV transmission line parallel to the existing Devers-Palo Verde Transmission Line from Midpoint Substation, approximately 10 miles southwest of Blythe, to the SCE Devers Substation, near Palm Springs. The ROW for the 500 kV transmission line would be adjacent to the existing DPV ROW and would require an additional 130 feet of ROW on federal and State land and at least 130 feet of ROW on private land and Indian Reservation land.
E	Colorado River Substation Expansion	10 miles southwest of Blythe	SCE	Approved by CPUC 11/2009. Application for expansion filed with CPUC in 11/2010. Expansion currently under environmental review.	44	The substation was approved by the CPUC (as the "Midpoint Substation") but is proposed to be expanded as a 500/230 kV substation and would be constructed in an area approximately 1,000 feet by 1,900 feet, permanently disturbing approximately 90 acres. The 500 kV switching station would include buses, circuit breakers, and disconnect switches. The switchyard would be equipped with 108-foot-high dead-end structures. Outdoor night lighting would be designed to illuminate the switchrack when manually switched on. The Draft Supplemental EIR was published by the CPUC in February 2011.
F	Desert Southwest Trans-mission Line	118 miles primarily parallel to DPV	Imperial Irrigation District	Final EIR/EIS prepared in 2005. Approved by the BLM in 2006.	N/A	New, approximately 118-mile 500 kV transmission line from a new substation/switching station near the Blythe Energy Project to the existing Devers Substation located approximately 10 miles north of Palm Springs, California.

TABLE 4.1-5 (Continued)
FUTURE FORESEEABLE PROJECTS ALONG THE I-10 CORRIDOR (Eastern Riverside County)

ID #	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
G	Blythe Energy Project II	Blythe, CA. Near the Blythe Airport and I-10	Blythe Energy, LLC	Approved by CEC in December 2005	30 acres (located on Blythe Energy Project land)	520 MW combined-cycle power plant located entirely within the Blythe Energy Project site boundary. Blythe Energy Project II will interconnect with the Buck Substation constructed by WAPA as part of the Blythe Energy Project. Project is designed on 30 acres of a 76-acre site.
H	Eagle Mountain Pumped Storage Project	Eagle Mountain iron ore mine, north of Desert Center	Eagle Crest Energy Company	License application filed with FERC in June 2009. EIR published in mid-2010; FERC Draft EIS published in December 2010.	1,524	1,300 MW pumped storage project designed to store off-peak energy to use during peak hours. The captured off-peak energy would be used to pump water to an upper reservoir. When the water is released to a lower reservoir through an underground electrical generating facility the stored energy would be added into the Southwestern grid during “high demand peak” times, primarily weekdays. Estimated water use is 8,100 AFY for the first four-year start-up period and replacement water is 1,763 AFY thereafter.
I	Palen Solar Energy Project	North of I-10, 10 miles east of Desert Center	Solar Millennium LLC/ Chevron Energy	Approved by CEC in December 2010. Undergoing environmental review by BLM. Proposed to have one unit online in 2012 and one unit online in 2013.	5,200	500 MW solar trough project on 5,200 acres. Facility would consist of two 250 MW plants disturbing approximately 3,870 acres. Project would include interconnection to the SCE Red Bluff Substation. Project would use an estimated 300 AFY of water.
J	Blythe Solar Power Project	North of I-10, immediately north of the Blythe Airport	Solar Millennium LLC/Chevron Energy	Approved by CEC and BLM in 2010; under construction.	9,400	1,000 MW solar trough facility on 9,400 acres.
K	NextEra (FPL) McCoy	Northwest of Blythe, CA, immediately north of Blythe Solar Power Project	NextEra (FPL)	Plan of Development in to Palm Springs BLM	20,608	250 MW solar trough project. ROW in process for monitoring water well drilling.
L	McCoy Soleil Project	10 miles northwest of Blythe	enXco	Plan of Development in to Palm Springs BLM	1,959	300 MW solar power tower project located on 1,959 acres. Project would require a 14-mile transmission line to proposed SCE Colorado Substation south of I-10. Would use 575-600 AFY of water.
M	Genesis Solar Energy Project	North of I-10, 25 miles west of Blythe and 27 miles east of Desert Center	NextEra (FPL)	Approved by CEC and BLM in 2010; under construction		250 MW solar trough project on 4,640 acres north of the Ford Dry Lake. Project includes six-mile natural gas pipeline and a 5.5-mile gen-tie line to the Blythe Energy Center to Julian Hinds Transmission Line, then travel east on shared transmission poles to the Colorado River Substation.

TABLE 4.1-5 (Continued)
FUTURE FORESEEABLE PROJECTS ALONG THE I-10 CORRIDOR (Eastern Riverside County)

ID #	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
N	Chuckwalla Solar I	1 mile north of Desert Center	Chuckwalla Solar I, LLC	Plan of Development submitted to BLM	4,083	200 MW solar photovoltaic project on 4,083 acres. Project would be developed in several phases and would tap into an existing SCE 161-kV transmission line crossing the site.
O	Rice Solar Energy Project	Rice Valley, Eastern Riverside County	Rice Solar Energy, LLC (Solar Reserve, LLC)	Approved by CEC; construction to begin in 2011	1,410	150 MW solar power tower project with liquid salt storage. Project is located on approximately 1,410 acres and includes a power tower approximately 650 feet tall and a 10-mile long interconnection with the WAPA Parker-Blythe transmission line.
P	Blythe Airport Solar I Project	Blythe Airport	U.S. Solar	City of Blythe approved the project in November, 2009	640	100 MW solar photovoltaic project located on 640 acres of Blythe airport land.
Q	Desert Quartzite	South of I-10, 8 miles southwest of Blythe	First Solar (previously OptiSolar)	POD in to BLM	7,724	600 MW solar photovoltaic project located on 7,724 acres. Adjacent to DPV transmission line and SCE Colorado Substation. Approximately 27 AF of water would be used during construction and 3.8 AFY during operation.
R	Desert Harvest Project	6 miles north of Desert Center	enXco	POD submitted to BLM	1,057	100 MW photovoltaic plant on 1,057 acres of BLM land. Would require a 5- to 8-mile transmission line to planned SCE Red Bluff Substation.
S	Eagle Mountain Landfill Project	Eagle Mountain, North of Desert Center	Mine Reclamation Corporation and Kaiser Eagle Mountain, Inc.	US Court of Appeals for the Ninth Circuit issued its opinion regarding the EIS for the project in 11/09 and ruled that the land exchange for the project was not properly approved by the administrative agency. Kaiser's Mine and Reclamation is considering all available options.	~ 3,500	The project proposed to be developed on a portion of the Kaiser Eagle Mountain Mine in Riverside County, California. The proposed project comprises a Class III nonhazardous municipal solid waste landfill and the renovation and repopulation of Eagle Mountain Townsite. The proposal by the proponent includes a land exchange and application for rights-of-way with the Bureau of Land Management and a Specific Plan, General Plan Amendment, Change of Zone, Development Agreement, Revised Permit to Reclamation Plan, and Tentative Tract Map with the County. The Eagle Mountain landfill project proposes to accept up to 20,000 tons of non-hazardous solid waste per day for 50 years.
T	Wiley's Well Communication Tower (part of the Public Safety Enterprise Communication System)	East of Wiley's Well Road, just south of I-10	Riverside County	Final EIR for the Public Safety Enterprise Communication System published in August 2008.	N/A	The Public Safety Enterprise Communication project is the expansion of Riverside County's fire and law enforcement agencies approximately 20 communication sites to provide voice and data transmission capabilities to personnel in the field.

TABLE 4.1-5 (Continued)
FUTURE FORESEEABLE PROJECTS ALONG THE I-10 CORRIDOR (Eastern Riverside County)

ID #	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
U	Paradise Valley "New Town" Development	Approximately 30 miles west of Desert Center (7 miles east of the city of Coachella)	Glorious Land Company	Notice of Preparation (NOP) of an EIR published in December 2005. Still under environmental review.	6,397	Company proposes to develop a planned community as an international resort destination with residential, recreational, commercial, and institutional uses and facilities. The project is planned as a self-contained community with all public and quasi-public services provided. The project is located outside the Coachella Valley Water District (CVWD) boundaries and the applicant has entered into an agreement with the CVWD to manage artificial recharge of the Shaver's Valley groundwater. The proponent has purchased a firm water supply from Rosedale-Rio Bravo Water District in Kern County. In-kind water would be transferred to the MWD that would release water from the Colorado River Aqueduct to a 38-acre percolation pond on the project site. MWD would deliver approximately 10,000 AFY to the percolation pond and over the long term, no net loss of groundwater in storage is anticipated.
V	Mecca Specific Plan	North of Salton Sea, east of community of Mecca, southeast of City of Coachella.	Mecca Group LLC	NOP of an EIR published in June 2008. Still under environmental review.	2,934	The proposed project includes 19,476 units with a mix of low-, medium- and high-density residential development. Non-residential uses include retail/commercial, mixed use, a golf course, and open space with civic uses and agricultural buffers. The Specific Plan incorporates existing residential, commercial, industrial, and civic uses with a blend of proposed low-, medium- and high-density residential and commercial land uses. The proposed General Plan Amendment and Change of Zone would be changed to Specific Plan and Specific Plan zoning.
W	Proposed National Monument (former Catellus Lands)	Between Joshua Tree National Park and Mojave National Preserve		In December 2009, Senator Feinstein introduced Senate Bill 2921 that would designate two new national monuments including the Mojave Trails National Monument.	941,000	The proposed Mojave Trails National Monument would protect approximately 941,000 acres of federal land, including approximately 266,000 acres of the former railroad lands along historic Route 66. The BLM would be given the authority to conserve the monument lands and also to maintain existing recreational uses, including hunting, vehicular travel on open roads and trails, camping, horseback riding and rockhounding.
X	BLM Solar Energy Zones (SEZs)	Along the I-10 corridor between Desert Center and Blythe	BLM	Proposed	202,896 (eastern Riverside County only)	The DOE and the BLM identified 24 tracts of land as Solar Energy Study Areas in the BLM and DOE Solar Programmatic Draft EIS, published in December 2010. These areas have been identified for in-depth study of solar development and may be found appropriate for designation as solar energy zones in the future.

SOURCE: CEC RSA, 2010 Section B.3.4, Table 3; BLM, 2011.

are not directly enforceable by the BLM except in the general sense referred to above. For those Energy Commission conditions that are also within the enforcement authority of the BLM because of overlapping authorities, the BLM has recommended them as mitigation measures in the PA/FEIS and thereby made them subject to the BLM's enforcement authority. Appendix B, *Conditions of Certification*, contains a complete list of the CEC's conditions of certification for the project.

In some instances, the BLM has identified potential impacts to public land resources that should be mitigated. In these instances, individual mitigation measures have been developed by the BLM and are recommended in the PA/FEIS. Compliance with these mitigation measures would be monitored and enforced solely by the BLM. In addition, standard terms and conditions for approval of the use of public land would be identified in the ROD and incorporated into any ROW grant authorized for the project and thereafter would be enforced by the BLM.

4.1.6 Terms and Conditions found in FLPMA and BLM ROW Regulations

Title V of FLPMA addresses the issuance of ROW authorizations on public land. The BLM has identified all the lands that would be occupied by facilities associated with the project that are needed for its construction, operation, and maintenance. The general terms and conditions for all public land rights of way are described in FLPMA section 505, and include measures to minimize damage and otherwise protect the environment, require compliance with air and water quality standards, and compliance with more stringent state standards for public health and safety, environmental protection, siting, construction, operation, and maintenance of ROWs. The Secretary may prescribe additional terms and conditions as he deems necessary to protect Federal property, provide for efficient management, and among other things, generally protect the public interest. For this project, terms and conditions would be incorporated into the ROW grant as necessary to protect public safety, including security fencing and on-site personnel. The environmental consequences analysis in the PA/FEIS identifies impacts and mitigation measures to reduce or eliminate impacts. The mitigation measures identified by the BLM in Chapter 4, *Environmental Consequences*, which would be incorporated as terms and conditions of the ROW grant, recommend actions necessary to prevent unnecessary or undue degradation of the public lands as required by FLPMA section 302. The additional mitigation measures that are identified and described in the EIS and that would be enforced by the other agencies, as noted above, provide additional protection to public land resources.

Specifically, the PA/FEIS identifies recommended mitigation measures that would:

1. Require compliance with Mojave Desert Air Quality Management District State regulations, reduce carbon emissions, and minimize dust;

2. Require planning and compliance with Federal, State and local agency requirements for drainage, erosion and sediment control, wastewater management, groundwater use and monitoring, and stormwater control and monitoring;

3. Require measures to protect public health and safety including traffic control, transmission line standards, and worker safety plans; and

4. Require biological resource mitigation and cultural resources mitigation to protect sensitive environmental resources and cause the least damage to the environment and protect the public interest, while allowing the project to be constructed.

Finally, all BLM ROW grants are approved subject to the regulations set forth in 43 CFR Part 2800, which specify that the BLM may, at any time, change the terms and conditions of a ROW grant “as a result of changes in legislation, regulations, or as otherwise necessary to protect public health or safety or the environment.” 43 CFR 2805.15(e). The BLM will monitor conditions and review any ROW grant issued for the PSPP to evaluate if future changes to the grant terms and conditions are necessary or justified under this provision of the regulations to further minimize or reduce impacts resulting from the project.

If approved, the solar energy ROW authorization would include diligent development terms and conditions, consistent with the requirements of 43 CFR 2805.12(i)(5). Failure of the holder to comply with the diligent development terms and conditions would provide the BLM authorized officer the authority to suspend or terminate the authorization (43 CFR 2807.17).

If approved, the solar energy ROW authorization also would include a required “Performance and Reclamation” bond to ensure compliance with the terms and conditions of the ROW authorization, which is consistent with the requirements of 43 CFR 2805.12(g). The “Performance and Reclamation” bond would consist of three components. The first component would be hazardous materials, the second component would be the decommissioning and removal of improvements and facilities, and the third component would address reclamation, revegetation, restoration and soil stabilization.

4.1.7 Incorporation of the Analysis of the Red Bluff Substation Project by Reference

Section 1502.21 of the CEQ regulations states, “Agencies shall incorporate material into an environmental impact statement by reference when the effect will be to cut down on bulk without impeding agency and public review of the action.” See also, BLM NEPA Handbook Section 5.2.1, *Incorporation by Reference*. The BLM is incorporating by reference each of the portions of the Desert Sunlight EIS cited and summarized in Appendix E, *Analysis of the Red Bluff Substation Project, Incorporated by Reference from the Desert Sunlight EIS*. For all of the affected resource and issue areas, construction, operation and maintenance of the Red Bluff Substation project would cause or contribute to the same direct, indirect and cumulative impacts regardless of whether it were constructed as part of the Desert Sunlight project, the PSPP, or another of the projects proposed for interconnection.

4.2 Impacts on Air Resources

4.2.1 Impact Assessment Methodology

Construction, operation and maintenance, and closure and decommissioning of the proposed action would emit criteria air pollutants, including fugitive dust and combustion products. This section analyzes potential impacts related to air resources from the emissions of criteria air pollutants from the proposed action and alternatives. Criteria air pollutants are defined as air contaminants for which the State and/or Federal government has established ambient air quality standards to protect public health.

The criteria pollutants analyzed within this section are nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), and particulate matter (PM). There are two subsets of particulate matter: inhalable particulate matter (less than 10 microns in diameter, or PM10) and fine particulate matter (less than 2.5 microns in diameter, or PM2.5). Nitrogen oxides (NOX, consisting primarily of nitric oxide [NO] and NO_2) and volatile organic compound (VOC) emissions readily react in the atmosphere as precursors to ozone and, to a lesser extent, particulate matter. Sulfur oxides (SO_X) readily react in the atmosphere to form particulate matter and are major contributors to acid rain. Global climate change and greenhouse gas (GHG) emissions are analyzed in Section 3.3, *Impacts on Global Climate Change*.

Dispersion Modeling Assessment

The Applicant used the U.S. Environmental Protection Agency (U.S. EPA) guideline American Meteorological Society/EPA Regulatory Model (AERMOD) to estimate ambient impacts from construction and operation of the proposed action. Construction emission sources for the site were grouped into two categories: equipment (off-road equipment) and vehicles (on-road equipment), where the exhaust and fugitive dust emissions for each type were calculated for particulate matter modeling. Emissions from onsite equipment engines and fugitive dust emission sources were modeled as area sources. Similar modeling procedures were used by the Applicant to determine impacts from the operating maintenance vehicle exhaust and fugitive dust emissions, while the stationary sources (boilers, engines, cooling towers) were modeled as point sources.

This air dispersion model analysis provides a means of predicting the location and ground level magnitude of the impacts of a new emissions source. AERMOD consist of several complex series of mathematical equations, which are repeatedly calculated by a computer for many ambient conditions to provide theoretical maximum offsite pollutant concentrations short-term (one-hour, three-hour, eight-hour, and 24-hour) and annual periods. Model results generally are described as maximum concentrations, often as a unit of mass per volume of air, such as micrograms per cubic meter ($\mu g/m^3$).

The inputs for the air dispersion model include two power blocks with stack information (exhaust flow rate, temperature, and stack dimensions); specific engine and vehicle emission data; and meteorological data, such as wind speed, atmospheric conditions, and site elevation. For the proposed action, the meteorological data used as inputs to the model included hourly wind speeds and directions measured approximately 27 miles to the east of the Project site at the Blythe Airport meteorological station during 2002 through 2004.

For the determination of one-hour average and annual average construction NOx concentrations the Ozone Limiting Method (OLM) was used to determine highest possible near field NO_2 impacts. The NOx emissions from internal combustion sources, such as diesel engines, are primarily in the form of nitric oxide (NO) rather than NO_2. The NO converts into NO_2 in the atmosphere, primarily through the reaction with ambient ozone, and NOx OLM assumes full conversion of stack NO emission with the available ambient ozone. The NOx OLM method was used assuming an initial NO_2/NOx ratio of 0.1 for all NOx emission sources. Actual monitored hourly background ozone concentration data from Niland, California were used for all of 2002 and January through April of 2003, and Blythe monitoring data were used from May 2003 through 2004, based on data availability and proximity to the project site, to provide ozone data that corresponds with the years of meteorological data that were used to calculate maximum potential NO to NO_2 conversion to determine the maximum hourly NO_2 impacts.

Background concentrations provided by the Applicant were replaced where appropriate[1] with the available highest ambient background concentrations from the last three years at the most representative monitoring stations as shown in Table 4.2-1. The information presented in this table has been updated since the publication of the SA/DEIS to use peak values from 2007 to 2009 background data for gaseous pollutants (2009 data were not yet available); the updated information shows an improvement in highest possible background concentrations for many of the criteria pollutants included in the air dispersion modeling analysis. Modeled impacts to these background concentrations were added, and then compared with the ambient air quality standards for each respective air contaminant to determine whether the proposed action's emission impacts would cause a new exceedance of an ambient air quality standard or would contribute to an existing exceedance.

Construction Modeling Analysis

The total duration of project construction for the proposed action is estimated to be 39 months. Construction primarily would include construction of two solar fields and two power blocks. Different areas within the project site and the construction laydown areas would be disturbed at different times over the period. Total construction disturbance area would be approximately 5,200 acres; the permanent disturbance area of the project operations would be approximately 2,970 acres. Construction elements of the proposed action would include the two solar power plants (power block and solar array, as well as other ancillary facilities such as the administration buildings, warehouse, and parking lot), an electric transmission line to a substation located to the west, access roads, and rerouted drainage channels.

1 This does not include the background for the federal one-hour NO_2 standard since the Applicant's modeling analysis uses actual monitored NO_2 concentrations to determine the combined PSPP plus background average 98th percentile 1-hour NO_2 impacts.

TABLE 4.2-1
BACKGROUND CONCENTRATIONS (μG/M^3)

Pollutant	Averaging Time	Recommended Background	Limiting AAQS[a]	Percent of Standard
NO_2	1 hour	119	339	35%
	Annual	19	57	33%
CO	1 hour	2,645	23,000	12%
	8 hour	878	10,000	9%
PM10	24 hour	83	50	166%
	Annual	30.5	20	153%
PM2.5	24 hour[b]	20.5	35	59%
	Annual	8.7	12	73%
SO_2	1 hour	23.6	655	4%
	3 hour	15.6	1,300	1%
	24 hour	13.1	105	12%
	Annual	3.5	80	4%

[a] The limiting AAQS is the most stringent of the CAAQS or NAAQS for that pollutant and averaging period.
[b] PM2.5 24-hour data shown are the 98th percentile values which is the basis of the ambient air quality standard and the basis for determination of the recommended background concentration.

SOURCE: CEC RSA, 2010 (Table 5)

Combustion emissions would result from the off-road construction equipment, including diesel construction equipment used for site grading, excavation, and construction of onsite structures, and water and soil binder spray trucks used to control construction dust emissions; and off-road construction equipment used at the onsite batch plant. Fuel combustion emissions also would result from exhaust from on-road construction vehicles, including heavy duty diesel trucks used to deliver materials, other diesel trucks used during construction, and worker personal vehicles and pickup trucks used to transport workers to and from and around the construction site. Fugitive dust emissions would result from site grading/excavation activities, installation of a temporary 12 kV construction power transmission line and the new project power transmission lines, completion of onsite wells and water pipelines, construction of power plant facilities, roads, and substation, the use of an onsite batch plant, and vehicle travel on paved and unpaved roads. There also would be emissions associated with the use of an onsite fuel depot.

The annual emissions for the shorter duration offsite construction activities are based on the following construction durations: one month for access road construction, and seven months for transmission line construction.

Using estimated peak hourly, daily, and annual construction equipment exhaust emissions, the Applicant modeled the proposed action's construction emissions to determine impacts (CEC RSA, 2010). To determine the construction impacts on ambient standards (i.e., one-hour through annual) it was assumed that the emissions would occur during a daily construction schedule of 10-hour days from March through September (7 a.m. to 5 p.m.) and 8-hour days from October through February (8 a.m. to 4 p.m.). The Applicant's modeling results indicate that 1 hour NO_2

concentrations above the State standard only occur within 200 meters of the north fence line at night. The results are conservative and contribute impacts to project construction higher than expected for the following reasons:

- The modeling analysis included the very conservative input assumptions of using area sources to model all of the construction NOx emissions, except for the stationary concrete batch plant generator which was modeled as a point source and consequently found to have minimal NO_2 impacts (less than 3 µg/m3).
- Impacts exceeding the State standard only occurred for five out of the 26,304 hours modeled and were found to only occur at night when construction activities would normally be winding down or at much lower level of emissions than during mid-day.
- The modeling, which did incorporate the ozone limiting method (OLM), did not undergo further refinement to determine the actual expected maximum conversion of NO to NO2 in the very short time period the emissions plume would take to get to and just past the fence line. OLM assumes immediate 100 percent conversion based on the available concentration of ozone. Such an analysis would show that the maximum NO2 concentrations from construction would not exceed the state standard.

The predicted proposed action pollutant concentration levels were added to a conservatively estimated background of existing emission concentration levels (Table 4.2-1) to determine the cumulative effect. Table 4.2-2 presents the results of the Applicant's modeling analysis. The construction-related maximum daily emissions modeling analysis for the proposed action, including both the onsite fugitive dust and vehicle tailpipe emission sources, is summarized in Table 4.2-3, and maximum annual emissions are summarized in Table 4.2-4.

TABLE 4.2-2
MAXIMUM PROPOSED ACTION CONSTRUCTION IMPACTS

Pollutants	Avg. Period	Project Impact ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	Standard ($\mu g/m^3$)	Percent of Standard
NO_2	1-hr.	351.9	45.1[a]	397.0	339	117%
	Annual	4.9	19.0	23.9	57	42%
CO	1-hr	575	2,645	3,220	23,000	14%
	8-hr	282	878	1,160	10,000	12%
PM10	24	51.9	83	134.9	50	270%
	Annual	3.9	30.5	34.1	20	171%
PM2.5	24	14.5	20.5	35.0	35	100%
	Annual	1.32	8.7	10.0	12	83%
SO_2	1-hr	1.71	23.6	25.3	665	4%
	3-hr	1.33	15.6	16.9	1,300	1%
	24-hr	0.42	13.1	13.5	105	13%
	Annual	0.01	3.5	3.5	80	4%

[a] This is the background concentration that corresponds the hour with the highest combined matched hourly project impact and hourly monitored NO2 background concentration.

SOURCE: CEC Commission Decision, 2010 (Air Quality Table 4)

TABLE 4.2-3
PROPOSED ACTION CONSTRUCTION – MAXIMUM DAILY EMISSIONS (lbs/day)

	NOx	VOC	CO	PM10	PM2.5	SOx
Onsite Construction Emissions						
Main Power Block (entire project)						
Off-road Equipment Exhaust	1,412.15	165.52	670.28	60.83	55.96	3.09
On-road Vehicles	36.74	2.69	17.22	1.21	1.11	0.05
Asphaltic Paving	—	0.00	—	—	—	—
Fugitive Dust from Paved Roads	—	—	—	5.24	0.89	—
Fugitive Dust from Unpaved Roads	—	—	—	585.25	124.09	—
Fugitive Dust from Construction Activities	—	—	—	691.68	143.87	—
Batch Plant Emissions	**17.86**	**1.3**	**9.84**	**17.48**	**17.48**	**0.03**
Fuel Depot	—	**6.17**	—	—	—	—
Subtotal – Power Block Onsite Emissions	**1,466.75**	**175.68**	**697.34**	**1,361.7**	**343.4**	**3.16**
Power Block On-road Equipment (offsite)	330.06	78.79	852.08	149.72	36.18	1.37
Access Road Construction (offsite)	73.42	6.76	35.86	25.95	7.57	0.14
Transmission Line Construction (offsite)	19.30	2.91	30.21	12.01	3.21	0.06

SOURCE: CEC RSA, 2010 (Table 6)

TABLE 4.2-4
PROPOSED ACTION CONSTRUCTION – MAXIMUM ANNUAL EMISSIONS (tons/year)

	NOx	VOC	CO	PM10	PM2.5	SOx
Construction Emissions						
Main Power Block (entire project)						
Off-road Equipment Exhaust	164.32	19.53	82.28	7.53	7.01	0.36
On-road Vehicles	4.90	0.31	2.05	0.16	0.15	0.01
Asphaltic Paving	—	0.03	—	—	—	—
Fugitive Dust from Paved Roads	—	—	—	0.64	0.11	—
Fugitive Dust from Unpaved Roads	—	—	—	71.14	15.17	—
Fugitive Dust from Construction Activities	—	—	—	73.33	15.08	—
Batch Plant Emissions	**2.14**	**0.16**	**1.18**	**2.3**	**2.3**	0.00
Fuel Depot	—	**1.13**	—	—	—	—
Subtotal – Power Block Onsite Emissions	**171.37**	**21.16**	**85.51**	**155.1**	**39.83**	**0.37**
Power Block On-road Equipment (offsite)	36.82	9.00	95.73	16.9	4.19	0.16
Access Road Construction (offsite)	0.81	0.07	0.39	0.29	0.08	0.00
Transmission Line Construction (offsite)	0.90	0.17	1.84	0.60	0.23	0.16

NOTE: Emissions that were not added may not be additive due to occurring at different times during the construction schedule, and all emissions include fugitive dust as appropriate.

SOURCE: CEC, Commission Decision (Air Quality Table 3)

Operation Modeling Analysis

Using estimated peak hourly, daily, and annual operating emissions, the Applicant modeled the proposed action's operation emissions to determine impacts (CEC RSA, 2010). The predicted proposed action pollutant concentration levels were added to conservatively-estimated maximum background concentration levels (Table 4.2-1) to determine the cumulative effect. Table 4.2-5 presents the results of the Applicant's modeling analysis of operations-phase emissions. This analysis includes emissions from the stationary sources for both power blocks and the onsite fugitive dust and vehicle tailpipe emission sources estimated by the Applicant. Table 4.2-6 presents operation-related maximum daily emissions modeling analysis for the proposed action. Table 4.2-7 presents operation-related maximum annual emissions modeling analysis for the proposed action. The following are the stationary and mobile emission source operating assumptions that were used to develop the operation emissions estimates for the proposed action:

Stationary Emission Sources

The proposed action would consist of two power plant units, each of which would consist of the following basis for equipment and emission estimates:

a. One 35-MMBtu/hr propane or liquefied petroleum gas (LPG) fired auxiliary boiler used for startup and HTF freeze protection; daily emissions based on 5 hours per day at 25% load and 12 hours per day at full load. Annual emissions based on 5,100 hours per year with duty cycle of 12% (600 hours per year) at full load and 88% (4,500 hours per year) at 25% load.

b. One 300 hp diesel-fired emergency fire water pump engine; testing one hour test per week, not to exceed 50 hours per year.

c. One 2,922 hp diesel-fired emergency generator engine; testing one hour test per week, not to exceed 50 hours per year.

d. One two-cell cooling tower; circulation rate of 6,034 gallons per minute, 2,000 milligrams per liter Total Dissolved Solids (TDS), drift eliminator with drift losses of less than or equal to 0.0005%, maximum run time of 16 hours per day and 3,700 hours per year.

e. One HTF expansion/ullage system; VOC control efficiency of 98%, limited to 0.75 pounds per hour or 1.5 pounds per day, operation is estimated at 2 hours per day and 400 hours per year.

f. HTF piping system. Assumes 3,050 valves, 4 pump seals, 7,594 connectors, and 10 pressure relief valves for each unit. The HTF piping system fugitive emissions were recalculated to consider the properties of the HTF during the daily operation cycle, where it is assumed that for 16 hours per day the HTF in the piping system is consistent with the properties of a light liquid and for 8 hours per day the HTF in the piping system is consistent with the properties of a heavy liquid. The specific emission factors used are set forth in Table 4.2-8.

TABLE 4.2-5
PROPOSED ACTION OPERATION EMISSION IMPACTS

	Avg. Period	Project Impact ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	Standard ($\mu g/m^3$)	Percent of Standard
NO_2	1-hr CAAQS	139.7	119	258.7	339	76%
	1-hr NAAQS	171.6	NA	171.6	188	91%
	Annual	0.03	19.0	19.0	57	33%
CO	1-hr	183.5	2,645	2,829	23,000	12%
	8-hr	73.9	878	952	10,000	10%
PM10	24	14.1	83	97.1	50	194%
	Annual	1.8	30.5	32.3	20	162%
PM2.5	24	2.5	20.5	23.0	35	66%
	Annual	0.39	8.7	9.1	12	76%
SO_2	1-hr	3.1	23.6	26.7	665	4%
	3-hr	2.1	15.6	17.7	1,300	1%
	24-hr	0.23	13.1	13.3	105	13%
	Annual	0.008	3.5	3.5	80	4%

SOURCE: CEC Commission Decision, 2010 (Air Quality Table 6)

TABLE 4.2-6
PROPOSED ACTION OPERATIONS – MAXIMUM DAILY EMISSIONS (LBS/DAY)

	NOx	VOC	CO	PM10	PM2.5	SOx
Onsite Operation Emissions						
Auxiliary Boilers	10.30	4.64	34.84	9.28	9.28	10.48
Emergency Fire Pump Engines	3.77	0.20	3.44	0.20	0.20	0.01
Emergency Generators	58.70	3.09	33.47	1.93	1.93	0.06
Auxiliary Cooling Towers	---	---	---	1.45	1.45	--
HTF Vents	---	3.00	---	---	--	---
HTF Fugitives	---	92.89	--	--	--	--
Onsite Maintenance Vehicles	0.86	0.09	0.56	310.06	65.76	0.01
Fuel Depot	--	0.45	--	--	--	--
Subtotal of Onsite Emissions	***73.63***	***104.36***	***72.31***	***322.92***	***78.61***	***10.56***
Offsite Emissions						
Delivery Vehicles	39.16	2.89	11.02	2.95	2.11	0.04
Employee Vehicles	9.06	9.49	90.28	18.70	8.75	0.14
Subtotal of Offsite Emissions	***48.22***	***12.38***	***101.30***	***21.65***	***10.86***	***0.18***
Total Maximum Daily Emissions	**121.85**	**116.74**	**173.61**	**344.57**	**89.47**	**10.74**

SOURCE: CEC RSA, 2010 (Table 8)

TABLE 4.2-7
PROPOSED ACTION OPERATIONS – MAXIMUM ANNUAL EMISSIONS (TONS/YR)

	NOx	VOC	CO	PM10	PM2.5	SOx
Onsite Operation Emissions						
Auxiliary Boilers	0.67	0.30	2.27	0.60	0.60	0.68
Emergency Fire Pump Engines	0.09	0.00	0.09	0.00	0.00	0.00
Emergency Generators	1.47	0.08	0.84	0.05	0.05	0.00
Auxiliary Cooling Towers	---	---	---	0.26	0.26	---
HTF Vents	---	0.30	---	---	---	---
HTF Fugitives	---	16.95	---	---	---	---
Onsite Maintenance Vehicles	0.10	0.01	0.07	31.32	6.64	0.00
Fuel Depot	--	0.004	--	--	--	--
Subtotal of Onsite Emissions	***2.33***	***17.74***	***3.27***	***32.23***	***7.55***	***0.68***
Offsite Emissions						
Delivery Vehicles	1.46	0.11	0.41	0.11	0.08	0.00
Employee Vehicles	1.65	1.73	16.48	3.41	1.60	0.02
Subtotal of Offsite Emissions	***3.11***	***1.84***	***16.89***	***3.52***	***1.68***	***0.022***
Total Maximum Annual Emissions	**5.44**	**19.48**	**20.16**	**35.75**	**9.23**	**0.70**

SOURCE: CEC RSA, 2010 (Table 9)

TABLE 4.2-8
EMISSION FACTORS

Piping Component	Light Liquid Emission Factor (lb/hr/source)	U.S.EPA Reference Table	Heavy Liquid Emission Factor (lb/hr/source)	U.S.EPA Reference Table
Valves	5.55E-04	Table 2-9 (100 ppm)	1.90E-05	Table 2-4 (Heavy Oil)
Pump Seals	1.86E-03	Table 2-9 (100 ppm)	5.30E-05	Table 2-12 (Zero Factor)
Flanges/Connectors	1.65E-05	Table 2-12 (Zero Factor)	1.65E-05	Table 2-12 (Zero Factor)
Pressure Relief Valves	9.85E-02	Table 2-5 (<10,000 ppm)	1.90E-05	Table 2-4 (Heavy Oil)

NOTE: for pressure relief valves the in service emission factors are for gas service, rather than light liquid service.

SOURCE: CEC RSA, 2010 (AP-42)

These emission factors may not assume appropriate control efficiencies for the inspection and maintenance program required by the South Coast Air Quality Management District (SCAQMD). This emission estimate will be revised as determined necessary and appropriate pursuant to adaptive management principles, after further consideration of the effectiveness of the inspection and maintenance program.

Mobile Emissions Sources

a. Emissions for employee trips were estimated assuming 134 employees per day averaging 95 miles round trip per employee.

b. Mobile emissions sources required for operation and maintenance were estimated by the Applicant based on vehicle miles traveled (VMT) and operating hours. For example, a mirror washing cycle or event can be completed in three days, which would allow for approximately 78 washing events per year, but it was assumed that washing would only be required once per week during October through March and twice a week during April through September, for a total of 78 washing events per year (CEC RSA, 2010). Each mobile source type has a different basis for emissions estimates as provided in the Applicant's revised emission estimate spreadsheets (CEC RSA, 2010).

Closure and Decommissioning

The anticipated lifespan of the proposed action is estimated to be 30 years. Eventually the facility would close, either at the end of its useful life or due to some unexpected situation such as a natural disaster or catastrophic facility breakdown. When the facility closes, all sources of air emissions would cease to operate and impacts associated with those emissions no longer would occur. The only other expected emissions would be equipment exhaust and fugitive particulate emissions from the dismantling activities. However, emissions from these activities would be less than the emissions associated with construction of the proposed action due to a much shorter duration of equipment use, equipment technology advancement, and fugitive dust emissions would be required to be controlled in a manner at least equivalent to that required during construction.

4.2.2 Discussion of Direct and Indirect Impacts

Proposed Action

The modeling analysis for the construction and operation phases indicate that, with the exception of PM10 and 1-hour NO_2, that the proposed action would not create new exceedances or contribute to existing exceedances for any of the modeled air pollutants. The conditions that would create the highest possible project modeled impacts (low wind speeds) are not the same conditions that occur for the PM10 and PM2.5 maximum background concentration levels. Additionally, the highest possible PM2.5, PM10, and NO_2 impacts occur at the fence line and drop off quickly with distance. Therefore, the impacts, when including mitigation measures, would not contribute substantially to exceedances of the PM10 or NO_2 CAAQS in downwind areas.

Ozone

Air dispersion models can be used to quantify ozone impacts; however, such models are used for regional planning efforts where hundreds or even thousands of sources are input into the model to determine ozone impacts. No regulatory agency models have been approved for assessing single source ozone impacts. However, because of the known relationship of NOx and VOC emissions to ozone formation, it can be said that the emissions of NOx and VOC from the proposed action do have the potential (if left unmitigated) to contribute to higher ozone levels in the region.

PM2.5 Impacts

Secondary particulate formation is the process of conversion from gaseous reactants to particulate products. For the purposes of this analysis, it is assumed that 100 percent of PM2.5 exhaust emissions occur due to secondary particulate formation. The process of gas-to-particulate conversion, which occurs downwind from the point of emission, is complex and depends on many factors, including local humidity and the presence of air pollutants. The basic process assumes that the SOx and NOx emissions are converted into sulfuric acid and nitric acid first and then react with ambient ammonia to form sulfate and nitrate. The sulfuric acid reacts with ammonia much faster than nitric acid and converts completely and irreversibly to particulate form. Nitric acid reacts with ammonia to form both a particulate and a gas phase of ammonium nitrate. The particulate phase would tend to fall out; however, the gas phase can revert back to ammonia and nitric acid. Thus, under the right conditions, ammonium nitrate and nitric acid establish a balance of concentrations in the ambient air.

Emissions of NOx and SOx from the proposed action (if left unmitigated) could contribute to higher PM2.5 levels in the region; however, the region is attainment for PM2.5 standards and the low level of NOx and SOx emissions from the proposed action would not significantly affect that status.

Alternatives

Reconfigured Alternative 1

Reconfigured Alternative 1 would require approximately the same amount of construction and would have the same operating equipment and nearly identical operating maintenance requirements as the proposed action. The Applicant did not provide criteria pollutant emission estimates for the construction and operation of this alternative, but it is assumed that the construction and operation emissions would be approximately the same, or just slightly higher due to a less efficient site layout, as those for the proposed action. Therefore, the construction and operation emissions of Reconfigured Alternative 1 would be similar to those shown in Tables 4.2-3 and 4.2-4, and Tables 4.2-6 and 4.2-7, respectively.

The maximum daily and maximum annual construction and operation emissions and emission impacts for Reconfigured Alternative 1 would likely to be similar to those found for the proposed action, assuming the same maximum daily and annual construction activities. However, the amount of increase or reduction in impacts is uncertain as the impacts are based on factors such as proximity to receptors and terrain as well as total emissions. Additionally, it is possible that the revised fence line shape would reduce the distance from the primary operating emission sources to public areas outside of the fence line.

Implementation of Reconfigured Alternative 1 would likely result in the following:

a. The construction emissions and ground level pollutant concentration impacts would be the same as the proposed action and would require the same level of mitigation. The total construction period and total construction emissions and long-term ground level pollutant concentration impacts would be similar to those required to construct the proposed action.

b. The operation emissions and ground level pollutant concentration impacts of Reconfigured Alternative 1 could be higher than those for the proposed action if the distance from the emergency generator to the fence line is reduced, which would likely require additional mitigation in order to reduce NO_x emission impacts and ensure impacts from this alternative do not cause new ambient air quality standard exceedances. Otherwise, this alternative is essentially identical to the proposed action from an air resources perspective, and would require the same level of mitigation as the proposed action to mitigate other potential impacts. This alternative would provide the same benefits of the proposed action in displacing fossil fuel–fired generation and reducing associated, but mainly out-of-air-basin, criteria pollutant emissions.

Reconfigured Alternative 2

Option 1

Reconfigured Alternative 2 Option 1 would require approximately the same amount of construction and would have the same operating equipment and nearly identical operating maintenance requirements as the proposed action. The Applicant did not provide criteria pollutant emission estimates for the construction and operation of this alternative, but it is assumed that the construction and operation emissions would be approximately the same as, or just slightly higher the proposed action due to a less efficient site layout. Therefore, the construction and operation emissions of Option 1 would be similar to those shown in Tables 4.2-3 and 4.2-4, and Tables 4.2-6 and 4.2-7, respectively.

The maximum daily and maximum annual construction and operation emissions and emission impacts for Option 1 would likely to be as high as that estimated for the proposed action, assuming the same maximum daily and annual construction activities. The Option 1 Unit 1 power block would be located approximately 2,700 feet (0.5 mile) south of the location for the proposed action. This revised location would move more of the solar field closer to the I-10, increasing concerns regarding any visible fugitive dust plumes; however, appropriate measures would mitigate the potential for adverse dust plumes that could impact the I-10 during construction and operation.

Additionally, the revised fence line shape would reduce the distance from the primary operating emission sources to public areas outside of the fence line. The layout of Reconfigured Alternative 2 Option 1 would not require revised modeling for SCAQMD permitting purposes because SCAQMD does not require ambient impact analysis modeling for the proposed action and it would not cause substantially different impacts related to the pollutants of concern relative to the proposed action because the impacts of this alternative would be caused predominately by the modeled maintenance equipment, with the exception of the 1-hour NO_2 impacts that would be caused mainly by the large emergency engines. Considering the significantly shortened distance to the fence line (from 3,914 to 2,388 feet) under this alternative and the potential increase in 1-hour NO_2 impacts from the engines, additional NO_2 emissions mitigation measures should be imposed for this alternative that would require the Applicant to prove that it would not cause exceedances of the short term 1-hour NO_2 standards. Such proof could be provided, for example, through modeling analysis or through the proposed use of Tier 4 Emergency Generator Engines (an approximate 90 percent reduction in proposed emissions from the dominant NO_2 impact source). With this additional recommended NOx emission mitigation measure, the short-term and annual construction and operation pollutant concentration impacts for Reconfigured Alternative 2 Option 1 would be no different than those shown for the proposed action in Tables 4.2-2 and 4.2-5, respectively.

Implementation of Reconfigured Alternative 2 Option 1 would likely result in the following:

a. The short-term construction emissions and ground level pollutant concentration impacts would be the same as the proposed action and would require the same level of mitigation. The total construction period and total construction emissions and long-term ground level pollutant concentration impacts would be similar to those required to construct the proposed action.

b. The operation-related emissions and ground level pollutant concentration impacts would be higher than those for the proposed action due to a change in the distance from the emergency generator to the fence line, which would require additional mitigation in order to reduce NOx emission impacts to ensure that impacts from this alternative would not cause new ambient air quality standard exceedances. Otherwise, Reconfigured Alternative 2 Option 1 would be nearly identical to the proposed action from an air resources perspective, and would require the same level of mitigation as the proposed action to mitigate potential impacts to air quality.

c. This alternative would provide the same benefits of the proposed action in displacing fossil fuel–fired generation and reducing associated, but mainly out-of-air-basin, criteria pollutant emissions.

Option 2

Reconfigured Alternative 2 Option 2 would require approximately the same amount of construction and would have the same operating equipment and nearly identical operation and maintenance requirements as the proposed action. It is assumed that the construction and operation emissions are approximately the same as, or just slightly higher than the proposed action due to the alternative’s less efficient site layout. Therefore, the construction and operation emissions would be similar to those shown Tables 4.2-3 and 4.2-4, and Tables 4.2-6 and 4.2-7, respectively.

The maximum daily and maximum annual construction and operation emissions and emission impacts for Reconfigured Alternative 2 Option 2 would likely to be as high as that estimated for the proposed action, assuming the same maximum daily and annual construction activities. The Reconfigured Alternative 2 Option 2 Unit 1 power block would be located approximately 2,700 feet (0.5 mile) south of the location for the proposed action. This revised location, like Reconfigured Alternative 2 Option 1, would move more of the solar field closer to the I-10, increasing concerns regarding any visible fugitive dust plumes; however, appropriate measures would mitigate the potential for significant dust plumes that could impact the I-10 during construction and operation.

Additionally, the revised fence line shape would reduce the distance from the primary operating emission sources to public areas outside of the fence line. The layout of Reconfigured Alternative 2 Option 2 would not require revised modeling for SCAQMD permitting purposes because SCAQMD would not require ambient impact analysis modeling for this project. Additionally, the impacts of this alternative are not expected to be substantially different than those of the proposed action because impacts of the alternative would result predominately from the modeled maintenance equipment except for the 1-hour NO_2 impacts, which would be caused mainly by the large emergency engines. Considering the significantly shortened distance to the fence line (from 3,914 to 1,384 feet) under this alternative and the potential increase in 1-hour NO_2 impacts from the engines, staff recommends an additional an NO_2 emissions mitigation measure for this alternative that would require the Applicant to prove that it would not cause exceedances of the short term 1-hour NO_2 standards. Such proof could be provided, for example, through modeling analysis or through the proposed use of Tier 4 Emergency Generator Engines (an approximate 90 percent reduction in proposed emissions from the dominant NO_2 impact source). With this additional recommended NOx emission mitigation measure, the short-term and annual construction and operation pollutant concentration impacts for this alternative would be no worse than those shown for the proposed action in Tables 4.2-2 and 4.2-5, respectively.

Implementation of Reconfigured Alternative 2 Option 2 would likely result in the following:

a. The short-term construction emissions and ground level pollutant concentration impacts would be the same as the proposed action and would require the same level of mitigation. The total construction period and total construction emissions and long-term ground level pollutant concentration impacts would be similar to those required to construct the proposed action.

b. The operation emissions and ground level pollutant concentration impacts would be higher than those for the proposed action due to shorter distance between the emergency generator and the fence line, which merits additional mitigation to reduce NOx emission impacts and ensure impacts from this alternative would not cause new ambient air quality standard exceedances. Otherwise, this alternative is nearly identical to the proposed action from an air resources perspective and would require the same level of mitigation as the proposed action to mitigate potential impacts on air quality.

c. This alternative would provide the same benefits of the proposed action in displacing fossil fuel–fired generation and reducing associated, but mainly out-of-air-basin, criteria pollutant emissions.

Reduced Acreage Alternative

The Reduced Acreage Alternative would reduce the total operation emissions compared to the proposed action by approximately 25 percent (see Tables 4.2-6 and 4.2-7) due to reduced requirements of the smaller project. However, the maximum daily and annual construction emissions are assumed to be similar to the proposed action assuming the same level of maximum daily and annual activity with a reduction in the overall construction schedule. Therefore, the maximum construction emissions would be approximately the same as the emissions shown in Tables 4.2-3 and 4.2-4.

The maximum short-term and maximum annual construction pollutant concentration impacts for the Reduced Acreage Alternative are assumed to be essentially the same as that estimated for the proposed action, assuming the same maximum daily and annual construction activities. Thus, the short-term and annual construction pollutant concentration impacts for this alternative are assumed to be essentially the same as those shown for the proposed action in Table 4.2-2.

The maximum annual operation pollutant concentration impacts for the Reduced Acreage Alternative would likely to be 25 percent less than those found for the proposed action as shown in Table 4.2-5. However, the exact amount of reduction in impacts is uncertain as the impacts are based on factors such as proximity to receptors and terrain as well as total emissions.

Implementation of the Reduced Acreage Alternative would likely result in the following:

a. The short-term construction emissions and ground level pollutant concentration impacts would be similar to the proposed action and would require the same level of mitigation. While the daily and annual construction activity would likely be similar to the proposed action, the total construction period and total construction emissions would be reduced from those required to construct the proposed action.

b. The operation emissions and ground level pollutant concentration impacts would likely be approximately 25 percent less than those for the proposed action.

c. The Reduced Acreage Alternative would displace approximately 25 percent less fossil fuel–fired generation and associated criteria pollutants, but mainly out of the air basin, compared to the proposed action.

No Action Alternative A

Implementation of No Action Alternative A would likely result in the following:

a. The impacts of the PSPP would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM’s land use plan, including another renewable energy project. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

b. The benefits of the PSPP in reducing fossil fuel use and greenhouse gas emissions from gas-fired generation would not occur. Both State and Federal law support the increased use of renewable power generation. Implementation of this alternative would not support those efforts.

CDCA Plan Amendment/No Project Alternative B

Under this alternative, the ROW application would be denied, and the CDCA Plan would be amended to identify the project site as unsuitable for any type of solar energy development. Insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis of impacts of this alternative related to air resources in this PA/FEIS. Appropriate NEPA analysis would need to be conducted on any new ROW application to determine the specific impacts.

CDCA Plan Amendment/No Project Alternative C

Under this alternative, the ROW application would be denied, and the CDCA Plan would be amended to identify the PSPP application area as suitable for any type of solar energy development. Insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need d to be conducted on any new ROW application to determine the specific impacts.

4.2.3 Discussion of Cumulative Impacts

Cumulative air quality impacts would occur when multiple projects affect the same geographic areas at the same time or when sequential projects extend the duration of air quality impacts on a given area over a longer period of time. The factors of geographic extent and time frame for ambient air quality impacts and climate change impacts are discussed below.

Air quality impacts of the project would stem from temporary construction and long-term operational activities. Ozone precursor emissions associated with engine exhaust from construction equipment and construction-related traffic would contribute to area-wide and regional air quality conditions. Direct particulate matter emissions, such as fugitive dust emissions, generally would have a more localized impact, with the most noticeable impacts occurring within one-half mile or less of the site. Secondary particulate matter, formed by atmospheric chemical reactions involving precursor emissions of organic compounds, nitrogen oxides, and sulfur oxides, would have an area-wide and regional extent similar to ozone.

Criteria pollutant emissions associated with construction or operational activities would not persist in the atmosphere for long periods of time. Ozone precursor emissions are chemically reactive, and have typical atmospheric lifetimes measured in hours, days, or weeks. The atmospheric lifetime of suspended particulate matter depends on particle size and composition. Most fugitive dust particles have typical atmospheric lifetimes measured in hours or days, while small particles can remain in the atmosphere for a few days to a few weeks. Emissions from large industrial facilities can be injected high into the atmosphere, resulting in longer atmospheric residence times for some pollutants from these sources. Actual changes in ambient air quality generally are determined by pollutants that have been emitted within recent days or weeks. Most emissions that were released earlier than that would no longer be affecting actual ambient air quality conditions for criteria pollutants.

Ambient air quality standards are set for time frames that include 1-hour, 3-hour, 8-hour, 24-hour, 30-day averages, calendar quarter averages, and yearly averages. Violations of some ambient air quality standards are based on statistical analyses of data compiled over a period of three consecutive years. Thus, there is a regulatory context in terms of attainment or nonattainment designations that is generally no more than three years beyond the time frame for emissions release.

Construction activities for the project would be limited to second half of 2011, 2012, 2013, and the first half of 2014. Criteria pollutant emissions from construction activity during those years would not persist in the atmosphere beyond the middle of 2014, and air quality conditions resulting from those emissions would not be considered in attainment or nonattainment designations after 2016.

Current ambient air quality conditions represent the cumulative effect of pollutant emissions on a local and regional geographic scale for recent time periods. Eastern Riverside County meets all federal ambient air quality standards, but occasionally exceeds state ambient air quality standards for ozone and PM10. The limited amount of ozone monitoring data from Blythe does not show any distinct trends in ozone levels or the frequency with which state ozone standards are exceeded. In a more general context, most Southern California monitoring stations show a trend of gradually improving air quality in terms of ozone, with a trend toward lower peak ozone levels and fewer days exceeding federal and state ozone standards. Historical data for PM10 levels often shows little distinct trend toward improving or declining air quality.

Existing projects and facilities listed in Section 4.1.4, *Cumulative Scenario Approach*, are too far from the project area to create cumulative fugitive dust impacts in combination with any of the alternatives. The proposed gen-tie line would cross I-10 to reach the Red Bluff Substation. Traffic on I-10, however, does not generate enough fugitive dust to lead to significant cumulative fugitive dust problems in combination with transmission line or substation construction activities. The region of interest for precursor emissions that can react to form ozone and secondary particulate matter extends for perhaps 30 to 40 miles from the project area. Thus, most of the projects listed in Section 4.1.4, *Cumulative Scenario Approach*, can be considered close enough to the project to have the potential for cumulative impacts related to ozone and secondary particulate matter. But traffic on I-10, the Genesis Solar Energy Project and Chuckwalla Solar I project are the only projects in Table 4.1-5 that are meaningful emission sources for precursors of ozone and secondary particulate matter. The other projects listed in Table 4.1-5 do not generate sufficient emissions of ozone or particulate matter precursors to result in the potential for adverse cumulative air quality impacts in combination with the various project alternatives. Additional considerations regarding cumulative air quality impacts for the various project alternatives in combination with existing conditions are presented below.

The region of interest for precursor emissions that can react to form ozone and secondary particulate matter extends for perhaps 30 to 40 miles from the project area. Thus, most of the projects listed in Section 4.1.4, *Cumulative Scenario Approach* can be considered close enough to the project to have the potential for cumulative impacts related to ozone and secondary particulate matter. But many of the smaller projects listed in Section 4.1.4, *Cumulative Scenario Approach*, especially urban development projects in the Blythe area, are unlikely to generate enough precursor emissions for ozone and secondary particulate matter to create actual cumulative impacts in combination with the project. The same consideration would hold true for most of the smaller renewable energy projects listed in Section 4.1.4, *Cumulative Scenario Approach*. The project would result in precursor emissions for ozone or secondary particulate matter during the construction phase and during its operational lifetime. Thus, the time frame for potential cumulative air quality impacts related to precursors of ozone and secondary particulate matter for the project is during the construction period as well as long-term operations.

The timing for approval and construction of the Chuckwalla Solar I project is not known, but could overlap with part of the construction period for the project. Consequently, there is the potential for short-term significant cumulative fugitive dust impacts from the project in combination with this or other solar energy projects. Because the timing for construction of at least some of the projects listed in Section 4.1.4, *Cumulative Scenario Approach,* would overlap with construction of the project, there also would be short term cumulative air quality impacts in terms of precursor emissions for ozone and secondary particulate matter.

The timing for construction of most projects listed in Section 4.1.4, *Cumulative Scenario Approach,* is not known. The Genesis and Desert Sunlight solar energy projects are planned with construction time frames that overlap that of the project. In addition, the transmission line projects (Devers-Palo Verde 2, Desert Southwest, and Green Energy transmission lines) could have construction periods that partially overlap with the project. It is unclear whether or not other projects listed in Section 4.1.4, *Cumulative Scenario Approach,* would have construction periods that overlap with the project.

With regard to operations, operation of the projects listed in Section 4.1.4, *Cumulative Scenario Approach,* would clearly overlap with operations of the project, potentially resulting in an adverse cumulative impact.

The action alternatives (i.e., Reconfigured Alternatives 1 and 2 and the Reduced Acreage Alternative) would have short term adverse air quality impacts associated with facility construction and long-term adverse impacts associated with operations. The air quality impacts from construction would not last long enough to alter current federal or state attainment status designations for the project area. Existing air quality conditions in the project area meet all federal ambient air quality standards, but occasionally exceed state air quality standards for ozone and PM10. These conditions would not be changed by the emissions associated with project construction. Thus, there would be no significant cumulative air quality impacts from the action alternatives in combination with existing cumulative air quality conditions.

There would be no cumulative air quality impacts under No Action Alternative A, CDCA Plan Amendment/No Project Alternative B or CDCA Plan Amendment/No Project Alternative C because there would be no right-of-way grant for development of the project and associated facilities. Any future proposals for use of the site would be subject to separate environmental analysis.

4.2.4 Summary of Mitigation Measures

The BLM has determined that implementation of mitigation measures jointly developed by the BLM and CEC, which were imposed by the Energy Commission as Conditions of Certification for the project, would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in Appendix B and, as related to impacts on air resources, are summarized below.

If left unmitigated, the proposed construction activities would contribute to adverse PM10 and ozone impacts. Implementation of Mitigation Measures AQ-SC1 to AQ-SC5 would reduce these impacts: AQ-SC1 would require the Applicant to designate and retain an on-site Air Quality Construction Mitigation Manager (AQCMM) to direct and document compliance with specified mitigation measures. AQ-SC2 would require the Applicant to provide an Air Quality Construction Mitigation Plan (AQCMP) that details the steps that will be taken and the reporting requirements necessary to ensure compliance with applicable the mitigation measures. AQ-SC3 would require a demonstration of compliance with the AQCMP measures related to minimizing fugitive dust from construction and preventing all fugitive dust plumes from leaving the project site. AQ-SC4 would establish a dust plume response requirement in the event that visible dust plumes are observed. AQ-SC5 would require a demonstration of compliance with diesel-fueled engine control measures.

If unmitigated, the project's direct and indirect, or secondary emissions would contribute to existing violations of the ozone and PM10 ambient air quality standards. Implementation of Mitigation Measures AQ-SC6 and AQ-SC7 would reduce the effect of the project-specific emissions by establishing a standard for onsite maintenance vehicle emissions and requiring the preparation of a site Operations Dust Control Plan, respectively.

AQ-SC-8 would require the Applicant to provide the CPM with copies of all SCAQMD-issued Authority-to-Construct (ATC) and Permit-to-Operate (PTO) documents for the facility.

Implementation of Mitigation Measure AQ-SC9 would ensure that the VOC emission reduction credit information would be provided to Staff for review.

Implementation of Mitigation Measure AQ-SC10 would ensure that the two auxiliary cooling towers emissions would be controlled adequately through the use of a high efficiency mist eliminator and control of the recirculating water total dissolved solids content.

Implementation of Mitigation Measure AQ-SC11 would assure that the operation of the emergency engines will not cause an exceedance of the state or federal 1-hour NO2 ambient air quality standards.

The SCAQMD issued a Final Determination of Compliance on December 1, 2010, imposing conditions of compliance on project construction and operation to ensure compliance with District Rules and Regulations. The SCAQMD's conditions are incorporated into the CEC's Conditions of Certification; compliance with SCAQMD conditions would result from the implementation of the following Mitigation Measures: AQ-1 (Operation of Equipment), AQ-2 (Equipment Maintenance), AQ-3 (Propane-fired Equipment), AQ-4 (Source Test(s) for Criteria Pollutant(s)), AQ-5 (Fuel Usage Limit), AQ-6 (Flow Meter Use), AQ-7 (AQMD Source Test Report), AQ-8 (NOx Emission Limits Exception), AQ-9 (CO Emission Limits Exception), AQ-10 (Equipment Emission Limit), AQ-11 (Equipment Operation Hour Limitation), AQ-12 (Fuel Usage Limit), AQ-13 (Operating Time Limit), AQ-14 (Boiler Operating Emission Rates) AQ-15 (Annual Operations Limit), AQ-16 (Boiler Operation Load Limits), AQ-17 (Non-Resettable Totalizing Fuel Meter), AQ-18 (Diesel Fuel Content), AQ-19 (Engine Emissions

Limits), AQ-20 (Non-Resettable Totalizing Fuel Meter), AQ-21 (Engine Operations Limit), AQ-22 (Engine Operations Log), AQ-23 (BACT emission limits).

4.2.5 Residual Impacts after Mitigation Measures were Implemented

Residual Air Quality impacts are the emissions associated with construction and operation as outlined in Tables 4.2-4 and 4.2-5.

4.2.6 Unavoidable Adverse Impacts

Unavoidable Adverse Air Quality impacts from the emissions associated with construction and operation as outlined in Tables 4.2-4 and 4.2-5.

4.3 Impacts on Global Climate Change

4.3.1 Impact Assessment Methodology

The methodology to assess impacts to climate change under NEPA continues to evolve as consensus forms as to how best to evaluate such effects on proposed action-specific and cumulative levels. The CEQ published draft guidance on February 18, 2010, for Federal agencies to improve their consideration of the effects of greenhouse gas (GHG) emissions and climate change in their evaluation of proposals for Federal actions under NEPA. For example, the CEQ proposes that agencies should consider the direct and indirect GHG emissions from the action and to quantify and disclose those emissions in the environmental document (40 CFR 1508.25). The CEQ further proposes that agencies should evaluate the relationship of climate change effects to a proposed action or alternatives, including the relationship to project design, environmental impacts, mitigation, and adaptation measures. Agencies should also consider mitigation measures to reduce proposed action-related GHG emissions from all phases and elements of the proposed action and alternatives over its/their expected life, subject to reasonable limits based on feasibility and practicality (CEQ, 2010).

For the proposed action and alternatives, this section analyzes the potential for construction-, operation-, maintenance- and decommissioning-related activities to emit GHGs and, thereby, contribute meaningfully to global warming in light of the combined emissions of other broad-scale causes of climate change. GHG emissions are quantified and set forth in Tables 4.3-1 and 4.3-2. Although it is doubtful that this individual project, standing alone, could result in significant climate change effects, this analysis considers the “incremental impact” of project emissions as a possible contributor, together with the incremental impacts of other past, present, and reasonably foreseeable actions, to cause global climate change, which intrinsically is a cumulative issue. Mitigation measures are considered. Additionally, as discussed in Section 3.3, *Global Climate Change*, agencies under the U.S. Department of the Interior are required to consider potential impact areas associated with climate change, including potential changes in flood risk, water supply, sea level rise, wildlife habitat and migratory patterns, invasion of exotic species, and potential increases in wildfires.

Analysis of Cumulative Impacts

Impacts resulting from construction, operation, maintenance and decommissioning of the proposed action and its alternatives would result in the emission of GHGs that, together with past, present, and reasonably foreseeable future actions, could contribute to climate change. Project-specific GHG emissions are considered in the context of this cumulative impacts analysis. Although the cumulative scenario described in Section 4.1 generally includes activities in the California desert and highlights projects along the I-10 corridor, the geographic scope of the cumulative effects analysis for climate change is much broader: it is both regional and global. Potential cumulative effects, whether adverse or beneficial, on climate change could be short-term (i.e., limited to the Project’s proposed 39-month construction period) or long-term (i.e., occur during the projected 30-40 year lifespan of the proposed action).

Existing conditions within the cumulative impacts area reflect a combination of the natural condition and the effects of past actions. Recent years have seen record-high average global surface temperatures; in fact, the past 20 years include the 18 warmest years on record since 1850 (Pew, 2008). This warming trend could result from several factors that influence the earth's climate, including natural factors, such as changes in solar radiation and volcanic activity, and anthropogenic (or human-caused) factors, such as the release of GHGs to the atmosphere and land-cover changes (Pew, 2008). Although climate science is complex and uncertainties remain, the evidence is compelling: human activities associated with fossil fuel burning and land use are primarily responsible for the changing (warming) global climate.

In response, the EPA issued a final rule on May 13, 2010, to apply Prevention of Significant Deterioration (PSD) requirements to new facilities whose carbon dioxide-equivalent emissions exceed 100,000 tons per year (EPA, 2010). Additionally, several states have enacted legislation establishing reduction targets for GHG emissions. For example, the California legislature adopted Assembly Bill 32, the Global Warming Solutions Act of 2006 (AB 32), which requires the California Air Resources Board to develop regulations that will reduce greenhouse gas emissions to 1990 levels by 2020 (Health and Safety Code Section 38500 et seq., 17 CCR 95100 et seq.). Moreover, State regulations prohibit utilities from entering into long-term contracts with any base load facility that does not meet a greenhouse gas emission standard of 0.5 metric tonnes carbon dioxide per megawatt-hour (0.5 MTCO2/MWh) or 1,100 pounds carbon dioxide per megawatt-hour (1,100 lbs CO2/MWh) (20 CCR 2900 et seq.). California's state-specific policies, including GHG goals, are discouraging or prohibiting new contracts and new investments in high GHG-emitting facilities such as coal-fired generation, generation that relies on water for once-through cooling, and aging power plants (CEC RSA, 2010). Some existing plants are likely to require substantial capital investments in order to continue operating in light of these policies and may instead be retired or be replaced. For additional discussion of relevant federal level regulations and requirements for assessing the potential impacts of climate change, please refer to Section 3.3, *Global Climate Change*. The project could provide 500 MW of renewable energy generation capacity to support renewable energy goals and policies in California.

4.3.2 Direct and Indirect Impacts of the Proposed Action on Climate Change

The power production and delivery system for electricity supply in California and the United States is complex and variable. At any one moment, the amount of power being generated must equal the amount of power being consumed. Therefore, the power production and delivery system operates as an integrated whole to meet demand, such that the dispatch of a new source of generation generally curtails or displaces one or more less efficient or less competitive existing sources. The project would provide a new, utility-scale source of solar energy to complement existing and proposed sources of renewable energy. When the sun shines and electricity is generated by the project, the real-time output required from fossil fuel plants would be reduced by the amount of renewable generation going into the electrical grid. As a result, operation of the project would cause a measurable decrease in GHG emissions from fossil fuel plants.

As analyzed below, construction of the project would involve the use of construction equipment and operation of motor vehicles. Operation of the project would involve the combustion of fossil fuels, to the extent required to operate auxiliary heating and to provide other services at the thermal solar plant. Thus, construction and operation of the project would produce GHGs.

Construction of the Project

Construction of industrial facilities such as power plants requires coordination of numerous equipment and personnel. The estimated 39-month construction period for the project would require on-site construction activities that would result in short-term, unavoidable increases in vehicle and equipment emissions, including GHGs. The GHG emissions estimate, for the entire construction period, is provided in Table 4.3-1.

TABLE 4.3-1
PROJECT CONSTRUCTION-RELATED GREENHOUSE GAS EMISSIONS

Construction Element	CO_2-Equivalent (MT CO_2E)[a,b,c]
On-Site Construction Equipment	70,200
On-Site Motor Vehicles	1,500
Off-Site Motor Vehicles	29,300
Construction Total	***101,000***

NOTES:
a One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms
b The vast majority of the CO2E emissions, over 99 percent, is CO_2 from these combustion sources.
c This does not include the revised construction description that now includes an onsite concrete batch plant and on-site fuel depot. On balance staff believes that these changes will not significantly impact the totals, which might be estimated to be higher or lower depending the balance of how concrete and fuel deliveries would have been handled versus the deliveries of the materials to make concrete (sand, aggregate, cement, water) and daily fueling of equipment by fuel/lube truck(s).

SOURCE: CEC RSA, 2010), C.1, Air Quality, Greenhouse Gas Table 2.

In addition to direct emission of GHGs, construction of the project also would cause the clearing of land and complete removal of vegetation over most of the project site. This would reduce the ongoing natural carbon uptake by vegetation. As discussed in Section 3.3, a study of the Mojave Desert indicated that the desert may uptake carbon in amounts as high as 100 grams per square meter per year (CEC RSA, 2010). This would equate to a maximum reduction in carbon uptake, calculated as CO_2, of 1.48 MT of CO_2 per acre per year for areas with complete vegetation removal. The maximum equivalent loss in carbon uptake for the project would be about 4,598 MT of CO_2 per year, which would correspond to 0.004 MT of CO_2 per MWh generated (based on 1,000,000 MWh generated per year). Compared to the CO_2 emissions that would be associated with the generation of fossil fuel in amounts comparable to energy to be supplied by the proposed action (fossil fuel energy generation-related GHG emissions can range from 0.35 to 1.0 MT of CO_2 per MWh depending on the fuel and technology), the natural carbon uptake loss caused by construction of the project would be negligible.

Operation and Maintenance of the Project

Electricity generation GHG emissions are generally dominated by CO_2 emissions from the carbon-based fuels; other sources of GHG are typically small and also are more likely to be easily controlled or reused/recycled. For this solar project, the primary fuel (solar energy) is GHG-free; however, natural gas would be used in the two auxiliary boilers used for HTF freeze protection, and gasoline and diesel fuel would be used in the maintenance vehicles, offsite delivery vehicles, staff and employee vehicles, and the diesel emergency fire water pump engine. Sulfur hexafluoride emissions also could result from electrical equipment leakage. Anticipated annual operations-related GHG emissions of the project are shown in Table 4.3-2. All emissions are converted to CO_2-equivalent and totaled.

TABLE 4.3-2
OPERATIONAL GREENHOUSE GAS EMISSIONS

	Annual CO2-Equivalent (MTCO2E)[a]
Auxiliary Boilers[b]	7,710
Emergency Generators[b]	144
Fire Pumps[b]	16
Maintenance Vehicles[b]	109
Delivery Vehicles[b]	4,507
Employee Vehicles[b]	2,320
Equipment Leakage (SF6)	12
Total Project GHG Emissions – $MTCO_2E$[b]	**14,818**
Facility MWh per year	1,000,000
Facility GHG Emission Rate (MTCO2E/MWh)	0.015

NOTES:
a One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.
b The vast majority of the CO2E emissions, over 99 percent, is CO2 from these emission sources.

SOURCE: CEC RSA, 2010, C.1, Air Quality, Greenhouse Gas Table 3.

The proposed action is estimated to emit, directly from primary and secondary emission sources approximately 14,818 metric tons of CO_2-equivalent GHG emissions per year. The project, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]). Regardless, the project has an estimated GHG emission rate of 0.015 MTCO2E/MWh, which is well-below the Greenhouse Gas Emission Performance Standard of 0.500 MTCO2/MWh.

The beneficial energy and GHG impacts of the project also could be measured in terms of the time required to produce an amount of energy as great as what was consumed during production, which, in the context of a solar power plant, includes all of the energy required during construction and operation. Within the realm of life cycle analysis, this amount of time is called the "energy payback time." Tables 4.3-1 and 4.3-2 provide an estimate of the onsite construction and operation emissions, employee transportation emissions, and the final segment of offsite materials and consumables transportation. However, there are additional direct transportation and indirect manufacturing GHG emissions associated with the construction and operation of the proposed action, all of which are considered in the determination of the energy payback time. A document sponsored by Greenpeace estimates that the energy payback time for concentrating solar power plants, such as the project, to be on the order of five months (CEC Genesis RSA, 2010); the project life for the proposed project is on the order of 30 years. Therefore, the proposed action's GHG emissions reduction potential from energy displacement would be substantial. The GHG displacement for the project would be similar to, but not exactly the same as, the amount of energy produced after energy payback is achieved multiplied by the average GHG emissions per unit of energy displaced.[1]

Closure and Decommissioning of the Project

Closure and decommissioning-related activities would emit GHGs when the facility is dismantled and the site is restored. It is anticipated that such emissions would be caused by the operation of construction equipment and motor vehicles; related impacts would be a one-time, limited-duration event. Project-specific contributions to global climate change during the closure and decommissioning phase are evaluated using the same methods as initial construction emissions, and are anticipated to be comparable in type and magnitude, but likely to be lower than, the construction emissions as discussed above.

Mitigation Potential of the Project on Climate Change

As discussed previously, the project would generate approximately 1,000,000 MWh of power per year, with a GHG emission rate of less than 0.02 MT of CO_2 per MWh. The power produced by the project would offset power production by fossil-based power plants, which can range from 0.35 to 1.0 MT CO_2 per MWh. The electric power produced from the project would be imported onto California's power grid, and would be used preferentially to conventional fossil fuel based power generation, including natural gas combined cycle plants, natural gas single cycle peaking plants, and power imported from other states, which may include power from coal-fired plants. Therefore, the Project would provide a direct benefit to climate change – namely the offset of up to approximately 1,000,000 MWh/yr of carbon dioxide-emitting power derived from existing/conventional fossil fuel power plants. Additionally, assuming that reductions in demand for existing fossil power would reduce demands for the natural gas and coal feedstocks used for those power plants, some degree of offset of upstream carbon dioxide, methane, nitrous oxide, and other GHG emissions associated with natural gas and coal extraction and transport, will also be realized. Therefore, implementation of the Project will provide direct and indirect benefits that counter the potential effects of climate change. The Project supports and is part of a transition towards increased in-State, national, and global renewable power production, which is a key component towards the mitigation of climate change.

[1] The average GHG emissions for the displaced energy over the project life is not known, but currently fossil fuel fired power plants have GHG emissions that range from 0.35 MT/MWh CO2E for the most efficient combined cycle gas turbine power plants to over 1.0 MT/MWh for coal fired power plants.

4.3.3 Cumulative Impacts of the Proposed Action on Climate Change

In addition to simple warming, climate change also is expected to result in a suite of additional potential changes that could affect the natural environment, in a manner that is relevant to the project. The potential for climate change effects on the proposed action is discussed below.

Hydrologic Resource

In California and much of the U.S. West, climate change is expected to result in several potential effects related to water resources. These include potential sea level rise, potential changes in the frequency of flooding and droughts, and potential reductions in surface water supply.

Sea Level Rise

Sea level rise is expected to occur as a result of increased global temperatures. Increased global temperatures include increases in ocean temperature, as well as air temperature. As water temperature increases, the water contained in the world's oceans would undergo thermal expansion. Increased temperatures could also result in a net melting/reduction in the extent of polar ice sheets. These effects could result in an increase in the level of the world's oceans, and some degree of sea level increase has already been established over the last century. However, these potential effects are not expected to affect the project, which would be located approximately 130 miles from the ocean, and at an elevation of at least 420 feet mean sea level (msl). The proposed action would not be affected by sea level rise.

Snowpack and Snowmelt Period

Changes in snowpack and snowmelt period are anticipated in California, as a result of climate change. Similar effects are anticipated in the Colorado River system, which includes the Chuckwalla Valley Basin and the action area (see Section 3.20, *Water Resources*, and 4.19, *Impacts on Water Resources*, for additional discussion). Specifically, climate change is expected to result in generally warmer temperatures, which, in turn, would result in a greater proportion of total annual precipitation falling as rain. Snowpack in California and the Colorado River watershed serves as a temporary means of water storage, wherein water is released slowly and into the early summer during snowmelt. If a greater proportion of precipitation falls as rain, the snowpack would be lessened, and the potential for water storage within the snowpack also would be lessened. Also, warmer temperatures would cause earlier snowmelt events, potentially reducing the ability of water managers to capture snow melt in reservoirs. However, there is no snowpack in the vicinity of the proposed action, and the project is not dependent on snowmelt water for water supply. Therefore, the project would not affect snowpack, and would not be deleteriously affected by potential changes in snowpack characteristics.

Dilution

Dilution refers to the amount of water that is available in a receiving water body into which wastewater is discharged. Under some circumstances, climate change could result in a change in the volume or timing of water flows that are available in stream for dilution of wastewater. However, the project would not discharge wastewater to surface waters (a septic system is included for on-site wastewater, and process water is controlled on site via an evaporation pond system). Therefore, potential climate-related changes in dilution capacity would not affect the proposed action.

Water Temperature

Water temperature can be critical to fisheries resources in parts of California, in particular, along those waterways that support cold water fisheries. However, the site and its vicinity do not contain any perennial surface waterways that could support fisheries. During rain events, surface water from the site drains into Palen Dry Lake, which does not support any fisheries resources. The project would rely on groundwater for a water supply, and the temperature of the groundwater would not be critical to project operation. Furthermore, the project would not result in any water discharge or other activity that would affect water temperature along nearby waterways, including the Colorado River or other rivers or waterways that support fisheries. No component of the proposed project would alter reservoir flows or otherwise change water management operations, such that water temperature would be altered. Therefore, potential changes in water temperature would not affect the project.

Flooding, Drainage, and Erosion

Climate change is anticipated to affect the frequency and intensity of extreme weather events, including large storm events and droughts, in western watersheds including the Colorado River basin and the closed basin into which runoff from the project site drains. Although the degree of change is a subject of substantial debate, most investigations concur that the Colorado River watershed, including the project site and its vicinity, would experience an increase in the frequency and intensity of high rainfall/flood events. This could result in an increase in potential stormwater runoff and flooding, and an increase in erosion and sedimentation on site and downstream from the site. Increases in the intensity or frequency of droughts are discussed in terms of water resources availability, below.

As discussed in Section 4.19, *Water Resources*, the project would include a series of engineered facilities, including rerouted drainage/flood channels, berms, and on-site drainage facilities that would channel, retain, and otherwise manage stormwater and flood flows on site and in the areas immediately surrounding the site. Also discussed in Section 4.19, the project would be designed to account for stormwater drainage and flood flows, and CEC Conditions of Certification (Appendix B) SOIL&WATER-8 through SOIL&WATER-12 would require revisions to the project's drainage report and plans, completion of a detailed FLO-2D analysis, implementation of drainage channel design and channel erosion protection measures, and implementation of a channel maintenance program. Additionally, these Conditions of Certification have been updated and incorporated into the PA/FEIS as mitigation measures WATER-10, WATER-11, and WATER-13 to include assessment of potential climate change effects on water resources, and incorporation of project design feature recommendations that would serve to offset potential drainage and flooding effects associated with climate change.

Water Resources Availability

As discussed in Section 3.20, *Water Resources*, and Section 4.19, *Impacts on Water Resources*, the site is located within the Chuckwalla-Palen Dry Lake watershed, which contains only ephemeral drainages and washes. Surface waters in the project area and its immediate vicinity occur only during substantial precipitation events, where surface runoff occurs. There are no perennial streams or other perennial waterways located on site or hydrologically connected to the project via surface waters. The project would not rely on surface water for water supply during construction or operation. Instead, the project would rely on groundwater for water supply during both construction and operation.

Estimates of the potential effects of climate change on the frequency and amount of rainfall in the west vary; however, most studies concur that in the desert southwest, some degree of reduction of precipitation would occur. Seager et al (2007) and Christensen et al (2004) completed extensive reviews and modeling of potential climate change effects on the Colorado River watershed and other southwestern watersheds, including several climate change scenarios. The authors conclude that precipitation and runoff within the watershed could generally decrease, while periods of drought could increase, resulting in an overall reduction in the availability of water along the Colorado River. These scenarios could result in moderate to substantial effects on water supply availability, and could affect the ability of water rights holders along the Colorado River to divert their full entitlements.

In the event that climate change results in reduced precipitation within the project area and its vicinity, some degree of associated reduction in groundwater recharge from rainfall could occur. This situation would not result in increased water requirements by the proposed action, and would not result in additional groundwater pumping during project construction or operations. Therefore, even with potential reductions in total precipitation volume associated with future climate change, no increase in pumping would be required as a result of the effects of climate change.

If climate change does result in reduced recharge to the underlying groundwater basin, the potential cumulative effects on groundwater levels identified in Section 4.19 could be exacerbated. Mitigation measures SOIL&WATER-2 through SOIL&WATER-5 and SOIL&WATER-15 would offset these effects in part. However, as discussed in the cumulative effects analysis discussion of Section 4.19, the combined operation of all of the foreseeable projects would have an impact on groundwater levels, and this effect could be exacerbated by anticipated reductions in groundwater recharge due to climate change.

Biological Resources

Biological resources could be affected as a result of climate change in California. Distribution patterns of species are generally expected to shift according to regional changes in temperature and precipitation, while the location of wildlife migration corridors and the extent of invasive species also could be altered.

Fisheries

The project does not contain any perennial or other surface waters that contain fisheries resources, and would not affect or be affected by changes in fisheries characteristics. Therefore, there would be no impact related to fisheries resources or characteristics.

Habitat Values of Mitigation Lands

As discussed in Section 4.17, *Impacts on Vegetation Resources*, and Section 4.21, *Impacts on Wildlife Resources*, implementation of the project would require mitigation for biological resources values that would be lost as a result of implementation of the project. As discussed in these sections, the proposed mitigation lands would be required to be equivalent in terms of habitat value, and at a replacement ratio of at least 1:1 (typically greater than 1:1, as specified in Sections 4.17 and 4.21) for direct impacts. Unfortunately, climate change could result in adverse effects on biological resources located on these mitigation lands. However, given that mitigation lands must be similar in biological resources value as compared to lost resources on site, it is anticipated that climate-related effects for the mitigation lands would be similar to those located at the project site, if the project were never built. Therefore, potential reductions in the biological resources values of mitigation land values resulting from climate change are expected to be similar to on-site conditions in the absence of the project.

Hazards

Heat related hazards, including potential increases in wildfire and heat waves, could be exacerbated by climate change.

Wildfire Risks

Potential risks associated with fire are discussed in Section 3.12, *Public Health and Safety*. Section 4.11, *Impacts on Public Health and Safety*, provides a discussion of potential fire-related risks, and also ensures that adequate fire control personnel, infrastructure, and associated planning would be completed and/or available to the project, to ensure compliance with federal, State, and local regulations, and to ensure worker safety.

Climate change would result in a small but general increase in temperature, and could also result in an increase in the frequency of extreme weather events that could generate wildfires, such as increased frequency of drought and heat waves, during operation of the project. In compliance with applicable regulations and mitigation proposed in Section 4.11, the Applicant would be required install a fire protection/control system on site in including a fire water supply system and associated infrastructure, and to comply with State and federal regulations regarding worker safety and training. Additionally, under CEC Condition of Certification WORKER SAFETY-7 (see Appendix B), the Applicant would be required to provide funding to the Riverside County Fire Department (RCFD) to ensure available resources to fight potential fires on site, while Condition of Certification WORKER SAFETY-10would provide for joint training exercises with the RCFD. Although the risk of wildfire that could affect the site could increase as a result of climate change, these potential increases in risk are expected to be offset by ongoing compliance with the worker safety and fire protection regulations and mitigation measures specified in Section 4.11. Therefore, no additional mitigation is warranted.

Heat Waves

The frequency of occurrence and the severity of heat waves could increase as a result of climate change. Heat waves could result in increased potential risk to project employees. However, Mitigation Measure WORKER SAFETY-2 (see Appendix B) would require implementation of an operation period heat stress protection plan that is based on and expands on Cal OSHA requirements. This plan would provide measures to protect workers against the effect of heat-related hazards, whether or not those hazards are caused by climate change. Although the frequency and/or intensity of heat wave events could increase as a result of future climate change, the heat stress protection plan would meet state requirements for worker safety.

Other Issues

In addition to the issues discussed above, potential climate change-related impacts associated with soil moisture and fugitive dust concentrations also warrant discussion.

Soil Moisture

As discussed in Section 3.15, *Soils Resources*, and 4.14, *Impacts on Soil Resources*, almost all rainfall that occurs in this region of California is lost through evaporation and evapotranspiration, and soil moisture at the project site is characteristically low. As discussed previously, although precise changes are impossible to predict, climate change could result in increases in extreme weather events, including droughts and heat waves, and an overall reduction in precipitation. These conditions could result in a concurrent reduction in soil moisture content at the site and regionally. However, reductions in soil moisture content would not affect project-related operations, and would not require any change in water resources usage. Additionally, the proposed facilities would in no way support additional drying of soils on site, or otherwise exacerbate potential changes in soil moisture associated with climate change. Therefore, no additional change would occur.

Fugitive Dust

As discussed in Section 3.02, *Air Resources*, and Section 4.02, *Impacts on Air Resources*, fugitive dust emissions would require mitigation during operation of the project. CEC Condition of Certification AQ-SC7 (see Appendix B) would mitigate operation period fugitive dust emissions to ensure compliance with State and local regulations and requirements. Although climate change could result in some degree of reduction of soil moisture, as discussed above, soil moisture is already very low under current conditions. Any further reductions in soil moisture would be minimal in terms of the absolute amount of water contained in on-site soils. Therefore, any potential further reductions in soil moisture associated with climate change are not anticipated to result in a substantial increase in fugitive dust emissions, and the proposed Mitigation Measure would be sufficient to meet federal, State, and local requirements regarding fugitive dust.

Alternatives

Three action alternatives were assessed for potential impacts associated with global climate change. These included the proposed project (discussed above), Reconfigured Alternative 1, Reconfigured Alternative 2 (Option 1 and Option 2), and the Reduced Acreage Alternative. Reconfigured Alternative 2 and the Reduced Acreage were developed primarily to minimize potential impacts of the project on biological resources.

Reconfigured Alternative 1

Reconfigured Alternative 1 would result in implementation of a project that would be similar to the project, except that the shapes of Units 1 and 2 would be modified, and would use approximately 180 acres more land than the proposed Units 1 and 2. Under Reconfigured Alternative 1, the total output would be 500 MW. This alternative would be expected to result in the same annual power generation rate as compared to the proposed Action: 1,000,000 MWH/yr. Also, because Reconfigured Alternative 1 would result in the installation of the same facilities as the proposed action, it is expected that this alternative would result in similar construction and operation period GHG emissions as the project. Because Reconfigured Alternative 1 would use an additional 180 acres of land area, as compared to the proposed action, land use-related GHG emissions would be slightly higher for this alternative, at 4,864 MT of CO2 per year, for an effective land use emission rate of 0.005 MT CO_2e/MWh. All other potential climate change impacts and benefits, including GHG emissions, mitigation potential of the power generated by the project, and effects associated with hydrologic resources, biological resources mitigation lands, and other potential effects would be the same as the project.

Reconfigured Alternative 2

Option 1

Reconfigured Alternative 2 Option 1 would be similar to the project, except that the shape of Unit 1 would be modified in order to avoid sensitive biological resources. The locations of various other facilities, including the warehouse and laydown yard, also would be shifted slightly, in order to avoid sensitive resources. Also, this alternative would include installation drainage facilities that would be similar in nature but would be increased in length, as compared to the project. However, construction and operation of this alternative otherwise would be nearly the same as the project, and would result in approximately the same rate of annual GHG emissions and the same rate of power production, as the project. All other potential climate change impacts and benefits, and effects associated with biological resources, hydrologic resources, and other potential effects would be the same as the project.

Option 2

Reconfigured Alternative 2 Option 2 would be similar to the project, except that the shape of Units 1 and 2 would be modified in order to avoid sensitive biological resources, avoid use of private land not currently controlled by the Applicant, and reduce impacts to the sand transport corridor. The locations of Units 1 and 2, and shared facilities, would be repositioned, but would not be re-sized. Drainage and flood protection facilities would be re-sized and re-located in order to provide sufficient protection at this location. However, construction and operation of this alternative otherwise would be nearly the same as the project, and would result in approximately the same rate of annual GHG emissions and the same rate of power production, as the project. All other potential climate change impacts and benefits, and effects associated with biological resources, hydrologic resources, and other potential effects would be the same as the project.

Reduced Acreage Alternative

The Reduced Acreage Alternative would reduce the total construction-, operation- and decommissioning-related GHG emissions of the proposed action by approximately 25 percent, due to a reduction in size in comparison to the project. This alternative would have a generation capacity of approximately 375 MW, as compared to 500 MW for the proposed action. Therefore, the total GHG emissions could be approximated by multiplying the proposed action's GHG emissions provided in Tables 4.3-1 and 4.3-2 by 0.75. The benefits of the proposed action in displacing fossil fuel fired generation and reducing associated GHG emissions from gas-fired generation would be reduced accordingly. The extent of effects to biological resources and hydrologic resources also would be reduced, due to the reduced intensity of construction activities and reduced water requirements. However, the Reduced Acreage Alternative would not alter the potential effects of climate change on mitigation lands, drainage and flooding, or water resources availability. All other potential climate change related impacts would be the same as for the project.

If the Reduced Acreage Alternative were selected, other renewable projects could be developed that would compensate for the loss of generation compared to the proposed action on other sites in Riverside County, the Colorado Desert, or in adjacent states as developers strive to provide renewable power that complies with utility requirements and Federal and State mandates.

No Action Alternative A

None of the anticipated impacts, beneficial or adverse, of the proposed action would occur. Instead, the project site would become available to other uses consistent with the CDCA Plan, potentially including another renewable energy project. If the PSPP is not approved, renewable projects would likely be developed on other sites in Riverside County, the Colorado Desert, or in adjacent states as developers strive to provide renewable power that complies with utility requirements and Federal and State mandates. In terms of potential impacts due to climate change under No Action Alternative A, the proposed action would not be implemented, and, therefore, would not be affected by climate change. Insufficient information is available at this time about what use would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative B

Because the CDCA Plan would be amended under this alternative to make the site unavailable for future solar development, GHG emissions associated with the development of renewable energy projects would occur elsewhere and the carbon uptake potential of the site would not be expected to change noticeably from existing conditions. Consequently, this alternative would not result in the GHG benefits associated with the project on this site, but such benefits could occur in connection with other renewable energy projects developed elsewhere to meet State and Federal mandates. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative C

Because the CDCA Plan would be amended under this alternative, it is possible that the site would be developed with the same or a different solar technology. As a result, GHG emissions and GHG emissions offset potential similar to that of the proposed action could result. Different solar technologies require different amounts of construction and operation-related maintenance, and different volumes of water during operation; however, it is expected that all the technologies would provide the more significant benefit, like the proposed action, of displacing fossil fuel fired generation and reducing associated GHG emissions. As such, No Project Alternative C could result in GHG benefits similar to those of the proposed action. In terms of potential climate change impacts on No Project Alternative C, these impacts would likely be similar to the proposed action, although metrics related to project size and water use could vary somewhat based on the selected power generation technology.

4.3.4 GHG Emissions Associated with Past, Present and Reasonably Foreseeable Future Actions

GHG Emissions from Past, Present and Reasonably Foreseeable Actions

As stated above, human activities are widely-recognized as being primarily responsible for the changing (warming) global climate. Such activities result in emissions of carbon dioxide and other GHGs from industrial processes, fossil fuel combustion, and changes in land use, such as deforestation. For example, in 1990, industrial processes and electric power generation caused the majority of human-generated global GHG emissions, contributing 32 percent and 20 percent, respectively (Pew, 2010a). Within the United States, which emitted over seven billion metric tons of CO2E in 2004; in that year, industry emitted 30 percent of the total, transportation emitted 28 percent, the commercial sector emitted 17 percent, the residential sector emitted 17 percent, and agriculture emitted 8 percent (Pew, 2010b). Industrial processes, power generation, land use changes and other actions contributing to climate change are expected to continue in the foreseeable future, subject to increasingly stringent requirements.

The project and other present and reasonably foreseeable future actions, including those identified in Section 4.1, would contribute construction-, operation and maintenance-, and closure and decommissioning-related GHG emissions impacts and benefits in the existing international, national, State-wide and regional context. Internationally, this context includes, among many other efforts, the Bali Roadmap, the Copenhagen Accord, and ongoing urbanization, deforestation, and development-related conversion of agricultural lands, as discussed in PA/FEIS Section 3.3. Nationally, context includes GHG-related activity by all branches of government, including the GHG Emissions Reduction Target for Federal Operations set by President Obama, enacted and proposed congressional legislation, and recent court actions, as discussed in Section 3.3.

Recent State-level GHG-related actions include the California Air Resources Board’s February 25, 2010, adoption of a regulation to limit and monitor sulfur hexafluoride (SF6) emissions from electric power sector equipment; the California Building Standards Commission’s January 14, 2010, approval of the most environmentally stringent building code in the United States, which went into effect in January 2011 and which the California Air Resources Board (CARB) anticipates will reduce GHG emissions by 3 million metric tons in 2020; and CARB’s September 24, 2009, adoption of a revised Forest Project Protocol that allows private landowners, public lands, and out-of-state projects to participate in the State’s voluntary forestry offsets market – it is the first state-approved carbon accounting standard that is applicable to projects nationwide. Additionally, the adoption of Senate Bill 375 (SB 375) in 2008 enhances California's ability to reach its AB 32 goals by providing regional planning-related GHG emissions-reduction goals.

Regionally, based on SB 375, the Southern California Association of Governments’ six-county area (including Riverside, San Bernardino, Orange, Los Angeles, Imperial and Ventura counties) must reduce its annual GHG emissions by 2.5 million metric tons by 2020. Local governments are considering GHG and related emissions reductions in their planning efforts. For example, the Riverside County Transportation Demand Management Program (Riverside County Code Ch. 10.36) is intended in part to reduce motor vehicle emissions, which include GHGs. In turn, San Bernardino County, which has been a focal point in conflicts over local climate regulation, has updated its General Plan and otherwise incorporates GHG emissions reduction considerations into its local planning decision-making process (OPR, 2010).

Overall, it is expected that the project would enhance the attainment of international, national, Statewide and regional GHG reduction efforts.

Environmental Consequences of Climate Change

Climate change, by its nature, is a cumulative problem that has resulted from global GHG emissions. No sufficient data or scientific method is currently available to precisely evaluate how the emissions from an individual project, such as the project, would contribute to global climate change. Therefore, based on available regional and global information, the following discussion evaluates the overall cumulative environmental consequences of climate change, as relevant to the project.

Beneficial and adverse impacts of GHG emissions caused by the proposed action, together with GHG emissions-related impacts of past, present and reasonably foreseeable future actions, would contribute to cumulative global climate change impacts on the various elements of human society and the environment that are sensitive to climate variability. For example, human health, agriculture, natural ecosystems, coastal areas, and heating and cooling requirements are examples of climate-sensitive systems. Globally, rising average temperatures are believed to have caused glaciers to shrink, permafrost to thaw, ice on rivers and lakes to freeze later and break up earlier, growing seasons to lengthen, and animal and wildlife ranges to shift. In North America, warming in western mountains is expected to cause decreased snowpack, more winter flooding, and reduced summer flows, thereby exacerbating competition for over-allocated water resources. Extended periods of high fire risk and large increases in areas burned – each a risk of global warming – would increase impacts on forests from pests, diseases and wildfire. Areas that currently experience periods of extreme heat are expected to be further challenged by an increased number, intensity and duration of heat waves during the course of the century, with potential for adverse health impacts particularly for elderly populations. (IPCC, 2007). For a review of how climate change could affect the proposed action and alternatives, please see the previous subsection, "Direct and Indirect Impacts of Climate Change on the Proposed Action."

Summary of the Project-Specific Mitigation Measures

The implementation of mitigation measures developed jointly by the BLM and CEC, and imposed by the CEC as Conditions of Certification for the project, would avoid or reduce impacts on the quality of the human environment. These Conditions of Certification are set forth in Appendix B and summarized here:

> AQ-SC2, AQ-SC5, AQ-SC6: These mitigation measures require the Applicant to complete an air quality construction mitigation plan and controls on diesel fueled engines; vehicles used during operations also are required to meet minimum air quality emissions standards.
>
> AQ-1, AQ-2, AQ-3, AQ-4, AQ-5, AQ-6, AQ-7, AQ-9, AQ-10, AQ-11, AQ-12, AQ-13, AQ-14, AQ-15. AQ-16, AQ-17, AQ-19, AQ-20, AQ-21, AQ-22, AQ-23, AQ-24, AQ-25, AQ-26, AQ-27, AQ-33, AQ-34, AQ-39, AQ-40: These mitigation measures place constraints on the operation and maintenance of equipment in support of air quality, require that low-emitting fuels are used for specific functions, implement source tests for criteria pollutants, implement monthly and annual fuel usage limits, require air quality reporting, implement air emissions limits, require annual equipment time limits, enforce boiler operational loads and limitations, require use of low sulfur fuel, require equipment regulatory compliance, require use of fuel meters, require documentation engine operation logs, require compliance with best available control technology (BACT) emissions limits, require implementation of an inspection and maintenance program, require maintaining of heat transfer fluid (HTF) records, and enforce limits on expansion tank ventilation.

4.3.5 Residual Incremental, Project-specific Impacts after Mitigation Measures Were Implemented

The residual GHGs emitted from the project were estimated to be 101,000 metric tons of CO_2 equivalent for construction, and 14,818 metric tons/year CO2 equivalent during the project operation period, for a total of 545,540 tons CO2 equivalent over the life of the project.

4.3.6 Unavoidable Adverse Impacts

The residual CO_2 equivalent emissions identified in Section 4.3.5 would be unavoidable.

4.4 Impacts on Cultural Resources

4.4.1 Impact Assessment Methodology

This section analyzes potential impacts of the construction, operation and maintenance and closure and decommissioning of the project related to cultural resources. The potential for impacts to cultural resources depends on whether such resources are present and whether they actually would be encountered during project activities. Cultural resources include materials (e.g., artifacts, structures, or land modifications) that reflect the history of human development as well as places that are valued by Native Americans or local national/ethnic groups.

This analysis evaluates the structural and cultural evidence of human development in the vicinity of the project site and recommends appropriate mitigation measures to avoid or reduce impacts to significant historic properties (cultural resources listed on or eligible to the National Register) in the event of project-related disturbance. Prehistoric, ethnographic and historic resources are considered in this assessment.

The basic regulatory process for assessing impacts related to cultural resources consists of five steps:

1. Determining the appropriate geographic extent of the analysis for the proposed action and for each alternative action under consideration;

2. Identifying cultural resources inventory within each such geographic area;

3. Determining the historical significance of the cultural resources in the inventory for each geographic area, unless the construction, operation and maintenance, and decommissioning and closure of the proposed or alternative actions would avoid particular resources;

4. Assessing the character and the severity of the effects of the proposed and alternative actions on the significant historic properties in each respective inventory that cannot be avoided; and

5. Developing measures that would address those effects.

Further details of each of these phases follow below and help provide the parameters of the present analysis.

Area of Potential Effects

The regulations implementing National Historic Preservation Act (NHPA) Section 106 define the Area of Potential Effects (APE) as the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist. The APE is influenced by the scale and nature of the undertaking and may be different for different kinds of effects caused by the undertaking (36 CFR 800.16(d)). In addition, the APE may be buffered for purposes of cultural resource inventory to facilitate the identification of resources that may be located in proximity to the APE and indirectly affected by a proposed project or to allow the redesign of project components to avoid direct effects to cultural resources. For purposes of complying with Section 106, the APE for the project consists of the following:

1. For archaeological resources, the APE is defined as the area included within the ROW grant for the solar energy generating plant and associated facilities, roads and transmission lines. For proposed linear facilities routes, the cultural resource survey corridor included a buffer of 50 feet on either side of the ROW for these routes and the maximum depth that would be reached by all foundation excavations and by all pipeline installation trenches as discussed in Section 4.4.2, below.

2. For ethnographic resources, the APE is expanded to take into account historic properties to which Indian Tribes may attach religious or cultural significance that may be further afield than the project site footprint or ROW, including the visual setting that may contribute to the historical integrity of the resources. Ethnographic resources often are identified in consultation with Native Americans and other ethnic groups, and issues that are raised by these communities may define the APE. For the project, the ethnographic APE is the geographic area around and including the project site where the project could directly or indirectly alter the character or use of ethnographic resources that are historic properties.

3. For built-environment resources, the APE is the proposed project footprint (plant site and linear facilities corridor) plus a 0.5-mile buffer from the plant site, and from any above-ground linear facilities, to take into consideration resources whose settings could be adversely affected by industrial development.

Cultural Resources Inventory

The records search for the project included collecting information about all known cultural resources within the APE. In addition to archival and online research, sources checked included:

1. The Eastern Information Center (EIC) of the California Historical Resources Information System (CHRIS);
2. Previously documented cultural resources or archaeological studies in the project area;
3. National Register of Historic Places (NHRP);
4. California Register of Historical Resources (CRHR);
5. California State Historical Landmarks;
6. California Points of Historical Interest; and
7. California Inventory of Historic Resources;
8. BLM Field Office files
9. Local historical societies, museums and research institutions,
10. Information on file at University of California, Davis, University of California, Riverside; California State University, Chico; University of Alabama; Museum of Man in San Diego, and
11. BLM Cultural Areas of Critical Environmental Concern (ACEC) files.

Pedestrian and “windshield” surveys also were conducted. Results of the cultural records search and inventory work are provided in Section 3.4, *Cultural Resources*.

Assessing Effects

The core of a cultural resources analysis under NEPA and Section 106 is the assessment of the character of the effects that a proposed or alternative action may have on significant historical properties (cultural resources listed on or eligible to the National Register). The analysis takes into account direct, indirect and cumulative effects.

In accordance with 36 CFR 800.5 of the Advisory Council on Historic Preservation’s implementing regulations which describe criteria for adverse effects. Impacts on cultural resources are considered significant if one or more of the following conditions would result from implementation of the proposed action:

a. An undertaking has an effect on a historic property when the undertaking may alter characteristics of the property that may qualify the property for inclusion in the National Register of Historic Places (NRHP). For the purpose of determining the type of effect, alteration to features of a property’s location, setting, or use may be relevant, depending on the property’s significant characteristics, and should be considered.

b. An undertaking is considered to have an adverse effect when the effect on a historic property may diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association. Adverse effects on historic properties include, but are not limited to:

    1. Physical destruction, damage, or alteration of all or part of the property;
    2. Isolation of the property from or alteration of the character of the property’s setting when that character contributes to the property’s qualification for the NRHP;
    3. Introduction of visual, audible, or atmospheric elements that are out of character with the property or that alter its setting;
    4. Neglect of the property, resulting in its deterioration or destruction; and
    5. Transfer, lease, or sale of the property.

Consideration is given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative. A formal finding of effect under Section 106 is made for the proposed undertaking as a whole rather than for individual resources affected by the undertaking.

4.4.2 Direct and Indirect Impacts

Proposed Action

Under NEPA, direct and indirect effects are those that are more clearly and immediately attributable to the implementation of proposed or alternative actions. Direct effects are those “which are caused by the [proposed or alternative] action and [which] occur at the same time and place” (40 CFR 1508.8(a)). Direct impacts to cultural resources are caused by project development, construction, and co-existence. Indirect effects are those “which are caused by the [proposed or alternative] action and are later in time or farther removed in distance, but are still reasonably foreseeable" (40 CFR 1508.8(b)).

The NHPA Section 106 regulations narrow the range of direct effects and broaden the range of indirect effects relative to the definitions of the same terms under NEPA. Under the NHPA, the term "effect" "means alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register" (36 CFR 800.16(i)). In practice, a "direct effect" under Section 106 is limited to the direct physical disturbance of a historic property. Effects that are immediate but not physical in character, such as visual intrusion, and reasonably foreseeable effects that may occur at some point subsequent to the implementation of the proposed undertaking are referred to in the Section 106 process as "indirect effects."

Ground-disturbing construction activities associated with the project could have a direct impact on cultural resources by damaging and displacing artifacts, diminishing site integrity and altering the characteristics that make the resources significant. In addition, in the case of historic architectural resources and places of traditional cultural importance, impacts can occur to the setting of a resource even if the resource is not physically damaged.

Based on graphical representations showing the anticipated disturbance below ground and the anticipated above-ground intrusion into the flat landscape, impacts associated with the project potentially affecting cultural resources include:

1. General cutting and filling would disturb the overall project site to a maximum depth of 2 feet.

2. In the solar array fields, the project collector foundation excavations would cause ground disturbance, and the collectors would intrude into the flat landscape to a maximum height of 25 feet.

3. In the power blocks, the project equipment foundation excavations would cause ground disturbance down to a maximum depth of 25 feet, and the equipment would intrude into the flat landscape to a maximum height of 75 feet.

4. Along the linear facilities corridor, project trench excavations would cause ground disturbance down to a maximum depth of 10 feet. The transmission line supports would cause ground disturbance down to a depth of 15 feet and create an intrusion into the flat landscape to a maximum height of 75 feet.

The area disturbed for construction and operation of the project, including drainage channels, would be approximately 2,970 acres. An additional 137.34 acres would be used for linear facilities (i.e., the final transmission line, temporary construction power line, telecommunications line, and site access road). The total area within the ROW that would be disturbed would be approximately 3,107.34 acres.

Based on this information, significant historic properties consisting of a total of 49 of the 64 sites recorded during cultural resource surveys for the project sites would be adversely affected by the project. Of the 49 sites that would be impacted, 9 are prehistoric. These nine sites may contribute to a potential Prehistoric Trails Network Cultural Landscape. Forty historic-period sites would be impacted, some of which may contribute to a potential Desert Training Center Cultural Landscape. Procedures for evaluating and treating sites discovered during construction will be addressed in the PA.

No additional impacts to cultural resources are anticipated from project operation or from project closure and decommissioning.

Alternatives

Reconfigured Alternative 1

The Reconfigured Alternative would change the shapes of both Units 1 and 2 as illustrated in Figure 2-2. Unit 1 would be a 250 MW solar generating facility on about 1,490 acres and Unit 2 would be a 250 MW solar generating facility, on approximately 1,450 acres. The reconfigured units would use approximately 180 acres more land than the proposed Units 1 and 2 which were located on 1,380 acres each. In addition to reconfiguring the Unit 1 and 2 solar fields, it also would modify the power block, water treatment system, water storage tanks, and the administration, control, warehouse, maintenance, and lab buildings.

Similar to the proposed action, the Reconfigured Alternative would transmit power to the grid through the Red Bluff Substation. It would require the same infrastructure as the proposed action, including on-site wells, transmission line, road access, gas pipeline, main office and warehouse buildings, and central internal switchyard. The transmission line, road access would remain approximately the same length as for the proposed action. The required linear facility routes would require minor adjustments to accommodate the changed solar field configurations.

Impacts to cultural resources under this alternative would be similar to those of the proposed action because Reconfigured Alternative 1 would be developed generally within the same ROW as the proposed action. This alternative would impact 41 sites consisting of 38 historic-period sites, 2 prehistoric sites, and 1 multi-component site.

Reconfigured Alternative 2

Option 1

Reconfigured Alternative 2 Option 1 would be a 500-MW solar facility, like the proposed action. Solar Unit 2 would remain as for the proposed action, but Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern third of the proposed field. This change would result in a triangular-shaped solar trough field trending southeast, as illustrated in Figure 2-3. This reconfigured eastern solar field would be located partially on public land managed by BLM, partially on a 40-acre private parcel on which the Applicant has a purchase option, and partially on two privately owned parcels not currently controlled by the Applicant. The overall disturbance area for Reconfigured Alternative 2 Option 1 would be approximately 4,360 acres. Because this alternative would be developed in the same general location as the project, the cultural resources setting would be the same as for the proposed action.

Reconfigured Alternative 2 Option 1 would have an adverse impact on the same cultural resources as the proposed action in addition to 12 others, including nine historic-period refuse scatters, two placer mining claim markers (one with associated refuse), and a temporary military camp (SMP-H-1012; JR-104, JR-107, JR-108; DS-5, DS-7, DS-14, DS-17, DS-24, DS-41, DS-44, and DS-45).

Option 2

Reconfigured Alternative 2 Option 2 would be a 500-MW solar facility, like the proposed action. Solar Unit 2 would remain as for the proposed action, but Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern third of the proposed field. This change would result in a triangular-shaped solar trough field trending southeast, as illustrated in Figure 2-4. This reconfigured eastern solar field would be located primarily on public land managed by BLM; however, as with the proposed action, it would include a 40-acre private parcel on which the Applicant has a purchase option. The overall disturbance area for Reconfigured Alternative 2 Option 2 would be approximately 4,324 acres. Because this alternative would be developed in the same general location as the project, the cultural resources setting would be the same as for the proposed action.

Reconfigured Alternative 2 Option 2 would have an adverse impact on the same cultural resources as the proposed action in addition to 12 others, including nine historic-period refuse scatters, one placer mining claim marker, a temporary military camp, and a prehistoric ceramic scatter (SMP-H-1012; JR-104; DS-5, DS-7, DS-14, DS-17, DS-24, DS-28, DS-41, DS-44, DS-45, and DS-P53).

Reduced Acreage Alternative

The Reduced Acreage Alternative would follow boundaries similar to those of Reconfigured Alternative 1, but it would be about 25 percent smaller, occupying about 2,080 acres as compared with 2,740 acres required for Units 1 and 2 of the proposed action. The boundaries of the Reduced Acreage Alternative are shown in Figure 2-5.

Impacts to cultural resources under this alternative would be less than those of the proposed action. The Reduced Acreage Alternative would impact 34 sites consisting of 33 historic-period sites and one multi-component site.

No Action Alternative A

Under this alternative, the PSPP would not be approved by the BLM, and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the site, and BLM would continue to manage the site in a manner consistent with the existing land use designation in the CDCA Plan. It is expected that the site would remain in its existing condition, with no new structures or facilities constructed or operated on the site and no new ground disturbance. As a result, no loss or degradation to cultural resources from construction, operation or decommissioning of the PSPP would occur. However, the project site would become available to other uses consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. Insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative B

Under this alternative, the project would not be approved by the BLM, and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. The BLM would continue to manage the site in a manner consistent with the existing land use designation in the CDCA Plan. Insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative C

Under this alternative, the project would not be approved by the BLM, and BLM would amend the CDCA Plan to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with a different solar technology. As a result, ground disturbance would result from the construction and operation of the solar technology and would likely result in a loss or degradation to cultural resources. Different solar technologies require different amounts of grading and maintenance; however, it is expected that all solar technologies require some grading and ground disturbance. As such, this alternative could result in impacts to cultural resources greater than, similar to or reduced relative to the impacts expected to occur under the proposed action.

4.4.3 Cumulative Impacts

The regulations implementing Section 106 of the NHPA contemplate close coordination between the NEPA and NHPA processes (36 CFR 800.8), and expressly integrate consideration of cumulative concerns within the analysis of a proposed action’s potential direct and indirect effects by defining “adverse effect” to include “reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative” (36 CFR 800.5(a)(1)).

For the cultural resources cumulative analysis, the relevant geographic scope was defined at two levels: local and regional. At the local level, the geographic area considered for cumulative impacts on cultural resources is an area on either side of I-10 referred to here as the I-10 Corridor. The area is broadly equivalent to a 4-mile-wide strip (2 miles to either side of I-10) 48 miles long, between Blythe and Desert Center, with an area of 192 square miles (122,440 acres). Although the total number of cultural resources present in this area is unknown, an estimate can be derived based on recent surveys related to three solar power projects (PSPP, Genesis Solar Energy Project and Blythe

Solar Power Project), which surveyed a total of 19,184 acres. These projects recorded 329 sites, indicating that the I-10 Corridor has an average site density of 0.017 cultural resources per acre. This suggests that the I-10 Corridor originally contained approximately 2,081 cultural resources.

At the regional level, the geographic area considered for cumulative impacts on cultural resources includes the 25-million-acre California Desert Conservation Area (see Figure 1-1). Approximately 20 percent of Riverside and San Bernardino counties have been surveyed for cultural resources. These surveys have identified and documented more than 20,000 cultural resources. These results suggest that there is a high potential to discover previously unknown resources within the cumulative study region.

Past, present and reasonably foreseeable future actions would cause impacts that could combine with the impacts of the project to cause an adverse cumulative impact related to cultural resources. The impacts of these other actions are summarized in Table 4.4-1.

TABLE 4.4-1
CUMULATIVE IMPACTS TO CULTURAL RESOURCES:
ESTIMATED NUMBERS OF CULTURAL RESOURCES

Location	Acres	Number of Known or Estimated Cultural Resources
Genesis APE	19,184	329
Blythe APE		(Average density of 0.017 sites per acre)
Palen APEs		
I-10 Corridor	122,440	2,081
Southern California Desert Region	11,000,000	187,000
Existing Actions: I-10 Corridor		
Chuckwalla Valley Prison and Ironwood Prison	1,720	29
I-10 Freeway	2,328	40
Devers-Palo Verde 1 Transmission Line	350	6
Kaiser Eagle Mountain Mine	3,500	59
Subtotal	***7,898***	***133***
Present and Reasonably Foreseeable Future Actions: I-10 Corridor		
13 Solar Projects and Chuckwalla Raceway	47,591	809
4 New Transmission Lines	465	17
Subtotal	48,056	826
Present and Reasonably Foreseeable Future Actions: Southern California Desert Region		
Solar Projects	567,882	9,654
Wind Projects	433,721	7,371
Subtotal	1,001,606	17,027

SOURCE: CEC Commission Decision (Cultural Resources Table 4)

Past ground-disturbing actions along the I-10 Corridor that caused impacts to cultural resources include construction of Chuckwalla Valley and Ironwood State Prisons, I-10, the Devers-Palo Verde 1 Transmission Line, and mining activities at the Kaiser Eagle Mountain Mine. Construction of the Chuckwalla Valley and Ironwood State Prisons disturbed approximately 1,720 acres, suggesting that 29 cultural sites were destroyed pursuant to this work. Interstate-10 is a four-lane divided highway with associated bridges, off-ramps and a berm system. Assuming a minimum width of 200 feet and length of 48 miles, this project disturbed approximately 2,328 acres, suggesting that 40 cultural sites were destroyed during its construction. The Devers-Palo Verde Transmission Line, a 500-kV transmission line, parallels I-10. Based on the construction of the access road and excluding the transmission tower pads, a width of 20 feet and a length of 48 miles were assumed for this analysis, resulting in approximately 350 acres of disturbance and the destruction of approximately 6 cultural sites. Finally, mining activities at the Kaiser Eagle Mountain Mine may have disturbed about 3,500 acres, destroying an estimated 59 cultural resources. Together, these past actions within the I-10 Corridor disturbed an estimated 7,898 acres, or 6.4 percent of the I-10 Corridor, and may have destroyed 133 of the estimated 2,081 cultural resources.

Cultural resources in the BLM California Desert District primarily have been impacted by past and currently approved projects through the ground disturbance that is required for construction of buildings, facilities, roads, and other infrastructure. The most intensive past use of the desert and concomitant disturbance of cultural resources has been on designated military installations (e.g., Edwards Air Force Base, Fort Irwin, Twentynine Palms Marine Corps Base, Chocolate Mountain Naval Aerial Gunnery Range), particularly at bombing ranges. General Patton conducted military training operations from 1942 to 1944; later training maneuvers were conducted throughout the I-10 Corridor in May 1964. In the case of military installations and maneuvers, however, avoidance of substantial adverse changes to NRHP-eligible cultural resources has been accomplished through deliberate project planning. Likewise, the severity of impacts to previously unknown cultural resources have been reduced by implementing mitigation measures requiring construction monitoring, evaluation of resources discovered during monitoring, and avoidance or data recovery for significant resources.

Present and reasonably foreseeable actions along the I-10 Corridor include 13 solar projects, development of the Chuckwalla Raceway, four new transmission lines and other activities identified as part of the cumulative scenario. Although some of these projects may not be built, this analysis conservatively assumes the maximum number of cultural resources would be destroyed. For example, development of the 13 proposed solar projects and Chuckwalla Raceway would disturb 47,591 acres, resulting in the destruction of 809 cultural resources; the four new transmission lines would disturb 465 acres and destroy 17 cultural resources. Together these present and reasonably foreseeable actions along the I-10 Corridor would disturb 48,056 acres, or 39 percent of the total I-10 Corridor, and destroy 826 cultural resources.

Present and reasonably foreseeable actions within the BLM California Desert District include numerous solar and wind projects. Although the cultural resources density per acre is unknown for this entire region, the density proposed for the I-10 Corridor serves as a reasonable approximation. Within the District, solar projects would occupy 567,882 acres and wind 433,721 acres, collectively consisting of approximately 4 percent of the CDCA. Together, these renewable energy projects would cause changes in the setting, feeling and association of the areas in which they are constructed. Potential impacts would include direct impacts in the form of physical disturbance or alteration as a result of construction activity or indirect impacts in the form of diminished access to and visual character of traditional use areas due to the presence of industrial structures. Based on density of sites per acre along the I-10 Corridor, the development of the renewable energy projects in the California Desert District would destroy 17,027 cultural sites.

Development of the project would directly impact 49 significant archaeological resources and indirectly impact two potential cultural landscapes. When combined with the impacts to cultural resources from past, present and reasonably foreseeable future actions (see Table 4.4-1, and discussion, below), the project would contribute approximately 6 percent of the cumulative impacts at the local level (49 of an estimated 826 cultural sites destroyed) and approximately .3 percent of the cumulative impacts at the regional level (49 of an estimated 17,027 cultural sites destroyed). Cumulative impacts would vary by alternative to the project only to the degree to which their direct and indirect impacts would vary. In any event, each of the "build" alternatives would contribute to the cumulative impacts.

4.4.4 Summary of Mitigation Measures

Adverse effects that the proposed action or an alternative could have on cultural resources would be resolved through compliance with the terms and conditions of the Programmatic Agreement (PA[1]) prepared and entered into for the project consistent with NHPA Section 106. In accordance with 36 CFR Section 800.14(b), PAs are used for the resolution of adverse effects for complex project situations and when effects on historic properties, resources eligible for or listed in the NRHP, cannot be fully determined prior to approval of an undertaking. The BLM prepared a PA in consultation with the State Historic Preservation Officer, Indian tribes, and other interested parties. Treatment plans containing measures to mitigate impacts on historic properties that cannot be avoided by project construction would be developed in consultation with stakeholders as stipulated in the PA. Analysis of impacts in this document and implementation of the PA will evidence BLM's compliance with Section 106 and NEPA. The PA is included in Appendix H.

4.4.5 Residual Impacts after Mitigation Measures were Implemented

Residual impacts on cultural resources would exist after the PA is implemented. Cultural resources damaged or destroyed by project construction, even if subjected to mitigation measures, permanently would be lost from the archaeological record. This would make the cultural resources unavailable for future study to address future research needs when more advanced investigative techniques and methods of analysis might be available.

4.4.6 Unavoidable Adverse Impacts

Ground disturbance caused by the project would result in unavoidable adverse impacts on cultural resources through damage, displacement and destruction of sites, features, and artifacts, loss of integrity of cultural resources, and changes in the settings of cultural resources inconsistent with their historic or traditional cultural values.

1 The PA is the required mitigation for impacts to cultural resources.

4.5 Impacts on Environmental Justice

4.5.1 Impact Assessment Methodology

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," directs Federal agencies to assess whether their actions have disproportionately high and adverse human health or environmental effects on minority and low-income populations. The Presidential memorandum accompanying the Executive Order states that "each Federal agency shall analyze the environmental effects, including human health, economic and social effects, of Federal actions, including effects on minority communities and low-income communities, when such analysis is required by NEPA."

This analysis of whether construction, operation and maintenance, and closure and decommissioning of the project would cause a disproportionate impact on low-income and/or minority populations within the potentially affected area relies on a demographic screening analysis to first determine whether there are environmental justice communities of concern that could be potentially impacted by the project. For the purposes of this study, the potentially affected area for the project consists of the area within a six-mile radius of the site. Beyond that distance, most direct physical effects would typically be expected to be relatively diminished and residents' daily interaction with the project would likely be relatively limited.

The environmental justice reviews the resource specific analyses to identify adverse health and environmental effects that would potentially impact the identified communities of concern. In accordance with CEQ Guidance, the review evaluates the resource impacts to determine if there are "significant (as defined by NEPA) and are or may be having an adverse impact" to a minority population, low-income population, or Indian tribe (CEQ, 1997).

Finally, any such identified significant (as defined by NEPA) impacts were then examined to determine whether the project impacts are disproportionately borne by the communities of concern or are distributed more widely and evenly amongst the local and regional population. In the absence of a high and adverse resource impact, no disproportionately high or adverse impact to a community of concern (i.e., environmental justice impact) would occur.

The demographic screening to determine the present of minority or low income populations is presented in the Affected Environment (Section 3.5, *Environmental Justice*). The screening analysis determined that the minority population, within both Census Block 458.00.6 and the City of Blythe as a whole, is more than 50 percent and, therefore, both qualify as communities of concern for the purpose of environmental justice analysis. In addition, Census Block 458.00.6 has a proportion of low-income residents living below the poverty level (28.3 percent) nearly twice that for Riverside County as a whole. Consequently, it is conservatively adjudged that Census Block Group 458.00.6 also is a low income community of concern for the environmental justice analysis.

However, it is noteworthy that the census blocks surrounding the project site are extremely large and also represent populations that live far outside the six-mile radius. The proposed site is located in a sparsely populated area about 100 miles east of the City of Riverside. The small, local communities nearest the site include the City of Blythe, California (approximately 25 miles east of the site) and the Cities of Ehrenburg and Quartzsite, Arizona (approximately 30 miles and 45 miles east of the site). The same census blocks used to determine minority population would have only counted zero persons in the low-income population category. Therefore, the census data used to determine low-income population included all census blocks intersected by the six-mile radius, even if only a minor proportion of the blocks' geographic area was located within the project's six mile radius area.

The estimated total residential population within a six-mile radius of the site is 17 people; the total minority population is 10 people or 58.8 percent of the local residents. The below poverty-level population reported in the 2000 U.S. Census block group data was 1,440 people; the total low-income population was 407 people, or 28.3 percent of its total population.

4.5.2 Discussion of Direct and Indirect Impacts

Proposed Action

To evaluate the potential for environmental justice concerns the findings and analysis for the following sections in the PA/FEIS were reviewed: Section 4.2, *Impacts on Air Quality*; Section 4.9, *Impacts on Noise;* Section 4.12, *Impacts on Public Health and Safety;* Section 4.13, *Social and Economic Impacts;* Section 4.14, *Impacts on Soil Resources*; Section 4.16, *Impacts on Transportation and Public Access – Off Highway Vehicle Resources* (specifically concerning traffic); Section 4.18, *Impacts on Visual Resources*; and Section 4.19, *Impacts on Water Resources*.[1] The PA/FEIS findings of the project's expected resource impacts are summarized in the Section ES, *Executive Summary*.

In its review of these PA/FEIS sections, the BLM analyzed their findings (i.e., potential impacts and mitigation measures) for environmental justice considerations whether any adverse impacts would occur to the communities of concern. In addition, if warranted the analysis then evaluates whether a "disproportionately high and adverse impact" on these communities would occur that would represent an environmental justice impact. If no significant and adverse resource impact is determined then no disproportionate disproportionately high or adverse impact to a community of concern (i.e. environmental justice impact) will occur.

The environmental justice review determined that construction, operation and maintenance, and closure and decommissioning of the project would not result in an environmental justice issue for any of the specified resource areas. For example, as analyzed in Section 4.2, *Impacts to Air Quality*, the project would not result in direct or cumulative air quality impacts, thereby resulting in no environmental justice issue for air quality. Similarly, with regard to Water Resources, the proposed action would not involve wastewater discharges that could affect drinking water supplies or other water bodies. No considerable noise impacts from the project are expected as a

1 Other sections (such as Cultural, Mineral and Land and Realty Resources) were determined to have no potential health or environmental effects on the local populations and therefore were not reviewed further for potential Environmental Justice impacts.

result of the project design, mitigation measures, and the absence of sensitive receptors nearby. The proposed action would not displace any homes or businesses nor would any significant adverse traffic impacts result during project construction or its subsequent operation. Moreover, no significant and adverse public health and safety impacts are anticipated associated with the proposed action.

For these reasons, and also given the rural and remote character of the area, and the low population concentration near the site, the project would not result in any disproportionate adverse impacts on low-income or minority populations. Therefore, no environmental justice impacts would be associated with the proposed action.

Alternatives

The potential for environmental justice issues to result from Reconfigured Alternative 1, Reconfigured Alternative 2 and the Reduced Acreage Alternative would be substantially the same as for the project. Slight distinctions could be made among the “build” alternatives with regard to the direct and indirect impacts associated with the total acreage of land disturbed on the project site under each build alternative. Generally, resource impacts relating to any potential environmental justice impact would decrease as the acreage disturbed is reduced. As with the project, none of the “build” alternatives would result in an environmental justice impact.

The “no project” alternatives also would not result in direct or indirect resource impacts from the project relating to potential environmental justice considerations. Therefore, no environmental justice impact from the project would be associated with No Action Alternative A, CDCA Plan Amendment/No Project Alternative B, or CDCA Plan Amendment/No Project Alternative C.

4.5.3 Discussion of Cumulative Impacts

No direct or indirect environmental justice impact would result from the proposed action or any of the alternatives. Therefore, no cumulative environmental justice impacts would result.

4.5.4 Summary of Mitigation Measures

No environmental justice mitigation measures are proposed.

4.5.5 Residual Impacts after Mitigation Measures were Implemented

No residual environmental justice impacts would occur.

4.5.6 Unavoidable Adverse Impacts

No unavoidable adverse environmental justice impacts would occur.

4.6 Impacts on Lands and Realty

4.6.1 Impact Assessment Methodology

The BLM Master Title Plats (MTPs) and automated Lands and Minerals Legacy Rehost 2000 System (LR2000) were reviewed to obtain information related to pending and authorized uses on the BLM-administered lands potentially affected by the project. The BLM's Washington Office and California State Office web sites provided additional information relating to corridor designations and solar study areas potentially affected by the project.

Impact assessment was based on known impacts relative to construction, operation, maintenance and decommissioning of rights-of-way and land use permits of all types on BLM-administered land.

4.6.2 Discussion of Direct and Indirect Impacts

Proposed Action

The project would consist of two adjacent, independent, identical power block units (Units) of 250 MW nominal capacity each for a total nominal capacity of 500 MW (Figure 2-2). The gen-tie line would interconnect with the power grid at Southern California Edison's (SCE) proposed Red Bluff Substation.

Although there are numerous existing rights-of-way of record within and adjacent to designated Corridors K and 30-52, only a few would be directly affected by the project. Any existing authorized use that would be affected by the project has "priority rights" in the sense that any new authorization(s) would be issued "subject to" the previously existing rights-of-way or other uses. Therefore, the Applicant would be required to mitigate any potential impacts to the existing authorized users at the Applicant's expense. This would mean bearing all costs for relocating or modifying any facilities such as power poles or conductor that might be necessary to accommodate the new use.

Impacts to Designated Corridors

Potential impacts to the designated corridors could occur as a result of the overhead gen-tie transmission line crossing all or portions of the designated corridors. Impacts to the corridors from the redundant telecommunications and fiber optic lines would be similar to the power line, depending on whether the cables are buried (as would be the case in crossing under I-10) or strung on existing or new power lines. However, with current technology, the potential impacts would be expected to be minimal, easily mitigated and would not preclude continued and future use of either designated corridor. Future use of the corridors would be slightly constrained by placement of additional facilities within, and following along the path of, the corridors.

Impacts from the access road exiting the frontage road and heading east to the project site and the emergency access road exiting the southern boundary of the site would be minimal because future transmission lines, both gas and electric, could easily bore under or span across the roads, respectively. Future use of the corridors would be slightly constrained by placement of additional facilities within the corridors.

The largest impact to the designated corridors would come from the proposed solar generating facility. Once constructed, the land encompassed by the project would not be available for placement of future site or linear facilities. Any future use would have to be constructed around the outermost perimeter of the Project rather than spanning across. Given that both corridors are 2 miles wide, with I-10 being the approximate center line of both, virtually all of the north halves of both corridors would be rendered unusable for future site and linear projects at the project site. However, the land south of the project site and south of both corridors is vacant desert land and would potentially be available for expanding the width of the corridors to the south along this segment. The CDCA Plan provides for a 5-mile standard width "in those cases where there are so many facilities or merging corridors that a five-mile width is needed to ensure sufficient space for system integrity and flexibility."

Impacts to Interstate 10

Potential impacts to I-10 from the overhead gen-tie line and the overhead and buried portions of the redundant telecommunications and fiber optic lines would be mitigated by following requirements of the Federal Highway Administration (FHWA) and/or California Department of Transportation (CalTrans), and industry standards (SOPs) and best management practices (BMPs) for aerial and buried crossings of federal highways.

Potential impacts from the new access road that would exit Corn Springs Road and head east to project boundary and the emergency access road abutting the northern edge of the I-10 right-of-way boundary and extending into the project site would be mitigated by following requirements of the FHWA, CalTrans and industry SOPs and BMPs for encroachment of federal/State highways.

Impacts to Other Authorized Uses

As proposed, potential impacts could occur from the aerial gen-tie line and the overhead and buried redundant telecommunications line and fiber optic cable crossing existing uses both north and south I-10. Once across the highway, the gen-tie line would turn to the east (or west depending on final site selection) and parallel the highway and existing power lines to the point of interconnection with the planned Red Bluff substation. However, construction and operation of these new linear facilities using industry SOPs and BMPs for crossing over or boring under existing authorized uses would effectively mitigate potential negative impacts to existing authorized users.

As proposed, the southwestern part of the project site could not be constructed due to the existence of SCE's Eagle Mountain-Blythe 161-kV transmission line. However, the Applicant and SCE are working together to try to accommodate both the solar facilities and SCE's 161-kV line within the project area which, if agreed to, would require moving approximately 5,900 feet of the Eagle Mountain-Blythe power line to skirt around the southwest corner of the Project area. If an agreement cannot be reached, the Applicant would have to reconfigure the southwest portion of the generating facilities to avoid impacts to the existing transmission line. SCE has submitted an application to move the 161-kV to the BLM to accommodate the project.

Reconfigured Alternative 1

The Reconfigured Alternative 1 would be a 500 MW solar facility, like the proposed project, but it would reconfigure the proposed solar Units 1 and 2 by changing their shapes (Solar Millennium, 2009).

Under this alternative, the proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northern third of the proposed field, resulting in separating Unit 1 into two separate polygons trending southeast. Approximately 240 acres of this reconfigured eastern solar field would be outside of the Applicant's right-of-way application area, requiring adjustment of the boundaries of the BLM right-of-way application, but the alternative would remain entirely within BLM-administered lands. This alternative includes use of the proposed Unit 2 (the western solar field) in the same approximate location, but it would be reconfigured into a stair-step shape trending northeast to avoid the primary and secondary washes crossing the site. The setting for Unit 2 would be similar to that for the proposed project.

Overall, impacts of this alternative would be basically the same as with the project. On-site access roads would be configured differently, but would be approximately the same length. The length of transmission lines for collecting and carrying power to the on-site substation and the fiber optic cable for operation of the data collection system would remain basically the same. The off-site transmission line, redundant telecommunications line, fiber optics cable and access road would require relatively minor route adjustments to accommodate the changed solar field configurations.

Reconfigured Alternative 2

Option 1

Reconfigured Alternative 2, Option would be a 500 MW solar facility like the project, but it would change the shape of Unit 1. Solar Unit 2 would be the same as the project. The overall disturbance area for Reconfigured Alternative 2, Option 1 would be approximately 4,365 acres (CEC RSA, 2010).

Proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern third of the proposed field. This alternative would reconfigure Unit 1 into a triangular shape trending southeast. This reconfigured eastern solar field would be located on BLM-administered public land, on a 40-acre private parcel on which the Applicant has a purchase option, and on two privately-owned parcels (approximately 120 acres each) not currently controlled by the Applicant.

Reconfigured Alternative 2, Option 1 assumes that the Applicant can acquire the 240 acres of private land that would be required for the implementation of this redesign effort. Reconfigured Alternative 2, Option 1 also would require adjustment of the boundaries of the right-of-way application because the alternative includes land not currently included in the proposed right-of-way application.

Overall, impacts of this alternative would be basically the same as with the project. The number of on-site access roads would be configured differently but would be approximately the same length. The length of transmission lines for collecting and carrying power to the on-site substation and the fiber optic cable for operation of the data collection system would remain basically the same. The off-site transmission line, redundant telecommunications line, fiber optics cable and access road would require relatively minor route adjustments.

Option 2

Reconfigured Alternative 2, Option 2 would generate 500 MW -- the same amount as the project; however, it would reconfigure Units 1 and 2. The total area of disturbance for Reconfigured Alternative 2, Option 2 would be about 4,330 acres (CEC RSA, 2010).

Proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern third of the proposed field. It would reconfigure Unit 1 so that it is triangular in shape trending southeast. As reconfigured, Unit 1 would avoid the use of the private land along its southern border and so would not retain a straight southern border. This reconfigured eastern solar field would be located primarily on BLM-administered public land; however, as with the proposed project, it includes a 40-acre private parcel on which the Applicant has a purchase option. This alternative would require adjustment of the boundaries of the right-of-way grant application because it would include land that is not included in the proposed right-of-way.

Proposed Unit 2 (the western solar field) would remain the same as for the project.

Overall, impacts of this alternative would be basically the same as with the project. The number of on-site access roads would be configured differently but would be approximately the same length. The length of transmission lines for collecting and carrying power to the on-site substation and the fiber optic cable for operation of the data collection system would remain basically the same or be slightly reduced. The off-site transmission line, redundant telecommunications line, fiber optics cable and access road would require relatively minor route adjustments.

Reduced Acreage Alternative

The Reduced Acreage Alternative would follow boundaries similar to those of the Reconfigured Alternative 1, but it would be about 25 percent smaller, occupying about 2,080 acres of land (as compared with 2,740 acres required for the Units 1 and 2 of the project). The Reduced Acreage Alternative would have a net generating capacity of approximately 375 MW (as compared with the 500 MW of the proposed project). This alternative would retain 75 percent of the proposed project’s generating capacity (Solar Millennium, 2009).

The off-site transmission, fiber optics cable and access road would require relatively minor route adjustments. The number of on-site access roads would be configured differently and slightly reduced in length. The length of transmission lines for collecting and carrying power to the on-site substation and the fiber optic cable for operation the data collection system would be reduced slightly.

This alternative would eliminate about 25 percent of the proposed project site. The impacts associated with all linear facilities would be essentially the same as the proposed project or may be slightly reduced. The amount of power generated would be reduced by 25 percent.

Overall, the impacts of this alternative would be slightly reduced from those expected with the project. The on-site access roads would be configured differently but would be approximately the same length or slightly reduced. The length of transmission lines for collecting and carrying power to the on-site substation and the fiber optic cable for operation of the data collection system would remain basically the same or be slightly reduced. The off-site transmission line, redundant telecommunications line, fiber optics cable and access road would require relatively minor route adjustments.

No Action Alternative A

Impacts associated with the project would likely only be delayed by selecting No Action Alternative A, since this region of the United States has extremely positive characteristics for solar power generation. If this project were not approved, another application for a different solar generating facility or a different type of solar generating facility would likely be filed at some time in the near future. However, an application also could be filed for a wind energy facility or any other use allowed consistent with the CDCA Plan Multiple Use Class M area. Insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative B

Impacts resulting from the project would not occur under this alternative; however, the land would remain open to other types of rights-of-way and/or land use authorizations, including wind energy facilities. Depending on the type of facility, the amount of acreage needed could be less than, approximately the same as, or larger than the project resulting in impacts specific to a future use other than solar energy development. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative C

Impacts associated with the project would likely only be delayed by selecting this alternative, since this region of the United States has extremely positive characteristics for solar power generation. If the project were not approved, another application for a different solar generating facility or a different type of facility would likely be filed at some time in the near future. The various solar energy technologies require the use of different amounts of land. Depending on the type of facility, the amount of acreage needed could be less, approximately the same as, or larger than the project. The land also would remain open to other types of rights-of-way and/or land use authorizations, including wind energy facilities. Resulting impacts would vary according to the specific future non-solar energy use or development.

4.6.3 Discussion of Cumulative Impacts

Impacts resulting from construction, operation, maintenance and decommissioning of the project could result in a cumulative effect on Lands and Realty with other past, present, or reasonably foreseeable future actions. The geographic scope of the cumulative effects analysis for Lands and Realty consists of eastern Riverside County, based on the jurisdictional boundaries within which the impacts of land use decisions of the proposed action and other projects could be additive, countervailing or synergistic. Potential cumulative effects on Lands and Realty could occur during the project's proposed 39-month construction period if, for example, it would be necessary to relocate or modify existing facilities within a right-of-way; during the projected 30-40 year lifespan of the proposed action if, for example, future projects were constrained by the placement of project-related facilities located within designated corridors; or pursuant to closure and decommissioning activities.

Existing conditions within the cumulative impacts area reflect a combination of the natural condition and the effects of past actions and are described in PA/FEIS Chapter 3. Direct and indirect effects of the construction, operation and maintenance, and closure and decommissioning of the project on Lands and Realty are analyzed above. Past, present and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1. Among them, other right-of-way applications for linear and non-linear projects that could be developed in eastern Riverside County include other utility-scale solar projects and the proposed Eagle Crest Pump Storage project and associated gen-tie transmission lines and other related ancillary facilities.

Additional actions that could have cumulative impacts include, among others, additional right-of-way grant applications for other renewable energy projects, substation projects and other linear facilities such as fiber optics, gas or electric transmission lines. Right-of-way grants and other land use decisions associated with these actions and projects would affect the nature, type, and intensity of uses authorized on the lands potentially affected by the project and its ancillary facilities. Permitting the project and other projects within the cumulative impact area could affect the amount of land that would be available for permitting by the BLM for other uses consistent with the CDCA Plan. Permitting the project and other projects for the single use proposed (e.g., solar energy development, pump storage, etc.) would restrict the use of the lands during the life of those projects reducing the number of acres of lands available to be administered by the BLM for other uses. Upon decommissioning of the project and other single use projects, affected acreage would become available for multiple use management by the BLM.

Multiple right-of-way grant applications recently have been approved or are pending in the vicinity of the project. ROW grants recently were approved for the Solar Millennium's Blythe

Solar Power Project (with associated 500-kV gen-tie line to carry 1,000 MW from the project) and NextEra's Genesis Solar Energy Project (with associated 230-kV gen-tie line to carry 250 MW from the project).

In addition to the project, other proposed solar generation projects in eastern Riverside County currently are undergoing review by the BLM: the Rice Solar Energy project proposed by Solar Reserve (a double-circuit 230 kV line to carry NextEra's proposed Genesis-McCoy 250 MW project on one circuit and Solar Reserve's proposed 150 MW on the second circuit); and Desert Sunlight Solar Farm (First Solar).

Figure 4.1-1 identifies these proposed projects by letter, as follows: the proposed action (K), Blythe (L), Genesis (O), Rice (R) and Desert Sunlight (V). The combined total number of acres identified for consideration in these applications, including the project, is approximately 32,700 acres. Each of these proposed actions has identified an "action area" that includes more acreage than what would be needed for construction, operation and maintenance to allow for flexibility in final design. Should one or more of these projects be authorized, the acreage included in the right-of-way grant(s) would be only that which is actually needed for a project(s), not the total number of acres identified in the application(s).

Cumulative impacts associated with approval of one or more of the pending solar energy applications would help diversify the domestic energy portfolio. Approval of one or more of the pending applications would help meet the goals of Section 211 of the Energy Policy Act of 2005 (Public Law 109-58, August 8, 2005), which encourages approval of at least 10,000 MW of non-hydropower renewable energy projects on public lands within 10 years of enactment.

Several transmission line projects and other past, present and reasonably foreseeable future activities are expected to occur within the cumulative impacts assessment area. For example, the Devers-Palo Verde No. 1 (DPV1) is an existing 500-kV transmission line which spans approximately 128 miles of land within California paralleling I 10 (see Figure 4.1-1, Number 3). The transmission line is within Corridors K and 30-52. DPV1 was approved by the California Public Utilities Commission (CPUC) in 1979 and constructed in 1982.

The Blythe 230-kV Transmission Line Project (Figure 4.1-1, Letter F) involves building two 230-kV transmission lines spanning approximately 70 miles between the Julian Hinds and Bucks substations, and construction of a new midpoint substation. Construction on the transmission lines began in February 2009, was completed in 2010, and the line has since been energized. The transmission line lies within the existing federally-designated utility corridors along I-10.

The Devers-Palo Verde 2 Transmission Line Project, approved by the CPUC in January 2007, involves the construction of two 500-kV transmission lines (Figure 4.1-1, Letter D). The proposed route for the Devers-Palo Verde 2 (DPV2) Transmission Line Project is along the south side of I-10, parallel to the existing DPV1 transmission line route. BLM anticipates issuance of a ROD in mid-2011 for the California-only portion of DPV2 to address the request for a right-of-way grant from SCE to construct, operate, and maintain DPV2 across BLM-administered land.

The Desert Southwest Transmission Line project consists of construction of an approximate 118-mile 500-kV transmission line and two new substation/switching stations. The BLM has approved a right-of-way grant for the construction of the transmission line which crosses public lands between Blythe and the western end of the Coachella Valley. This transmission line work would be constructed within an existing federal utility corridor. BLM has issued a ROW grant for the project. Upon completion of plans for development and finalization of the Programmatic Agreement, BLM would issue a notice to proceed for this project.

Two substations are identified as part of the solar generating facilities in the area - the Colorado River Substation and the Red Bluff Substation. The location of the Colorado River Substation is shown in Figure 4.1-1, Letter E; the proposed location of the Red Bluff Substation is designated "Y," but the location is not yet finalized.

Cumulative impacts would vary by alternative only to the degree to which direct and indirect impacts vary by alternative.

4.6.4 Summary of Mitigation Measures

The design features of the project, as well as compliance with applicable laws, ordinances, regulations, and standards; the use of industry SOPs (e.g., NERC, WECC, etc.); BMPs; and conditions of certification imposed by the CEC would avoid or reduce impacts associated with construction and operation of the project. Moreover, utility corridors have been designated by the BLM to accommodate such uses and to reduce overall environmental impacts that would result from the construction and operation of multiple linear facilities in multiple locations. Accordingly, additional mitigation measures are not recommended.

4.6.5 Residual Impacts after Mitigation Measures were Implemented

There would be no known residual impacts to existing authorized uses.

4.6.6 Unavoidable Adverse Impacts

Approval of the PSPP would result in land not being available for other uses during the life of the project; however, once the project is no longer viable and is decommissioned, the land once again would be available for other uses consistent with the CDCA Plan and applicable LORS.

4.7 Impacts on Mineral Resources

4.7.1 Impact Assessment Methodology

Applicable geologic maps and reports for this area were reviewed and geoarchaeological monitoring of a geotechnical investigation within the archaeological project area of analysis (PAA) took place July 20–28, 2009. Stratigraphic samples were collected for sedimentological and mineralogical data.

4.7.2 Direct and Indirect Impacts

Proposed Action

Construction of the project would include grading, foundation excavation, utility trenching and possibly drilled shafts. Neither operation nor decommissioning of the project would involve ground disturbance of a type that could cause an adverse impact on mineral resources or their availability. The proposed project site currently is not used for mineral production, nor is it under claim, lease, or permit for the production of locatable, leasable, or salable minerals. As discussed in Section 3.8, *Mineral Resources*, there is little to no potential oil, gas or geothermal resources to be present on the project site. Only limited exploration for oil and gas resources has been performed in the area and no active oil or gas operations are located in the immediate vicinity of the project. Further, due to the geologic environment, mineral resources other than sand and gravel are not present on the site.

Sand and gravel resources are present at the site and could be a source of salable resources. However, use of the site as a solar energy facility would not appreciably reduce or restrict the availability of sand and gravel resources because nearly all alluvial fans and broad desert basins in the region are potential sand and gravel sources. In addition, the project could use sand and gravel resources on or near the site for its own construction needs after proper permitting for use of the material, and any potential on-site sand and gravel resources would become available again following decommissioning of the project. As a result, the proposed action would have a negligible and temporary effect on the availability of sand and gravel resources, and no impact on the availability of other mineral or gas resources.

Alternatives

Reconfigured Alternative 1

The geologic units that would be disturbed by Reconfigured Alternative 1 are the same as those that would be disturbed by the proposed action, and ground disturbance would occur in roughly comparable amounts. Consequently, potential impacts to mineralogic resources would be the same as for the proposed action.

Reconfigured Alternative 2

The geologic units that would be disturbed by Reconfigured Alternative 2 are the same as those that would be disturbed by the proposed action, and ground disturbance would occur in roughly comparable amounts. Consequently, potential impacts to mineralogic resources would be the same as for the proposed action.

Reduced Acreage Alternative

The geologic units that would be disturbed by the reduce Acreage Alternative are the same as those that would be disturbed by the proposed action. However, ground disturbance from the Reduced Acreage Alternative would be less than required for the project. Potential impacts to mineralogic resources associated with the Reduced Acreage Alternative would be reduced in direct proportion to the reduction in ground disturbance.

No Action Alternative A

If the project were not constructed, no impacts on mineral resources would occur. However, under this alternative, any use consistent with the CDCA Plan Multiple Use Class M could be developed on the project site. Insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment /No Project Alternative B

Because the CDCA Plan would be amended to identify the project site as suitable for solar energy development, the site would be developed with the same or a different solar technology. However, other uses consistent with the CDCA Plan also could be developed. Insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment /No Project Alternative C

Because the CDCA Plan would be amended to make the proposed project site unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated there. As a result, the geologic conditions of the site are not expected to change noticeably from existing conditions and, as such, this alternative would result in no impact to mineral resources.

4.7.3 Cumulative Impacts

Because the proposed action and alternatives would have no direct or indirect effect on mineral resources, no cumulative effect would result.

4.7.4 Summary of Mitigation Measures

No mitigation measures are recommended.

4.7.5 Residual Impacts after Mitigation Measures were Implemented

There would be no known residual impacts to mineral resources.

4.7.6 Unavoidable Adverse Impacts

Approval of the project would result in no unavoidable adverse impacts on mineral resources.

4.8 Impacts on Multiple Use Classes

4.8.1 Impact Assessment Methodology

All but 40 acres of the proposed action would be developed on BLM-administered land that is classified in the CDCA Plan of 1980, as amended, as Multiple Use Class M (MUC-M). Accordingly, this analysis focuses on the project's potential impacts related to multiple use classes. The analysis was prepared by reviewing the applicable CDCA Plan requirements and concepts (including multiple use, sustained yield and maintenance of environmental quality) on MUC-M land and evaluating the proposal to determine whether it would be consistent with them.

One privately-owned 40-acre parcel (APN 810-110-007) is under the County of Riverside's jurisdiction rather than the BLM's. The County has designated this parcel for "Open Space Rural" land uses in its General Plan, and has zoned it as a controlled development area (W-2). The Multiple Use Class (MUC) Guidelines in Table 1 of the CDCA Plan provide that solar electricity generation facilities may be allowed in MUC-M areas in accordance with Federal, State and local laws subject to approval of a CDCA Plan amendment by the BLM. Because the proposed solar electrical generation facilities must be "in accordance with. . . local laws," this analysis also evaluates consistency with County requirements applicable to APN 810-110-007.

A variety of resources were reviewed and relied upon in preparing this analysis, including but not limited to BLM's Land Use Planning Handbook (BLM, 2005); other BLM manuals, including BLM Manual 6840 concerning Special Status Species Management (BLM, 2001); BLM Instruction Memorandum No. 2008-014, concerning the Clarification of Guidance and Integration of Comprehensive Travel and Transportation Management Planning into the Land Use Planning (BLM, 2007); CDCA Plan of 1980 (BLM, 1980), as amended; Riverside County General Plan; Eastern Riverside County Land Use Plan; Riverside County Zoning Ordinance; and documents that were part of the California Energy Commission proceedings.

4.8.2 Discussion of Direct and Indirect Impacts

Proposed Action

The proposed solar plant site would disturb approximately 2,970 acres. Development of the linear facilities (i.e., the final transmission line, temporary construction power line, telecommunications line, and site access road) would disturb approximately 137.34 acres. All but 40 acres of the total would be on MUC-M classified lands.

Proposals to develop a solar energy generation facility on a site not expressly identified in the CDCA Plan for this specific use are considered through the CDCA Plan amendment process. Requests for amendment are submitted to the California Desert District Manager. For the PSPP, the Applicant submitted an application to the BLM requesting a project-specific CDCA Plan amendment and ROW grant. No changes in the MUC classification would be required prior to approving the ROW grant. Nonetheless, approval of the ROW grant would restrict multiple use opportunities on the PSPP site to a single dominant use for the anticipated 30-40 year lifespan of the proposed action. This restriction would be lifted upon closure and decommissioning of the project. Thereafter, use opportunities on the site would return to the pre-PSPP conditions described in Chapter 3, *Affected Environment*.

According to the Riverside County Transportation and Land Management Agency's Planning Department's Regional Office Manager, the proposed action would be consistent with Riverside County's "Open Space-Rural" designation on the 40-acre parcel. In addition, Riverside County is in the process of updating its General Plan specifically to allow solar energy generation facilities with respect to the project site. The Energy Commission found, and the BLM agrees, that the proposed action would be a permitted use under the local General Plan and zoning designation. Accordingly, the PSPP would be consistent with County land use policies, and so in accordance with local laws.

Alternatives

Reconfigured Alternative 1

All of the Federal lands that would be affected by this alternative are classified MUC M. Reconfigured Alternative 1 would disturb approximately 1,450 acres as compared to 2,970 acres for the proposed action. MUC-M classified lands required for the linear facilities would be substantially similar to the proposed action.

Reconfigured Alternative 2

Option 1

All of the Federal lands that would be affected by Option 1 are classified MUC M. Reconfigured Alternative 2 Option 1 would disturb approximately 4,360 acres as compared to 2,970 acres for the proposed action. MUC-M classified lands required for the linear facilities would be substantially similar to the proposed action.

Option 2

All of the Federal lands that would be affected by Option 2 are classified MUC M. Reconfigured Alternative 2 Option 2 would disturb approximately 4,324 acres as compared to 2,970 acres for the proposed action. MUC-M classified lands required for the linear facilities would be substantially similar to the proposed action.

Reduced Acreage Alternative

All of the Federal lands that would be affected by this alternative are classified MUC M. The Reduced Acreage Alternative would disturb approximately 2,080 acres as compared to 2,970 acres for the proposed action. MUC-M classified lands required for the linear facilities would be substantially similar to the proposed action.

No Action Alternative A

Under No Action Alternative A, no ROW would be granted and no CDCA Plan amendment would be approved: existing conditions, activities and multiple use opportunities on the site would remain unaffected. Such opportunities could include a different proposal for utility-scale solar power facilities, fossil-fuel based energy development, or livestock grazing. Insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative B

Under CDCA Plan Amendment/No Project Alternative B, the PSPP would not be approved by the BLM, and the site would be made unavailable for solar development. The BLM would continue to manage the site consistent with the existing MUC-M classification. No use opportunities, such as energy development (except solar), agriculture or livestock grazing, recreation, maintaining habitat for wildlife, or any other allowable use on MUC-M designated land, would be foreclosed. Accordingly, a utility scale wind project, geothermal, nuclear, or fossil fuel project could be developed if allowed by applicable laws, ordinances, regulations, and standards. Insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative C

Under CDCA Plan Amendment/No Project Alternative C, the proposed PSPP would not be approved by the BLM, and BLM would amend the CDCA Plan to allow for other solar projects on the site. The development of another solar energy project on the site could result in the same foreclosure of use opportunities as would the proposed action.

4.8.3 Discussion of Cumulative Impacts

The geographic scope of the cumulative effects analysis for multiple use classes would include the approximately 1.5 million acres of the overall 25 million-acre CDCA Plan area that are designated MUC-M. Potential cumulative impacts could result from construction of the proposed action and, to the extent they exist, would continue until closure and decommissioning is complete, because this is the period of time during which the existence of the proposed action would preclude the development of other uses on the site and, thereby, affect the type of use opportunities on MUC-M lands throughout the CDCA Plan area.

Existing conditions within the cumulative impacts area reflect the MUC-M use opportunities presently being exercised; and, where such opportunities are not currently are being exercised, the flexibility to elect to pursue one or more among them at some point in the future. Effects of the PSPP on MUCs, as analyzed above, essentially relate to opportunity cost: if the PSPP or one of the build alternatives is developed on the site, the site cannot be used for use opportunities that otherwise would be available on the site.

Past, present and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1. Among them, any projects that have been or would be developed on MUC-M classified land also would restrict available use opportunities within that classification for the duration of those projects. For example, six utility-scale solar energy generation projects were approved by the BLM in 2010: Ivanpah Solar Electric Generating Project (ISEGS), Blythe Solar Power Project (BSPP), Imperial Valley Solar Project (IVSP), Chevron Energy Solutions Lucerne Valley Solar Project (Chevron-Lucerne), Calico Solar Project (Calico), and the Genesis Solar Energy Project (GSEP). Three among them would be developed on MUC-M classified land: Chevron-Lucerne (approximately 516 acres), Calico (approximately 6,215 acres) and GSEP (approximately 1,800 acres). Together with the PSPP, approximately 11,500 acres of the 1.5 million acre total would be dedicated to utility scale solar energy generation for the duration of the projects. Other types of projects, if approved for development on MUC-M lands would similarly dedicate MUC-M classified lands for the uses approved and, thereby, preclude their use for multiple uses envisioned under the CDCA Plan, e.g., mining, livestock grazing and recreation. Cumulatively, this would be a considerable commitment of MUC-M classified lands.

Any contribution to the cumulative impact on multiple uses classes that would be caused by the “build” alternatives would vary in direct proportion to the acreage disturbed. This also would be true for No Action Alternative A and CDCA Plan Amendment/No Project Alternative C: each would contribute to a cumulative impact on MUC-M lands in direct proportion to the amount of land dedicated to an approved use, whether that use ultimately is energy-related or not. By contrast, because CDCA Plan Amendment/No Project Alternative B would not limit the multiple use opportunities that presently are available on the site, CDCA Plan Amendment/No Project Alternative B would not contribute to any cumulative impact on MUC-M lands.

4.8.4 Summary of Mitigation Measures

No mitigation measures are recommended.

4.8.5 Residual Impacts after Mitigation Measures were Implemented

There would be no known residual impacts to existing multiple use classes.

4.8.6 Unavoidable Adverse Impacts

Approval of the ROW grant would have the effect of limiting current multiple use opportunities of the facility footprint area to a single dominate use for the life of the project.

4.8.7 Land Use Plan Amendment Consistency Analysis

The project site is located in the CDCA planning area. The CDCA Plan governs BLM's land management practices and site-specific implementation decisions in the vicinity of the proposed action in accordance with the intent of Congress as stated in FLPMA under the principles of multiple use and sustained yield. The CDCA Plan of 1980 (BLM, 1980), as amended, is a comprehensive, long-range plan with goals and specific actions for the management, use, development, and protection of the resources and public lands within the CDCA. Land uses that are not in conformance with the CDCA Plan would require a plan amendment. As noted above, the proposed site is not expressly identified in the CDCA Plan as a solar energy generation site. Consequently, a CDCA Plan amendment would be required.

The process for considering amendments to BLM land use plans is described in the agency's *Land Use Planning Handbook* (BLM, 2005). The general process for amending a BLM LUP is as follows:

1. The plan amendment process would be completed in compliance with FLPMA, NEPA, and all other relevant federal law, executive orders, and BLM management policies.
2. The plan amendment process would include an EIS to comply with NEPA.
3. Where existing planning decisions remain valid, those decisions may remain unchanged and would be incorporated into the new plan amendment.
4. The plan amendment would recognize valid existing rights.
5. Native American tribal consultations would be conducted in accordance with policy, and tribal concerns would be given due consideration.
6. Consultation with other agencies with jurisdiction would be conducted throughout the plan amendment process.

Chapter 7 of the CDCA Plan details the plan amendment process. The PSPP proposes a Category 3 amendment because it requests a specific use or activity, which is not currently authorized by an existing plan element—specifically, the Energy Production and Utility Corridors Element. In analyzing the Applicant's request to amend the CDCA Plan, the analysis of the proposed amendment will:

1. Determine whether the request has been properly submitted and whether any law or regulation prohibits granting the requested amendment.
2. Determine whether alternative locations within the CDCA are available that would meet the Applicant's needs without requiring a change in the Plan's classification, or an amendment to any Plan element.
3. Determine the environmental effects of granting and/or implementing the Applicant's request.
4. Consider the economic and social impacts of granting and/or implementing the Applicant's request.

5. Provide opportunities for and consideration of public comment on the proposed amendment, including input from the public and from Federal, State, and local government agencies.

6. Evaluate the effect of the proposed amendment on BLM management's desert-wide obligation to achieve and maintain a balance between resource use and resource protection.

Details concerning the proposed amendment for the PSPP or an alternative are provided in Chapter 2, *Proposed Action and Alternatives*. This PA/FEIS document acts as the mechanism for satisfying NEPA requirements for the CDCA Plan Amendment process, and provides the analysis required to support a CDCA Plan amendment to identify the proposed site as suitable or unsuitable for solar development within the Plan.

As analyzed above, all of the BLM-administered lands proposed for use by the PSPP and alternatives are classified in the CDCA Plan as MUC-M. Multiple use class designations govern the type and degree of land uses allowed within the classification area. All land use actions and resource-management activities on BLM-administered lands within a MUC delineation must meet the guidelines for that class. These guidelines are provided in Table 1, *Multiple Use Class Guidelines*, of the CDCA Plan (at page 15).

MUC-M allows electric generation plants for solar facilities to be developed in accordance with Federal, State and local regulations after NEPA requirements are met. The specific application of the Multiple Use Class designations and resource management guidelines for a specific resource or activity are further discussed in the plan elements section of the CDCA Plan. In MUC-M designations, the authorized officer is directed to use judgment in allowing for consumptive uses by taking into consideration the sensitive natural and cultural values that might be degraded.

The site of the proposed action and alternatives analyzed above meets the Multiple Use Class Guidelines as noted in the CDCA Plan for the resources listed below. See Section 3.9 *Multiple Use Class*, Table 3.9-2 Multiple-Use Class-M Land Use and Resource Management Guidelines.

For purposes of this discussion, No Action Alternative A, as well as CDCA Plan Amendment/No Project Alternatives B and C, are considered herein as being one and the same and are therefore referred to as "No Action Alternatives" since none precludes development on the site. (Although CDCA Plan Amendment/No Action Alternative B would make the land unavailable for a solar development facility, it would not preclude other types of development). Additionally, the terminology "proposed action and alternatives" is used herein since the classification of the BLM-administered portion of the site of the proposed action, Reconfigured Alternative 1, Reconfigured Alternative 2, the Reduced Acreage Alternative, and the No Action Alternatives would be the same -- MUC-M.

1. *Agriculture:* Agricultural uses of Class M lands are not allowed, with the exception of livestock grazing. The BLM-administered portion of the proposed site is not currently used for agriculture, and the proposed action and alternatives would not involve use of the site for agriculture.

2. *Air Quality:* Class M lands are to be managed to protect air quality and visibility in accordance with Class II objectives of Part C of the Federal Clean Air Act as amended. The anticipated maximum emissions that would be associated with the proposed action are provided in Table 4.2-2 for construction and Table 4.2-3 for operation and maintenance activities (see Section 4.2, *Impacts on Air Resources*). The analysis indicates, with implementation of the mitigation measures identified in Section 4.2.4, *Summary of Mitigation Measures*, construction activities would not be expected to contribute to adverse PM10 and ozone impacts; the PSPP would not cause new violations of any NO2, SO2, PM2.5 or CO ambient air quality standards. The emissions associated with the Reduced Acreage would be lower than those of the proposed action. The emissions associated with Reconfigured Alternative 1 and Reconfigured Alternative 2 would be comparable to those of the PSPP. Emissions associated with the CDCA Plan Amendment/No Project Alternatives B and C also could be comparable to those of the proposed action if another development project were to be proposed. Therefore, all of the alternatives would conform to the Class II objectives referenced in the CDCA Plan guidelines.

3. *Water Quality:* Class M designations will be managed to minimize degradation of water resources, and best management practices (BMPs) will be used to avoid degradation and to comply with Executive Order (EO) 12088. Section 4.19 of this PA/FEIS, *Impacts on Water Resources,* evaluated the proposed action and alternatives for groundwater use conflicts, the potential to impact groundwater quality, and the potential to impact surface water resources including drainage and water quality. The BLM has reviewed, and agrees with, the implementation of the BMPs that would be associated with the proposed action and its alternatives. These BMPs have been derived from a variety of sources, including those proposed by the Applicant, those required by the California Energy Commission through its Conditions of Certification, and those required for compliance with Federal and State laws designed to protect water resources. Implementation of these BMPs, and BLM's standard term and condition requiring compliance with other Federal, State, and local regulations, would constitute compliance with Executive Order 12088. The measures would be applicable to all project alternatives, and would therefore conform to the guidelines in Table 1 of the CDCA Plan.

4. *Cultural and Paleontological Resources:* Cultural and paleontological resources will be preserved and protected. Procedures described in 36 CFR 800 will be observed where applicable. As analyzed in Section 4.4, *Impacts on Cultural Resources*, Section 4.10, *Impacts on Paleontological Resources*, impacts of the proposed action and alternatives would be mitigated, and therefore all alternatives would conform to the MUC Guidelines. Adverse effects on cultural resources listed on or determined eligible for the National Register of Historic Places will be resolved in accordance with the Programmatic Agreement prepared for the project in consultation with the California State Historic Preservation Officer, Indian tribes and other interested parties in accordance with National Historic Preservation Act Section 106 (the Programmatic Agreement is included in Appendix H. Identification of the site location for the proposed action or any of the alternatives is subject to the MUC Guidelines for cultural and paleontological resource protection as is evidenced by the applicability of the guidelines to the specific facility proposal. As such, all of the site locations and the site location alternatives are within the MUC Guidelines for cultural and paleontological resource protection established by the CDCA Plan.

5. *Native American Values:* Native American cultural and religious values will be protected and preserved with appropriate Native American groups consulted. Consultation with Indian tribes was initiated at the earliest stages of project planning and will continue during the NEPA compliance process. Opportunities have been provided to allow Indian tribes to identify places and resources of importance to them and to express concerns regarding cultural and religious values that could be impacted by the proposed action and alternatives. Adverse effects on any places of traditional cultural or religious importance that are identified by tribes will be resolved in accordance with the Programmatic Agreement included in Appendix H. Therefore, cultural guidelines with respect to requirements for consultation have been met. In addition, the protection of cultural resources as discussed in Section 4.4 ensures that preservation and protection of Native American cultural and religious values associated with cultural resources is accomplished in accordance with the CDCA Plan MUC Guidelines.

6. *Electrical Generation Facilities:* Solar generation may be allowed on Class M lands after NEPA requirements are met. The analysis contained in this PA/FEIS, which addresses the proposed action and its alternatives, comprise the NEPA compliance required for this MUC guideline.

7. *Transmission Facilities:* New electric and water transmission facilities and cable for interstate communication may be allowed only within designated corridors. NEPA requirements will be met. The proposed action and alternatives described for the PSPP meet this guideline by locating the gen-tie connection to the interstate transmission system within an existing designated ROW corridor.

8. *Communication Sites:* Communication sites may be allowed on Class M lands after NEPA requirements are met. As described in Section 2.3, *Connected Actions*, operation and maintenance of the PSPP would require the installation of a new twisted-pair telecommunications cable to provide voice and data communications between the PSPP and the proposed Red Bluff Substation. The microwave repeating tower that would be used to transmit related communications data is an existing feature; no new communications site would be required for the PSPP. Accordingly, the proposed action and alternatives would not involve installation of communication sites. Nonetheless, the analysis contained in this PA/FEIS, which addresses the proposed action and its alternatives, satisfies NEPA; therefore this use may be allowed.

9. *Fire Management*: Fire suppression measures in Class M areas will be taken in accordance with specific fire management plans, subject to such conditions as the authorized officer deems necessary. The project area is within the area covered by the Fire Management Activity Plan (FMAP) 1996 for the California Desert developed by the National Park Service and BLM. The FMAP brings together fire management goals for biological resources, wilderness, and other sources and establishes fire management standards and prevention and protection programs. The FMAP includes limitations on fire suppression methods in critical habitat and other tortoise habitat; the limitations are designed to limit habitat disturbance while keeping fires small. While the FMAP addresses management and suppression of wildfires, it does not address incidents on specific facilities such as power plants. During operation and maintenance of the PSPP, the project would meet the fire protection and suppression requirements of all applicable NFPA standards (including Standard 850 addressing fire protection at electric generating plants), the California Fire Code, and all Cal-OSHA requirements. These fire standards require the on-site fire suppression components to include both fixed and portable fire extinguishing systems

located throughout the site. The Worker Environmental Awareness Program (WEAP) required by Mitigation Measure BIO-6 would include a discussion of fire prevention measures to be implemented by workers during project activities and recommend that workers dispose of cigarettes and cigars appropriately and not leave them on the ground or buried. The Weed Management Plan required by Mitigation Measure BIO-14 also would preclude the use of mechanical trimmers during periods of high fire risk and allow their use only with the implementation of fire prevention measures. Should a fire occur in the area that is not specific to the facility, it would be addressed by BLM, not by the Applicant, and it would be addressed in conformance with the Fire Management Plan, and therefore, would conform to the guideline for Fire Management for this multiple use class.

10. *Vegetation:* Table 1 of the CDCA Plan includes a variety of guidelines associated with vegetation as follows:

> Native Plants – Commercial or non-commercial removal of native plants in Class M areas may be allowed only by permit after NEPA requirements are met, and after development of necessary stipulation. Approval of a ROW grant for the proposed action and alternatives would constitute the permit for such removal. The BMPs in the PA/FEIS and conditions of approval that would be required in a Record of Decision would constitute the stipulations to avoid or minimize impacts from removal of native plants.

> Harvesting of plants by mechanical means – Harvesting by mechanical means is also allowed by permit only. Although the proposed action and its alternatives would include the collection of seeds (see Mitigation Measure BIO-19), the removal of these items would not be done for distribution to the public. Also, the guidelines for vegetation harvesting include encouragement of such harvesting in areas where the vegetation would be destroyed by other actions, which would be the case with the proposed action and alternatives. Therefore, the proposed action and alternatives would be in conformance with this MUC guideline.

> Rare, Threatened, and Endangered Species, State and Federal – In all MUC areas, all State- and federally-listed species will be fully protected. In addition, actions which may adversely affect the continued existence of federally listed species will require formal consultation with the U.S. Fish and Wildlife Service. As evaluated in Section 4.17, *Impacts on Vegetation Resources,* no listed plants would be impacted by the proposed action and alternatives.

> Sensitive Plant Species – Identified sensitive plant species would be given protection in management decisions consistent with BLM's policy for sensitive species management, BLM Manual 6840. The objective of this policy is to conserve and/or recover listed species, and to initiate conservation measures to reduce or eliminate threats to BLM sensitive species to minimize the likelihood of and need for listing. As analyzed in Section 4.17, *Impacts on Vegetation Resources*, construction, operation and decommissioning of the PSPP, Reconfigured Alternative 1, Reconfigured Alternative 2, or the Reduced Acreage Alternative would have an adverse impact sensitive plant communities (including groundwater dependent ecosystems) and other native vegetation. In an effort to protect this species, BLM worked with the Applicant and the California Energy Commission to develop mitigation measures to avoid or reduce impacts to sensitive plant species (see, e.g., BIO-19, Special-Status Plant Impact Avoidance, Minimization and Compensation).

Because the requirements of this mitigation measure are intended to avoid or reduce threats to sensitive species to minimize the likelihood of listing, the PSPP and alternatives are in conformance with the MUC guidance in the CDCA Plan.

Unusual Plant Assemblages (UPAs) – No UPAs have been identified on the site of the proposed action and alternatives.

Vegetation Manipulation – Mechanical control may be allowed after consideration of possible impacts. Vegetation manipulation is defined in the CDCA Plan as removing noxious or poisonous plants from rangelands; increasing forage production; creating open areas within dense brush communities to favor certain wildlife species; or eliminating introduced plant species. For the proposed action or an alternative, BIO-14 would require the implementation of a Weed Management Plan that conforms to Federal, State, and local regulations. Therefore, each alternative would conform to the guidelines.

11. *Land Tenure Adjustment:* Class M land may be sold in accordance with FLPMA and other applicable Federal laws and regulations. The proposed action and alternatives would not involve sale of any BLM-administered lands.

12. *Livestock Grazing:* Livestock grazing is allowed subject to the protection of sensitive resources. The proposed action and alternatives would not involve livestock grazing on Class M lands.

13. *Minerals:* The proposed action and alternatives would not involve the development of minerals on Class M lands.

14. *Motorized Vehicle Access/Transportation:* Pursuant to the CDCA Plan guidelines for Class M areas, motorized-vehicle use is allowed on "existing" routes of travel unless closed or limited by the authorized officer, and new routes may be allowed upon approval of the authorized officer. Issuance of a ROW grant would constitute approval of the authorized officer. In areas designated as limited use area for OHV use, changes to the transportation network (new routes, re-routes, or closures) in MUC-M areas may be made through activity-level planning or with site-specific NEPA analysis, pursuant to BLM Instruction Memorandum No. 2008-014 concerning the *Clarification of Guidance and Integration of Comprehensive Travel and Transportation Management Planning into the Land Use Planning* (BLM, 2007). Modifications to area OHV designations (open, closed, or limited) would require amendment to the applicable Resource Management Plan. There are no area OHV designations that are being made or modified through the proposed action or any of the alternatives. With the proposed action and/or its alternatives, approximately nine miles of designated open routes within the solar plant site would be closed to OHV use; however, the closure of only one route (ending in the center of the north boundary of the project) would block direct motorized access to lands that currently are accessible via designated routes. Nonetheless, it appears that the area's open washes could provide access to those currently accessible lands. This activity falls within the CDCA Plan guideline noted above.

15. *Recreation:* The proposed action and alternatives would not involve use of its proposed site for recreational uses.

16. *Waste Disposal:* The proposed action and alternatives would not involve the development of waste disposal sites.

17. *Wildlife Species and Habitat:* Table 1 of the CDCA Plan includes a variety of guidelines associated with wildlife as follows:

> Rare, Threatened, and Endangered Species, State and Federal – In all MUC areas, all State and federally listed species and their critical habitat will be fully protected. In addition, actions which may adversely affect the continued existence of federally listed species will require formal consultation with the U.S. Fish and Wildlife Service. As discussed in Section 4-21, *Impacts on Wildlife Resources*, the desert tortoise, which is federally- and State-listed as threatened, would be affected by the proposed action and alternatives. As specified in the guideline, BLM has initiated formal consultation with the U.S. Fish and Wildlife Service in accordance with Section 7 of the Endangered Species Act. BLM has worked with the Energy Commission, USFWS, CDFG, and the Applicant to develop protection and compensation measures for the desert tortoise, which include stringent impact avoidance measures, the full level of compensation required by USFWS for this category of tortoise habitat, and enhancement and protection measures in other areas (see, e.g., BIO-8, BIO-9, BIO-10, BIO-11, BIO-12, and others). Therefore, the proposed action and its alternatives would comply with the guideline to provide full protection to the species.
>
> Sensitive Species – Identified species would be given protection in management decisions consistent with BLM's policy for sensitive species management, BLM Manual 6840. The objective of this policy is to conserve and/or recover listed species, and to initiate conservation measures to reduce or eliminate threats to BLM sensitive species to minimize the likelihood of and need for listing. Several BLM sensitive wildlife species (other than the desert tortoise, identified and discussed in the previous paragraph) present or likely to occur on habitat associated with the proposed action and alternatives include, but are not limited to, Mojave fringe-toed lizard and western burrowing owl. Those species that are likely to occur on the site of the proposed action and alternatives would be protected under a number of mitigating measures meant to avoid, minimize, or compensate for impacts from the proposed action or alternatives. See, e.g., BIO-20 (Mojave Fringe-toed Lizard), BIO-18 (Western Burrowing Owl).

The proposed action and alternatives, including the recommended mitigation measures associated with these actions, would involve habitat manipulation to improve habitat (such as tortoise fencing along roads and project) and introduction of native species (through the translocation of tortoises). Introduction of native species is permitted in Class M areas, and habitat manipulation is allowed subject to environmental assessment, as is done within this PA/FEIS. Therefore, the proposed action and its alternatives would be in conformance with these guidelines.

The proposed action and alternatives may involve the control of depredation of ravens (see, e.g., BIO-13). Therefore, this guideline is applicable to these actions, subject to conformance with State and Federal laws in MUC-M areas.

18. *Wetland/Riparian Areas:* No wetlands or riparian areas are present on the site of the proposed action and alternatives.

19. *Wild Horses and Burros:* No wild and free-roaming horses or burros are present on the site of the proposed action and alternatives.

4.9 Impacts on Noise

4.9.1 Impact Assessment Methodology

The severity of noise related to the construction, operation and decommissioning of the project depend on its character and loudness, the times of day or night during which it would be produced, and the proximity of the project to sensitive receptors. To evaluate potential noise impacts, the BLM reviewed the results of an ambient noise survey for the proposed action, as presented in the CEC RSA, in light of BLM Manual 7300 (concerning the analysis of noise as part of the agency's January 2009 Air Resource Management Program); BLM Handbook H-1112-2, the agency's Safety and Occupational Health Program, which is responsible for assessing employees' exposure to potentially high noise- and vibration-producing work operations and activities; and other information and analysis generated by the California Energy Commission.

For purposes of this analysis, the BLM is relying on the Energy Commission's threshold of a 5 dBA increase in existing ambient noise levels at the nearest sensitive receptor, as well as operations-related compliance with the County of Riverside exterior noise limits for stationary sources, to determine whether project-related noise emissions are considerable. Other relevant factors include the duration and frequency of noise generated by the project, and the number of people who could be affected by it. Construction-related noise is not considered an adverse impact when it is temporary, limited to day-time hours, and industry-standard abatement measures are employed. For the purposes of this analysis, day-time hours are considered to be the same as those defined by the County of Riverside municipal code, between the hours of six a.m. and six p.m. during the months of June through September and between the hours of seven a.m. and six p.m. during the months of October through May.

Ambient noise levels were measured near the western boundary of the project site on May 18 to May 19, 2009, using standard noise measurement equipment and techniques (see Table 3.10-1). The power block would be the major source of the project's noise during the facility's operation.

1. *Location LT1* (closest residence to the project site): This home is located approximately 25 feet from the northwest corner of the proposed ROW, but over one mile from the nearest power block. A location near this residence was monitored continuously between 6:51 p.m., May 18, and 7:51 p.m., May 19, 2009.

2. *Location LT2* (second closest residence to the project site): This home is located approximately 3,500 feet northwest of the site boundary and well over a mile from the nearest power block. A location near this residence was monitored continuously between 6:51 p.m., May 18, and 7:51 p.m., May 19, 2009.

4.9.2 Direct and Indirect Impacts

Proposed Action

Noise impacts associated with the proposed action could be created by short-term although relatively long-term (39 months) construction activities, long-term operation of the project, and short-term closure and decommissioning activities. For noise-related impacts on wildlife, such as Nelson's bighorn sheep and nesting birds, refer to Section 4.21, *Impacts on Wildlife Resources*.

Construction

Construction noise typically varies with time; accordingly, it is most appropriately measured by, and compared with, the L_{eq} (energy average) metric. Typical Environmental and Industry Sound Levels are provided in Table 4.9-1. For the project, construction noise would elevate the existing ambient noise level at the nearest receptor (LT1) by 16 dBA and at the second nearest receptor (LT2) by 5 dBA (see Table 4.9-2). Even though the overall construction period for the project is expected to require 39 months, the duration of the construction activities in the area that could have a considerable impact at LT1 and LT2 would be limited to several months. Construction within a particular area would not last long, meaning that maximum construction noise would affect the sensitive receptor nearest to the construction activities for a period of only a few months. Construction of related facilities such as the proposed transmission line also would proceed rapidly, thus subjecting nearby receptors to increased noise levels for relatively short periods of time.

TABLE 4.9-1
TYPICAL ENVIRONMENTAL AND INDUSTRY SOUND LEVELS

Noise Source (at distance)	A-Weighted Sound Level in Decibels (dBA)	Noise Environment	Subjective Impression
Civil Defense Siren (100')	140-130		Pain Threshold
Jet Takeoff (200')	120		Very Loud
Very Loud Music	110	Rock Music Concert	
Pile Driver (50')	100		
Ambulance Siren (100')	90	Boiler Room	
Freight Cars (50')	85		
Pneumatic Drill (50')	80	Printing Press Kitchen with Garbage Disposal Running	Loud
Freeway (100')	70		Moderately Loud
Vacuum Cleaner (100')	60	Data Processing Center Department Store/Office	
Light Traffic (100')	50	Private Business Office	
Large Transformer (200')	40		Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing

SOURCE: CEC RSA, 2010 (Table A2)

TABLE 4.9-2
PREDICTED CONSTRUCTION NOISE LEVLES

Receptor	Highest Construction Noise Level L_{eq} (dBA)	Measured Existing Ambient, Average Daytime L_{eq} (dBA)	Cumulative, Using Highest Noise Level of 48 dBA	Change (dBA)
LT1	59	43	59	+16
LT2	46	43	48	+5

SOURCE: CEC RSA, 2010 (Table 3)

Typically, “high pressure steam blow” is the loudest noise encountered during construction of a project incorporating a steam turbine. Steam blows are used to expunge debris from piping and tubing. After erection and assembly of the feed water and steam systems, the piping and tubing that comprise the steam path have accumulated dirt, rust, scale, and construction debris such as weld spatter, dropped welding rods, and the like. If the plant were started up without thoroughly cleaning out these systems, all this debris would find its way into the steam turbine, quickly destroying the machine. In order to prevent this, before the steam system is connected to the turbine, the steam line temporarily is routed to the atmosphere.

Traditionally, high pressure steam then is raised in the boiler or a temporary boiler and allowed to escape to the atmosphere through the steam piping. This flushing action, referred to as a *high pressure steam blow*, is quite effective at cleaning out the steam system. A series of short steam blows, lasting two or three minutes each, are performed several times daily over a period of two or three weeks. At the end of this procedure, the steam lines are connected to the steam turbine, which is then ready for operation. Alternatively, high pressure compressed air can be substituted for steam. High pressure steam blows, if unsilenced, can produce noise levels as high as 129 dBA at a distance of 50 feet; this would amount to roughly 88 dBA at LT1 and 84 dBA at LT2. Unsilenced steam blows could be disturbing at the nearest noise-sensitive receptors, depending on the frequency, duration, and noise intensity of venting. With a silencer installed on the steam blow piping, noise levels are commonly attenuated to 86 dBA at 50 feet; this would amount to roughly 45 dBA at LT1 and 41 dBA at LT2.

Operation and Maintenance

The noise emanating from a power plant is unique. It is generally broadband, steady state in nature. This noise contributes to, and becomes part of, the background noise level when most intermittent noises cease. The project’s primary noise sources include the two power blocks where the steam turbine generators, air-cooled condensers, electric transformers, and various pumps and fans would be located. The two power blocks of the project (one for each 250 MW unit) would be centrally located in the middle of each 1,380-acre solar unit; these blocks would be surrounded by the solar reflector fields. In addition, there would be diesel-powered emergency generators, which would be enclosed by a noise-reducing structure that would reduce noise levels to approximately 70 dBA at 50 feet. All water pipes and gas pipes would be underground and therefore silent during plant operation.

Some additional operation-related noise would be associated with the transmission lines. Audible transmission line noise (also called “corona”) typically is perceived as a characteristic crackling, hissing, or frying sound or hum, especially in wet weather. In fair weather, audible noise from modern transmission lines generally is indistinguishable from background noise at the edge of a right-of-way 100 or more feet wide. Noise levels depend on the strength of a line’s electric field, and is a concern mainly from lines of 345-kV or higher. It can be limited through design, construction and maintenance practices. The 230-kV line proposed for the project would embody a low corona design to minimize field strengths. The BLM does not expect this line to add considerably to the current background noise levels.

Figure 4.9-1 illustrates the estimated noise contours that would be associated with the proposed two power blocks and Table 4.9-3 shows the predicted operational noise levels at the closest sensitive receptor locations. As shown in Table 4.9-3, daytime operational noise levels are predicted to be 42 dBA Leq at the nearest sensitive receptor and would result in only inaudible (+3 dBA) daytime increases above the ambient level. Operations would not result in any increase at the other sensitive receptor. In addition, noise levels at the nearest sensitive receptors would be substantially less than the County of Riverside daytime exterior limit of 65 dBA for stationary sources.

TABLE 4.9-3
PREDICTED OPERATIONAL NOISE LEVELS AT THE IDENTIFIED SENSITIVE RESIDENTIAL RECEPTORS

Receptor	Project Alone Operational Noise Level (dBA)	Measured Existing Ambient, Daytime L_{eq} (dBA)	Cumulative L_{eq} (dBA)	Increase in Existing Ambient (dBA)
LT1	42	43	46	+3
LT2	33[3]	43	43	0

SOURCE: CEC RSA, 2010 (Table 4)

Adverse impacts on residential receptors also can be identified by comparing predicted power plant noise levels with the nighttime ambient background noise levels at the nearest sensitive residential receptors. The project would result in virtually no nighttime operations-related noise levels; however, the project would have limited nighttime activities related to maintenance. The projected noise level from these maintenance activities at LT1 is 22 dBA (CEC RSA, 2010). This is considerably lower than the average nighttime ambient noise level of 34 at LT1 (see Table 3.10-1). Therefore, these maintenance activities would not be expected to increase ambient noise levels at LT1 and there would be no associated impact. Additionally, these activities would have no impact on LT2, due to its further distance from the project site than LT1. Noise levels at the nearest sensitive receptors would also be substantially less than the County of Riverside nighttime exterior limit of 45 dBA for stationary sources.

The Applicant acknowledges the need to protect plant operating and maintenance workers from noise hazards and commits to compliance with all applicable LORS (CEC RSA, 2010). Signs would be posted in areas of the plant with noise levels exceeding 85 dBA (the level that OSHA recognizes as a threat to workers' hearing), and hearing protection would be required and provided.

Vibration from an operating power plant could be transmitted through two primary means: ground (ground-borne vibration) and air (airborne vibration). The operating components of the proposed plant would consist of high-speed steam turbine generators and various pumps and fans. All of these pieces of equipment must be carefully balanced in order to operate; permanent vibration sensors would be attached to the turbines and generators. As discussed in the CEC RSA, ground-borne vibration from equipment proposed to be used by the project would be undetectable at nearby sensitive receptors. Airborne vibration (low frequency noise) can rattle windows and objects on shelves and can rattle the walls of lightweight structures. However, none of the project equipment is likely to produce noticeable low frequency noise beyond the site boundary. Vibration levels associated with construction equipment would attenuate rapidly from the source, and would also not be noticeable beyond the site boundary. This makes it highly unlikely that the project would cause perceptible airborne vibration effects at any offsite noise-sensitive receptor.

Closure and Decommissioning Impacts

The anticipated lifespan of the project is estimated to be 30 years. All operational noise from the project would cease when the project closes, and no further adverse noise impact from its operation would be possible. The remaining potential temporary noise source would be the dismantling of the project structures and equipment, as well as any site restoration work that may be performed. Since this noise would be similar to that caused by the original construction, it could be similarly treated. Any noise LORS in existence at that time would apply. Unless modified, applicable mitigation measures identified in Section 4.9.4, *Summary of Mitigation Measures,* also would apply.

Alternatives

Reconfigured Alternative 1

Because the major sources of project noise, including the power blocks, would be located in approximately the same general area under Reconfigured Alternative 1 as for the proposed action, the noise impacts of this alternative would likely be comparable to the project. The same mitigation measures would apply.

Reconfigured Alternative 2

The major sources of project noise, including the power blocks, would be located in approximately the same general area for either Reconfigured Alternative 2 Option 1 or Reconfigured Alternative 2 Option 2 as for the proposed action. Therefore, the noise impacts of

Reconfigured Alternative 2 would likely be comparable to the proposed action, and the same mitigation measures would apply.

Reduced Acreage Alternative

With the Reduced Acreage Alternative, the major sources of noise, including the power blocks, would be located approximately in the same general area as they would be for the proposed action. Thus, the Reduced Acreage Alternative would result in construction-related noise impacts that would be comparable to the action. However, as a result of being 25 percent smaller a project than would result from the proposed action, this alternative would generate approximately 25 percent less noise at the plant site. Noise associated with the transmission line during wet weather would be indistinguishable between the proposed action and the Reduced Acreage Alternative.

No Action Alternative A

If No Action Alternative A were selected, the construction, operation and decommissioning-related noise impacts of the project would not occur. If No Action Alternative A were chosen, another utility-scale solar power facilities or any other use compatible with the CDCA Plan Multiple Use Class M could be proposed for the site. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative B

If the project site were identified in the CDCA Plan as unsuitable for any type of solar energy development, another renewable energy technologies (e.g., wind), other electrical generation facilities (e.g., fossil fuel), transmission facilities (e.g., new gas, electric or water transmission facilities), or communications sites could be allowed in accordance with the CDCA Plan MUC-M land use and resource management guidelines. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative C

If the project application area were identified in the CDCA Plan as suitable for any type of solar energy development, then the absence of the proposed action would likely result in the construction of another solar power plant project. Noise impacts associated with construction, operation and decommissioning of such a project would depend on the proposed proximity of noise sources to sensitive receptors, the timing of construction and other factors. Similar LORS would likely apply. Consequently, noise related impacts of CDCA Plan Amendment/No Project Alternative C would likely be comparable to the proposed action.

4.9.3 Discussion of Cumulative Impacts

Noise and vibration impacts resulting from construction, operation, maintenance and decommissioning of the proposed action and alternatives could result in a cumulative effect with other past, present, or reasonably foreseeable future actions. The geographic scope of the cumulative effects analysis for noise and vibration is limited to the distance over which sounds generated by the proposed action could be heard, i.e., within approximately 1 mile of the site. Potential cumulative effects could occur during the project's proposed 39-month construction period, during the projected 30-40 year lifespan of the proposed action, or result from closure and decommissioning, i.e., if other noise-generating activities were to occur within these timeframes and within the cumulative impacts area.

Existing conditions within the cumulative impacts area reflect a combination of the natural condition and the effects of past actions and are described in PA/FEIS Chapter 3. Anticipated effects of the proposed action are analyzed above. Past, present and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1.4, *Cumulative Scenario Approach*. Cumulative projects are identified in Table 4.1-1, *Cumulative Scenario*, and shown in Figure 4.1-1, *BLM Rights of Way with Existing and Future/Foreseeable Projects*. However, no existing or foreseeable projects close to the project site exist that could create cumulative noise impacts. Consequently, the incremental noise impacts of the proposed action and alternatives would not combine with impacts of other projects in a way that would be additive, countervailing or synergistic. Consequently, the PSPP or alternatives would not result in significant adverse cumulative impacts relating to noise or vibration.

4.9.4 Summary of Mitigation Measures

The mitigation measures imposed by the Energy Commission as Conditions of Certification for the PSPP would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in Appendix B. As summarized below, NOISE-1, NOISE-2, NOISE-3, NOISE-6 and NOISE-7 would avoid or reduce construction-related noise impacts on the nearest sensitive receptors and workers; in turn, NOISE-4 and NOISE-5 would address operation and maintenance-related noise impacts.

> NOISE-1 and NOISE-2: To ensure construction noise levels would not disrupt the nearest receptors, these two mitigation measures establish a notification and complaint process to resolve issues arising from any excessive construction noise.
>
> NOISE-3: This mitigation measure would protect construction workers from injury due to excessive noise by requiring the project owner to implement a noise control program consistent with OSHA and Cal/OSHA requirements.
>
> NOISE-4: To avoid or reduce the potential for strong tonal noises to cause annoyance, NOISE-4 would require that no single piece of equipment be allowed to stand out as a source of noise that draws legitimate complaints.
>
> NOISE-5: This mitigation measure would require the project owner to conduct an occupational noise survey to identify the magnitude of employee noise exposure and, if

necessary, identify ways to comply with the applicable Federal and State regulations governing noise-hazard areas in the facility.

NOISE-6: This mitigation measure generally limits construction to the periods specified in the Riverside County Noise Ordinance and, thereby would reduce the potential for construction activities to disrupt the nearest receptors.

NOISE-7 would reduce potential annoyance related to steam blows.

4.9.5 Residual Impacts after Mitigation Measures were Implemented

No residual impact would result from construction, operation or decommissioning of the proposed action or alternatives because implementation of the mitigation measures would ensure that project-related noise complied with applicable limits.

4.9.6 Unavoidable Adverse Impacts

The proposed action or alternatives would not result in any unavoidable adverse impacts.

4.10 Impacts on Paleontological Resources

4.10.1 Impact Assessment Methodology

A paleontological resources assessment (CEC RSA, 2010) was prepared. Correspondence from the Natural History Museum of Los Angeles County (CEC RSA, 2010); the University of California at Berkeley Museum of Paleontology (UCMP); and the Riverside County Land Information System (CEC RSA, 2010) also was reviewed for information regarding known fossil localities and stratigraphic unit sensitivity within the proposed action area. All research was conducted in accordance with the Society for Vertebrate Paleontology's accepted assessment protocol (CEC RSA, 2010) to determine whether any known paleontological resources exist in the general area and how they might be impacted by the proposed action and alternatives.

4.10.2 Discussion of Direct and Indirect Impacts

Proposed Action

There is a high probability that paleontological resources would be encountered during grading and excavation in the older Quaternary age alluvial and lacustrine sediments of the project site. Further, deeper excavations in the younger alluvium that would encounter the underlying older Quaternary age alluvial soils also would have a high probability to encounter paleontological resources.

The paleontological resource sensitivity of undisturbed Quaternary alluvium and lacustrine sediments varies from low at shallow depths to high at deeper depths. Since the depth to Pleistocene age sediments beneath Holocene deposits is unknown, all sediments beneath disturbed ground initially would be treated as highly sensitive. Where these units are mapped at the surface or may be present near the surface adjacent to these mapped areas, specifically along the northern and southern borders of the proposed site, paleontological monitoring would be conducted during any excavation activity. Since the depth to Pleistocene age alluvial and lacustrine deposits is undetermined at present for the remainder of the site, any excavations that penetrate below 1.5 feet of the existing ground surface would be treated as having a high potential for impacting significant paleontological resources and would require paleontological monitoring. This depth is based on observations of possible older alluvium encountered in excavations advanced for the geomorphic reconnaissance report (Solar Millennium, 2009). This depth would likely increase from the northern and southern boundaries towards the center of the proposed project site. After monitoring of grading and trenching activities during construction of the site, a qualified professional paleontologist may determine the appropriate depth above which the coarse and fine grained soils are Holocene in age, have a low sensitivity, and low potential for adverse impacts on paleontological resources.

Significant paleontological resources have been documented in the same or similar older alluvium deposits that are present in the vicinity of the project: although no recorded fossil collection sites exist within the proposed site boundaries or within a one-mile radius of it, three vertebrate fossil collection areas have been documented in the proposed project area within the same or similar sedimentary units that underlie the site. One location east-southeast of the site between I-10 and Ford Dry Lake contained fossil remains of a pocket mouse. Another site northwest of the proposed project site in the northern Chuckwalla Valley yielded fossil remains of tortoise, horse, camel, and llama.

Construction of the project would include grading, foundation excavation, utility trenching and possibly drilled shafts. These activities could damage or destroy paleontological resources. The probability of encountering paleontological resources is considered to be generally high on portions of the site based on the soils profile, SVP assessment criteria, and the near-surface occurrence of the sensitive geologic units. The potential for encountering fossils hosted in Quaternary alluvium would increase with the depth of cut. Excavations for ancillary facilities and new pipelines and on-site excavations that penetrate surficial Holocene age alluvium would have a higher probability of encountering potentially high sensitivity materials, although sensitive materials could occur nearer the surface. Mitigation measures could not avoid or reduce fossil disturbance associated with drilled shaft foundations; however, the volume of disturbance and probability of encountering fossil resources would be low in comparison to the grading and excavation activities.

As the value of paleontological resources is predicated on their discovery within a specific geological host unit, construction of the project could result in a net gain to the science of paleontology by allowing fossils that would not otherwise have been found to be recovered, identified, studied, and preserved.

Operation, future decommissioning and closure of the project would not adversely impact paleontological resources because the ground disturbed during these activities would have been disturbed already, and impacts mitigated as required, during construction of the project.

Alternatives

Reconfigured Alternative 1

Because the geologic units that would be disturbed by Reconfigured Alternative 1 are the same as those that would be disturbed by the proposed action, potential impacts to paleontological resources would be the same as for the proposed action.

Reconfigured Alternative 2

Because the geologic units that would be disturbed by Reconfigured Alternative 2 (under either option) are the same as those that would be disturbed by the proposed action, potential impacts to paleontological resources would be the same as for the proposed action.

Reduced Acreage Alternative

Because the ground disturbance from the Reduced Acreage Alternative would be less than that associated with the proposed action, potential impacts to paleontological resources would be correspondingly reduced.

No Action Alternative A

If No Action Alternative A were selected, it is expected that the site would remain at least for the short-term in its existing condition, with no grading of the site, no installation of power generation and transmission equipment, no new structures or facilities constructed or operated on the site, and none of the potential impacts to paleontological resources that would be associated with constructing, operating or decommissioning the PSPP.

In the absence of the project, however, the site could become available to other uses that are consistent with BLM's land use plan, including new power plants, whether renewable or non-renewable, which would be needed to serve the demand for electricity and to meet Renewable Portfolio Standards (RPS). Insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

Paleontological resources have been documented in the general area of the project. As the value of paleontological resources is predicated on their discovery within a specific geologic host unit, construction of the project could result in a net gain to the science of paleontology by allowing fossils that would not otherwise have been found to be recovered, identified, studied, and preserved. No Action Alternative A would preclude this potential net gain.

CDCA Plan Amendment/No Project Alternative B

Under this alternative, the proposed site would be unavailable for solar development and BLM would continue to manage it consistent with the existing land use designation in the CDCA Plan. Insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative C

Under this alternative, it is possible that a different solar energy project would be constructed on the site using the same or a different solar technology. As a result, impacts related to paleontology that would result from the construction, operation and decommissioning of the other solar project would likely be similar to the impacts of the proposed action. Different solar technologies require different amounts of grading and maintenance; however, it is expected that all the technologies would require some grading and maintenance. As such, CDCA Plan Amendment/No Project Alternative C could result in impacts and benefits related to paleontology similar to the impacts under the proposed action.

4.10.3 Discussion of Cumulative Impacts

Paleontological resources have been documented in older Quaternary alluvium similar to that located on the project site. Beneficial and adverse impacts on paleontological resources resulting from construction, operation, maintenance and decommissioning of the project could result in a cumulative effect with other past, present or reasonably foreseeable future actions. See Section 4.1.4, *Cumulative Scenario Approach*. Cumulative projects are identified in Table 4.1-1, *Cumulative Scenario*, and shown in Figure 4.1-1, *BLM Rights of Way with Existing and Future/Foreseeable Projects*. The geographic scope of the cumulative effects analysis for paleontological resources consists of eastern Riverside County, in locations where ground-disturbing activities, rock units with potential high sensitivity or known paleontological resources exist or would occur. This geographic scope of cumulative impacts analysis was established based on a conservative estimate of the natural boundaries of the affected resource. It is expected that potential cumulative effects on these resources would be limited to ground disturbing activities associated with construction, and with closure and decommissioning. Operation and maintenance of the project and action alternatives would not be expected to cause impacts to paleontological resources.

Existing conditions within the cumulative impacts area reflect a combination of the natural condition and the effects of past actions and are described in PA/FEIS Chapter 3. Direct and indirect effects of the project and alternatives are analyzed above. Past, present and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1 and include, for example, the Blythe Solar Power Project, Genesis Solar Energy Project, Desert Sunlight Solar Energy Project, and others. As the value of paleontological resources is associated with their discovery within a specific geologic host unit, the potential impacts to paleontological resources due to construction activities would be addressed as required by the mitigation measures summarized in Section 4.10.4, *Summary of Mitigation Measures*. Implementation of these mitigation measures should result in a net gain to the science of paleontology by allowing fossils that would not otherwise have been found to be recovered, identified, studied, and preserved. Consequently, incremental impacts of the project, in combination with the impacts of other projects in the cumulative scenario within the paleontological cumulative impacts area, should be neutral (no fossils encountered) or positive (fossils encountered, preserved, and identified). Construction and other ground-disturbing activities associated with past and present projects could add to fossil discoveries which would enhance our understanding of the prehistoric climate, geology, and geographic setting of the region for the benefit of current and future generations. Cumulative impacts would vary by alternative only to the degree to which direct and indirect impacts would vary by alternative.

4.10.4 Summary of Mitigation Measures

The mitigation measures imposed by the Energy Commission as Conditions of Certification for the project would address impacts on the quality of the human environment. These mitigation measures are set forth in full in Appendix B. Specifically, PAL-1 to PAL-7 would reduce potential impacts to paleontological resources by requiring a worker education program in conjunction with the monitoring of earthwork activities by a qualified professional paleontologist (paleontological resource specialist [PRS]). Earthwork would be halted any time potential fossils are recognized by either the paleontologist or the worker. For finds deemed significant by the

PRS, earthwork cannot restart until all fossils in that strata, including those below the design depth of excavation, are collected.

4.10.5 Residual Impacts after Mitigation Measures were Implemented

No residual adverse impacts on paleontological resources would exist after mitigation measures were implemented. Implementation of mitigation measures is expected to result in a net gain to the science of paleontology by allowing fossils that would not otherwise have been found to be recovered, identified, studied, and preserved.

4.10.6 Unavoidable Adverse Impacts

No unavoidable adverse impacts would be expected to occur. Construction-related ground disturbance could add to fossil discoveries which would enhance understanding of the prehistoric climate, geology, and geographic setting of the region for the benefit of current and future generations. Activities associated with operation of the project and with closure and decommissioning of the site, including site restoration, are not expected to have an impact related to paleontological resources because such resources mostly likely would have been discovered during construction.

4.11 Public Health and Safety

4.11.1 Impact Assessment Methodology

To complete this analysis of environmental consequences associated with impacts on public health and safety, the BLM considered potential impacts on the following issue areas: hazardous materials/hazardous waste, waste management, unexploded ordnance (UXO), undocumented immigrants (UDI), transmission line safety and nuisance, traffic and transportation safety, worker safety and fire protection, and geologic hazards. The approach for each of these issues is described below.

4.11.2 Hazardous Materials

4.11.2.1 Impact Assessment Methodology

This section considers whether the construction and operation of the project could affect public health and safety as a result of the use, handling, transportation, or storage of hazardous materials. The analysis considers plausible potential spills for the hazardous materials to be used at the proposed facility. To be conservative, and weight the analysis in favor of public safety, BLM considered as "plausible" a spill otherwise considered highly unlikely. BLM analyzed this highly unlikely spill to assess the risk to local populations. Hazardous material handling and usage procedures are incorporated to reduce the likelihood of a spill, to reduce its potential size, and to prevent or reduce the potential migration of a spill off site to avoid significant off-site impacts. The analysis considers potential direct contact from runoff of spills, air-borne plume concentrations, and the potential for spills to mix with runoff water and be carried off-site. The Applicant has proposed secondary containment basins for containing liquids, and determined that volatile chemicals would have a restricted exposure to the atmosphere after capture.

Risk of Accidents and Spills

This analysis includes a review and assessment of the potential for the transportation, handling, and use of hazardous materials to impact the surrounding community. All chemicals were evaluated. This analysis addresses the potential impacts on all members of the population including the young, the elderly, and people with existing medical conditions that may make them more sensitive to the adverse effects of hazardous materials. In order to accomplish this goal, analysis uses the most current public health exposure levels (both acute and chronic) that are established to protect the public from the effects of an accidental chemical release.

In order to assess the potential for released hazardous materials to travel off site and affect the public, this analysis includes several aspects of the proposed use of these materials at the facility. It is recognized that some hazardous materials must be used at power plants. Therefore, this analysis was conducted by examining the choice and amount of chemicals to be used, the manner in which the Applicant would use the chemicals, the manner by which they would be transported to the facility and transferred to facility storage tanks, and the way in which the Applicant plans to store the materials on site.

Engineering and administrative controls concerning hazardous materials use are included as part of the proposed action. Engineering controls are the physical or mechanical systems, such as storage tanks or automatic shut-off valves, that can prevent the spill of hazardous material from occurring, or that can either limit the spill to a small amount or confine it to a small area. Administrative controls are the rules and procedures that workers at the facility must follow that would help to prevent accidents or to keep them small if they do occur. Both engineering and administrative controls can act as methods of prevention or as methods of response and minimization. In both cases, the goal is to prevent a spill from moving off-site and causing harm to the public.

The engineered safety features which would be used include:

1. Secondary containment areas, surrounding each of the hazardous materials storage areas, designed to contain accidental releases that might happen during storage; and
2. Physical separation of stored chemicals in isolated containment areas with a non-combustible partition in order to prevent accidental mixing of incompatible materials which could result in the formation and release of toxic gases or fumes.
3. Storage of small quantity hazardous materials in original, properly labeled containers; installation of a fire protection system for hazardous materials storage areas;
4. Continuous monitoring of HTF piping system by plant staff and by automatic pressure sensors designed to trigger isolation valves if a leak is detected; and
5. Designing the propane storage tanks with continuous tank level monitors, temperature and pressure monitors and alarms, and excess flow and emergency isolation valves.

Administrative controls would include having trained plant personnel as the hazardous materials response team which would be the first responder to hazardous materials incidents. In the event of a large incident involving hazardous materials, backup support would be provided by the Riverside County Fire Department, which has a hazmat response unit capable of handling any incident at the PPSP and would respond in about 1.5-2 hours. While the response time is not adequate given the remote location, the on-site team would be adequately trained to respond to any emergency. This analysis includes a review and evaluation of the Applicant's proposed use of hazardous materials as described by the Applicant (CEC RSA, 2010). To conduct this analysis, the BLM followed these five steps:

Step 1: Review of the chemicals and the amounts proposed for on-site use and determine the need for and appropriateness of their use.

Step 2: Removed from further assessment those chemicals proposed for use in small amounts or whose physical state is such that there is virtually no chance that a spill would migrate off-site and impact the public.

Step 3: Review and evaluate measures proposed by the Applicant to prevent spills, including engineering controls, such as automatic shut-off valves and different-sized transfer-hose couplings, and administrative controls, such as worker training and safety management programs.

Step 4: Review and evaluate measures proposed by the Applicant to respond to accidents. These measures also included engineering controls such as catchment basins and methods to keep vapors from spreading and administrative controls such as training emergency response crews.

Step 5: Analyze the theoretical impacts on the public of a highly unlikely spill of hazardous materials, as reduced by the mitigation measures proposed by the Applicant. When mitigation methods proposed by the Applicant would be sufficient, no further mitigation is recommended. If additional mitigation measures would improve the proposed action, additional prevention and response controls are proposed.

Health Risk Assessment

A screening level risk assessment has been performed using simplified assumptions that are intentionally biased toward protection of public health. That is, an analysis was designed that overestimated public health impacts from exposure to the emissions of the proposed action. In reality, it is likely that the actual risks from the proposed action would be much lower than the risks as estimated by the screening level assessment. The risks for screening purposes are based on examining conditions that would lead to the highest, despite their actual probability, and then using those conditions in the study. The evidence shows that this risk analysis overstates actual health risks. Such conditions include:

1. using the highest levels of pollutants that could be emitted from the power plant;
2. assuming weather conditions that would lead to the maximum ambient concentration of pollutants;
3. using the type of air quality computer model that predicts the greatest plausible impacts;
4. calculating health risks at the location where the pollutant concentrations are estimated to be the highest;
5. assuming that an individual's exposure to cancer-causing agents occurs continuously for 70 years; and
6. using health-based standards designed to protect the most sensitive members of the population (i.e., the young, elderly, and those with respiratory illnesses).

A screening level risk assessment, at a minimum, would include the potential health effects from inhaling hazardous substances. Some facilities may also emit certain substances that could present a health hazard from non-inhalation pathways of exposure. When these substances are present in facility emissions, the screening level analysis includes the following additional exposure pathways: soil ingestion, dermal exposure, and mother's milk (CEC RSA, 2010). The risk assessment process for the project addresses two categories of health impacts: chronic (long-term) non-cancer effects and cancer risk (also long-term).

Chronic Non-cancer Health Effects

Chronic health effects are those that arise as a result of long-term exposure to lower concentrations of pollutants. The exposure period is considered to be approximately from 12 percent to 100 percent of a lifetime, or from eight to 70 years (CEC RSA, 2010). Chronic health effects include diseases such as reduced lung function and heart disease.

The analysis for non-cancer health effects compares the maximum project contaminant levels to safe levels called *Reference Exposure Levels*, or RELs. These are amounts of toxic substances to which even sensitive people can be exposed and suffer no adverse health effects. These exposure levels are designed to protect the most sensitive individuals in the population, such as infants, the aged, and people suffering from illness or disease which makes them more sensitive to the effects of toxic substance exposure. The RELs are based on the most sensitive adverse health effect reported in the medical and toxicological literature and include margins of safety. The margin of safety addresses uncertainties associated with inconclusive scientific and technical information available at the time of standard setting and is meant to provide a reasonable degree of protection against hazards that research has not yet identified. The margin of safety is designed to prevent pollution levels that have been demonstrated to be harmful, as well as to prevent lower pollutant levels that may pose an unacceptable risk of harm, even if the risk is not precisely identified as to nature or degree. Health protection is achieved if the estimated worst-case exposure is below the relevant REL. In such a case, an adequate margin of safety exists between the predicted exposure and the estimated threshold dose for toxicity.

Exposure to multiple toxic substances may result in health effects that are equal to, less than, or greater than effects resulting from exposure to the individual chemicals. Only a small fraction of the thousands of potential combinations of chemicals have been tested for the health effects of combined exposures. In conformity with the California Air Pollution Control Officers Association (CAPCOA) guidelines, the health risk assessment assumes that the effects of each substance are additive for a given organ system (CEC RSA, 2010). Other possible mechanisms due to multiple exposures include those cases where the actions may be synergistic or antagonistic (where the effects are greater or less than the sum, respectively). For these types of substances, the health risk assessment could underestimate or overestimate the risks.

The assessment of non-cancer health effects is calculated using a *hazard index*. A hazard index is a ratio comparing exposure from facility emissions to the reference (safe) exposure level. A ratio of less than 1.0 signifies that the conservatively estimated maximum exposure is below the safe level. The hazard index for every toxic substance that has the same type of health effect is added to yield a Total Hazard Index. A Total Hazard Index of less than 1.0 indicates that cumulative maximum exposures are less than the RELs. Under these conditions, health protection from the proposed action is likely to be achieved, even for sensitive members of the population. In such a case, it is presumed that there would be no significant non-cancer project-related public health impacts.

Cancer Health Risks

For carcinogenic substances, the health assessment considers the risk of developing cancer and assumes that continuous exposure to the cancer-causing substance occurs over a 70-year lifetime. The risk that is calculated is not meant to predict the actual expected incidence of cancer, but rather a theoretical upper-bound number based on overly conservative adverse exposure assumptions.

Cancer risk is expressed in chances per million and is a function of the maximum expected pollutant concentration, the probability that a particular pollutant will cause cancer (called *potency factors* and established by OEHHA), and the length of the exposure period. Cancer risks for each carcinogen are added to yield total cancer risk. The conservative nature of the screening assumptions used means that actual cancer risks due to emissions from the proposed action would likely be considerably lower than those estimated.

Regulations implementing the provisions of Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986 (Health & Safety Code Section 25249.5 et seq.) were used for guidance to determine a cancer risk significance level. Title 22, California Code of Regulations Section 12703(b) states that "the risk level which represents no significant risk shall be one which is calculated to result in one excess case of cancer in an exposed population of 100,000, assuming lifetime exposure." This level of risk is equivalent to a cancer risk of 10 in one million, which is also written as 10×10^{-6}. An important distinction is that the Proposition 65 significance level applies separately to each cancer-causing substance, whereas this analysis bases significance on the total risk from all cancer-causing chemicals. Thus, the manner in which the significance level is applied in this analysis is more conservative (health-protective) than that applied by Proposition 65.

The screening analysis is performed to assess higher than likely risks to public health associated with the proposed action. The analysis also addresses potential impacts on all members of the population including the young, the elderly, people with existing medical conditions that may make them more sensitive to the adverse effects of toxic air contaminants, and any minority or low-income populations that are likely to be disproportionately affected by impacts. To accomplish this goal, this analysis uses the most current acceptable public health exposure levels set to protect the public from the effects of airborne toxics. If the screening analysis predicts no significant risks, then no further analysis is required. However, if risks are above the significance level, then further analysis, using more realistic site-specific assumptions, would be performed to obtain a more accurate assessment of potential public health risks. When a screening analysis shows cancer risks to be above the significance level, refined assumptions would likely result in a lower, more realistic risk estimate. Based on refined assumptions, if risk posed by the facility exceeds the significance level of 10 in one million, appropriate measures would be required to reduce the risk to less than significant. If, after all risk reduction measures had been considered, a refined analysis identifies a cancer risk greater than 10 in one million, the risk would be deemed to be significant.

4.11.2.2 Discussion of Direct and Indirect Impacts

Impact Assessment Methodology

Accidents and Spills

The types of hazardous materials that would be stored onsite for the operation and maintenance of the project are identified in Table 4.11-1, including the material name, the Chemical Abstracts Service (CAS) Number, the application/use of the chemical, the hazard characteristics, the maximum quantity proposed for use on site, and the CERCLA/SARA reportable quantity (RQ). The purpose of this hazardous materials management analysis is to identify the hazardous materials that would be used at the project site and to determine the affects of their transportation to the site, the use, handling, storage, and disposal on the environment.

TABLE 4.11-1
HAZARDOUS MATERIALS PROPOSED FOR STORAGE ONSITE DURING OPERATIONS

Material	CAS No.	Application	Hazardous Characteristics	Maximum Quantity On Site	CERCLA SARA RQ[a]
Acetic Acid 60%	64-19-7		Health: Moderate toxicity Hazard Class: corrosive, irritant	50 lbs	5,000 lbs
Acetylene	74-86-2	Welding gas	Health: moderate toxicity Physical: combustible, flammable	800 cubic feet total	10,000 pounds
Activated Carbon	7440-44-0	Control of VOCs from HTF expansion tank	Health: non-toxic (when unsaturated), low to moderate toxicity when saturated, depending on the absorbed material Physical: combustible solid	4,000 pounds	N/A
Argon	7440-37-1	Welding gas	Health: low toxicity Physical: non-flammable gas	800 cubic feet	N/A
Calcium Hypochlorite 100 percent	7778-54-3	Water treatment	Health: moderate toxicity Physical: corrosive, irritant	Minimal onsite storage for water treatment, not expected to exceed 50 pounds	10 pounds
Carbon Dioxide	124-38-9		Health: low toxicity Physical: nonflammable gas	15 tons	N/A
Diesel Fuel	68476-34-6		Health: low toxicity Physical: combustible liquid	300 gallons	N/A
Herbicide Roundup® or equivalent	38641-94-0		Health: low toxicity Physical: irritant	No onsite storage, brought on site by licensed contractor, used immediately	N/A
Hydraulic Fluid	64741-89-5		Health: low to moderate toxicity Physical: Class IIIB combustible liquid	500 gallons in equipment, maintenance inventory of 110 gallons in 55-gallon steel drums	N/A
Liquefied Petroleum Gas	68476-85-7		Low toxicity; Hazard class – Flammable Gas	Up to 36,000 gallons in storage tanks and piping; pressurized carbon steel tanks and pipelines for delivery to equipment	10,000 pounds
Lube Oil	64742-65-0		Health: low toxicity Physical: N/A	10,000 gallons in equipment and piping, additional maintenance inventory of up to 550 gallons in 55-gallons steel drums	N/A

TABLE 4.11-1 (Continued)
HAZARDOUS MATERIALS PROPOSED FOR STORAGE ONSITE DURING OPERATIONS

Material	CAS No.	Application	Hazardous Characteristics	Maximum Quantity On Site	CERCLA SARA RQ[a]
Mineral Insulating Oil	8042-47-5		Health: low toxicity Physical: N/A	32,000 gallons	N/A
Nitrogen	7727-37-9		Health: low toxicity Physical: non-flammable gas	7,500 pounds	N/A
Oxygen	7782-44-7	Welding gas	Health: low toxicity Physical: oxidizer	800 cubic feet	NA
Oxygen Scavenger Reagent Acetic Acid (60 percent) Iodine (20 percent) De-ionized Water (20 percent)	64-19-7 7553-56-2 7732-18-5	Water treatment	Health: moderate toxicity Physical: corrosive, irritant	Minimal onsite storage for water treatment, not expected to exceed 50 pounds	5,000 pounds
Soil Stabilizer Active Ingredient: acrylic or vinyl acetate polymer or equivalent	N/A		Health: non-toxic Physical: N/A	No onsite storage, supplied in 55 gallon drums or 400-gallon totes, used immediately	N/A
Sulfuric Acid (29.5 percent)	7664-93-9	Contained in batteries	Health: high toxicity Physical: corrosive and water reactive	Contained in batteries; 2,000 gallons	1,000 pounds
Therminol VP-1 Biphenyl (26.5 percent) Diphenyl Ether (73.5 percent)	 92-52-4 101-84-8	Heat transfer fluid in solar array	Health: moderate toxicity Physical: irritant; combustible liquid (Class III-B)	1.3 million gallons	100 pounds N/A

NOTE:
[a] Reportable quantities for a pure chemical, per the Comprehensive Environmental Response, Compensation, and Liability Act.

SOURCE: Solar Millennium, 2009

The effects are determined by the following:

1. identifying the types and amounts of hazardous substances that the project could emit to the environment;
2. estimating amounts of pollutants that people could be exposed to through inhalation, ingestion, and dermal contact; and
3. characterizing potential health risks by comparing higher than likely exposure to safe standards based on known health effects.

Small Quantity Hazardous Materials

During the construction phase of the proposed action, hazardous materials proposed for use include paint, solvents, gasoline, diesel fuel, motor oil, lubricants, and welding gases (CEC RSA, 2010). A concrete batch plant for the construction phase would require the use of some additional hazardous materials, such as fly ash and calcium chloride. In addition, a fuel depot is proposed for the construction phase that would include two 2,000-gallon on-road vehicle diesel tanks, two 8,000-gallon off-road vehicle diesel tanks, and one 500-gallon gasoline tank. The fuel depot would be constructed with secondary containment areas surrounding each tank and the covered maintenance area, and a concrete pad in the vehicle washing area (CEC RSA, 2010).

No acutely toxic hazardous materials would be used on site during construction, and none of these materials would pose a significant potential for off-site impacts as a result of the quantities on site, their relative toxicity, their physical state, and/or their environmental mobility. Any impact of spills or other releases of these materials would be limited to the site because of the small quantities involved, their infrequent use (and therefore reduced chances of release), and/or the temporary containment berms used by contractors. Petroleum hydrocarbon-based motor fuels, mineral oil, lube oil, and diesel fuel are all very low volatility and represent limited off-site hazards even in larger quantities. During operations, hazardous chemicals such as cleaning agents, water treatment chemicals, welding gasses, oils, activated carbon, and other various chemicals would be used and stored in relatively small amounts and represent limited off-site hazards because of their small quantities, low volatility, and/or low toxicity.

Large Quantity Hazardous Materials

The proposed action would require the use of large quantities of Liquefied Petroleum Gas (LPG) and Therminol VP1. Following are discussions relative to the proposed action's use of these hazardous materials and any associated effects.

Liquefied Petroleum Gas (LPG) or propane would be used at the project site to fuel the auxiliary boilers. LPG is composed mostly of propane and butane and poses a fire and explosion risk (not a risk of toxicity) because of its flammability. Up to 72,000 gallons (152,000 lbs) of LPG would be stored in 18,000-gallon carbon steel tanks equipped with secondary containment structures. Despite the large amounts of LPG (propane) stored at the project site, a Risk Management Plan including an Off Site Consequence Analysis is not required due to its use as a fuel on the project site (CEC RSA, 2010).[1] The project would be located very close to I-10 and along a main east-west natural gas line owned by Southern California Edison. The predominant safety risk from storing and using large amounts of LPG at a power plant is that of fire and explosion. Accordingly, these risks are discussed in the Worker Safety and Fire Protection portion of this analysis and appropriate mitigation is proposed and would reduce the risk associated with the use of LPG.

Therminol VP1™ (a biphenyl) is the heat transfer fluid (HTF) that would be heated in the loop and enter the header, which would return hot HTF from all loops to the power block where steam turbines would generate power. Therminol is a mixture of 73.5 percent diphenyl ether and 26.5 percent biphenyl, and is a solid at temperatures below 54 °F. Therminol therefore can be expected to remain liquid if a spill occurs during the late spring, summer, and early fall months when day-time and night-time temperature do not drop below 54 °F. At cooler temperatures Therminol will crystallize into a waxy solid. Therminol breaks down when heated to the temperatures required to generate steam and thus volatile organic compounds (VOC) emissions occur, which include the toxic HTF decomposition products.

Approximately 2,600,000 gallons of HTF would be stored at the project site contained in the pipes, heat exchanger, ullage tanks, expansion tank, and thermal troughs. Isolation valves would be placed throughout the HTF piping system designed to automatically block off sections of the piping in the event that a loss of pressure is detected (CEC RSA, 2010). While the risk of off-site migration is low, Therminol is highly combustible and even flammable at the normal operating temperature of 750 °F and fires have occurred at other solar generating stations that use it.

Construction-related Risks to Public Health

Potential risks to public health during construction could be associated with exposure to toxic substances in contaminated soil disturbed during site preparation, diesel exhaust from heavy equipment operation and emissions from the concrete batch plant and fuel depot. Criteria pollutants associated with the operation of heavy equipment and particulate matter from earth moving are discussed in Section 4.2, *Impacts on Air Resources*.

The operation of construction equipment would result in air emissions from diesel-fueled engines. Diesel emissions would be generated from sources such as trucks, graders, cranes, welding machines, electric generators, air compressors, and water pumps. Although diesel exhaust contains criteria pollutants such as nitrogen oxides, carbon monoxide, and sulfur oxides, it also includes a complex mixture of thousands of gases and fine particles. These particles are primarily composed of aggregates of spherical carbon particles coated with organic and inorganic substances. Diesel exhaust contains over 40 substances that are listed by the U.S. Environmental Protection Agency (USEPA) as hazardous air pollutants and by the California Air Resources Board (ARB) as toxic air contaminants.

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1 If a facility has more than 10,000 pounds of propane stored in a single tank, compliance with the U.S. EPA’s Chemical Accident Prevention rule (40 CFR Part 68) generally is required. However, there is an exception to the rule: if the propane is stored for use as a fuel at the facility, Part 68 does not apply (U.S. EPA, 2000).

Exposure to diesel exhaust may cause both short- and long-term adverse health effects. Short-term effects can include increased cough, labored breathing, chest tightness, wheezing, and eye and nasal irritation. Long-term effects can include increased coughing, chronic bronchitis, reductions in lung function, and inflammation of the lung. Epidemiological studies also strongly suggest a causal relationship between occupational diesel exhaust exposure and lung cancer.

Based on a number of health effects studies, the Scientific Review Panel (SRP)[2] on Toxic Air Contaminants recommended a chronic REL for diesel exhaust particulate matter of five micrograms per cubic meter ($\mu g/m^3$) and a cancer unit risk factor of $3x10^{-4}$ ($\mu g/m^3$) (CEC RSA, 2010). The SRP did not recommend a value for an acute REL, since available data in support of a value was deemed insufficient. On August 27, 1998, ARB listed particulate emissions from diesel-fueled engines as a toxic air contaminant and approved SRP's recommendations regarding health effect levels.

Construction of the project, including site preparation, is anticipated to take place over a period of 39 months. As noted earlier, assessment of chronic (long-term) health effects assumes continuous exposure to toxic substances over a significantly longer time period, typically from eight to 70 years. The Applicant estimated that 33,058 pounds of diesel particulate matter (DPM) would be emitted during the entire construction period of about 3.3 years. In order to model the cancer risk from construction emissions, the Applicant divided the total amount of DPM by the exposure period of 70 years which is typically used to assess health risks. The Applicant's modeling of highest possible construction emissions (using a 100-meter spacing receptor grid) found that the cancer risk was estimates to be 3.3 in 1 million at the point of maximum impact (PMI), below the level of significance of 10 in 1 million. The chronic hazard index was found to be 0.0021 at the PMI, below the level of significance of 1.0. The PMI was located along the northern site boundary in a remote area that is part of the project right-of-way and not frequently accessed by the public (CEC RSA, 2010).

Since preparing the construction HRA discussed above, the Applicant modified the project to include a concrete batch plant and a fuel depot during the construction phase of the project, and changes were also made to the construction schedule. The operation of the concrete batch plant would result in increased diesel exhaust and fugitive dust emissions during construction. The diesel storage tanks at the proposed fuel depot would also contribute TAC emissions (CEC RSA, 2010). The Applicant has revised the air quality modeling for construction criteria emissions to reflect these changes; however, the construction HRA, which assesses health risks from non-criteria pollutants, has not been revised. The increased construction emissions associated with the proposed changes would not significantly contribute to public health impacts.

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[2] The SRP, established pursuant to California Health and Safety Code Section 39670, evaluates the risk assessments of substances proposed for identification as Toxic Air Contaminants by ARB and the Department of Pesticide Regulation (DPR). The SRP reviews the exposure and health assessment reports and the underlying scientific data upon which the reports are based.

Emissions Sources

The emissions sources at the proposed project site include two propane-fired auxiliary boilers, two small wet cooling towers used for ancillary equipment, two diesel-fueled emergency generators, two diesel-fueled emergency fire pumps, two HTF expansion/ullage systems, and DPM from maintenance vehicles.

As noted earlier, the first step in a health risk assessment is to identify potentially toxic compounds that may be emitted from the facility. Toxicity values include RELs, which are used to calculate short-term and long-term non-cancer health effects, and cancer unit risks, which are used to calculate the lifetime risk of developing cancer, as published in the OEHHA Guidelines.

Table 4.11-2 lists toxic emissions and shows how each contributes to the health risk analysis. For example, the first row shows that oral exposure to benzene is not of concern, but if inhaled, benzene could have cancer, chronic (long-term) non-cancer health effects, and acute (short-term) effects.

TABLE 4.11-2
TYPES OF HEALTH IMPACTS AND EXPOSURE ROUTES ATTRIBUTED TO TOXIC EMISSIONS[a]

Substance	Oral Cancer	Oral Non-cancer	Inhalation Cancer	Non-cancer (Chronic)	Non-cancer (Acute)
Arsenic	X	X	X	X	X
Benzene			X	X	X
Biphenyl[a]					
Chloroform		X	X	X	
Chromium (Hexavalent)			X	X	X
Dichlorobenzene			X	X	
Diesel Exhaust			X	X	
Formaldehyde			X	X	X
Hexane				X	
Manganese				X	
Naphthalene		X	X	X	
Polycyclic Aromatic Hydrocarbons (PAHs)	X	X	X	X	
Toluene				X	X
Zinc[a]				X	X

NOTE:
[a] No cancer risk factors or RELs have been established for biphenyl or zinc.

SOURCE: CEC RSA, 2010.

Emission factors for most plant components were obtained from the USEPA emission factors database (AP-42) and the California Air Toxics Emission Factors (CATEF II) database. Data from existing solar plants were used to estimate emissions from the HTF expansion tanks, which consist of benzene (calculated as 99.99 percent) and biphenyl (calculated as 0.01 percent). Since biphenyl has not been assigned a health risk factor, it was not included in the HRA calculations (CEC RSA, 2010).

In response to Data Request 176, the Applicant stated that VOC emissions from the HTF expansion tank are estimated to be 137 pounds per MW per year, based on comparable thermal solar projects and on an operational mass balance for the ullage system developed by the Applicant's solar design engineer. In regards to the composition of VOC emissions from the HTF expansion tank, the Applicant notes that HTF breakdown products may include benzene, toluene, xylene, phenol, naphthalene, methane, ethane, benzenol, and biphenyl. In the revised health risk assessment conducted for this project in response to Data Request 174, the Applicant modeled the entire amount of HTF emissions as benzene since it is the compound with the highest risk factors for cancer and non-cancer effects (CEC RSA, 2010).

In response to Data Requests 173 and 175, the Applicant provided total daily and annual DPM emissions from maintenance vehicles and total cumulative daily and annual PM2.5 emissions including both fugitive dust and DPM. The total DPM emissions from maintenance vehicles were estimated to be 3.8 pounds per year and the total PM2.5 emissions were estimated to be 7,767 pounds per year. DPM emissions are therefore negligible when compared to non-exhaust emissions, the majority of which (over 80 percent) is attributed to mirror washing trucks (CEC RSA, 2010). The estimated DPM emissions from maintenance vehicles were added to the Applicant's revised health risk assessment.

Since the project intends to use groundwater for cooling, the potential exists for TACs present in the water to disperse into the air via cooling tower drift (these cooling towers are used for ancillary equipment only). In response to Data request 178, the Applicant conducted water sampling and analysis of the on-site well water for VOCs, petroleum hydrocarbons, pesticides, herbicides, minerals, metals, and other chemicals of concern. The results are presented in Table DR-PH-178-1, showing that four metals considered as TACs are present in the well water (arsenic, hexavalent chromium, manganese, and zinc). Emissions calculations for the project's health risk assessment were revised to include the metals detected in the groundwater samples (CEC RSA, 2010).

The Applicant has modified the project to replace the two originally proposed HTF heaters with heat exchangers that would provide freeze protection for the circulating HTF at night. The HTF heat exchangers would use hot steam from the STGs to warm the HTF, which would require the auxiliary boilers to operate more often than originally proposed (up to 100 hours per year for each boiler). The increased boiler operational hours would only slightly increase the annual TAC emissions and would not add significantly to health and safety risks. Therefore the HRA was not revised (CEC RSA, 2010).

Other changes that have been proposed since the SA/DEIS and which may impact the health and safety analysis includes the following:

1. Reconfiguration of the power blocks' layout,
2. Addition of a fuel depot on-site during construction and operation

The BLM has reviewed the reconfigured power block layouts and the reconfigured alternative site layouts and determined that they do not add significantly to health and safety risks; therefore, the HRA was not revised.

Emissions Levels

Once potential emissions are identified, the next step is to quantify them by analyzing the maximum possible emissions in the context of maximum exposure to the most sensitive public groups. Maximum hourly emissions are required to calculate acute (one-hour) non-cancer health effects, while estimates of maximum emissions on an annual basis are required to calculate cancer and chronic (long-term) non-cancer health effects.

The next step in the health risk assessment process is to estimate the ambient concentrations of toxic substances that may result from the proposed action. This is accomplished by using a screening air dispersion model and assuming conditions that result in maximum impacts. The Applicant's screening analysis was performed using the ARB/OEHHA Hotspots Analysis and Reporting Program (HARP) modeling program. Finally, ambient concentrations were used in conjunction with RELs and cancer unit risk factors to estimate health effects which might occur from exposure to facility emissions. Exposure pathways, or ways in which people might come into contact with toxic substances, include inhalation, dermal (through the skin) absorption, soil ingestion, consumption of locally grown plant foods, and mother's milk.

The above method of assessing health effects is consistent with OEHHA's Air Toxics Hot Spots Program Risk Assessment Guidelines referred to earlier, and results in the following health risk estimates.

Proposed Action

The Applicant's revised screening health risk assessment resulted in a maximum acute hazard index of 0.11 and a maximum chronic hazard index of 0.00076 at the point of maximum impact (PMI) (CEC RSA, 2010 Part 1, p. C.5-15). The maximum remotely possible cancer risk was found to be 1.35 at the PMI. As Table 4.11-3 shows, both acute and chronic hazard indices are under the significance level of 1.0, and cancer risk is below the significance level of 10 in 1,000,000, indicating that no short- or long-term adverse health effects are expected.

TABLE 4.11-3
OPERATION HAZARD/RISK AT POINT OF MAXIMUM IMPACT

Type of Hazard/Risk	Hazard Index/Risk	Significance Level	Significant?
Acute Noncancer	0.11	1.0	No
Chronic Noncancer	0.00076	1.0	No
Individual Cancer	1.35 in 1 million	10 in 1 million	No

SOURCE: CEC RSA, 2010 Part 1, 2010, Public Health Table 3

Thorough evaluation of the risk assessment was conducted to determine if the Applicant's modeling results are transparent, verifiable, and accurate, and the results are presented in the Application for Certification (Aug. 2009) submitted by the Applicant to the CEC and in its "Responses to CEC Staff Public Health Data Requests 172-179" (January 2010). Modeling files provided by the Applicant also independently were reviewed. The BLM has been determined that standard procedures were followed and appropriate assumptions made in the Applicant's analysis of potential health risks and, therefore, that the conclusions of impacts on public health are based on a verifiable and appropriate Human Health Risk Assessment.

Construction Phase Analysis

For the construction phase analysis, atmospheric dispersion modeling of DPM emissions from construction equipment and vehicles was conducted by the Applicant using the OFFROAD2007 Model. Total estimated on-site PM emissions from diesel construction equipment exhaust over the estimated six-year construction period was provided in the January 2010 data responses and is 33,058 pounds. The corresponding annual DPM emission rate for exhaust emissions from onsite construction equipment and vehicles is expected to be 472 pounds per year (lb/yr) for residential exposure over a 70-year lifetime.

The maximum predicted offsite concentration of diesel particulate matter, on a 70-year basis, was reported by the Applicant to be 0.0104 ug/m^3 (CEC RSA, 2010). Cancer risk due to diesel exhaust emissions was determined by multiplying the DPM concentration by the diesel cancer inhalation unit risk of 0.0003 $(ug/m^3)^{-1}$. Cancer risk at the location of the maximum offsite concentration was determined to be 3.1 in a million and chronic HI to be 0.0021 (noncancer chronic REL is 5 ug/m^3).

Operations-related Risks to Public Health

For the operations-phase analysis, atmospheric dispersion modeling of facility emissions was conducted by the Applicant using AERMOD. Local meteorological data were used, building downwash effects were included for 27 buildings, and 1,837 grid receptors were modeled.

A total of 18 emitting units were modeled by the Applicant for facility operations including:

1. 2 auxiliary boilers
2. 4 cooling tower stacks (used for ancillary equipment only)
3. 2 HTF (heat transfer fluid) heaters (no longer proposed for this project)
4. 2 ullage system vents
5. 2 diesel emergency generators
6. 2 diesel firewater pumps
7. 4 mobile sources involved in routine operations (mirror washing trucks, trucks used in weed abatement, trucks used in application of soil stabilizer, water trucks); 4 on-site points modeled for emissions

The HTF (heat transfer fluid) would be circulated through the solar field where it would be heated by sunlight concentrated on the receiver tube elements of the solar collectors. HTF is comprised biphenyl/diphenyl oxide. Thermal decomposition of HTF results in decomposition products that can include benzene, phenol, and toluene. In modeling HTF fugitive loss emissions, the Applicant assumed that 99 percent of the emissions would be comprised of benzene.

The HARP On-Ramp program was used to load the Applicant's AERMOD results into the CARB/OEHHA Hotspots Analysis and Reporting Program (HARP), Version 1.4a for the risk analysis. Exposure pathways assessed include inhalation, ingestion of home-grown produce, dermal absorption, soil ingestion and mother's milk. Emission factors obtained from the Applicant's modeling files and used in this analysis are listed in Table 4.11-4. For risk calculations using the HARP model, the "Derived (Adjusted) Method" was used for cancer risk and the "Derived (OEHHA) Method" was used for chronic non-cancer hazard.

**TABLE 4.11-4
OPERATION-PHASE EMISSION RATES**

Substance	Annual Average Emissions (lbs/year)	Maximum 1-Hour Emissions (lbs/hour)
Emission Rates from Each of 2 Auxiliary Boilers		
Benzene	1.10E-01	7.21E-05
Formaldehyde	4.18E+00	2.57E-03
Hexane	1.00E+02	6.00E-02
Naphthalene	3.00E-02	2.09E-05
PAHs-w/o	3.32E-03	2.05E-06
p-DiClBenzene	6.00E-02	4.12E-05
Toluene	1.80E-01	1.17E-04
Emission Rates from Each of 4 Cooling Tower Cells		
Chloroform	6.94E+01	1.88E-02
Arsenic	4.34E-04	1.17E-07
Cr(VI)	1.02E-02	-
Manganese	3.51E-04	-
Emission Rates from Each of 2 HTF Heaters		
Benzene	3.00E-02	7.21E-05
Formaldehyde	1.28E+00	2.57E-03
Hexane	3.09E+01	6.00E-02
Naphthalene	1.00E-02	2.09E-05
PAHs-w/o	1.02E-03	2.05E-06
p-DiClBenzene	2.00E-02	4.12E-05
Toluene	5.00E-02	1.17E-04
Emission Rates from Each of 2 Ullage System Vents		
Benzene	3.00E+02	7.40E-01
Emission Rates from Operation of each of 2 Emergency Generators		
Diesel PM	4.95E+00	9.00E-02
Emission Rates from Operation of Each of 2 Emergency Fire Pumps		
Diesel PM	4.95E+00	9.00E-02
Emission Rates from On-Site Maintenance Vehicles		
Diesel PM	2.50E+02	-

SOURCE: CEC RSA, 2010.

Cancer risk and chronic and acute hazard index values are compared to results reported by the Applicant in the January 2010 response to CEC data requests in Table 4.11-5. Risk and hazard were determined at the point of maximum impact, PMI, under the 70-year residential scenario, located on the northern fenceline. The nearest residential receptor is located at the northwest corner of the project site (at the edge of a solar array). No sensitive receptors were identified within three miles of the project site.

TABLE 4.11-5
CANCER RISK AND CHRONIC HAZARD DUE TO OPERATION PHASE EMISSIONS

	EIS Analysis			Applicant's Analysis		
	Cancer Risk (per million)	Acute HI	Chronic HI	Cancer Risk (per million)	Acute HI	Chronic HI
PMI (for cancer risk and chronic HI, Rec #372)	7.8	0.11	0.0042	1.35	0.11*	0.00076
MEIR (Rec. #1)	1.9	0.026	0.011	0.11	0.026	0.000056

*Cancer PMI (point of maximum impact, Rec. #372) is located on the northern fenceline.

SOURCE: CEC RSA, 2010

Table 4.11-6 presents substance- and source-specific cancer risks at the PMI. Analysis of this table indicates that 99 percent of the cancer risk at the PMI is attributed to emissions from two sources: 83 percent due to emissions from on-site mobile sources of DPM and 16 percent due to emissions from the HTF from the auxiliary boiler, the HTF heater and ullage system.

Cooling Towers

One small wet cooling tower for each power block is proposed by the Applicant to cool ancillary equipment. In addition to being a source of potential TACs, the possibility exists for bacterial growth to occur in the cooling towers, including Legionella. Legionella is a bacterium that is ubiquitous in natural aquatic environments and is also widely distributed in man-made water systems. It is the principal cause of legionellosis, otherwise known as Legionnaires' Disease, which is similar to pneumonia. Transmission to people results mainly from inhalation or aspiration of aerosolized contaminated water. Untreated or inadequately treated cooling systems, such as industrial cooling towers and building heating, ventilating, and air conditioning systems, have been correlated with outbreaks of legionellosis.

Legionella can grow symbiotically with other bacteria and can infect protozoan hosts. This provides Legionella with protection from adverse environmental conditions, including making it more resistant to water treatment with chlorine, biocides, and other disinfectants. Thus, if not properly maintained, cooling water systems and their components can amplify and disseminate aerosols containing Legionella.

TABLE 4.11-6
RESULTS OF ANALYSIS: CONTRIBUTION TO TOTAL CANCER RISK BY INDIVIDUAL SUBSTANCES FROM ALL SOURCES AT THE POINT OF MAXIMUM IMPACT (PMI)

Substance	Auxiliary Boilers (2 units)	Cooling Tower (4 stacks)	Diesel Generator (2 units)	Diesel Firewater Pump (2 units)
Benzene	2.20E-11			
Chloroform		6.73E-09		
DieselExhPM			3.26E-08	1.62E-08
Formaldehyde	1.75E-10			
Naphthalene	7.17E-12			
PAHs-w/o	3.72E-09			
p-DiClBenzene	4.78E-12			
Arsenic		4.06E-10		
Cr(VI)		2.66E-08		
TOTAL	***3.93E-09***	***3.37E-08***	***3.26E-08***	***1.62E-08***

Substance	HTF Heater (2 units)	Ullage System (2 sources))	On-site Mobile Sources (4 sources)	Total Cancer Risk
Benzene	3.66E-12	1.27E-06		1.27E-06
Chloroform				6.73E-09
DieselExhPM			6.46E-06	6.51E-06
Formaldehyde	3.28E-11			2.08E-10
Naphthalene	1.47E-12			8.64E-12
PAHs-w/o	7.01E-10			4.42E-09
p-DiClBenzene	9.77E-13			5.76E-12
Arsenic				4.06E-10
Cr(VI)				2.66E-08
TOTAL	***7.40E-10***	***1.27E-06***	***6.46E-06***	***7.82E-06***

SOURCE: CEC RSA, 2010.

The State of California regulates recycled water for use in cooling towers in Title 22, Section 60303 of the California Code of Regulations. This section requires that, in order to protect workers and the public who may come into contact with cooling tower mists, chlorine or another biocide must be used to treat the cooling system water to minimize the growth of Legionella and other micro-organisms. This regulation does not apply to the project since the proposed action would use groundwater supplied from on-site wells; however, the potential remains for Legionella growth in cooling water at the project due to nutrients found in groundwater.

The USEPA published an extensive review of Legionella in a human health criteria document (CEC RSA, 2010). The USEPA noted that Legionella may propagate in biofilms (collections of microorganisms surrounded by slime they secrete, attached to either inert or living surfaces) and that aerosol-generating systems such as cooling towers can aid in the transmission of Legionella from water to air. The USEPA has inadequate quantitative data on the infectivity of Legionella in humans to prepare a dose-response evaluation. Therefore, sufficient information is not available to support a quantitative characterization of the threshold infective dose of Legionella. Thus, the presence of even small numbers of Legionella bacteria presents a risk - however small - of disease in humans.

In February of 2000, the Cooling Technology Institute (CTI) issued its own report and guidelines for the best practices for control of Legionella (CEC RSA, 2010). The CTI found that 40-60 percent of industrial cooling towers tested were found to contain Legionella. More recently, a 2005 report of testing in cooling towers in Australia that found the rate of Legionella presence in cooling tower waters to be extremely low, approximately three to six percent. The cooling towers all had implemented aggressive water treatment and biocide application programs.

To minimize the risk from Legionella, the CTI noted that consensus recommendations included minimization of water stagnation, minimization of process leads into the cooling system that provide nutrients for bacteria, maintenance of overall system cleanliness, the application of scale and corrosion inhibitors as appropriate, the use of high-efficiency mist eliminators on cooling towers, and the overall general control of microbiological populations.

Good preventive maintenance is very important in the efficient operation of cooling towers and other evaporative equipment (ASHRAE, 1998). Preventive maintenance includes having effective drift eliminators, periodically cleaning the system if appropriate, maintaining mechanical components in working order, and maintaining an effective water treatment program with appropriate biocide concentrations. Most water treatment programs are designed to minimize scale, corrosion, and biofouling and not to control Legionella.

The efficacy of any biocide in ensuring that bacterial and in particular Legionella growth, is kept to a minimum is contingent upon a number of factors including but not limited to proper dosage amounts, appropriate application procedures, and effective monitoring.

Alternatives

Reconfigured Alternatives 1 and 2

If one of the Reconfigured Alternatives were selected, a utility-scale solar energy generating facility would be developed on the site that would have the same generating capacity as the proposed action. Types and amounts of hazardous materials would be substantially similar to the proposed action. Compliance with applicable laws, ordinances, rules, and standards as well as implementation of standard engineering and administrative controls to prevent and control accidental releases of hazardous materials would be expected. Consequently, public health and safety risks would be comparable to those of the proposed action.

Reduced Acreage Alternative

If the Reduced Acreage Alternative were selected, a utility-scale solar energy generating facility would be developed on the site that would have approximately 25 percent less generating capacity as the proposed action. The types of hazardous materials would be substantially similar to the proposed action, although the amounts required would be less. As a result, public health and safety risks would be slightly reduced as compared to the proposed action.

No Action Alternative A

If No Action Alternative A were selected, there would be no direct or indirect impacts on public health and safety relating to hazardous materials, because the requested ROW application would be denied and no amendment of the CDCA Plan would be approved to associate the site with solar energy development at this time. In this case, no cumulative impacts presently would be caused or contributed to under this alternative.

However, No Action Alternative A would allow future applications for development of a renewable energy facility or any other use consistent with the CDCA Plan. Insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative B

If the CDCA Plan Amendment/No Project Alternative B were selected, there would be no direct or indirect impacts on public health and safety relating to hazardous materials, because the requested ROW application would be denied and the CDCA Plan would be amended to identify the site as unsuitable for any type of solar energy development. Any non-solar energy use consistent with the CDCA Plan could be proposed. Insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative C

If the CDCA Plan Amendment/No Project Alternative C were selected, there would be no direct or indirect impacts on public health and safety relating to hazardous materials, because the requested ROW application would be denied, and no ROW grant authorized. In this case, no cumulative impacts presently would be caused or contributed to under this alternative.

However, under this alternative, the CDCA Plan would be amended to identify the site as suitable for any type of solar energy development. Accordingly, hazardous materials impacts associated with this alternative would depend on if a different solar project would be proposed, the solar technology proposed, size of the project, and other variables. Impacts similar in nature to those of the proposed action could be expected to result from risks and hazards relating to accidents and spills, human health, small quantity hazardous materials, large quantity hazardous materials, construction and emissions. Such impacts could be similar to, greater or less than those of the proposed action.

4.11.2.3 Discussion of Cumulative Impacts

Impacts resulting from construction, operation, maintenance, and decommissioning of the project could result in a cumulative impact relating to hazardous materials, including the use, storage, and transport of hazardous materials, with other past, present, or reasonably foreseeable future actions. For example, cumulative impacts would exist or could result from the interaction of one or more controlled or uncontrolled release of hazardous materials, e.g., airborne or subsurface plumes, within the same geographic area, and during the same timeframe. The geographic area of the cumulative impacts analysis area for hazardous materials management includes the Mojave Desert Air Basin for airborne hazards and, for waterborne hazards, the watershed and groundwater basin. BLM has identified this geographic area to be large enough to provide a reasonable basis for evaluating cumulative hazardous materials-related impacts. The relevant timeframe within which incremental impacts could be additive, synergistic or otherwise combine includes the construction period for the proposed action, its anticipated 30-40 year lifespan, and the period of time required for closure and decommissioning of the project and alternatives.

Existing conditions within the cumulative impacts area reflect a combination of the natural condition and the effects of past actions and are described in the Chapter 3. Direct and indirect effects of the project are analyzed above. Past, present, and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1.4, *Cumulative Scenario Approach*. The only nearby existing source of emissions is Interstate 10, a major route for trucks delivering goods to and from California, located about 0.5 mile south of the project site. This source is located close enough to the project site for public health cumulative impacts to be feasible. However, due to the low emissions of TACs modeled for this project and the resulting minimal health risks, the potential for cumulative impacts is extremely low. In addition, the point of maximum impact modeled by the Applicant was located near the northern facility fenceline, about 2 miles north of I-10. Furthermore, emissions from I-10 would be predominantly DPM from truck traffic, which has been demonstrated to have very localized impacts, with the highest concentration of DPM occurring in the immediate vicinity of the source (CEC RSA, 2010). The cumulative impacts of the proposed project combined with I-10 emissions would not be substantial.

A considerable amount of future development is planned in the general area of the project, including over 10 other solar power plants. However, no foreseeable projects are planned in the immediate vicinity of the project. The nearest planned project is the Chuckwalla Solar I project whose eastern boundary would be about 2 miles northwest of the project's western boundary. Given the distance between the projects, there is little to no potential for cumulative impacts to occur during construction. Cumulative impacts resulting from the operations phase of project could occur if future facilities emitting TACs were located within 0.5 mile of the project site. None of the future foreseeable projects are close enough to meet this criterion, and so none is likely to cause or contribute to a cumulative impact. Decommissioning of the project is not expected to result in adverse impacts related to public health. It is unlikely that the construction or decommissioning of any of the cumulative projects would occur concurrently with the project, because the decommissioning is not expected to occur for approximately 30-40 years. As a result, it is not expected that significant impacts related to public health during decommissioning of the project generated by the cumulative projects will occur.

4.11.2.4 Summary of Mitigation Measures

The implementation of the mitigation measures imposed by the CEC as Conditions of Certification for the project would avoid or reduce impacts on the quality of the human environment. These mitigation measures are summarized below and provided in full in Appendix B. The following address impacts on public health and safety:

HAZ-1: Use of Approved Hazardous Materials places a limitation on the use and storage of hazardous materials and their strength and volume.

HAZ-2: Hazardous Materials Management Plans shall be developed and implemented, including a Hazardous Materials Business Plan (HMBP), and Spill Prevention, Control, and Countermeasure Plan (SPCC), and a Process Safety Management Plan (PSMP).

HAZ-3: Safety Management Plan. Specific to the delivery of liquid hazardous materials, the plan will include procedures, protective equipment requirements, training and a checklist, as well as a section describing all measures to be implemented to prevent mixing of incompatible hazardous materials.

HAZ-4: Installation of Isolation Valves for Heat Transfer Fluid. The placement of additional isolation valves in the HTF pipe loops throughout the solar array would add significantly to the safety and operational integrity of the entire system by allowing a loop to be closed if a leak develops in a ball joint, flex-hose, or pipe, instead of closing off the entire HTF system and shutting down the plant. The Applicant would be required to install a sufficient number of isolation valves that could be either manually, remotely, or automatically activated to limit the maximum amount of spilled HTF to the entire contents of a single solar array “loop,” which would be equal to 1,250 gallons. Most leaks in existing solar power plants release very small amounts of HTF. This amount is a maximum amount that could be lost if there were a catastrophic break in a HTF pipe in the solar field. Other shut-off valves would be placed in areas of the power block to isolate a leak.

Public Health-1: Cooling Water Management Plan. The Cooling Tower Institute has issued guidelines for the best practices for control of Legionella. Preventive maintenance includes effective drift eliminators, periodically cleaning the system as appropriate, maintaining mechanical components, and maintaining an effective water treatment program with appropriate biocide concentrations. This condition specifically requires the project owner to prepare and implement a biocide and anti-biofilm agent monitoring program to ensure that proper levels of biocide and other agents are maintained within the four wet cooling towers at all times, that periodic measurements of Legionella levels are conducted, and that periodic cleaning is conducted to remove biofilm build up.

SOIL&WATER-18: Groundwater Quality Monitoring and Reporting Plan. This plan will describe and require the monitoring of background and on-site groundwater quality in the shallow and deep regional aquifer in areas that will be affected by pumping related to the proposed project. This monitoring data will be used, among other things, to determine if a release from the waste management units or septic systems (if required) has adversely affected sensitive receptors.

The BLM supplements CEC Condition of Certification HAZ-2 to require BLM review and input regarding the development of hazardous materials management plans for

> BLM-HAZ-2: Hazardous Materials Business Plan (HMBP). The project owner shall concurrently provide a Hazardous Materials Business Plan (HMBP), and Spill Prevention, Control, and Countermeasure Plan (SPCC), and a Process Safety Management Plan (PSMP) to the Riverside County Environmental Health Department (RCEHD), the CPM, and the BLM for review. After receiving comments from the RCEHD, CPM, and the BLM, the project owner shall reflect all recommendations in the final documents. Copies of the final HMBP, SPCC Plan, and PSMP shall then be provided to the RCEHD and BLM for information and to the CPM for approval.

4.11.2.5 Residual Impacts after Mitigation Measures were Implemented

Although unlikely, it is possible that even after the implementation of the Mitigation Measures identified above, an accidental release could occur and could cause an airborne or waterborne risk to the human environment.

4.11.2.6 Unavoidable Adverse Impacts

Unavoidable adverse impacts would be the same as the residual impacts described above.

4.11.3 Waste Management

This section presents an analysis of issues associated with wastes generated from the construction, operation, and closure/decommissioning of the proposed action. The technical scope of this analysis encompasses solid wastes existing on site and wastes that would likely be generated during facility construction, operation, and closure/decommissioning. Management and discharge of non-hazardous liquid wastes generated during construction are addressed in the *Water Resources* section of this document. Information related to hazardous waste management may also be covered in the *Worker Safety* and *Hazardous Materials Management* sections of this document.

4.11.3.1 Impact Assessment Methodology

Projected wastes were evaluated in terms of landfill capacity and compliance with waste management regulations. The applicable laws listed in PA/FEIS Appendix C have been established to ensure the safe and proper management of both solid and hazardous wastes in order to protect human health and the environment.

4.11.3.2 Discussion of Direct and Indirect Impacts

Proposed Action

Site preparation and construction of the two phases of the project would last approximately 39 months and generate non-hazardous, universal, and hazardous wastes in solid and liquid forms. Construction activities would generate an estimated 70 cubic yards per week of non-hazardous waste (i.e., scrap wood, concrete, steel, glass, plastic, paper, insulating materials, aluminum, and food waste) and operation would generate 33.5 cubic yards per week of non-hazardous waste. The total amount of non-hazardous solid waste generated from project construction is estimated to be 11,830 cubic yards (70 cubic yards per week for 39 months), and the total amount from lifetime operations is estimated to be 52,260 cubic yards or more (33.5 cubic yards per week for 30 years or more; see Table 4.11-7). These quantities include both recyclable and non-recyclable wastes, and the operations waste stream amount includes a substantial amount of HTF-contaminated soil, with concentrations less than 10,000 milligrams of HTF per kilogram of soil, that would be treated and reused on site.

Construction activities would generate an estimated one cubic yard of empty containers per week; 175 gallons of solvents, used oil, paint, and oily rags every 90 days; 1,000 gallons of heat exchanger cleaning waste once per power plant field; as well as variable amounts of flushing and cleaning wash water. Approximately 190 cubic yards of recyclable and non-recyclable hazardous waste would be generated over the 39-month construction period, and approximately 1,590 cubic yards of non-recyclable hazardous waste would be generated over the 30-year operating lifetime. Hazardous wastes would be collected in hazardous waste accumulation containers and stored in a laydown area, warehouse area, or storage tank on equipment skids for less than 90 days (or less than 180 days in the case of lead acid batteries). The accumulated wastes would then be properly manifested, transported, and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal firms. All wastes would be disposed in accordance with applicable LORS.

Operation of the project would generate an estimated 33.5 cubic yards of non-hazardous solid waste per week. Non-hazardous solid wastes generated during project operations would consist of dirty shop rags, Heat Transfer Fluid-contaminated soil with concentrations of less than 10,000 milligram of HTF per kilogram, spent demineralizer resin, auxiliary cooling tower basin sludge, spent softener resin, damaged parabolic mirrors, used air filters, office paper, newsprint, aluminum cans, plastic and glass containers, and other miscellaneous domestic and office waste. Dirty shop rags would be sent to a commercial laundry for cleaning and recycling; spent demineralizer resin would be recycled; auxiliary cooling tower basin sludge would be disposed of at a permitted waste management facility; spent softener resin would be recycled; and damaged parabolic mirrors would be recycled to the extent possible, and the remainder disposed of at a Class III facility.

Anticipated universal waste generated during construction would include an estimated 40 spent batteries (e.g., alkaline dry cell, nickel-cadmium, and lithium ion) over the 3-year construction period, fewer than 100 spent florescent light bulbs (per year), and about eight drums of empty or nonempty aerosol cans. Universal wastes would be recycled by licensed universal waste handlers.

Operation of the project would generate an estimated 190 cubic yards of hazardous solid waste per year and 106,000 gallons of hazardous liquid waste per year. Hazardous wastes generated during operations would include used hydraulic fluid, oils, and grease associated with the HTF system, turbine, and other hydraulic equipment; effluent from the oily water separation system resulting from plant wash down; oil adsorbent and oil filters; spent carbon from air pollution control of the

TABLE 4.11-7
SUMMARY OF OPERATIONS-GENERATED NON-HAZARDOUS WASTE STREAMS AND MANAGEMENT METHODS

Waste Stream	Origin and Composition	Estimated Amount	Estimated Frequency of Generation	Waste Management Method	
				Onsite	Offsite
Non-Hazardous[a]					
Dirty shop rags	Maintenance cleaning operations	100 pounds per month	Routine	None	Send to commercial laundry for cleaning and recycling
Soil contaminated with HTF (< 10,000 mg/kg)	Solar array	1,500 cy/year	Intermittent	Bioremediation or land farming at LTU	Disposal at permitted waste management facility
Reverse Osmosis (RO) Membrane Cleaning Waste	Acidic and/or caustic chemicals	6,000 to 12,000 gallons per cleaning	Up to four times per year	Evaporation ponds	Evaporation Pond solids disposal at permitted waste management facility
RO system concentrate – Inert or liquid designated waste	Auxiliary cooling tower and boiler blowdown	TBD	Routine	Evaporation ponds	Evaporation Pond solids disposal at permitted waste management facility
Auxiliary cooling tower basin sludge	Auxiliary cooling tower	2,000 pounds/ year	Annually	Evaporation ponds	Evaporation Pond solids disposal at permitted waste management facility
Spent softener resin	Softener	1,000 ft^3	Once every 3 years	None	Recycle
Damaged parabolic mirrors	Metals and other materials	TBD	Variable	None	Recycle for metal content and/or other materials or send for landfill disposal
Sanitary wastewater	Toilets, washrooms	5,500 gallons/ day	Continuous	Septic leach field	None
Universal Waste[a]					
Spent batteries	Batteries containing heavy metals such as alkaline dry cell, nickel-cadmium, or lithium ion.	<20/month	Continuous	Accumulate for <one year	Recycle
Spent fluorescent bulbs or high-intensity discharge lamps	Facility lighting	< 100 per year	Intermittent	Accumulate for <one year	Recycle
Hazardous[a]					
Used hydraulic fluid, oils and grease	HTF system, turbine, and other hydraulic equipment	100,000 gallons/year	Intermittent	Accumulated for <90 days	Recycle
Effluent from oily water separation system	Plant wash down area/oily water separation system	6,000 gallons/year	Intermittent	None	Recycle
Oil absorbent, and oil filters	Various	Ten 55-gallon drums per month	Intermittent	Accumulated for <90 days	Sent off site for recovery or disposal at Class I landfill.
Soil contaminated with HTF (>10,000 milligrams per kilogram [mg/kg])	Solar array equipment leaks	20 cy/year	Intermittent	Accumulated for <90 days	Sent off site for disposal at a Class I landfill or to soil thermal treatment facility.
Spent carbon	Spent activated carbon from air pollution control of HTF vent	90,000 pounds/year	Intermittent	Contained in engineered process vessel, no accumulation outside of process	Sent off site for regeneration at a permitted management facility.
Spent batteries	Lead acid	40 every 2 years	Intermittent	Accumulated for <180 days	Recycle

NOTE:
[a] Classification under Title 22 CCR Division 4.5, Chapters 11, 12, and 23.

SOURCE: CEC RSA, 2010

HTF vent; soil contaminated with HTF as a result of solar array equipment leaks; and spent lead acid batteries. Used hydraulic fluid, oils, and grease would be recycled; effluent from the oily water separation system would be recycled; oil adsorbent and oil filters would be sent offsite for recovery or disposal at a Class I landfill; spent activated carbon would be sent off site for regeneration at a permitted management facility; HTF-contaminated soil (concentration greater than 10,000 milligram per kilogram) would be sent off site for disposal at a Class I landfill or to a soil thermal treatment facility; and spent lead acid batteries would be recycled (CEC RSA, 2010).

For all construction waste, recyclable materials would be separated and removed to recycling facilities; non-recyclable materials would be disposed of at a Class III landfill. There are at least seven Class III landfill facilities located in the project vicinity, including the Oasis Sanitary Landfill (in Oasis), Desert Center Landfill (in Desert Center), Blythe Sanitary Landfill (in Blythe), El Sobrante Landfill (in Corona), Badlands Sanitary Landfill (in Moreno Valley), Lamb Canyon Sanitary Landfill (in Beaumont), and Chiquita Canyon Sanitary Landfill (in Valencia). With the exception of Oasis and Desert Center, there is sufficient capacity at these facilities to handle the project's construction and operation non-hazardous wastes over the life of the project, amounting to less than 1.0 percent of total landfill capacity. Disposal of the non-hazardous solid wastes generated by the proposed action would occur without substantially impacting the capacity or remaining life of the other Class III facilities in Riverside County.

Hazardous wastes generated during construction, operation and closure/decommissioning would be recycled to the extent possible and practical. Those wastes that cannot be recycled would be transported off site to a permitted treatment, storage, or disposal facility. Hazardous wastes would be transported to one of two available Class I waste facilities: Clean Harbors Buttonwillow Landfill in Kern County and Chemical Waste Management Kettleman Hills Landfill in Kings County. The Kettleman Hills facility also accepts Class II and III waste. The quantity of hazardous wastes from the proposed project requiring off-site disposal would be up to approximately 0.1 percent of the combined remaining capacity of the two Class I waste facilities. There is sufficient remaining capacity at these facilities to handle the project's hazardous wastes during its operating lifetime. In addition to the Class I landfills, there are several commercial liquid hazardous waste treatment and recycling facilities in California that can process project-related hazardous wastes.

Alternatives

Reconfigured Alternatives 1 and 2

If Reconfigured Alternatives 1 or 2 (Option 1 or 2) were selected, a utility-scale solar energy generating facility would be developed in the vicinity of proposed site and it would have the same generating capacity as the proposed action. The types and amounts of non-hazardous, universal and hazardous wastes would be similar to the proposed action. Compliance with applicable LORS would be required. Consequently, risks to public health and safety would be comparable to the proposed action.

Reduced Acreage Alternative

If the Reduced Acreage Alternative were selected, a solar energy generating facility would be developed on the site that is approximately 25 percent smaller than that of the proposed action and would generate 25 percent less energy than the proposed action. The non-hazardous, universal and hazardous wastes generated under this alternative would be similar to those of the proposed action. However, the volume of wastes would be reduced by approximately 25 percent compared to the proposed action. Consequently, public health and safety risks would be similar to, but slightly less than, the proposed action.

No Action Alternative A

If No Action Alternative A were selected, there would be no direct or indirect impacts on public health and safety related to non-hazardous, universal and hazardous waste, because the requested ROW application would be denied and no amendment of the CDCA Plan would be approved. In this case, no cumulative impacts would presently be caused or contributed to under this alternative.

However, No Action Alternative A leaves open the possibility that any use alloweable in an MUC-M area could be proposed on the site. Insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative B

If No Project Alternative B were selected, there would be no direct or indirect impacts on public health and safety relating to non-hazardous, universal and hazardous wastes, because the requested ROW application would be denied and the CDCA Plan would be amended to identify the site as unsuitable for any type of solar energy development. Other uses consistent with CDCA Plan MUC-M could be proposed. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative C

If No Project Alternative C were selected, there would be no direct or indirect impacts on public health and safety relating to non-hazardous, universal and hazardous wastes. No cumulative impacts presently would be caused or contributed to under this alternative. However, under No Project Alternative C, the CDCA Plan would be amended to identify the site as suitable for any type of solar energy development. Accordingly, non-hazardous, universal and hazardous waste-related impacts could occur under No Project Alternative C if a solar energy project, or other type of renewable energy project would be developed on the site. Resulting impacts could be similar to, greater, or less than those of the proposed action.

4.11.3.3 Discussion of Cumulative Impacts

Existing waste management-related conditions within the cumulative impacts area reflect a combination of the natural condition as well as the effects of past actions and are described in Chapter 3. Additionally, existing projects along the I-10 Corridor (Eastern Riverside County) including existing renewable energy project also generate waste that is generally disposed of within Riverside County. Most of the reasonably foreseeable projects along the I-10 corridor identified Table 4.1-4 would generate smaller volumes of non-hazardous, universal and hazardous waste than the project. Direct and indirect effects of the project, including those associated with the generation of non-hazardous, universal and hazardous wastes that would add to the total waste generated in Kern, Kings and Riverside Counties, are analyzed above. Past, present, and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1.4, *Cumulative Scenario Approach*. The geographic extent for the analysis of the cumulative impacts associated with the project is the location of the closest large Class I landfills in Kern and Kings counties and Class III landfills in Riverside County. This geographic scope is appropriate because waste disposal facilities in these counties are the ones most likely to be used for disposal of waste generated by the project considering regulatory acceptability and transport costs.

Cumulative waste impacts could also occur as a result of development of some of the many proposed solar and wind development projects and other non-energy projects that have been or are expected to be under consideration by the BLM, the CEC and Riverside County during the life of the proposed action, from construction to decommissioning. Many of these projects are located within the California Desert Conservation Area, as well as on BLM land. Since each project would be constructed in similar time frames, large quantities of waste could require disposal at a small number of facilities simultaneously, resulting in negative impacts to landfill capacity.

Cumulative Impacts in the Project Area

A value of 100 cubic yards per MW was used as a rough guide for determining total volume of non-hazardous solid wastes that could result from implementation of all the solar energy projects listed in Table 4.1-2. Solar projects represent approximately half of the projects on the list, so it is assumed that they would generate approximately half the volume of non-hazardous waste generated by all the cumulative renewable energy projects. The 100 cubic yards per MW value is based on the 500 MW project total lifetime value of 52,260 cubic yards of non-hazardous solid waste and factors in the lesser amounts of waste likely to be generated by solar photovoltaic projects. Similar to the project, these quantities for the cumulative solar projects do not include closure or decommissioning wastes; disposal at landfills with adequate capacity would be a condition in facility closure plans. The approximately 4,723,300 cubic yards generated by the solar energy projects in the cumulative scenario list indicates that all of the renewable power projects on the list, including wind energy, would generate approximately 9,447,000 cubic yards within the cumulative impacts area. When compared to the almost 200,000,000 cubic yards of Riverside County Class III landfill capacity available to these generators as indentified in Table 3.12-1, *Solid Waste Disposal Facilities*, it is apparent that the non-hazardous waste generated by the project would not result in substantial cumulative effects related to waste management. Moreover, the Mesquite Regional Class III Landfill in Imperial County with a capacity of 600 million tons is scheduled to be fully operational in 2011/2012, providing a substantial increase in capacity for waste removal in the desert region.

4.11.3.4 Summary of Mitigation Measures

Implementation of the mitigation measures imposed by the CEC as Conditions of Certification for the project would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in Appendix B. The following address impacts on waste:

> WASTE-2: Construction Supervision of Professional Engineer or Professional Geologist to oversee any earth-moving activities that have the potential to disturb contaminated soil and impact public health, safety, and the environment.
>
> WASTE-3: Soil Inspection by Professional Engineer or Professional Geologist of any contaminated soils identified during earth-moving activities to determine extent of contamination, provide a written report to the applicant, DTSC or RWQCB and Compliance Project Manager (CMP) with recommendations.
>
> WASTE-4: Construction Waste Management Plan ensures compliance with applicable LORS.
>
> WASTE-5: Hazardous Waste Generator Identification: required to be obtained from the U.S. Environmental Protection Agency (USEPA) before generating any hazardous wastes during project construction and operation.
>
> WASTE-6: Notification of Waste-Management Violation: to the CPM whenever any waste management related enforcement action is initiated by a local, state, or Federal authority concerning the project or its waste disposal contractors.
>
> WASTE-7: Operation Waste Management Plan identifies all hazardous and non-hazardous wastes and the methods of managing the wastes.
>
> WASTE-8: Document Releases and Spill of HTF requires the compliance with regulatory requirements for managing accidental discharges of HTF and to ensure that hazardous concentrations of HTF-contaminated soils are not treated in the project’s Land Treatment Unit (LTU), which is designed to only handle HTF soils that do not exceed hazardous threshold levels.
>
> WASTE-9: Documentation and Remediation of Accidental or Unauthorized Spills: report, clean up, and remediate any hazardous materials spills or releases.
>
> WASTE-10: Appropriate Landfill Use requires that none of the project’s non-hazardous, non-recyclable and non-reusable construction and operation waste be diverted or deposited at Desert Center or Oasis Sanitary Landfills.

4.11.3.5 Residual Impacts after Mitigation Measures were Implemented

None are expected.

4.11.3.6 Unavoidable Adverse Impacts

None are expected.

4.11.4 Unexploded Ordnance (UXO)

UXO presents an immediate risk of acute physical injury from fire or explosion resulting from accidental or unintentional detonation. As discussed in Section 3.12.4, *Unexploded Ordnance (UXO)* unidentified UXO could be present on the site or along the access routes or the existing or proposed corridors of the power lines.

4.11.4.1 Impact Assessment Methodology

Review of historical uses of the site, generally-accepted risk information that is widely-available from a multitude of internet sources, and analysis included in the CEC's Revised Staff Assessment all contributed to the analysis of potential UXO-related impacts associated with development of the project.

4.11.4.2 Discussion of Direct and Indirect Impacts

Proposed Action

During construction, maintenance, and closure and decommissioning activities associated with the proposed action, land disturbance activities could unearth unexploded World War II-era and more recent vintage munitions, including conventional and unconventional land mines, personnel mines, and bullets, the detonation of which would pose a safety risk to the construction workers. For example, surface and shallow sub-surface UXO could be disturbed by vehicles, walkers, and excavation using shovels or similar hand tools, and deeper sub-surface UXO could be disturbed by the earth movement and excavation processes that would be required for development of the proposed action.

Due to the proximity of the project site to Palen Pass and the historic World War II training camps, and the potential for UXO to be present in the study area, the Applicant plans to conduct pre-construction UXO surveys with qualified technicians (that meet Department of Defense requirements) and/or employ UXO experts during ground disturbances in areas that may contain UXO. Implementation of Mitigation Measures WASTE-1, would formalize UXO training, investigation, removal, and disposal.

Alternatives

Action Alternatives, No Action Alternative A and CDCA Plan Amendment/No Project Alternative B

Risks associated with accidental or unintentional detonation of UXO would be equal to those of the proposed action for all of the alternatives pursuant to which ground disturbance could occur consistent with the CDCA Plan (including No Action Alternative A, CDCA Plan Amendment/No Project Alternative B, and CDCA Plan Amendment/No Project Alternative C) regardless of whether such disturbance is related to the development of a renewable energy project. Insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

4.11.4.3 Discussion of Cumulative Impacts

The accidental or unintentional detonation of UXO in the vicinity of the project constitutes a continuing risk of immediate, acute physical injury from fire or explosion. However, the incremental UXO-related risks of projects in the cumulative scenario could not combine in a way that would be additive, countervailing, or synergistic. Consequently, there would be no significant UXO-related cumulative impacts associated with the project.

4.11.4.4 Summary of Mitigation Measures

Implementation of the mitigation measures imposed by the CEC as Conditions of Certification for the project also would avoid or reduce impacts of unexploded ordnance on health and human safety. These mitigation measures are set forth in Appendix B. The following address impacts for UXO:

> WASTE-1: Training and Reporting Plan. This mitigation measure requires the project owner to prepare a UXO Identification, Training and Reporting Plan to train site workers to recognize, avoid, and report military waste debris and ordnance before the start of construction.

4.11.4.5 Residual Impacts after Mitigation Measures were Implemented

Even with the implementation of the Mitigation Measure identified above, a risk of accidental or unintentional detonation of UXO would remain, resulting in a continuing risk of immediate, acute physical injury from fire or explosion.

4.11.4.6 Unavoidable Adverse Impacts

Unavoidable adverse impacts would be the same as the residual impacts discussed above.

4.11.5 Undocumented Immigrants (UDI)

There are no known incidents with UDI at or near the project site. Thus, no UDI-related direct or indirect impacts would result from the proposed action or alternatives, no mitigation measures are recommended, and no cumulative impacts, residual impacts, or unavoidable adverse impacts on UDI would result.

4.11.6 Transmission Line Safety and Nuisance

4.11.6.1 Impact Assessment Methodology

The potential magnitude of the line impacts of concern depends on compliance with the listed design-related laws, ordinances, regulations, and standards as well as industry practices (Table 1-1), which have been established to maintain impacts below hazard thresholds. Thus, if the proposed action would comply with applicable laws, ordinances, regulations and standards, then it would remain below such thresholds.

4.11.6.2 Discussion of Direct and Indirect Impacts

Proposed Action

This analysis focuses on the transmission line required to serve the generation facility, and addresses the following issues taking into account both the physical presence of the line and the physical interactions of its electric and magnetic fields:

1. aviation safety;
2. interference with radio-frequency communication;
3. audible noise;
4. fire hazards;
5. hazardous shocks;
6. nuisance shocks; and
7. electrical and magnetic field (EMF) exposure.

The transmission line for the proposed action, Reconfigured Alternatives 1 and 2, as well as the Reduced Acreage Alternative would follow the same route. The line would (a) be constructed, operated, and maintained according to SCE's guidelines for line safety and field management which conform to applicable law, ordinances, regulations, and standards and (b) would traverse undisturbed desert land with no nearby residents, thereby eliminating the potential for residential electric and magnetic field exposures.

Since the line for the proposed action and the action alternatives would be designed and operated according to the applicable SCE guidelines, there would be no difference in the magnitude of the field and nonfield impacts of concern in this analysis. This lack of difference would manifest itself regarding radio frequency communication, audible noise, hazardous and nuisance shocks, electric and magnetic field levels, fire hazards, and aviation safety.

Aviation Safety

The overhead 230 kV single circuit transmission line would likely range from 90 feet to a maximum of 145 feet in height and would span approximately five miles from the project power block westward to SCE's proposed Red Bluff Substation. The closest airports are the Desert Center Airport (2 miles from the transmission line) and the Blythe Airport (approximately 30 miles east of the site). Since the 145 foot maximum height of the proposed transmission line's support structures is well below the 200-foot height threshold of concern for the FAA, it is unlikely that the proposed transmission line would affect navigable airspace.

Interference with Radio-Frequency Communication

The proposed action line would be designed, built, and maintained in keeping with standard SCE practices that minimize surface irregularities, surface discontinuities, and related corona noise. Such corona effects would further be minimized by the specific low-corona designs proposed by the Applicant. No radar transmission or receiving facilities or other NAVAIDS are located at the Desert Center Airport. Since the line would traverse an uninhabited open space and would not interfere with modern digital airport-related communications, no interference with radio-frequency communication would occur.

Audible Noise

Since the noise level depends on the strength of the line electric field, the potential for perception could be assessed from estimates of the field strengths expected during operation. Such noise is usually generated during rainfall, mainly from overhead lines of 345 kV or higher, unlike the proposed transmission line. Research by the Electric Power Research Institute has validated this by showing the fair-weather audible noise from modern transmission lines to be generally indistinguishable from background noise at the edge of a right-of-way of 100 feet or more (CEC RSA, 2010). Since the low-corona designs are also aimed at minimizing field strengths, operation of the proposed line would not significantly contribute to current background noise levels in the project area. For an assessment of the noise from the proposed line and related facilities, please refer to Section 4.9, *Impacts on Noise*.

Fire Hazards

Potential fire hazards would be caused by sparks from conductors of overhead lines, or could result from direct contact between the line and nearby trees and other combustible objects. Standard fire prevention and suppression measures for similar SCE lines would be implemented for the proposed line (CEC RSA, 2010). Additionally, potential fire hazards would be addressed through compliance with applicable laws, ordinances, regulations, and standards (Table 1-1).

Hazardous and Nuisance Shocks

Operation of the proposed transmission line could result in hazardous and/or nuisance shocks. For the proposed line, the Applicant would be responsible in all cases for ensuring compliance with standard industry practices within the right-of-way (ROW) including minimum national safe operating clearances and grounding procedures for metallic objects.

Electric and Magnetic Field Exposure

While health hazards related to EMF exposure have not been established from the available evidence, the absence of such evidence does not serve as proof of a definite lack of a hazard. Therefore, it is appropriate, in light of present uncertainty, to recommend feasible reduction of such fields without affecting safety, efficiency, reliability, and maintainability of the proposed line.

The California Public Utilities Commission (CPUC) requires each utility within its jurisdiction to establish EMF-reducing measures and incorporate such measures into the designs for all new or upgraded power lines and related facilities within their respective service areas. The EMF fields for newly designed transmission lines are required to be similar to other lines in that service area. In the utility industry, the present focus is on reducing the impacts of magnetic fields because unlike electric fields, they can penetrate the soil, buildings, and other materials to produce the types of human exposures at the root of the health concern of recent years.

As with similar SCE lines, specific field strength-reducing measures would be incorporated into the proposed line's design to ensure the field strength minimization currently required by the CPUC in light of the concern over EMF exposure and health.

The field reduction measures to be applied include the following:

1. increasing the distance between the conductors and the ground to an optimal level;
2. reducing the spacing between the conductors to an optimal level;
3. minimizing the current in the line; and
4. arranging current flow to maximize the cancellation effects from interacting of conductor fields.

Solar panels do not emit electromagnetic waves over distances that could interfere with radar signal transmissions, and any electrical facilities that do carry concentrated current would be buried beneath the ground and away from any signal transmission. Setbacks of 500 and 250 feet have been determined to be adequate protective buffers of solar fields from major on-airport radar equipment at Oakland and Bakersfield, respectively (FAA, 2010b), and the greater setback between aviation facilitates and the project is expected to adequately address aviation safety-related concerns. Similarly, because there are no residences in the immediate vicinity of the route for the proposed line, there would not be the long-term residential EMF exposures that generally lead to health-related EMF concerns. The only project-related EMF exposures would be the short-term exposures of plant workers, regulatory inspectors, maintenance personnel, visitors, or individuals in the vicinity of the line. Short term exposures are well understood as not significantly related to the health concern.

Alternatives

Action Alternatives

Construction and operation of Reconfigured Alternatives 1 and 2, and the Reduced Acreage Alternative would have the same transmission line safety and nuisance impacts to those analyzed for the project since the transmission line under these alternatives would follow the same route.

No Action Alternative A

Under this alternative, the PSPP would not be implemented and the CDCA Plan would not be amended. The project site could become available to other uses that are consistent with Multiple Use Class-M. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative B

Under this alternative, the proposed action would not be implemented and BLM would make the area unavailable for future solar development. Under this scenario, any non-solar energy use consistent with the CDCA Plan MUC-M classification could be proposed for the site. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative C

Under this alternative, the PSPP would not be implemented, but BLM would allow for other solar projects on the site. Under this alternative, other renewable energy projects, including solar projects, may be constructed to meet state and federal mandates, and those projects would require transmission lines that could have similar transmission line safety and nuisance impacts as those that would occur under the proposed action. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

4.11.6.3 Discussion of Cumulative Impacts

Incremental impacts of construction, operation, maintenance, and decommissioning of the project could contribute to a cumulative effect on transmission line safety and nuisance when considered in combination with additional transmission lines that would be associated with the cumulative projects (see Section 4.1.4, *Cumulative Scenario Approach*). The cumulative impacts area for potential cumulative transmission line safety and nuisance impacts would be limited to the immediate vicinity of the proposed transmission line. The relevant timeframe within which incremental impacts could interact to cause or contribute to cumulative impacts would begin when the proposed transmission line is erected and would last for as long as the line remains in place. This time period very likely could extend past the point of site closure and decommissioning of the project.

Existing conditions within the cumulative impacts area reflect a combination of the existing conditions and the effects of past actions and are described in FEIS Chapter 3. Direct and indirect effects of the proposed action and alternatives are analyzed above. Past, present, and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1.4, *Cumulative Scenario Approach*. It is unlikely that transmission lines associated with the cumulative projects would be sited in the immediate vicinity of the transmission line of the proposed action. Therefore, cumulative impacts are not anticipated to result from the proposed action. None of the alternatives is expected to cause or contribute to any cumulative transmission line safety and nuisance impacts, because, if a line is built pursuant to the alternative, incremental impacts would be the same as those of the proposed action and, if no line is built, no line-related impacts would result.

Regarding EMF exposure, when field intensities are measured or calculated for a specific location, they reflect the interactive, and therefore, cumulative effects of fields from all contributing conductors. This interaction could be additive or countervailing, depending on prevailing conditions. Since the proposed action's transmission line would be designed, built, and operated according to applicable SCE field-reducing guidelines (as currently required by the CPUC for effective field management), any contribution to cumulative area exposures should be at levels expected for SCE lines of similar voltage and current-carrying capacity. The action alternatives would contribute to cumulative EMF conditions, as could the no project alternative scenarios that could include a transmission line. If no transmission line were developed, the alternative would not generate EMF.

4.11.6.4 Summary of Mitigation Measures

The implementation of the mitigation measures imposed by the CEC as Conditions of Certification for the project also would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in Appendix B. The following mitigation measures address impacts on transmission line safety and nuisance:

> TLSN-1: EMF Reduction Guidelines. This mitigation measure requires the project owner to construct the proposed transmission line according to applicable State requirements, including requirements of the California Public Utility Commission's General Orders, regulatory High Voltage Electrical Safety Orders, and Southern California Edison's EMF reduction guidelines.

> TLSN-2: Measurements of Electric and Magnetic Fields. This mitigation measure requires the project owner to use a qualified individual to measure the strengths of the electric and magnetic fields before and within 6 months after energization according to specified standard procedures.

> TLSN-3: Transmission Line Distance from Combustible Material. This mitigation measure requires the project owner to ensure that the proposed transmission line ROWs are kept free of combustible material in accordance with State law.

> TLSN-4: Grounding Permanent Metallic Objects. This mitigation measure requires the project owner to ensure that all project-related permanent metallic objects within the transmission line ROWs are grounded according to industry standards regardless of ownership.

4.11.6.5 Residual Impacts after Mitigation Measures were Implemented

None are expected.

4.11.6.6 Unavoidable Adverse Impacts

None are expected.

4.11.7 Traffic and Transportation Safety

4.11.7.1 Impact Assessment Methodology

The Traffic and Transportation Safety analysis focuses on:

1. Whether construction or operation of the project would result in traffic and transportation safety impacts, including aviation safety.

2. Whether the project would comply with applicable laws, ordinances, regulations and standards (see Table 1-1).

In this analysis, potential impacts are identified related to the construction and operation of project on the surrounding transportation systems and roadways and, when applicable, mitigation measures are proposed.

4.11.7.2 Direct and Indirect Impacts

Proposed Action

Aviation Safety

The Desert Center Airport is located approximately 5 miles northwest of the main project site; it is used an average of approximately 12 times a month. Construction, operation and decommissioning of the project could have a limited affect on airport operation. The project includes two dry-cooling systems, including two 120-foot air-cooled condensers, one for each system. Under certain ambient air conditions, the two air-cooled condensers could create upward plumes exceeding 14.1 feet per second (f/s), which is equivalent to 4.3 meters per second (m/s), at heights as much as approximately 1,670 feet above ground level (AGL)[3] (CEC RSA, 2010b). For the purposes of this analysis, it has been determined that a plume of 14.1 f/s velocity has the potential to affect aircraft operations when flying at low levels (CEC RSA, 2010b). Given the rare use of the Desert Center Airport and distance between the project site and the Blythe Airport, it is not anticipated that industrial plumes would impact aviation safety.

Solar facilities generally use one of three technologies designed to concentrate the sun's rays to generate heat, thereby creating electricity. The project would consist of parabolic trough solar collector arrays. A parabolic trough, a type of a solar thermal energy collector, is constructed as a long parabolic mirror with a Dewar tube running its length at the focal point. Sunlight is reflected by the mirror and focused on the Dewar tube. This technology has the potential for creating glint and glare. *Glint* is defined as a momentary flash of light; *glare*, as a more continuous source of

[3] These calculations were completed by an aviation consultancy firm to assess the impacts of proposed Blythe Solar Power Project in order to determine potential impacts on aviation safety and the general operations of Blythe Airport. Given the similarities of the proposed infrastructure for the Blythe and Palen facilities, it was extrapolated that the facilities would generate industrial plumes of similar types and size.

excessive brightness relative to the ambient lighting. Hazards from glint and glare from concentrating solar plants can range from permanent eye injury or retinal burn to temporary disability or distractions (flash blindness). These hazards could affect pilots using or flying to the airport. However, reducing the potential for project-related glint and glare impacts, the windows of air traffic control towers and airplane cockpits are coated with anti-reflective glazing and operators generally wear polarized eye wear (FAA, 2010a).

The Applicant has proposed two, four-acre evaporation ponds (i.e., artificial bodies of water) to be located next to each power block. The evaporation ponds will result in 8 acres of evaporation ponds within the project site. Evaporation ponds could attract birds, especially where natural water sources are scarce. This could affect nearby airport operations because flying birds could become a hazard to aircraft, particularly during take-offs and landings, the most critical times of flight. During take-offs and landings, the presence of birds could obscure pilots' vision or result in other dangers or distractions that could cause pilots to lose control of their aircraft. Mitigation of this impact would be appropriate.

Roadway Safety

The direct and indirect traffic and transportation safety-related impacts of the project on the transportation system are examined in this section. Several pieces of equipment that exceed roadway load or size limits would need to be transported to the project site via I-10 during construction, potentially resulting in a roadway hazard. This equipment includes the steam turbine generators and main transformers. The equipment would be transported using multi-axle trucks. To transport the equipment, the Applicant must obtain special ministerial permits from Caltrans to move oversized or overweight materials. In addition, the Applicant must ensure proper routes are followed; proper time is scheduled for the delivery; and proper escorts, including advanced warning and trailing vehicles as well as law enforcement control are available, if necessary.

Hazardous materials to be used by the project consist of Liquefied Petroleum Gas (LPG) and heat transfer fluid (Therminol VP-1™) as well as diesel fuel, mineral insulating oil, and lube oil. Five thousand gallon tanker trucks that would meet the appropriate US Department of Transportation (DOT) requirements would use I-10 two times a week to make deliveries of LPG to the site (a total of approximately 104 deliveries per year). Transportation of hazardous materials could result in leaks or spills and cause a hazard to public health and safety. Trucks would travel on I-10, exit at Corn Springs Road and continue to the project site via a new access road. The transport vehicles would be required to follow federal and state regulations governing proper containment vessels and vehicles, including appropriate identification of the nature of the contents. Additionally, the Applicant would be required to develop and implement a Safety Management Plan for the delivery of hazardous materials. See Table 1-1 for information about applicable laws, ordinances, regulations, and standards.

Emergency Services Vehicle Access

A decrease in public safety could occur if emergency vehicles do not have proper access to the site during construction and operations. Emergency vehicles would have adequate access to the Project site directly from I-10 at Corn Springs Road (CEC RSA, 2010). On-site circulation of emergency vehicles would be subject to site plan review by the Riverside County Fire Department. Additionally, the Applicant would be required to provide a secondary access to the site for emergency purposes, subject to review by the Riverside County Fire Department.

Water and Rail Obstructions

The project is not adjacent to a navigable body of water and therefore would not alter water-related transportation. Also, the proposed action would not alter rail transportation since no rail tracks exist on or near the project site.

Alternatives

Action Alternatives

Construction and operation of Reconfigured Alternatives 1 and 2 and the Reduced Acreage Alternative would have similar roadway safety impacts as those described for the project since the facilities under these alternatives would generally be the same, with only a minor reconfiguration of one or both solar units or a 25 percent reduction in the overall acreage. Therefore, there would be no substantial change in impacts from a roadway safety perspective under these alternatives.

No Action Alternative A

Under this alternative, the PSPP would not be implemented and the CDCA Plan would not be amended. The project site could become available to other uses that are consistent with Multiple Use Class-M. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative B

Under this alternative, the proposed action would not be implemented and BLM would make the area unavailable for future solar development. Under this scenario, any non-solar energy use consistent with the CDCA Plan MUC-M classification could be proposed for the site. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative C

Under this alternative, the PSPP would not be implemented, but BLM would allow for other solar projects on the site. Under this alternative, other renewable energy projects, including solar projects, may be constructed to meet state and federal mandates, and those projects would require transmission lines that could have similar transmission line safety and nuisance impacts as those that would occur under the proposed action. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

4.11.7.3 Discussion of Cumulative Impacts

Incremental traffic and transportation-related safety impacts[4] resulting from construction, operation, maintenance and decommissioning of the project could result in a cumulative effect in combination with past, present, and/or reasonably foreseeable future actions. The cumulative impacts area for transportation safety consists of the I-10 corridor and areas in the vicinity of the Desert Center Airport and Blythe Airport. This geographic scope of cumulative impacts analysis is limited to the area where project-related transportation impacts could cause hazards. Potential cumulative effects on transportation safety could begin (for aviation) with the installation-related testing of the proposed air-cooled condensers, the installation of facilities that could cause glint or glare, or the occurrence of water within the evaporation ponds, and (for roadways) with the onset of over-sized construction vehicles. These beginning points may not coincide precisely with the initiation of the construction period. The potential for cumulative impacts would persist for as long as these features are present, and could extend to the conclusion of the closure and decommissioning phase of the project.

Existing conditions within the cumulative impacts area reflect a combination of the existing condition and the effects of past actions and are described in Chapter 3. Direct and indirect effects of the proposed action and alternatives are analyzed above. Past, present, and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1.4, *Cumulative Scenario Approach*. Within the cumulative impacts area for transportation safety, there are 13 solar projects (including the Genesis Solar Energy Project and the Blythe Solar Power Project) proposed along the I-10 corridor predominantly between Desert Center and Blythe. Based on the currently available data for these various projects (information obtained from Plans of Development and other project documents), and assuming all projects move forward, these projects would be under construction in the same general time frame as the project (2010 to 2013). Construction traffic could affect area roadways at the same time, thereby increasing the potential safety risks associated with accidents, hazardous materials spills, and potential incompatibility with other types of vehicles. Projects other than renewable projects also could proceed during this timeframe and, thereby, contribute construction traffic-related risks elsewhere along the I-10 corridor. The increased risk of safety hazards associated with construction traffic could be substantial.

Aviation-related risks could increase as a result of the construction and operation of water features that could attract birds as part of other developments, such as the evaporation ponds associated with the Blythe Solar Power Project, thermal plumes caused by condensers and other equipment, and new sources of glint or glare, such as the solar troughs associated with utility scale solar thermal projects (e.g., the Blythe Solar Power Project, Genesis Solar Energy Project and the PSPP) and, to a lesser extent (FAA, 2010a), solar panels associated with photovoltaic projects (e.g., Desert Sunlight). Together, these contributions to an aviation-related hazard could be

[4] Traffic impacts, as contrasted with safety impacts, are analyzed in PA/FEIS Section 4.16.

substantial. However, given the low level of use at the Desert Center Airport and the distance between the project site and the Blythe Airport, the project's contribution to aviation safety hazards is expected to be insubstantial.

4.11.7.4 Summary of Mitigation Measures

The implementation of the mitigation measures imposed by the Energy Commission as Conditions of Certification for the project also would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in Appendix B. The following mitigation measures address impacts on transportation safety:

> TRANS-1: Regulation Compliance. This mitigation measure would require the project owner to comply with State of California and local regulations related to vehicle sizes and weights and driver licensing as well as transportation permits for roadway use.
>
> TRANS-2: Transport of Hazardous Materials. This mitigation measure would require the project owner to ensure that permits and/or licenses are secured from the California Highway Patrol and Caltrans for the transport of hazardous materials.
>
> BIO-26: Evaporation Pond Netting and Monitoring. This mitigation measure would require the project owner to cover the evaporation ponds with netting of a specified size before any discharge to exclude birds and other wildlife from drinking or landing on the water of the ponds; it also would require regular monitoring of the netted ponds to verify that the netting remains intact, is fulfilling its function in excluding birds and other wildlife from the ponds, and does not pose an entanglement threat to birds and other wildlife.

4.11.7.5 Residual Impacts after Mitigation Measures were Implemented

The implementation of Mitigation Measure BIO-26 to address aviation-related bird-attractant hazards associated with the planned evaporation ponds may not be enough to preclude the ponds from serving as an attractant to birds. Thus, some residual impact would remain.

4.11.7.6 Unavoidable Adverse Impacts

None are expected.

4.11.8 Worker Safety and Fire Protection

4.11.8.1 Impact Assessment Methodology

Two issues are assessed in Worker Safety-Fire Protection:

1. The potential for impacts on the safety of workers during demolition, construction, and operations activities, and

2. Fire prevention/protection, emergency medical response, and hazardous materials spill response during demolition, construction, and operations.

Worker safety issues are thoroughly addressed by Cal/OSHA regulations. If all LORS are followed, workers would be adequately protected.

Regarding fire prevention matters, the on-site fire-fighting systems proposed by the Applicant have been analyzed and the time needed for off-site local fire departments to respond to a fire, medical, or hazardous material emergency at the project site has been determined. If on-site systems do not follow established codes and industry standards, additional measures would be recommended. The local fire department capabilities and response times in each area have been reviewed and interviews have been conducted with local fire officials to determine if they feel adequately trained, manned, and equipped to respond to the needs of a power plant.

4.11.8.2 Direct and Indirect Impacts

Proposed Action

Worker Safety

Industrial environments are potentially dangerous during construction and operation and maintenance, and closure and decommissioning of facilities. Workers at the project site would be exposed to excessive heat, loud noises, moving equipment, trenches, and confined space entry and egress. The workers could experience falls, trips, burns, lacerations, and numerous other injuries. They could be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, or electrical sparks and electrocution.

Other workplace hazards that could be associated with the proposed action are less traditionally industrial, and more specific to the nature of a utility-scale solar energy generation plant. This solar power plant would provide a work environment that includes a solar field located in the high desert. The solar field features thousands of mirrors that heat a heat transfer fluid (HTF) to approximately 750 °F. At the mirror focal point, the pipe containing the HTF would reach temperatures as high as 1,100 °F. Experience at existing solar generating stations shows that these mirrors break, the pipes age, and HTF can leak and catch fire from ball joints or frayed flex hoses. The area under the solar arrays must be kept free from weeds and thus herbicides would be applied as necessary. Exposure to workers via inhalation and ingestion of dust containing herbicides poses a health risk. Finally, workers would inspect the solar array for HTF leaks and broken mirrors at least once each day by driving up and down dirt paths between the rows of mirrors and even under the mirrors. Cleaning the mirrors would also be conducted on a routine schedule. All these activities would take place year-round and especially during the summer months of peak solar power generation, when outside ambient temperatures routinely reach 115 °F and above.

Consequently, it would be particularly important for the Applicant to have well-defined policies and procedures, training, and hazard recognition and control at project facilities to minimize such hazards and protect workers. If the project complies with all applicable laws, ordinances, regulations, and standards (Table 1-1), workers would be adequately protected from health and safety hazards.

Construction Safety and Health Program

Workers at the project site would be exposed to hazards typical of construction, operation, and decommissioning of a solar thermal electric power generating facility.

Construction Safety Orders are published at Title 8 California Code of Regulations sections 1502, et seq. These requirements have been promulgated by Cal/OSHA and would apply to the construction phase of the proposed action, and would require the development of a Construction Safety and Health Program. Such a program would include the following:

1. Construction Injury and Illness Prevention Program (8 CCR 1509);
2. Construction Fire Prevention Plan (8 CCR 1920);
3. Personal Protective Equipment Program (8 CCR 1514 - 1522); and
4. Emergency Action Program and Plan.

Additional programs under General Industry Safety Orders (8 CCR 3200-6184), Electrical Safety Orders (8 CCR 2299-2974), and Unfired Pressure Vessel Safety Orders (8 CCR 450-544) would include:

1. Electrical Safety Program;
2. Motor Vehicle and Heavy Equipment Safety Program;
3. Forklift Operation Program;
4. Excavation/Trenching Program;
5. Fall Protection Program;
6. Scaffolding/Ladder Safety Program;
7. Articulating Boom Platforms Program;
8. Crane and Material Handling Program;
9. Housekeeping and Material Handling and Storage Program;
10. Respiratory Protection Program;
11. Employee Exposure Monitoring Program;
12. Hand and Portable Power Tool Safety Program;
13. Hearing Conservation Program;
14. Back Injury Prevention Program;
15. Ergonomics Program;
16. Heat and Cold Stress Monitoring and Control Program;
17. Hazard Communication Program;
18. Lock Out/Tag Out Safety Program;
19. Pressure Vessel and Pipeline Safety Program; and
20. Solar Components Safe Handling Program.

Operations and Maintenance Safety and Health Program

Prior to the start of operations of the project, the Operations and Maintenance Safety and Health Program would be prepared. This operational safety program would include the following programs and plans:

1. Injury and Illness Prevention Program (8 CCR 3203);
2. Fire Protection and Prevention Program (8 CCR 3221);
3. Personal Protective Equipment Program (8 CCR 3401-3411); and
4. Emergency Action Plan (8 CCR 3220).

In addition, the requirements under General Industry Safety Orders (8 CCR 3200-6184), Electrical Safety Orders (8 CCR 2299-2974), and Unfired Pressure Vessel Safety Orders (8 CCR 450-544) would apply to the proposed action. Written safety programs for the project, which the Applicant would develop, would ensure compliance with the above-mentioned requirements and would assure that the impacts that otherwise could occur would be avoided or sufficiently minimized.

Safety and Health Program Elements

As mentioned above, the Applicant provided the proposed outlines for both a Construction Safety and Health Program and an Operations Safety and Health Program. The measures in these plans are derived from applicable sections of state and federal law. Both safety and health programs would be comprised of six more specific programs and would require major items detailed in the following paragraphs.

Injury and Illness Prevention Program

The Injury and Illness Prevention Program would include the following components as presented in the AFC (CEC RSA, 2010):

1. Identity of person(s) with authority and responsibility for implementing the program;
2. Safety and health policy of the plan;
3. Definition of work rules and safe work practices for construction activities;
4. System for ensuring that employees comply with safe and healthy work practices;
5. System for facilitating employer-employee communications;
6. Procedures for identifying and evaluating workplace hazards and developing necessary program(s);
7. Methods for correcting unhealthy/unsafe conditions in a timely manner;
8. Safety procedures; and
9. Training and instruction.

Fire Protection

Although the need for fire department response to the project is not expected to be frequent, there is a significant chance that response needs could arise (CEC RSA, 2010). Development of the proposed action would be subject to requirements of the Riverside County Fire Department (RCFD), including access requirements. Further, implementation of the proposed action could require response or assistance from the RCFD’s hazardous materials response team; advanced life support/ paramedic services; disaster preparedness and response during construction, operation and maintenance; or closure and decommissioning. The two closest RCFD stations that would respond to an incident at the project are located off of I-10 approximately 10 miles west. The Lake Tamarisk Station (#49) is located at 43880 Lake Tamarisk in Desert Center and the Terra Lago Station (#87) is located at 42900 Golf Center Parkway in Indio. The nearest hazardous materials response team is located at the North Bermuda Dunes Station (#81) located at 37-955 Washington Street in Palm Desert. Units from the two closest RCFD stations would arrive at the project site within 14 minutes after dispatch when responding to incidences of fire and within approximately 1.5-2 hours when responding to hazardous material spills.

The types of hazards that could trigger the need for an RCFD response are discussed above. The Applicant would develop and implement a fire prevention program for the project and would be required to fund capital improvements and staffing for the RCFD. The Applicant also has coordinated with the RCFD to establish the level of fire-related risk that would be associated with the project and to determine the appropriate level of response capability commensurate with that risk and consistent with applicable safety regulations. Based on this planning and coordination, the proposed action would not be expected to cause access-related difficulties for the RCFD or adversely affect its response capability.

Further, compliance with applicable laws, ordinances, regulations, and standards would avoid or reduce the potential for workplace accidents that otherwise would require emergency responders. For example, California regulations applicable to the proposed action would require the Applicant to prepare an Operations Fire Prevention Plan (8 CCR 3221) to determine general program requirements (scope, purpose, and applicability) and potential fire hazards; to develop good housekeeping practices, proper handling and materials storage, potential ignition sources and control measures for these sources, and the persons who would be responsible for equipment and system maintenance; to locate portable and fixed fire-fighting equipment in suitable areas; to establish and determine training and instruction requirements; and to define recordkeeping requirements. Additionally, the 2007 California Fire Code, 2007 California Building Code and Riverside County Ordinance No. 787 would safeguard life and property from fire and explosion hazards. The Applicant would also have to prepare a complete chemical classification inventory for submission to the Riverside County Planning and Engineering Bureau.

Applicable regulations also would require preparation of a Personal Protective Equipment (PPE) Program and require first aid supplies be on-site whenever hazards are present that, due to process, environment, chemicals or mechanical irritants, can cause injury or impair bodily function as a result of absorption, inhalation, or physical contact (8 CCR 3380-3400). All safety equipment would have to meet National Institute of Safety and Health (NIOSH) or American National Standards Institute (ANSI) standards, and would carry markings, numbers, or certificates of approval. Respirators would meet NIOSH and Cal/OSHA standards. Each employee would be provided with the following information pertaining to the protective clothing and equipment: proper use, maintenance, and storage; when to use the protective clothing and equipment; benefits and limitations; and when and how to replace the protective clothing and equipment.

Compliance with the PPE Program would ensure that the Applicant complies with applicable PPE requirements and provides employees with the information and training necessary to protect them from potential workplace hazards. Further, applicable regulations would require an Emergency Action Plan (8 CCR 3220). It is expected that the Emergency Action Plan would identify roles and responsibilities; determine emergency incident response training; develop emergency response protocols; specify evacuation protocols; define post emergency response protocols; and determine notification and incident reporting. Additional LORS called *safe work practices* would apply to the proposed action. Both the Construction and the Operations Safety Programs would address safe work practices under a variety of programs. The components of these programs would include, but not be limited to, the programs discussed above. Employee safety training would include safe work practices. Implementation of these measures and programs would serve as the primary mechanism for fire prevention and protection for the project. Services provided by the RCFD would be secondary and for emergency purposes.

Alternatives

Action Alternatives

Construction and operation of Reconfigured Alternatives 1 and 2 and the Reduced Acreage Alternative would have similar worker safety impacts as those described for the proposed action since the facilities under these alternatives would generally be the same, with only a reconfiguration of one or both solar units or a 25 percent reduction in the overall acreage. Therefore, there would be no substantial change in impacts associated with worker safety under these alternatives as compared to the proposed action.

No Action Alternative A

Under this alternative, the PSPP would not be implemented and the CDCA Plan would not be amended. The project site could become available to other uses that are consistent with Multiple Use Class-M. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative B

Under this alternative, the proposed action would not be implemented and BLM would make the area unavailable for future solar development. Under this scenario, any non-solar energy use consistent with the CDCA Plan MUC-M classification could be proposed for the site. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative C

Under this alternative, the PSPP would not be implemented, but BLM would allow for other solar projects on the site. Under this alternative, other renewable energy projects, including solar projects, may be constructed to meet state and federal mandates, and those projects would require transmission lines that could have similar transmission line safety and nuisance impacts as those that would occur under the proposed action. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

4.11.8.3 Discussion of Cumulative Impacts

Incremental worker safety-related impacts of the project would result in a risk level that would remain below thresholds of concern and, therefore, would not cause or contribute to any cumulative effect on worker safety. Regardless of the level of solar development or acreage developed under any of the action alternatives, the utility-scale solar energy development that would result would be subject to the same worker safety requirements as the proposed action and, therefore, also would not result in a risk level that could cause or contribute to any cumulative effect on such safety. The no project alternatives are not expected to require workers, and so would not be expected to affect worker safety.

For purposes of this analysis, the cumulative impacts area for fire safety-related resources consists of the RCFD's service area. Potential cumulative fire safety-related effects could occur over the course of 40 or more years, encompassing the entire lifespan of the project, from construction, operation, and maintenance, through closure and decommissioning. For the fire safety-related issues of emergency medical and hazardous materials spill response, the incremental impacts of the project could result in a cumulative effect when combined with the impacts of other projects in the cumulative scenario. More specifically, a cumulative Worker Safety/Fire Protection impact would occur in the event of a simultaneous need for a fire department to respond to multiple locations such that its resources and those of the mutual aid fire departments (which routinely respond in every-day situations to emergencies at residences, commercial buildings, and heavy industry) would be over-whelmed and could not effectively respond. The RCFD has indicated that the project would result in a cumulative adverse impact to its effectiveness for timely responses. Implementation of Mitigation Measure WORKER SAFETY-7 would address such an impact by enhancing the ability of RCFD to respond to fire safety-related issues of emergency medical and hazardous materials spill response.

4.11.8.4 Summary of Mitigation Measures

The implementation of mitigation measures imposed by the Energy Commission as Conditions of Certification for the project would avoid or reduce impacts on the quality of the human environment. These mitigation measures are summarized below and set forth in Appendix B. The following would address impacts on worker safety / fire safety:

> WORKER SAFETY-1: Project Construction Safety and Health Program. This mitigation measure would require the project owner to submit to the Compliance Project Manager (CPM) a copy of the Project Construction Safety and Health Program containing various plans and programs to benefit worker safety.
>
> WORKER SAFETY-2: Project Operations and Maintenance Safety and Health Program. This mitigation measure would require the project owner to submit to the CPM a copy of the Project Operations and Maintenance Safety and Health Program containing an Operation Injury and Illness Prevention Plan; an Operation heat stress protection plan; a Best Management Practices (BMP) for the storage and application of herbicides; an Emergency Action Plan; a Hazardous Materials Management Program; a Fire Prevention Plan; and a Personal Protective Equipment Program.

WORKER SAFETY-3: Construction Safety Supervisor. This mitigation measure would require the project owner to provide a site Construction Safety Supervisor (CSS) who, by way of training and/or experience, is knowledgeable of power plant construction activities and relevant laws, ordinances, regulations, and standards.

WORKER SAFETY-4: Safety Monitor. This mitigation measure would require the project owner to make payments to the Chief Building Official (CBO) for the services of a Safety Monitor who will be responsible for verifying that the CSS implements all appropriate safety requirements.

WORKER SAFETY-5: Automatic External Defibrillator (AED). This mitigation measure would require the project owner to ensure that a portable automatic external defibrillator (AED) is located on site during construction and operations and shall implement a program to ensure that workers are properly trained in its use and that the equipment is properly maintained and functioning at all times.

WORKER SAFETY-6: Emergency Access Point. This mitigation measure would require the project owner to provide a secondary site access gate for emergency personnel and a second access road which provides entry to the site.

WORKER SAFETY-7: Fire Protection/Response Infrastructure. This mitigation measure would require the project owner to provide funding to offset project impacts to the RCFD.

WORKER SAFETY-8: Water Spray System. This mitigation measure would require the project owner to place a water spray system on the two liquefied petroleum gas storage tanks.

WORKER SAFETY-9: Dust Control Plan. This mitigation measure would require the project owner to develop and implement an enhanced Dust Control Plan that requires site worker use of dust masks whenever visible dust is present; and the implementation of local air pollution control district rules and other requirements relating to visible dust.

4.11.8.5 Residual Impacts after Mitigation Measures were Implemented

None are expected.

4.11.8.6 Unavoidable Adverse Impacts

None are expected.

4.11.9 Geologic Hazards

This analysis evaluates whether project-related activities could result in exposure to geological hazards, as well as whether the facility can be designed and constructed to avoid any such hazard which could impair its proper functioning. These hazards include faulting and seismicity, liquefaction, lateral spreading, dynamic compaction, hydrocompaction, subsidence, expansive and corrosive soils, landslides, flooding, volcanic hazards, tsunamis, and seiches.

4.11.9.1 Impact Assessment Methodology

The proposed action and alternatives are evaluated qualitatively in terms of their susceptibility to geologic and seismic hazards. Potential effects are assessed based upon existing publications and maps completed by regulatory agencies, such as the United State Geological Survey, California Geologic Survey, California Division of Mines and Geology and geotechnical engineers who have evaluated the site. The potential for damage to proposed structures or increased risk of injury due to geologic hazards is analyzed using available data from the aforementioned sources. In addition, the conclusions and recommendations provided in the geotechnical investigation are evaluated, and, where appropriate, incorporated into the analysis.

The following issues were considered in the analysis of impacts related to geology and soils for the proposed action and each alternative:

1. Accelerated and/or environmentally harmful soil erosion;
2. Damage to project elements or increased exposure of the public to risks from rupture of a known earthquake fault;
3. Injury, death, or property damage as a result of earthquake induced ground deformations (e.g. lateral spreading, subsidence, liquefaction, or collapse), or otherwise unstable soils;
4. Injury, death, or property damage as a result of an onsite or offsite landslide;

4.11.9.2 Discussion of Direct and Indirect Impacts

Proposed Action

Groundshaking

The occurrence of relatively large earthquakes in the Mojave region demonstrates that the site is likely to be subject to moderately intense earthquake-related ground shaking in the future (Modified Mercalli Intensity Level VII) over the life of the project. The anticipated level of shaking, based on the estimated peak ground acceleration (PGA) value at the site (discussed under Seismic Hazards) could result in slight damage to older structures and would not likely result in damage to newer structures built according to current design standards. Several laws and policies impose stringent seismic safety requirements on the design and construction of new structures (see Table 1-1). It is possible that groundshaking could cause the failure of hazardous materials storage tanks; solar field piping; the secondary containment system (berms and dikes); and the failure of electrically controlled valves and pumps. The failure of any of these components could result in leaks of chemicals that may cause fires or impact the environment. The solar array would be constructed to be flexible and the piping would be attached with ball joints and would not be fixed to a rigid structure; therefore failure of the piping during an earthquake is unlikely (CEC RSA, 2010). While ground-shaking at the site would not constitute a major effect, mitigation should be implemented to the extent practical through structural designs consistent with the California Building Code and the site-specific geotechnical report that would be required for the project to minimize risks associated with severe ground-shaking.

Secondary Earthquake Hazards

The site is located in an area with low to moderate level of liquefaction potential (CEC RSA, 2010). However, the medium dense to very dense nature of course grain soils encountered in the project borings, coupled with a groundwater table depth of greater than 60 feet below the ground surface, indicates that there is no liquefaction potential at the site (CEC RSA, 2010). Consequently, the potential for lateral spreading during seismic events would be negligible.

The site generally is underlain by dense to very dense granular soils. However, there is a potential that loose sand layers occur both at the surface and as buried layers between the borings since the site is situated on alluvial fan and alluvial valley deposits. These layers create potential for earthquake-induced settlement. The potential for and mitigation of the effects of earthquake-induced settlement of site soils during an earthquake would be addressed in a project-specific geotechnical report. Common mitigation methods include deep foundations (driven piles; drilled shafts) for severe conditions, geogrid-reinforced fill pads for moderate severity and over-excavation and replacement for areas of minimal hazard.

Subsidence and Settlement

No regional subsidence due to the historic groundwater withdrawal has been reported in the vicinity of the project (CEC RSA, 2010). Further, no localized or regional subsidence was recorded even during the 1980’s and 1990’s when regional groundwater extraction was at its historic maximum of approximately 48,000 acre-feet per year in the general area. In addition, no petroleum or natural gas withdrawals are taking place in the proposed site vicinity. Therefore, the potential for local or regional ground subsidence resulting from petroleum, natural gas, or groundwater extraction is considered to be very low. Shallow foundations would not be subjected to settlement in the study area because the clay layers are deep enough to resist consolidation resulting from the additional weight of the foundations and solar panel structures.

Hydrocompaction

The geotechnical report prepared for the project indicates a low to moderate risk of hydrocompaction based on the geotechnical data and the observation of soil profile in the test pits (CEC RSA, 2010). The potential for and mitigation of the effects of hydrocompaction of site soils should be addressed in a project-specific geotechnical report. Typical mitigation measures would include over-excavation/replacement, mat foundations or deep foundations depending on severity and foundation loads.

Corrosive Soils

Fine grain, moist soils containing sulfides are present at the site and would be corrosive to buried structures. If a buried structure were to corrode as a result of contact with these soils, it could crack or prematurely fail. However, on site soil conditions are neither unique nor particularly hazardous and methods to address corrosive and expansive soils are common engineering practices. Consequently, the effects of corrosive soils could be mitigated effectively through final design by incorporating the recommendations of a site-specific geotechnical report. Typical mitigation measures would include backfilling pipeline excavations with suitable clean engineered fill.

Erosion

The preliminary stages of construction, especially site grading, excavation, and soil stockpiling would leave loose soil exposed to the erosive forces of rainfall and high winds. Should substantial erosion occur, the foundations of project components could become unstable and collapse creating a potential hazard to public health and safety. However, soil erosion could be mitigated effectively through final design by incorporating the recommendations of a site-specific geotechnical report and compliance with applicable law, ordinances, rules and standards.

Volcanic Hazards

The project site is located approximately 40 miles west of the Lavic Lake volcanic hazard area. The intervals at which eruptions occur have not been determined, but it is likely to be in the range of one thousand years or more. However, the PSSP would be a sufficient distance to be out of the range of volcanic hazards.

Alternatives

Action Alternatives

The geologic units that would be disturbed by the Reconfigured Alternatives or Reduced Acreage Alternative are the same as those that would be disturbed by the proposed action. Each of the action alternatives would have similar geographic and physical relationship to regional faults and major geologic features. The main geologic hazards for each of the action alternatives would include ground shaking, hydrocompaction, earthquake induced settlement, corrosive soils, and erosion. Therefore, no changes to the levels of impact, beyond those discussed for the proposed action, would be anticipated for either the Reconfigured Alternatives or Reduced Acreage Alternative.

No Action Alternative A

Under this alternative, the PSPP would not be implemented and the CDCA Plan would not be amended. The project site could become available to other uses that are consistent with Multiple Use Class-M. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative B

Under this alternative, the proposed action would not be implemented and BLM would make the area unavailable for future solar development. Under this scenario, any non-solar energy use consistent with the CDCA Plan MUC-M classification could be proposed for the site. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative C

Under this alternative, the PSPP would not be implemented, but BLM would allow for other solar projects on the site. Under this alternative, other renewable energy projects, including solar projects, may be constructed to meet state and federal mandates, and those projects would require transmission lines that could have similar transmission line safety and nuisance impacts as those that would occur under the proposed action. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

4.11.9.3 Discussion of Cumulative Impacts

Impacts resulting from construction, operation, maintenance and decommissioning of the project could result in a cumulative effect in connection with geologic hazards with other past, present, or reasonably foreseeable future actions. Past, present and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1.4, *Cumulative Scenario Approach*. This geographic scope of cumulative impacts analysis was established because potential cumulative effects, as they pertain to geologic hazards, generally are limited to regional subsidence due to groundwater withdrawal in the Chuckwalla Valley groundwater basin. The geographic scope of the cumulative impacts analysis for such resources is limited generally to the project site and transmission line route overlaying the Chuckwalla Valley groundwater basin. Several projects identified in the cumulative scenario (Section 4.1,4, *Cumulative Scenario Approach*) are located within the Chuckwalla Valley groundwater basin. Such projects could include groundwater pumping of similar magnitude to the project; however, the combined effect of these projects would still result in much less than the historic rate of 48,000 ac-ft/yr. Impacts associated with strong ground shaking and earthquake-induced settlement, hydrocompaction, and corrosive soils are not cumulative in nature and would not add to potential cumulative impacts to the facility.

Potential cumulative effects on geologic hazards could occur at any time during the lifespan of the project, from construction to decommissioning. Existing conditions within the cumulative impacts assessment area of geologic resources and hazards reflect a combination of the natural condition and the effects of past actions and are described in FEIS Chapter 3. Historic groundwater withdrawals have not resulted in any documented subsidence in the vicinity of the project. The proposed action would result in increased annual groundwater pumping, from the current 2,000 aft/yr to approximately 2,300 aft/yr (a 15 percent increase). Since this level of pumping did not result in any documented regional subsidence, significant impacts to regional subsidence would not be expected. Therefore, there would be no significant cumulative contribution to regional subsidence from foreseeable renewable projects, including the project, in the Chuckwalla Valley groundwater basin. Additional information on groundwater withdrawal is contained in Section 4.19, *Water Resources*. Finally, decommissioning of the project is not expected to require any significant amount of groundwater pumping; impacts to regional subsidence are not expected. Consequently, the project would not cumulatively contribute to adverse impacts to public health and safety resulting from geologic hazards.

4.11.9.4 Summary of Mitigation Measures

Implementation of the mitigation measures imposed by the Energy Commission as Conditions of Certification for the project would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in Appendix B. The following address impacts associated with geologic hazards:

GEO-1: Soils Engineering Report. This mitigation measure would require the inclusion in a Soils Engineering Report of laboratory test data, associated geotechnical engineering analyses, and a thorough discussion of potential hydrocompaction or dynamic compaction; the presence of expansive clay soils; and the presence of corrosive soils as well as recommendations for mitigating these potential geologic hazards, if present.

SOIL&WATER-1: Drainage Erosion and Sedimentation Control Plan (DESCP). This mitigation measure would require the project owner to obtain approval of the Drainage Erosion and Sedimentation Control Plan (DESCP) for managing stormwater during project construction and operations.

CIVIL-1: Submittals to the CBO. This mitigation measure would require the project owner to submit to the CBO the design of the proposed drainage structures and the grading plan; an erosion and sedimentation control plan; related calculations and specifications; and requisite soils, geotechnical, or foundation investigations reports.

CIVIL-2: Unforeseen adverse soil or geologic conditions. This mitigation measure would require the resident engineer, if appropriate, to stop all earthwork and construction in the affected areas when unforeseen adverse soil or geologic conditions are identified. Modified plans, specifications, and calculations may be required based on the new conditions.

CIVIL-3: Inspections and Discrepancy Reports. This mitigation measure would require the project owner to perform inspections in accordance with the 2007 California Building Code. If work is not being performed in accordance with the approved plans, the discrepancies must be reported immediately along with the proposed corrective action.

CIVIL-4: Final Grading Plan Approval. This mitigation measure would require the project owner to obtain the CBO’s approval of the final grading plans (including final changes) for the erosion and sedimentation control work and a statement from the civil engineer that the work within his/her area of responsibility was done in accordance with the final approved plans.

STRUC-1: Structure Approval. This mitigation measure would require the project owner to submit to the CBO for design review and approval the proposed lateral force procedures for project structures and the applicable designs, plans and drawings for project structures.

4.11.9.5 Residual Impacts after Mitigation Measures were Implemented

None are expected.

4.11.9.6 Unavoidable Adverse Impacts

None are expected.

4.11.10 Site Security

4.11.10.1 Impact Assessment Methodology

The energy generation sector is one of 14 areas of Critical Infrastructure listed by the U.S. Department of Homeland Security (DHS). The level of security needed for any particular facility depends on the threat imposed, the likelihood of an adversarial attack, the likelihood of success in causing a catastrophic event, and the severity of consequences of that event. The U.S Department of Homeland Security's Chemical Facility Anti-Terrorism Standards require facilities that use or store certain hazardous materials to conduct vulnerability assessments and implement certain specified security measures. These standards were implemented with the publication of a list of chemicals of interest.

4.11.10.2 Discussion of Direct and Indirect Impacts

Proposed Action

The project would include the use of hazardous materials in sufficient quantities that special site security measures should be developed and implemented to prevent unauthorized access. Neither the chemical constituents of Therminol VP-1 (diphenyl ether and biphenyl) nor chemicals other than Liquefied Petroleum Gas, including propane, proposed to be used and stored at the project site are on the chemicals of interest list. Propane is listed by the DHS as a Chemical of Interest with a threshold level of 60,000 pounds. The project would store a maximum of 152,000 pounds of propane/LPG and therefore the Chemical Facility Anti-Terrorism Standards would apply and the Applicant would need to submit a "Top Screen" assessment to the DHS. Regardless of whether the DHS decides to regulate the project, BLM believes that all power plants under the jurisdiction of the CEC should implement a minimum level of security. Action is appropriate to ensure that this facility (or a related shipment of a hazardous material) is not the target of unauthorized access.

The level of security needed for a particular power plant depends on the threat imposed, the likelihood of an adversarial attack, the likelihood of success in causing a catastrophic event, and the severity of consequences of that event. To determine an appropriate level of security for the project, this analysis evaluates an internal vulnerability assessment decision matrix that the CEC modeled after the U.S. Department of Justice Chemical Vulnerability Assessment Methodology (July 2002), the NERC 2002 guidelines, the U.S. Department of Energy VAM-CF model, and DHS regulations published in the Federal Register (Interim Final Rule 6 CFR Part 27). Based on this analysis, the project would fall into the "low vulnerability" category (CEC RSA, 2010). Accordingly, certain security measures would be appropriate to protect the proposed infrastructure from malicious mischief, vandalism, or terrorist attack.

These security measures include perimeter fencing and breach detectors, possibly guards, alarms, site access procedures for employees and vendors, site personnel background checks, and law enforcement contact in the event of a security breach. Site access for vendors would be strictly controlled. Consistent with current state and federal regulations governing the transport of hazardous materials, hazardous materials vendors would have to maintain their transport vehicle fleets and employ only drivers who are properly licensed and trained. The Applicant would be required, through its contractual language with vendors, to ensure that vendors supplying hazardous materials strictly adhere to the U.S. Department Of Transportation requirements that hazardous materials vendors prepare and implement security plans per 49 CFR 172.802 and ensure that all hazardous materials drivers are in compliance with personnel background security checks per 49 CFR Part 1572, Subparts A and B. The CEC compliance project manager (CPM) may authorize modifications to these measures, or may require additional measures in response to additional guidance provided by the DHS, the U.S. Department of Energy, or NERC, after consultation with appropriate law enforcement agencies and the Applicant.

Alternatives

Action Alternatives

If an energy generation facility were constructed on the proposed site, the level of security needed would be facility-specific and depend on the threat imposed, the likelihood of an adversarial attack, the likelihood of success in causing a catastrophic event, and the severity of consequences of that event. Similar to the proposed action, Reconfigured Alternatives 1 and 2, and the Reduced Acreage Alternative would have a low vulnerability to site security hazards.

No Action Alternative A

Under this alternative, the PSPP would not be implemented and the CDCA Plan would not be amended. The project site could become available to other uses that are consistent with Multiple Use Class-M. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative B

Under this alternative, the proposed action would not be implemented and BLM would make the area unavailable for future solar development. Under this scenario, any non-solar energy use consistent with the CDCA Plan MUC-M classification could be proposed for the site. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative C

Under this alternative, the PSPP would not be implemented, but BLM would allow for other solar projects on the site. Under this alternative, other renewable energy projects, including solar projects, may be constructed to meet state and federal mandates, and those projects would require transmission lines that could have similar transmission line safety and nuisance impacts as those that would occur under the proposed action. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

4.11.10.3 Discussion of Cumulative Impacts

The development and operation of the project would contribute an incremental “low vulnerability” site security threat to a cumulative effect relative to site security with other past, present, or reasonably foreseeable future energy generation actions. The geographic scope of the cumulative impacts analysis for such threat would be the California Desert area. Potential cumulative site security effects could occur at any time during the lifespan of the project, from construction to decommissioning, and would not persist past closure and decommissioning.

Other past, present, and reasonably foreseeable future energy generation projects are identified in Section 4.1.4, *Cumulative Scenario Approach*. As of January 2010, there were 244 renewable projects proposed in California in various stages of the environmental review process or under construction. Solar, wind, and geothermal development applications have requested use of BLM land, including approximately one million acres of the California desert. State and private lands have also been targeted for renewable solar and wind projects. In addition, nearly 80 applications for solar and wind projects are being considered on BLM land in Nevada and Arizona (CEC RSA, 2010). Renewable energy projects in BLM’s California Desert District are identified in Table 4.1-2. Renewable energy projects on state and private lands are identified in Table 4.1-3. The BLM has not received threat determinations for specific facilities, such as the proposed PSPP; however, given the utility-scale nature of the proposed action and similarities with other proposed utility scale solar proposals, such as Blythe, Genesis, and Desert Sunlight, the BLM assumes that threat levels among the facilities would be comparable. Smaller projects could have an even lower vulnerability. Although the threat imposed and likelihood of an adversarial attack may be comparable regardless of facility size, the likelihood of a smaller (lower energy output) facility’s success in causing a catastrophic event and the severity of consequences of that event would seem reduced.

The presence of other DHS “Critical Infrastructure and Key Resources” sectors in the cumulative impacts analysis area, if present, also could contribute incrementally to the overall threat level. Such other sectors include National Monuments and Icons, Agriculture and Food, Banking and Finance, Chemical, Commercial Facilities, Critical Manufacturing, Dams, Defense Industrial Base, Emergency Services, Government Facilities, Healthcare and Public Health, Information Technology, Nuclear Reactors, Materials and Waste, Postal and Shipping, Water, Communications, and Transportation Systems (including aviation and highway). Thus, the Wileys Well Communication Tower, Blythe Municipal Airport, and I-10 each could contribute incrementally to the overall security threat.

4.11.10.4 Summary of Mitigation Measures

Mitigation measures imposed by the Energy Commission as Conditions of Certification for the project would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in full in Appendix B. With respect to site security-related impacts, implementation of the following two mitigation measures would address the possibility that the proposed action or an alternative (including a project-related shipment of a hazardous material) could be the target of unauthorized access: HAZ-5 (Construction Site Security Plan) and HAZ-6 (Operational Site Security Plan) would require the implementation of site security measures that are consistent with applicable requirements and agency guidance.

4.11.10.5 Residual Impacts after Mitigation Measures were Implemented

No residual site security-related impacts are expected to remain after the implementation of HAZ-5 and HAZ-6.

4.11.10.6 Unavoidable Adverse Impacts

No unavoidable adverse impacts are expected.

4.11.11 Military Overflights

To determine if there is any possible conflict with military overflights and military aviation training and operations, an analysis is required from the Department of Defense Regional Environmental Coordination office. Southern California falls within Region IX; the office is in San Diego under the jurisdiction of the Navy. The Department of Defense has advised the BLM that this project would not have a significant impact on military testing or training.

4.12 Impacts on Recreation

4.12.1 Impact Assessment Methodology

The effects of the project on the recreation environment were assessed based on the following considerations, including whether its construction, operation or decommissioning would directly or indirectly impact recreational opportunities including hiking, backpacking and long term camping in established Federal, State, or local recreation areas and/or wilderness areas.

This Section 4.12 focuses on non-transportation-related recreational opportunities. For impacts to OHV users, see Section 4.16, *Impacts on Transportation and Public Access - Off-Highway Vehicle Resources*.

4.12.2 Discussion of Direct and Indirect Impacts

Proposed Action

On-Site Recreational Users

According to the Recreation Element of the CDCA Plan, "lands managed by the Bureau [BLM] are especially significant to recreationists." The conversion of public land to support the project could disrupt dispersed recreational activities. Construction activities associated with the proposed action could cause direct and indirect impacts from noise, fugitive dust, and truck and other vehicle ingress and egress to the construction site; visual intrusions also could impact visitors seeking experiences from a natural setting. (see Section 4.18, *Impacts on Visual Resources).* During operations, the site would not be available for recreational use. Decommissioning-related impacts on recreation would likely be similar to those that may occur during construction.

While camping has not been observed in the project area by BLM Rangers, day users, hikers and RV campers would no longer be able to use the area if such recreation were desired. Recreationists may compensate by substituting other desert lands in the vicinity for their recreational experiences and benefits. This could lead to higher user levels on adjacent public lands open for recreation use. This could result in more concentrated use of those areas, leading to loss of some native vegetation, wildlife habitat fragmentation or loss, elevated soil loss, increases in noise, and possible temporary declines in air quality from more concentrated vehicle use in a smaller available area. Given the low recreation use on adjacent lands with similar resources or opportunities, however, additional impacts from displacement would be minimal.

Off-Site Recreational Users

Effects to recreational users of specially-designated lands (including wilderness areas and Areas of Critical Environmental Concern (ACECs) could occur. For a discussion of potential impacts to OHV route access to wilderness areas, see Section 4.16, I*mpacts on Transportation and Public Access - Off Highway Vehicle Resources*. For a discussion of the potential impacts to visual quality from wilderness areas and ACECs, see Section 4.18, *Impacts on Visual Resources*.

Special Designations

Four wilderness areas and two ACEC's are located in the vicinity of the site: Palen/McCoy, Chuckwalla Mountains, Joshua Tree, and Little Chuckwalla Mountains Wilderness Areas; and Chuckwalla DWMA and Palen Dry Lake ACEC's. As shown in Table 3.13-1, the Chuckwalla DWMA (ACEC) would be crossed by linear features (e.g., redundant telecom line and gen-tie line) associated with the proposed action south of the project site. The Palen Dry Lake ACEC and Palen/McCoy Wilderness are closest to the project site boundary at 0.5 and 1.5 miles respectively.

While these wilderness areas and ACEC's do not have maintained trails or trail heads, and are scarcely visited by the public (CEC Genesis RSA, 2010), recreational users could be impacted by construction, operation and decommissioning activities such as construction noise, fugitive dust, vehicle movement, and other "non-natural" construction activities and structures caused by the proposed action. These impacts could affect users' perception of solitude, naturalness and unconfined recreation.

As discussed in Section 4.9, *Impacts on Noise*, typically, "high pressure steam blow" is the loudest noise encountered during construction of a project incorporating a steam turbine. With a silencer installed on the steam blow piping, as required under NOISE-7, noise levels commonly are attenuated to 86 dBA at 50 feet from the steam blow site and is expected to attenuate to 59 dBA at the nearest resident measurement site LT1 (LT1), 25 feet from the project boundary. During operation, the primary noise source of the proposed action would be the power block. The Applicant predicts the proposed action's operational noise level at receptor LT1 to be 42 dBA Leq; the operational noise level at the second nearest resident measurement site LT2, 3,500 feet from the project boundary, would be 33 dBA Leq. Closure and decommissioning-related noise would be less than expected for construction, since no high pressure steam blows would be required, but in other respects are anticipated to be comparable to construction noise levels. Considering the fact that the nearest special designation where recreational use would occur is approximately 1.25 miles from the project power block, noise would attenuate such that the sound from the loudest noise associated with construction, the steam blow, would be barely audible (approximately 53 dBA Leq at 1.25 miles); noise associated with operational activities would be virtually inaudible (approximately 40 dBA Leq at 1.25 miles) and noise associated with decommission would be less than construction. Therefore, impacts to recreational users would be minimal.

As discussed in Section 4.2, *Impacts on Air Resources*, construction, operation and decommissioning activities could generate dust in the form of PM10/PM2.5. However, the worst-case PM2.5 and PM10 impacts occur at the fence line and drop off quickly with distance. Dust could also be generated by construction equipment during installation of the gen-tie and redundant telecommunication lines; however, these areas and OHV route would be closed to recreational users during the construction period. Therefore, there would be no impacts to recreational users within special designation areas.

For an extended discussion of impacts on special designations, see Section 4.15, *Impacts on Special Designations*.

Joshua Tree National Park

Joshua Tree National Park is located approximately three miles west of the project site. Since the national park is further from the site than the Palen/McCoy Wilderness, as discussed above, impacts to recreational users during construction, operation and decommissioning activities would also be minimal in relation to noise and result in no impact in relation to dust.

Developed Recreation Sites

Corn Springs is the closest BLM campground to the project site, located about 7.5 miles southwest of the project. The location of the fee campground within the Chuckwalla Mountains prevents the project from creating air or noise impacts on the visitors to the campground.

Cottonwood Springs is the closest NPS campground to the project site, located about 36 miles west of the project. The distance of this campground from the site would prevent construction, operation, or decommissioning of the project from creating air or noise impacts on campground visitors.

The closest developed recreation sites where long term camping can occur is within the two LTVAs to the east of the project. The Mule Mountains LTVA is approximately 25 miles east; the Midland LTVA is approximately 36 miles east. Visitors camping at LTVAs seek opportunities for socialization with similar users in a semi-primitive environment. As discussed in Section 3.13, *Recreation*, there are no LTVAs within 20 miles of the project site. Due to the great distance between the project and the closest LTVAs, there would be no impacts to LTVA visitors from noise and/or dust created by construction, operations and decommissioning activities.

It is anticipated, however, that some construction workers would reside in RV campers at the Mule Mountains and Midland LTVAs, or possibly camp on public lands in the vicinity of the proposed site during the construction phase of the project. Although the BLM offers developed campgrounds within commuting distance of the project, only LTVAs allow long-term camping. The Midland and Mule Mountains LTVAs allow camping for up to seven months (September 14 to April 16) with a special use permit. Outside of these dates, the camping limit is 14 days. Depending on the number of authorized workers using the LTVA, use could impact the social setting or the physical infrastructure of the LTVAs. However, the LTVAs are designed with minimal facilities given that campers must use self-contained RVs and there are no assigned or designated sites, except for the Wiley’s Well and Coon Hollow Campgrounds within the Mule Mountains LTVA. Midland LTVA is 135 acres and averages 41 permits per year. Mule Mountains LTVA is 2,805 acres with an average of 135 permits per year. Except for the designated campsites at Wiley’s Well and Coon Hollow, each LTVA can accommodate several hundred RV units with a minimum distance of 15 feet between units, which is well in excess of current use levels.

Use of LTVAs by construction workers to a level that spacing and relative solitude is reduced, could cause seasonal long-term visitors to move to other LTVAs in Arizona or Imperial County, which could compound crowding at already popular sites. However, it is unlikely that any displacement of recreational users to other LTVAs would be noticed due to the number, distance, and unstructured camping patterns of the other LTVAs in the system.

Although it is theoretically possible that unauthorized use of these LTVAs could occur when they are closed from April 16 to September 14, such use would be subject to law enforcement and, in any event, would be unlikely since it is extremely hot during the closed season.

The pattern of recreational camping in dispersed areas is unlikely to change. As stated in Section 3.13, *Recreation*, dispersed camping has not been noted in the immediate area, and the nature of those who participate in dispersed camping in the general vicinity is such that they would have nearly unlimited choices in site selection. Construction workers may choose to camp in dispersed areas, but as noted above, they would be limited to 14 days.

Conclusion

Impacts associated with construction and operation of the project to on-site and off-site recreational users would be minimal. Impacts associated with closure and decommissioning would likely benefit recreational values, since additional acres would be reclaimed and potentially made available for recreational use.

Alternatives

Reconfigured Alternative 1

Reconfigured Alternative 1 would require approximately 180 additional acres relative to the project. Impacts to on-site and off-site recreational users associated with the operation, maintenance and closure would be substantially similar to the proposed action.

Reconfigured Alternative 2

Option 1

Reconfigured Alternative 2 Option 1 would disturb approximately 4,360 acres as compared to 2,970 acres for the proposed action. Impacts to on-site and off-site recreational users associated with the operation, maintenance and closure would be substantially similar to the proposed action.

Option 2

Reconfigured Alternative 2 Option 2 would disturb approximately 4,324 acres as compared to 2,970 acres for the proposed action. Impacts to on-site and off-site recreational users associated with the operation, maintenance and closure would be substantially similar to the proposed action.

Reduced Acreage Alternative

If this alternative were selected, the only difference with regard to direct and indirect effects relative to the proposed action would correlate directly to the reduction of disturbance from 2,970 acres to 2,080 acres of surface disturbance. Other impacts to on-site and off-site recreational users associated with the operation, maintenance and closure would be substantially similar to the proposed action.

No Action Alternative A

Under No Action Alternative A, existing conditions, activities and recreation opportunities on and off the site would remain unaffected. The land on which the project is proposed would become available to other uses consistent with CDCA Plan multiple use opportunities, potentially including another solar thermal renewable energy project. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative B

Under CDCA Plan Amendment/No Project Alternative B, the site would be designated as unsuitable for any type of solar development and the BLM would continue to manage the site consistent with the existing multiple use class designation in the CDCA Plan (MUC-M). Thus, recreation-related-impacts of this alternative would vary from no impacts (e.g., if the site were left in its existing condition and no uses were developed that could affect the recreational opportunities or experiences available from adjacent properties) to substantial impacts (e.g., if a more intense or intrusive use was implemented, such as a different type of energy facility that would cause additional acres of disturbance). Insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative C

Selection of CDCA Plan Amendment/No Project Alternative C would likely result in the development of another solar energy project on the site, which could result in the same foreclosure of use opportunities and on- and off-site impacts as the proposed action while the amount of acreage needed could be less, approximately the same as, or larger than the project depending on the solar technology subsequently proposed.

4.12.3 Discussion of Cumulative Impacts

The geographic scope of the cumulative effects analysis for recreation consists generally of the California Desert, with emphasis on eastern Riverside County, and specifically of specially-designated recreation or wilderness areas (including wilderness areas, ACECs and LTVAs).

Past, present and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1.4, *Cumulative Scenario Approach*. Existing conditions within the cumulative impacts area reflect a combination of the natural condition, including related recreational opportunities, and the effects of past actions. See, e.g., Table 4.1-4, *Existing Projects along the I-10 Corridor Eastern Riverside County*. Present and reasonably foreseeable future actions, including other renewable energy projects, making up the cumulative scenario also are identified in Section 4.1. See Table 4.1-2, *Renewable Energy Projects in the California Desert District*, and Table 4.1-3, *Renewable Energy Projects on State and Private Lands*.

Individually and collectively, these projects would add large- and small-scale industrial, utility-related and other uses in the region, resulting in direct preclusion of access to recreational lands that would be dedicated to other, non-recreational uses. Within the California Desert District, approximately 567,882 acres potentially available for recreational use (e.g., hiking, biking, back country driving, hunting, bird watching, OHV use, and camping) could be lost to solar development, and an additional 433,721 acres could be lost to wind development (see Table 4.1-2). Indirect effects on recreation use of lands in the cumulative impacts area also could result from the change in the overall character of undeveloped BLM-administered lands resulting from development of the cumulative projects, as well as from changes to the visual landscape, impacts on vegetation, development of roads, and related effects on wildlife. On the basis of the amount of land required for comparably rated solar energy facilities, power tower, dish engine, and PV technologies require about 80 percent more land area than parabolic trough technologies, resulting in larger areas dedicated to these technologies being excluded from recreation use.

However, most of the projects in the cumulative scenario are in areas with low recreation use or potential future opportunities. In some cases, the solar facilities themselves may become local or regional attractions for travelers or sightseers, and transmission line projects may provide additional opportunities for backcountry driving and/or provide new or better access to some areas. These types of changes could result in a net gain for recreation opportunities.

To the extent that No Action Alternative A would not result in development of the site, no cumulative impact on recreation would occur. Although the proposed action's effects on recreation individually would be low for the project area, this incremental contribution to cumulative conditions, in combination with the impacts of past, present and reasonably foreseeable projects in eastern Riverside County, could have a sizeable, perhaps significant, impact on future recreation opportunities and experiences of users, communities, and regional populations in the California Desert, particularly on the "dispersed, undeveloped" recreation that the CDCA Plan emphasizes.

4.12.4 Summary of Mitigation Measures

None proposed. Relevant, reasonable measures that could improve the project by further reducing its contribution to cumulative impacts have been incorporated into the project: all alternatives except for No Action Alternative A would result in some preclusion of access within the site boundary; thus, an incremental impact to recreation resources cannot be entirely avoided. However, the magnitude of the project-specific impact has been limited as much as possible by recommending that the project be placed in an area that is not of unique or important recreation resources and by retaining public access to other public lands in the project area to allow for their continued recreation use. Accordingly, no mitigation measures are proposed.

4.12.5 Residual Impacts after Mitigation Measures were Implemented

The conversion of public land to support the project would result in a loss of up to approximately 5,200 acres within the site boundary that otherwise could support dispersed recreational activities, opportunities and experiences.

4.12.6 Unavoidable Adverse Impacts

The preclusion of the public from access to the site (as a result of security fencing) and surface disturbance that would occur from the project would result in unavoidable adverse impacts on recreation resources by permanent removal of vegetation, landforms, and other natural features of the characteristic landscape for the life of the project or until post-decommissioning restoration occurs.

4.13 Social and Economic Impacts

4.13.1 Impact Assessment Methodology

This analysis of direct, indirect and cumulative social and economic impacts of the proposed action and alternatives complies with the National Environmental Policy Act (NEPA) requirements for licensing the power plant and land use under BLM jurisdiction. This analysis evaluates project-related changes to the existing local population and economy, including employment and the relationship to local housing conditions. The economic impacts of project-related construction and operation spending and other related socioeconomic impacts also are evaluated. The proposed action's projected peak employment is used to analyze the maximum extent of construction employment impacts to the communities in the vicinity of the proposed site, their social character and their economies. Potential effects to the local area's social character are evaluated based on the findings of the economic impact analysis.

Impacts on public services related to health and safety (e.g., police protection, fire protection and emergency medical services) are analyzed in Section 4.11, *Impacts on Public Health and Safety*. Effects on parks and recreational opportunities are considered in Section 4.12, *Impacts on Recreation*.

Regulations of the Council on Environmental Quality implementing the procedural provisions of NEPA (40 CFR Part 1500 - 1508) provide no specific thresholds of significance for socioeconomics impact assessments. Significance varies, depending, among other things, on the setting of the proposed action (40 CFR 1508.27[a]), but 40 CFR 1508.8 states that indirect effects may include those that are growth-inducing and others related to induced changes in the pattern of land use, population density, or growth rate.

Input-output economic modeling software (IMPLAN) was used to estimate the indirect economic impacts associated with construction, operation, closure and decommissioning-related expenditures resulting from the project that would benefit the eastern Riverside County region.

The cumulative impact analysis in Section 4.17.3 evaluates the combined socioeconomic impacts of the proposed action and projects identified in the cumulative scenario (see Section 4.1.4, *Cumulative Scenario Approach*).

4.13.2 Discussion of Direct and Indirect Impacts

Proposed Action

Construction

Construction employment and spending for the proposed action would be the primary direct economic impact associated with the project. As such, the construction employment and related spending effects would be a temporary impact lasting for the anticipated 39-month duration of the construction period. Given the absence of any significant current economic use of the site, the construction activities associated with the proposed action would represent a beneficial economic impact adding new employment and spending to the local economy.

Economic

As discussed in greater detail in Section 3.14, *Social and Economic Setting*, the origin of project construction workers is a central factor determining the magnitude and extent of potential socioeconomic impacts to the local economy and communities associated with the proposed action. The direct benefits of employment and higher personal incomes primarily would benefit the communities from which construction workers and their families reside, since construction workers would likely spend the majority of their earnings in these communities. The workers' spending for goods and services would have an indirect socioeconomic impact on the communities and economies where that spending occurs. In addition, if there are insufficient suitable local workers to staff the project facilities, then the project could attract individuals to relocate to the area either temporarily or permanently, which could result in an increased demand for housing and local services. If there is insufficient housing or service capacity, then adverse indirect social and economic impacts could result. People permanently (or in some cases even only temporarily) moving into the area for work could encourage the construction of new homes, extension of roads and/or other infrastructure development and/or could increase the existing demand for public services. Informal worker lodging or camping in the local area would likely be a particular concern. Given the relatively long commute distances that some workers could face, some could seek to save travel-related time and costs by choosing to camp at existing public camp sites or, informally, on nearby public or private lands.

Construction Labor Needs. The availability of the local and regional workforce to meet the project's construction labor needs is analyzed to determine whether the project would induce population growth. Consistent with the geographic demarcations for the local and regional study areas, the "local workforce" consists of employable residents living in relatively close proximity to the site (i.e., the cities of Blythe, California or Quartzite, Arizona; or the community of Ehrenburg, Arizona).[1] The "regional workforce" consists of all potential employable adults currently living up to a two-hour commute (one-way) to the site. As discussed in Section 3.14, *Social and Economic Setting*, and shown in Figure 3.14-1, the regional labor force consists of the employable adults living in the cities west of the site along I-10 as far as, and including, the City of Banning.

The Applicant expects that construction would last 39 months, with an average of about 566 daily construction workers with a peak employment of 1,145 workers during month 17 of construction (CEC RSA, 2010). Generally, increased employment represents a beneficial economic impact on local communities from the new job opportunities and increased income generated for the local economy. However, in rural areas such as Blythe and/or for projects with more skilled/specialized job requirements, increased labor demand can have adverse indirect socioeconomic impacts on the local communities if it causes significant in-migration that the existing local housing,

[1] In addition, residents living in the unincorporated areas near these communities or within an hour's commute of the project would also be considered local labor force. However, given the very limited data on the unincorporated residents, it is conservatively assumed that all the unincorporated population identified in Section 3.14 are regional but not local residents.

infrastructure and/or other public services cannot support. The estimated peak employment of 1,145 workers is used to analyze the maximum extent of construction employment-related impacts from potential in-migration.

Labor Force Supply. Table 4.13-1 shows Year 2006-2016 occupational employment projections for the Riverside/ San Bernardino/Ontario MSA[2] by construction labor skill as compared to the estimated number of total construction workers by craft needed during the peak month (month 17) as presented in the Revised Staff Assessment for the project (CEC RSA, 2010). The primary trades required for construction of the proposed action will include pipefitters, skilled and unskilled laborers, electricians, carpenters, equipment operators, ironworkers, and truck drivers.

TABLE 4.13-1
TOTAL LABOR BY SKILL IN RIVERSIDE/SAN BERNARDINO/ONTARIO MSA (2006 and 2016 Estimate) AND PROJECT REQUIRED CONSTRUCTION BY CRAFT PEAK MONTH

Trade	Total # of Workers for Project Construction by Craft – Peak Month	Riverside/ San Bernardino/Ontario MSA 2006	Riverside/ San Bernardino/Ontario MSA 2016
Operator	90	4,790	5,460
Oiler	4	27,930[a]	32,080[a]
Laborer	185		
Truck Driver	35		
Tradesman	10		
Carpenter	100	28,850	32,390
Pipe Fitter	337	4,630[b]	5,330[b]
Electrician	150	6,740	7,600
Cement Finisher	100	4,110	4,690
Ironworker	59	19,460	20,800
Millwright	25	2,630[c]	2,960[c]
Construction Staff	50	10,990[d]	12,380[d]
Total	***1,145***	***111,550***	***125,360***

NOTES:
a "Construction Laborers" category was used.
b "Plumbers, Pipefitters, and Steamfitters" category was used.
c "Machinists" category was used.
d "Supervisors, Construction and Extraction Workers" category was used.

SOURCE: CEC RSA, 2010; ESA, 2010.

Table 4.13-1 shows that there is a very large population of suitably skilled construction workforce for the proposed action currently living within Riverside and San Bernardino Counties.[3]

2 Metropolitan Statistical Areas (MSA) are geographic entities defined by the U.S. Office of Management and Budget (OMB) for use by Federal and State statistical agencies in collecting, tabulating, and publishing socioeconomic statistics. The Riverside/San Bernardino/Ontario MSA consists of Riverside and San Bernardino Counties combined. As such, the MSA population and labor force estimates include a major portion of individuals residing outside the likely daily commuting range from the site.

3 Given its more rural character and the far smaller size of its labor force, only a very minor proportion of future construction workers would be expected to originate from La Paz County in Arizona. For this analysis, it is conservatively assumed that all construction workers for the PSPP would be California residents.

However, only a portion of these workers could be expected to be currently living within the region. Based on the regional study area's estimated 2010 population of 559,968 residents, compared to a corresponding Riverside and San Bernardino population of 4,212,684, the regional study area's skilled labor force would total approximately 13.3 percent of the skilled workforce shown in Table 4.13-1. Overall, that would suggest a total skilled labor force of approximately 15,755 workers (13.3 percent of approximately 118,455 total skilled construction workers)[4] living within the regional study area.

Applying the current local unemployment levels of 13.5 percent within the regional study area would suggest that approximately 2,130 unemployed skilled workers may currently reside in the regional study area. Compared with the required average project employment need of 566 workers, the proposed action could employ up to approximately 26.6 percent of the estimated currently unemployed construction workers. During peak construction, 1,145 workers would be needed, which would employ up to nearly 53.8 percent of the estimated available unemployed skilled workforce. While this would represent a major proportion of the region's skilled workforce, there also could be individuals amongst the region's estimated approximately 30,100 unemployed (i.e. 32,240 total regional unemployed – 2,130 regional skilled unemployed construction workers) that have or could obtain the necessary training to perform the facility construction. Also, it is likely that some of the currently employed skilled local construction workers would change their jobs in order to work closer to home and their positions could be filled by other workers living outside of the regional study area.

Consequently, it is expected that most, if not all, of the construction employment for the project would consist of construction workers who live within a two-hour commute from the site. Employee ride sharing, and the relatively long duration of the work would likely encourage workers to commute considerable daily distances to work on the project.

Housing and Lodging Impacts within the Local Study Area. As shown in Table 3.14-2, published vacancy rates for the cities of Blythe, California; Ehrenberg, Arizona; and Quartzsite, Arizona are 16.1, 34.9, and 41.9 percent, respectively. These vacancy rates indicate that some currently vacant housing could be available for construction workers who choose to relocate within the local study area. Altogether, it is conservatively estimated that up to approximately 2,480 existing housing units could be available as potential housing for future construction workers (this estimate does not account for other potential available housing within the unincorporated local study area). The extent to which construction workers choose to rent local housing would depend on the rental prices and the condition of the available housing. Especially if construction workers would be willing to share rental accommodations, rental housing could be an option for workers wishing to relocate or, more likely, commute weekly to work at the site.

In addition, as discussed in Section 3.14, *Social and Economic Setting*, analysis of the current motel and hotel businesses and their occupancy rates suggests that lodging could be available to accommodate construction workers who choose to stay temporarily at a local motel or hotel to be

4 Using the average of 2006 and 2016 skilled labor force estimates shown the Table 3.14-1.

close to the site. There are approximately 1,000 hotel/motel rooms within the local study area (i.e., the Cities of Blythe and Quartzite and community of Ehrenburg) (CEC RSA, 2009).

Other lodging opportunities also could be available at privately-owned RV/campgrounds and public campground areas within the local study area. However, during the high season (December to March) these facilities can be popular with visitors and, therefore, could have limited availability for construction workers. In addition, most of the public campgrounds (including the BLM-administered Long Term Visitor Areas (LTVAs) are intended for recreational use; construction workers might not be permitted to use these areas. Consequently, it is unlikely that the public RV/campgrounds would be very suitable or attractive lodging options for most project construction workers who seek local accommodations.[5] However, BLM may allow temporary LTVAs to be established on site for construction workers for the duration of project construction as temporary lodging facilities.

Furthermore, particularly during the non-winter season, it is likely that there would be considerable housing opportunities within the local area for construction workers seeking temporary accommodations. Lodging facilities within the local study area could include both rental housing for workers seeking longer term local housing and motel lodging for those looking for more occasional or shorter stay accommodations. The relatively high vacancy rates also would ensure that any project-related temporary housing needs would be met with existing housing or lodging facilities. As a result, no new housing or motel development would be expected to be induced by the proposed action and the increased use of this under-utilized housing or motel lodging would be considered beneficial for local property owners.

Construction Worker Expected Commuting Patterns. Given the major skilled labor force residing within the areas of Riverside and San Bernardino Counties, and the common construction worker commuting habits (EPRI, 1982; CEC RSA, 2010), it is reasonable to expect that project construction workers residing outside the regional study area would commute weekly to the local area rather than in-migrate with their families. Consequently, any such workers who choose to reside temporarily in the local area would have a limited service impact on local public services and infrastructure. Furthermore, given that existing housing and/or lodging facilities would be used to accommodate the few (if any) construction workers who choose to stay temporarily in the local area, the local transient occupancy tax revenues, local rental home owners' property, and/or business taxes payments should account for their limited local infrastructure and public service usage.

Therefore, it is concluded that the proposed action would not induce substantial growth or concentration of population in either the regional or local study areas. Furthermore, construction of the proposed action would not encourage people to relocate to the area and, thereby, would not result in new and unplanned growth or land use changes.

5 Except for construction workers that already own their own RV or camper trailers.

Construction Spending Impacts. Construction of the proposed action would create a temporary, positive impact on the local economic base and fiscal resources. Construction workers wages and salaries would provide additional income to the area, as would expenditures within the local and regional study areas for construction materials and services. An IMPLAN input-output model was used to estimate economic impacts within eastern Riverside County based on the construction-phase project-related expenditures that would be expected to occur within the regional study area.

IMPLAN is an economic impact modeling tool that uses region-specific input/output accounts by industry to estimate secondary impacts of economic changes. Secondary impacts include: (1) indirect impacts that occur due to the purchase of goods and services by firms involved with construction and operation; and (2) induced impacts, which result from household spending by project- related employees. Secondary impacts can occur in the form of employment, income, output, and taxes.

Social Accounting Matrices (SAM) multipliers were used for the impact analysis. SAM multipliers are recommended by the writers of the IMPLAN software because an induced effect estimate using a SAM multiplier is based on information in the social account matrix, which accounts for social security and income tax leakage, institution savings, and commuting. The multipliers for the impact analyses for the proposed action were derived based on specific industry data for the Riverside County study area in the IMPLAN Professional input/output relationships to represent the direct economic impacts associated with the proposed action (e.g., estimated annual construction cost and annual operation cost). Zip code level IMPLAN data was obtained to enable both Riverside County and sub-County area analysis of the spending impacts from future project construction and operation. IMPLAN Sector 36, "Construction of other new non-residential structures," was selected as the IMPLAN sector most closely corresponding to the North American Industry Classification System Code 21, which is used for "Power plants, new construction." All figures are presented in 2010 dollars. Table 4.13-2 summarizes the IMPLAN analysis findings.

The proposed construction labor payroll has been estimated at approximately a total of $218.7 million over 39 months ($67.3 million estimated annually). Capital expenditures and local spending on construction materials, equipment, and service are estimated to total approximately $30.0 million over 39 months ($9.2 million estimated annually). For this analysis, it was assumed that the construction material and equipment purchases would include standard construction materials and services that would mostly be obtained from within the IMPLAN study area.[6] These project expenditures were used to estimate the economic benefits to the local and regional economies. The IMPLAN model also assumes that all of the construction workers for the proposed action would be from within the regional study area of eastern Riverside County.

The proposed solar facility construction is expected to directly create an average of 566 annual full-time employees over 39 months, with a peak monthly employment of 1,145 full-time employees. This new employment would create both indirect and induced secondary employment

[6] The costs for specialized solar materials and equipment (e.g., panels) that would have to be purchased from outside Riverside County are not included, since their acquisition from out-of-County or out-of-State suppliers/manufacturers would have minimal economic benefit to local or regional businesses.

TABLE 4.13-2
PROJECT CONSTRUCTION ECONOMIC BENEFITS (2010 Dollars)

Fiscal Benefits	
State and local sales taxes	$5.4 million ($1.65 million average per year)
Project Construction Spending	
Labor	$218.7 million ($67.3 million average per year)
Materials, equipment and services	$30.0 million ($9.2 million average per year)
Total	$248.7 million ($76.5 million average per year)
Direct, Indirect, and Induced Benefits	
Direct	
Economic Output	$248.7 million ($76.5 million average per year)
Jobs	566 jobs
Indirect	
Economic Output	$51.7 million ($15.9 million average per year)
Jobs	117 jobs
Induced	
Economic Output	$132.6 million ($40.8 million average per year)
Jobs	340 jobs
Total	
Economic Output	$433.0 million ($133.2 million average per year)
Jobs	1,023 jobs

SOURCE: CEC RSA, 2010 Part 1 Socioeconomics and Environmental Justice Table 10

in the regional study area. Indirect employment is defined as employment that would be generated by the purchase of goods and services required for the facility's development. Induced employment is defined as employment that would be generated by the purchase of goods and services by businesses that are indirectly supported by the proposed action.

As shown in Table 4.13-2, according to the IMPLAN analysis, construction of the project could be expected to have the direct beneficial economic impact of generating an average of $67.3 million in annual spending on construction labor within the regional study area for the duration of the construction period. In addition, an average of up to approximately $9.2 million could be spent annually on construction materials, equipment, and services from businesses within the regional study area. Together, the construction spending is expected to generate up to an additional $56.7 million per year in indirect and induced economic output for other businesses in eastern Riverside County.

The actual future economic impact for eastern Riverside County could be smaller than the total economic benefits shown in Table 4.13-2. Project-related spending would benefit eastern Riverside County and the local economies depending on the extent that workers live and spend their earnings at businesses locally and elsewhere in eastern Riverside County. Given the local study area's rural character, most of the projected benefits would likely be received by the larger cities and communities located elsewhere in eastern Riverside County, outside the local study area. The economic benefits to both local and regional businesses could be less than those estimated by the IMPLAN model if greater sales leakage occurs than that assumed by the IMPLAN model. Irrespectively, the net short-term economic impact on the local and regional economies would be considerable.

In terms of economic output impacts, the primary local industries that would benefit the most include the following: rental housing, architectural and engineering services, wholesale and retail trade businesses, real estate establishments, physicians and other medical professionals, food service, and hotel/motel businesses.

Social

The potential for project-related impacts to the local study area's social character are determined by the nature of economic impacts of the construction activity and any project-related in-migration.

As discussed above, construction of the project could be expected to generate considerable economic benefits directly for both construction workers and local businesses providing materials and services for construction. In addition, major indirect and induced spending benefits for the local and eastern Riverside County economies would be generated by subsequent spending of the construction workers and construction businesses' income within the local and regional economy. The economic benefits are expected to extend widely within the local and regional economy but would most benefit food, retail, lodging, real estate, and medical related businesses.

The additional new income for the local economy from the project would have a positive, but short-term, contribution towards supporting local business and maintaining the economic vitality of the City of Blythe and other neighboring communities. The positive effect for the local economy would be increased given the local study area's recent and on-going economic weaknesses as a result of both longer term changes and the more recent economic downturn. The continued viability of Blythe's local business community is essential for its long term well-being. Increased local employment opportunities would improve local residents' standard of living and will help retain younger residents who otherwise would be more likely to leave the community if there are insufficient local employment opportunities. The local community's positive social attitudes to the proposed action may generally be expected to increase based on the extent that local residents are employed (either directly or indirectly) or otherwise benefit from the project.

Project-related in-migration of new residents could affect the social character of the local study area. An influx of new individuals with different values, lifestyles, and/or socio-demographic backgrounds could have a positive or negative influence on the quality of life and/or community values. The existing community members' attitudes and opinions to any such changes could vary greatly among individuals. However, in general, the magnitude of the in-migration would need to be relatively substantial for the social environment to be noticeably altered. Furthermore, social changes typically require, or are most commonly associated with, permanent changes to the community's composition and/or attitudes rather than as the result of short-term influences or changes.

As discussed above, the majority of construction workers for the project would be expected to commute daily to the site. Given that most workers would likely travel to the site from their homes located in the regional area that are west of Blythe, local residents may have little daily interaction with most workers. It is possible that some construction workers could chose to commute weekly from their homes and stay within the local area at local hotels/motels or perhaps rent homes. In this case, after the workday is over, these individuals would be more likely to interact with existing residents at local businesses or community facilities. However, given the very limited number of construction workers expected to stay in the local area during the work week, the presence of these individuals would not be expected to result in substantial or long-term adverse effects to the local area’s social composition and character.

Therefore, in general, given the expected new local employment opportunities and economic benefits to local business and relatively limited temporary in-migration of construction workers, most local residents and stakeholder groups would be expected to be supportive or, at a minimum, would not oppose the solar facility’s construction. Consequently, the project would be expected to have a minor and largely positive impact on the social character of the local study area for the duration of facility construction.

Alternatives

Reconfigured Alternative 1

Population impacts of Reconfigured Alternative 1 would be comparable to those of the proposed action. Although it is possible that construction activities for this alternative could be increased relative to the proposed action due to the larger footprint of Unit 1, it is likely that identical construction activities would be required. Consequently, this alternative would cause identical socioeconomic impacts as the proposed action. The regional study area includes a substantial number of construction workers by type that would adequately provide all required workers for Reconfigured Alternative 1 as well. Therefore, Reconfigured Alternative 1 is not considered to result in population in-migration to the local or regional study area from construction activities.

Reconfigured Alternative 2

As only a minor change would occur to the project site, this alterative would have similar if not the identical construction-related socioeconomic regional and local study area effects as the project.

Reduced Acreage Alternative

The Reduced Acreage Alternative would also result in a smaller facility that would have approximately a 25 percent lower electrical production capacity. As a result, it may be expected that necessary construction spending and employment would be similarly reduced. The construction period for the project might be reduced as well.

As a result of its lower construction spending, the economic spending and employment benefits to the local and regional economies would be expected to be similarly reduced. In addition to reduced direct economic benefits, the indirect and induced spending and employment gains to the local and regional economy would also be lower by a similar proportion.

Consequently, it may be projected that this alternative would result in direct economic output benefits of approximately $187 million with additional induced and indirect spending of another $138 million during the project's construction period. Project construction is expected to directly create an average of 425 annual full-time employees over its construction period with a peak monthly employment of approximately 860 workers. Another 343 indirect and induced employment (full time equivalent jobs) for the regional economy would also be expected during construction.

No Action Alternative A

Since there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed on the site. As a result, the socioeconomic impacts of the project would not occur at the proposed site. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates. However, insufficient information is available at this time about what other projects would be developed, and is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS.

CDCA Plan Amendment/No Project Alternative B

Since the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. However, insufficient information is available at this time about what other projects could be developed, and is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS.

CDCA Plan Amendment/No Project Alternative C

Since the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed on the site. As a result, this No Project Alternative would not result in the socioeconomic impacts associated with the proposed project. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

Operation

Economic

As discussed in greater detail in Section 3.14, *Social and Economic Setting*, the origin of project workers is a central factor determining the magnitude and extent of potential socioeconomic impacts to the local economy and communities from the proposed action. The direct benefits of employment and higher personal incomes primarily would benefit the communities where the workers and their families reside, since that would likely be where they spend the majority of their earnings. Workers' spending for goods and services would have an indirect on the communities and economies where that spending occurs. In addition, if there are an insufficient number of suitable local workers available to staff the project, then the project could attract individuals to relocate to the area, which, in turn, could result in an increased demand for housing and local services. If there is insufficient housing or service capacity to meet the new demand, then adverse indirect social and economic impacts could result.

For this analysis, the project would "induce substantial population growth" if workers permanently (or in some cases even only temporarily) move into the local area for employment at project facilities and, thereby, encourage the construction of new homes, extension of roads, other infrastructure development, and/or increase demand for public services.

Project Operations Labor Needs

The employment and spending by the proposed action's future operations would be the primary direct long-term economic impact associated with the project. The proposed action is expected to require a total of up to 134 permanent full-time employees (CEC RSA, 2010). Table 4.13-3 shows Year 2006-2016 occupational employment projections for the Riverside/San Bernardino/ Ontario MSA by operational labor skill as compared to the estimated number of total operational workers needed.

TABLE 4.13-3
TOTAL LABOR BY SKILL IN RIVERSIDE/SAN BERNARDINO/ONTARIO MSA (2006 and 2016 Estimate) AND PROJECT REQUIRED OPERATION

Trade	Total # of Workers for Project Operation	Riverside/ San Bernardino/Ontario MSA 2006	Riverside/ San Bernardino/Ontario MSA 2016
Maintenance and Repair Workers, General	--	2,030	2,380
Plant and System Operators	--	310	370
Total	***134***	***2,340***	***2,750***

SOURCE: CEC RSA, 2010 Part 1 Socioeconomics and Environmental Justice Table 5

Approximately a third of the operations jobs would be lower skilled positions. All employees would be provided with necessary training. The basic job requirements for the lower skilled operations workers would likely be high school diplomas and basic mechanical equipment operating abilities. Former agricultural equipment operators, construction laborers, and many other manual labor jobs would be expected to have transferrable skills.

The other more skilled operations would generally require some secondary education and greater mechanical/electrical equipment experience than the lower skilled operation positions. Project construction workers and more experienced farm or other equipment operators would be expected to have transferrable skills suitable to those required for these positions. On-the-job training could be expected to enable, over time, some lower skilled employees to gain the expertise necessary to staff the more skilled operations positions. In addition, local community colleges (Palo Verde College in Riverside and College of the Desert in Palm Desert) as well as University of California - Riverside have recently developed Utility Job Training Courses with federal funding support specifically designed to provide its students with the training necessary to qualify for the higher skilled operations jobs.

As shown in Table 4.13-3, data for the Riverside/San Bernardino/Ontario MSA indicates that in 2006, the “Maintenance and Repair Workers, General” and “Plant and System Operators” employment sector contained a total of 2,340 workers, with 2016 forecasts for these employment sectors to grow to a total of 2,750 employees. The existing labor force of currently qualified plant and system operators within Riverside and San Bernardino counties is relatively limited and likely reflects the current level of available employment opportunities. As discussed in the previous estimate of the proportion of construction work living in the regional study area, on a per capita basis, it may reasonably be assumed that approximately 13.3 percent of these Riverside MSA operators and general maintenance workers would live within the regional study area.

While the demand for 89 more skilled plant operators for the facility’s future operations would likely exceed the region’s existing supply of unemployed plant operators, the demand would also correspond to a third of the estimated unemployed general maintenance workers in the region. In addition, there would also be individuals amongst the region’s estimated nearly 24,077 unemployed (i.e. 24,340 total regional unemployed – 263 unemployed general maintenance / plant operators) that have or could obtain the necessary training to perform the facility operations. Also, it is likely that some of the currently employed workers would change their jobs to obtain a better paying job and/or to work closer to home. Given the region’s high unemployment levels, any currently employed worker switching jobs could expect to have their vacated position filled by other workers (possibly including others living outside of the regional study area).

According to the Applicant, at least 50 percent of workers would be expected to come from within the regional study area workforce (CEC RSA, 2010), resulting in a potential influx of up to 77 workers in communities within the proposed action’s regional and local study areas (Solar Millennium 2009a). Consequently, it is expected that most of the facility’s operations employment would be provided by workers living within the regional study area from the site. Future project-related in-migration may occur but would be expected to be very minor with at most 77 employees relocating to the local study area. Furthermore, depending on the success of local training programs and possible interest amongst project construction workers or other more skilled local residents, actual in-migration may be lower or unnecessary except for a few top plant management and supervisory positions.

Housing Impacts within the Local Study Area

There would be greater incentive for future operations workers to live closer to the site since the operations job opportunities at the solar facility would be permanent positions. These operations jobs also could encourage workers to seek permanent homes in the local area. As shown previously in Table 4.13-2, the most current published vacancy rates for the cities of Blythe, California; Ehrenberg, Arizona; and Quartzsite, Arizona are 16.1, 34.9, and 41.9 percent, respectively. These vacancy rates indicate that there is likely currently considerable vacant housing, which could be available to future operations workers who choose to relocate to the local study area. Altogether, it is conservatively estimated that up to approximately 2,480 existing housing units could be available as potential housing for future construction workers (the estimate does not account for other potential available housing within the unincorporated local study area).

Currently, home and rental prices within the City of Blythe and the other communities within the local area are comparatively affordable and there is considerable available housing supply. These vacancy rates and the relatively minor number of project employees likely seeking local housing indicates that more than sufficient existing local housing would be available for any future operational employees choosing to relocate to the local area. Therefore, no new housing or infrastructure growth would be necessary to provide housing or public services for the project's operations workforce.

Future facility operations would encourage, at most, a small number of people to relocate to the area. The small magnitude of the potential action-related in-migration would be expected to be accommodated by the local area's existing housing and, consequently, would not result in new and unplanned growth or land use changes. Therefore, it is concluded that the proposed action would not induce substantial growth or concentration of population in the local study areas.

Consequently, the project's future operations would not be expected to result in population growth either directly or indirectly that would be major in magnitude or adverse in nature.

Operations Spending Impacts

The future facility operations would have a long-term, positive impact on the local economic base and fiscal resources. Operations workers' wages and salaries would provide additional income to the area, as would expenditures within eastern Riverside County for construction materials and services.

As discussed in the construction spending impact analysis, an IMPLAN input-output model was used to estimate the indirect and induced economic impacts for eastern Riverside County based on the operation-phase project expenditures that would be expected to occur within the regional study area.

The same IMPLAN model was used to estimate the project's operations impact on the eastern Riverside County economy although IMPLAN Sector 31, "Electric power generation, transmission, and distribution," was used to estimate spending impacts for operations labor since it most closely corresponds to the North American Industry Classification System Code 221119, which is used for, "Electric power generation: solar." For this analysis, it was assumed that the operations material and equipment purchases would be for standard construction materials and services that would mostly be obtained from within the IMPLAN study area. These project expenditures were used to estimate the economic benefits to the regional study area economy. The IMPLAN model also assumes that all of the project's operations workers would reside within the regional study area of eastern Riverside County.

Project operations would create a permanent, positive impact on the local economy and fiscal resources. Operations employees' salaries would provide additional income to the area, as would expenditures within the multi-county study area for operations and maintenance materials and services. Table 4.13-4 summarizes the IMPLAN analysis findings for the future PSPP operations.

TABLE 4.13-4
PROJECT OPERATIONS ANNUAL ECONOMIC BENEFITS (2010 Dollars)

Fiscal Benefits	
State and local sales taxes	$0.48 million
Project Operations Spending	
Labor	$5.8 million
Operations and maintenance supplies	$5.0 million
Total	$10.8 million
Direct, Indirect, and Induced Benefits	
Direct	
Economic Output	$10.8 million
Jobs	134 jobs
Indirect	
Economic Output	$1.4 million
Jobs	10 jobs
Induced	
Economic Output	$4.7 million
Jobs	39 jobs
Total	
Economic Output	$16.9 million
Jobs	183 jobs

SOURCE: CEC RSA 2010.

The annual expenditures of the project were assumed to be $5.0 million for materials, equipment, and supplies; and $5.8 million in payroll annually. These figures were used as inputs into the model to predict economic and employment impacts.

Project operations are expected to directly employ 134 full-time employees. This employment would create both indirect and induced secondary employment in the region. Indirect employment is defined as employment that would be generated by the purchase of goods and services required by the project. Induced employment is defined as employment that would be generated by the purchase of goods and services by businesses that are indirectly supported by the project.

As shown in Table 4.13-4, according to the IMPLAN analysis, project operations could have the direct beneficial economic impact of generating a total of $10.8 million in annual spending on labor and materials within eastern Riverside County. This operations spending could also be expected to generate up to $6.1 million in new indirect and induced economic output and earnings for other businesses and residents within eastern Riverside County.

The actual future economic impact for eastern Riverside County could be smaller than the total economic benefits shown in Table 4.13-4. Project-related spending would benefit eastern Riverside County and the local economies depending on the extent that workers live and spend their earnings at businesses locally and elsewhere in eastern Riverside County. Given the local study area's rural character, most of the projected benefits likely would be received by the larger cities and communities located elsewhere in eastern Riverside County outside the local study area. The economic benefits to both local and regional businesses could be less than estimated if greater sales leakage occurs than that expected by the IMPLAN model. Irrespectively, the net annual economic impact would be a minor and positive benefit on the local and eastern Riverside County economies.

In terms of economic output impacts, the primary local industries that would benefit the most include: rental housing, architectural and engineering services, wholesale and retail trade businesses, real estate establishments, physicians and other medical professionals, and food service businesses.

Social

The potential for proposed action-related impacts to the local study area's social character are determined by the nature of economic impacts of the project and any related in-migration.

As discussed above, the project could generate considerable economic benefits directly for both workers and local businesses providing materials and services for the project. In addition, major indirect and induced spending benefits for the local and eastern Riverside County economies would be generated by subsequent spending by the workers and businesses income within the local and regional economy. The economic benefits are expected to extend widely within the local and regional economy but would most benefit food, retail, lodging, real estate, and medical-related businesses.

The additional new income for the local economy from the project would have a positive contribution towards supporting local business and maintaining the economic vitality of the City of Blythe and the other neighboring communities for the lifetime of the project. The positive effect for the local economy would be increased given the local study area's recent and on-going economic weaknesses as a result of both longer term changes and the more recent economic downturn. The continued viability of Blythe's local business community is important for the City's long-term well-being. Increased local employment opportunities would improve local residents' standard of living and would help retain younger residents that otherwise would be more likely to leave the community if there are insufficient local employment opportunities. The extent of the local community's positive social attitudes towards the project could be expected to increase as more local residents gain employment (either directly or indirectly) or otherwise benefit from the project.

Project-related in-migration could affect the social character of the local study area. An influx of new individuals with different values, lifestyles and/or socio-demographic backgrounds could have a positive or negative influence on the quality life and/or community values. The existing community members' attitudes and opinions to any such changes could vary greatly between individuals. However, generally, the magnitude of the in-migration would need to be relatively substantial to noticeably alter the prevailing social environment. The majority of the facility's permanent workforce is expected to commute daily to the site from within the regional area. Given that most workers would likely travel to the site from their homes located west of Blythe, local residents would have little daily interaction with most workers. It is possible that some workers would choose to commute weekly from their homes and stay at local hotels/motels or perhaps rental homes. In the latter case, before or after the workday is over, these individuals would be more likely to interact with existing residents at local businesses or community facilities. However, given the very limited number of workers expected to stay in the local area during the work week, their presence would not be expected to result in substantial or long-term adverse effects to the local area's social composition and character.

Therefore, generally, given the expected new local employment opportunities and economic benefits to local business and relatively limited in-migration of permanent workers, most local residents and stakeholder groups would be expected to be supportive or at a minimum not opposed to project operation. Consequently, the proposed action is expected to have a minor impact and largely positive impact on the social character of the local study area's economy for the 30-40 year duration of the project.

Alternatives

Reconfigured Alternative 1

Operation of Reconfigured Alternative 1 would require the same number of employees as the proposed action. Therefore, up to 34 operational employees could choose to relocate to the local area for Reconfigured Alternative 1 from more distant regional study area locations. As discussed above, in the event any direct operational employees or indirect/induced employees were to relocate to the local study area permanently, this population would be served adequately by local area available housing. Consequently, operation of Reconfigured Alternative 1 would not induce substantial population growth in excess of available local study area housing.

Housing impacts of Reconfigured Alternative 1 would be identical to those of the proposed action. Any temporary in-migration from the required construction workforce of Reconfigured Alternative 1 seeking local housing during the work week (assumed up to 15%) would not trigger the need for new housing in the local study area. Furthermore, it is assumed all workers would be residents of the local or regional study area.

It is possible that up to 34 operational employees could choose to relocate to Reconfigured Alternative 1's local area from more distant regional study area locations. In the event any direct operational employees or indirect/induced employees were to relocate permanently to the local study area, this population would be adequately served by local area available housing. Consequently, construction and operation of Reconfigured Alternative 1 would not induce substantial population growth in excess of available local and regional study area housing.

Reconfigured Alternative 2

Operations spending and employment for the Reconfigured Alternative 2 (under either option) would be expected to be the same as that for the proposed action; consequently, the social and economic impacts would be the same.

Reduced Acreage Alternative

The Reduced Acreage Alternative would also result in a smaller facility that would have approximately a 25 percent lower electrical production capacity. As a result, it may be expected that necessary operations spending and employment would be similarly reduced.

As a result of its lower operations spending, the economic spending and employment benefits to the local and regional economies would be expected to be similarly reduced. In addition to reduced direct economic benefits, the indirect and induced spending and employment gains to the local and regional economy would also decreased a similar proportion.

Consequently, it may be projected that this alternative would result in direct economic output benefits of approximately $8.1 million with additional induced and indirect spending of another $4.6 million annually. The project's operations would be expected to provide 100 full-time jobs. Another 37 indirect and induced employment (full time equivalent jobs) for the regional economy would also be expected.

No Action Alternative A

Since there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would remain in its existing condition, with no new structures or facilities constructed and operated on the site. As a result, the socioeconomic impacts of the project would not occur at the proposed site. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, potentially including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed and operated to meet State and Federal mandates. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative B

Since the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative C

Since the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, this No Project Alternative would not result in the socioeconomic impacts associated with the proposed project. However, in the absence of this project, other renewable energy projects may be constructed and operated to meet State and Federal mandates, and those projects would have similar socioeconomic impacts in other locations.

Closure and Decommissioning

Economic

The anticipated lifespan of the project is estimated to be 30 to 40 years. Closure- and decommissioning-related social and economic impacts would be related to both the discontinuation of the solar operations and the short-term effects of the necessary facility deconstruction and subsequent site reclamation activities.

The direct economic impact associated with discontinuation of the solar energy generation site would result in job losses for the operations workforce, which would no longer be needed to maintain the facility's daily operations and/or repair the solar power generation equipment and related infrastructure. Closure would also directly reduce future revenues to any local material, equipment, and service suppliers previously supporting the facility's daily operations.

In addition, closure would have the additional adverse economic effect of reducing the employment and revenues for other local or regional businesses that rely on spending by the project's operations staff or suppliers. As a result of the reduced income and revenues of these affected businesses, the project's staff and support businesses would make few purchases from other local businesses, which, in turn, would reduce these businesses and its employees' income and purchasing ability.

Facility deconstruction activities could, however, result in a short-term increase in local spending from the employment, equipment, and materials required to dismantle the solar facility and reclaim the site. The cost and duration for the deconstruction activities is likely to be roughly comparable to that of the construction; except that the amount of labor and materials would be less than that required for the facility development because the facility would not need to be operational. The magnitude and duration of the resulting short-term economic benefits would likely be proportional to the extent of the deconstruction activity required for the facility's removal. The economic benefits to the local and regional economy would also likely be of a similar type and magnitude as those projected for construction, unless there is significant change to the local and regional economy during the interim period.

Given a reasonable expectation of considerable increased solar-related local business development and employment, it could be expected that there would be an increased number and variety of businesses that could provide necessary solar-related services. This would, in turn, ensure that the local and regional economies would be able to retain a greater proportion of benefit from the future decommissioning spending since a smaller proportion of the work would be performed by out-of-region businesses and, hence, be lost by the region's economy.

Consequently, the economic impacts associated with the ultimate decommissioning could be initially positive from the increased employment and business spending over the relatively brief duration of the deconstruction and site restoration activities. However, following the completion of the decommissioning process, there would be minor adverse long-term economic impacts to the local economy from the loss of the solar facility's employment and annual spending.

Social

As discussed in the economic analysis above, ultimate closure and decommissioning would result in the reduced local employment opportunities and decreased revenues for businesses supplying the materials, equipment, and services required to operate and maintain the project. In addition, there would be secondary economic losses for local residents and businesses that benefit from sales and employment by the project employees and supplier businesses.

The potential for adverse social impacts would depend on the magnitude of the facility-related economic losses. Future decommissioning the proposed action alone would be expected to have, at most, a very minor adverse social impact. Given a reasonable expectation that a considerable number of other solar developments would occur within the region as well as an increase in other solar-related local business development and employment, the loss of an individual project would have a reduced potential to result in adverse social impacts. For substantial adverse social impacts to occur, the scale of employment and/or business economic losses would need to be of a type and magnitude that worker relocation and/or business closures would occur so that the local quality of life is reduced or the local communities' social character is adversely altered. Furthermore, the potential for adverse social impacts could be significantly reduced or eliminated if proposed decommissioning is anticipated and planned appropriately. In addition, the potential for adverse social impacts would also be significantly reduced if alternative employment and business opportunities develop, thereby reducing the economic impacts to the workers and businesses affected by the closure.

Consequently, future decommissioning of the project could result at most in a very minor adverse long-term social impact from the reduced local employment and spending. It is also very possible that future decommissioning of the project would result in a negligible adverse future social impact.

4.13.3 Discussion of Cumulative Impacts

The potential for cumulative socioeconomic impacts exists where there are multiple projects proposed in an area that have overlapping construction schedules and/or project operations that could impact similar resources. Projects with overlapping construction schedules and/or operations could collectively result in a demand for labor that cannot be met by the region's labor pool, which could lead to an influx of non-local workers and possibly their dependents. This population increase could impact social and economic resources if there are insufficient housing resources and/or infrastructure and public services to accommodate the new residents' needs.

Section 4.1.4, *Cumulative Scenario Approach*, identifies current solar and non-solar projects which could be developed in the foreseeable future within both eastern Riverside County and elsewhere in Riverside County or the surrounding counties. While a large number of projects may be planned and, therefore, considered to be possible for future development, not all of them are expected to actually be built due to construction funding constraints, schedule, and/or delays. Many of the currently proposed projects in the region anticipate participation in federal funding programs and/or assistance for project development. Given the uncertain and challenging economic circumstances facing both federal and state economies, it is far from assured that future funding and other governmental support will be sufficiently available for all the proposed projects within the projected schedules.

As shown in Table 4.1-1, currently more than a dozen BLM renewable energy projects are identified in the Cumulative Project Scenario for the social and economic analysis. In addition, six smaller BLM authorized actions are also identified. Finally, the Blythe Airport Solar 1 and Chuckwalla Valley Raceway projects are two other developments expected to occur or be completed within eastern Riverside County.[7]

There are 13 solar projects proposed along the I-10 corridor predominantly between Desert Center and Blythe. Based on the currently available data for these various projects (information obtained from Plans of Development and other project documents), and assuming all projects move forward, these projects would be constructed in the same general timeframe as the proposed action (i.e. between 2011and 2016).

The cumulative analysis conservatively assumes that all the proposed solar projects would be completed (or at least begin major construction) within the five-year cumulative timeframe. This cumulative impacts discussion is based on available data with respect to both construction schedules and the projects' labor requirements. If construction and operating labor requirements are not known for some projects, average work force levels of other comparable projects and professional judgments have been used to develop conservative estimates of expected cumulative labor requirements for these projects.

Economic

Construction

Cumulative Construction Labor Needs

If all of the 13 major BLM Solar Projects identified in eastern Riverside County are constructed, a total of 6,108 MW of new solar power would be developed. The average solar power project would be approximately 470 MW in size and may be expected to require approximately 1,926

[7] The Chuckwalla Valley Raceway project is scheduled for completion in late 2010 and therefore would not be expected to add any significant construction labor need during the 2011 to 2016 cumulative analysis time period.

full time equivalents (FTE) construction workers to be built.[8] Full build-out of all 13 BLM solar projects would require approximately 25,040 FTE of construction worker employment over the cumulative analysis's five year time-frame. This labor demand would be roughly equivalent to an average of 5,000 FTE of construction workers per year (i.e., 25,040 jobs divided by five). This level of construction worker labor demand would represent the minimum employment impact on the regional study area since it assumes that all the BLM solar project construction work would be evenly performed over the five year period.

However, the solar projects' cumulative peak construction employment needs would place the highest demand on the regional construction labor supply and have the greatest potential for cumulative socioeconomic impacts. Based on their projected power generation performance and construction employment estimates, the typical peak construction labor requirements for solar projects are estimated to average 1.86 workers per MW. In which case, during its period of peak construction, a typical 470 MW solar project would employ approximately 875 construction workers. Under the extremely improbable circumstance that peak construction of all 13 planned BLM solar projects happening concurrently, a maximum of 11,360 construction workers would be required in the region.

The actual cumulative construction labor force demand within the study region would be higher than the 5,000 FTE minimum and likely considerably lower than the 11,360 FTE maximum. The average construction period for BLM solar projects is estimated to be approximately 43 months or 3.6 years. Furthermore, project developers would likely seek to minimize the construction occurring during the hottest summer months and may stagger their construction periods accordingly. Consequently, some seasonality may be expected to occur as developers favor more construction during the region's cooler winter months. Therefore, conservatively assuming that all the projects would be completed with the five-year cumulative scenario period, the regional labor need for a likely maximum cumulative labor demand conditions would be for four projects to have peak labor needs during the same year.[9]

Given an average construction period of 3.6 years, it would be expected that at least nine of the 13 BLM solar projects would be occurring at any one time and more likely, at least 11 would be ongoing during the expected peak labor demand period of 2012 to 2014. Therefore, the peak construction labor demand for the cumulative analysis is estimated to be equivalent to the total construction labor demand for seven solar projects under average construction conditions and four solar projects during peak construction. Altogether, such a rate of solar construction would be expected to require a total of 7,180 construction workers for the various BLM solar projects along the I-10 corridor during the years of major solar project development.[10]

In addition, there also could be demand for construction workers from the planned non-BLM solar project proposed for the Blythe Airport. This 100 MW solar project could contribute

8 This is based on an estimated average construction labor need of approximately 4.1 construction workers (FTE) per MW of solar power production capacity.

9 The peak construction requirement typically occurs during mid-construction, suggesting that 2012 – 2014 would be most likely to experience peak labor demands.

10 This assumes a typical 470 MW solar project requiring 527 workers under average construction conditions and 873 workers during the shorter periods of peak construction.

approximately 150 construction workers annually over the course of a multi-year construction period. The future construction needs of the various other non-solar projects on BLM land in the region are not known. However, for purposes of this analysis, the projects are assumed to have an annual construction labor need roughly comparable to another solar project (i.e., 530 construction workers).

Therefore, 7,880 construction workers is very conservatively estimated to represent the maximum possible future cumulative labor force demand from the region's planned solar and non-solar development. This estimate assumes all the identified projects would be developed within the five year cumulative analysis period.[11] The proposed action's maximum potential contribution to this cumulative effect would be approximately 13.8 percent during its peak construction period. The project's average contribution to the cumulative impact would be approximately 8.2 percent during its non-peak construction.

Regional Labor Force Supply

As discussed earlier in the social and economic analysis, the total work force of skilled construction workers currently living in eastern Riverside County is estimated to be approximately 14,665. Future demand for 7,880 construction workers would be equivalent to employment for more than half (53.7 percent) of the current skilled labor force. Such demand for construction workers far exceeds the current unemployed construction labor force. Approximately 850 skilled construction workers are expected to be added to the eastern Riverside County labor force by 2016 (based on past job projections shown in Table 4.13-1). The cumulative labor force demand would still represent more than half the region's currently forecasted future skilled construction labor force.

The current unemployed labor force within eastern Riverside County is estimated to be 32,240. The construction worker demand, if met fully by the unemployed labor pool in eastern Riverside County, would represent approximately a 24.4 percent decrease in the regional study area's unemployment level. Although many of the region's currently unemployed residents may lack transferable skills or have the physical aptitude to acquire the necessary skills required by cumulative labor demand, many residents could be adequately trained to be employable. Furthermore, some of the construction work would be more entry-level positions which may be suitable for less skilled workers.

Some of the regional workforce currently employed in other sectors also could have the capabilities to qualify for project construction work. In such cases, some job transferring may occur, especially since the construction jobs may be expected to be relatively well-paid and attractive for many local residents. The less skilled or desirable jobs vacated by individuals transferring to construction work could be filled by other less skilled unemployed residents. Finally, the cumulative labor force demand on eastern Riverside County also could be partly reduced as projects located to the west would be closer to cities and potential workers outside the

[11] In actuality, construction labor shortages (and related wage escalation) would also be expected to become a possible constraint reducing the pace of future development occurring.

project's regional study area. Consequently, these projects could meet some of their labor needs from residents from San Bernardino, Riverside or Moreno Valley.

Housing and Lodging Impacts within the Local Study Area

There could be demand for specialized construction trades that exceed the available labor supply for specific trades within eastern Riverside County. In which case, it is assumed that those job positions would be filled by workers relocating into the region from elsewhere.

Given the numerous factors discussed above, it is difficult to project the extent of future weekly commuting or other in-migration that would be necessary to meet the future cumulative labor needs within the region. However, as a conservative assumption, other social and economic impacts analyses for solar projects have suggested that a 15 percent rate of in-migration would be a conservative and reasonable assumption. Such a proportion of in-migration applied to the projected maximum future cumulative labor force demand would suggest that up to 1,165 construction workers could require temporary housing in the local, or possibly, regional study area.

As discussed earlier, the skilled construction labor force within Riverside County is estimated to be approximately 69,100. This suggests that there is likely to be a considerable additional potential labor force available that could be willing to commute weekly or temporarily relocate to the local area. Consequently, from a broader geographic and labor force perspective, no significant shortages of adequately skilled construction workers, is foreseen, provided adequate and/or suitable housing is available for relocating near the projects' sites.

The cumulative influx in construction labor to the area could create demand for temporary housing that is greater than the existing supply of temporary lodging. As discussed in the previous construction impact analysis, private and public RV/campgrounds are not expected to be suitable or attractive lodging options for most project construction workers seeking local accommodations. There are expected to be some suitable and available temporary lodging at local hotel/motel lodging. Although, room availability and prices could be higher during the winter months, based on County-wide vacancy rate estimates, nearly 300 rooms could be available in the local area. Given that some construction workers might be willing to share rooms and save on their lodging costs, the existing local hotel/motels could be able to satisfy up to 450 future construction workers seeking local temporary housing. If construction workers are willing to commute 1 to 1.5 hours daily to the site, the supply of potential hotel/motel increases dramatically to an estimated 8,285 rooms, which would correspond to an average of 2,420 unoccupied rooms. This would be more than sufficient temporary housing for an expected 1,165 construction workers seeking temporary housing.

In addition to the available lodging in the local area, there are also potentially considerable under-utilized homes in the local area that may be suitable for rent by construction workers seeking local housing. Within the City of Blythe, approximately 880 homes are currently estimated to be vacant and another 1,594 local housing units may be available within the cities of Ehrenburg and Quartzite in Arizona. Given that some construction workers could be willing to share homes to reduce their lodging costs, these housing units could provide more housing for the projected cumulative local housing demand.

Some of the solar developers might also choose to develop onsite housing facilities for their construction work forces. For example, on-site worker accommodations are planned as part of the Rice Solar project by its developer.[12] The Eagle Crest Pumped Storage project near Desert Center is located at a former mine site that has housing previously used by mine workers. Project documents indicate that the possible use of the onsite housing for the pumped storage project is under consideration. In addition, BLM may allow temporary LTVAs to be established on site for construction workers for the duration of project construction as temporary lodging facilities.

Irrespective of the availability of temporary housing, it may be expected that, even under future cumulative conditions, a relatively small proportion of construction workers would choose to permanently relocate to the local communities where they are employed during construction. This is because many construction workers could choose to commute relatively long distances to their work sites and may expect to seek work within the more populated areas of Riverside and San Bernardino Counties in the future.

Furthermore, during the same time period with the greatest potential for adverse impacts resulting from the cumulative demand for construction worker housing, there also would be a major positive economic stimulus to the Blythe area and eastern Riverside County economies associated with the solar development which could likely offset any adverse impacts.

In summary, there is potential for short-term adverse cumulative social and economic impacts in the Blythe area associated with the demand for skilled construction labor for the dozen solar projects proposed for future development within eastern Riverside County. Analysis suggests that future construction labor demand would be greatest from 2012 to 2014 and may be sufficient to exceed the existing local work force within eastern Riverside County. In which case, there may be increased demand for temporary local housing from construction workers seeking to commute weekly to the local area. However, given the estimated availability of lodging and possible rental housing, it is expected that there will be adequate and suitable housing to meet any future construction worker temporary housing demand. Therefore, no major adverse social or economic impacts would be expected to result.

Operations

Based on their projected electrical generation projections and employment requirements, if all of the 13 major BLM Solar Projects identified are constructed, a total of 6,108 MW of new solar power would be developed. The average solar power project is estimated to require approximately 0.21 operations workers for each MW of solar power production. Consequently, if full build-out of the planned solar development occurs, the future cumulative operations labor employment in the

[12] Development of temporary worker housing facilities is more likely to be possible at projects (such as Rice), which are located on private property.

region would be approximately 1,280. The project's operations employment of 65 jobs represents approximately a 5.2 percent contribution to the cumulative operations labor need.

As discussed in the earlier operations analysis, there is currently only a limited population of skilled plant workers living in the eastern Riverside County. However, the transferability of construction worker skills, on-the-job and local community college training opportunities, as well as the lower skilled qualification requirements for half the operations job suggest that there would be many local and eastern Riverside County residents who would be able to meet the cumulative operations labor needs.

Even conservatively assuming that up to 25 percent of the future operations labor force could be obtained from persons living outside the region, there would be an in-migration population of 320 operations workers. There is more than sufficient available local housing to accommodate the housing needs of these workers and their families. Furthermore, the relatively limited number of new residents would not be expected to result in any noticeable change to the local communities' social composition or character. The future operations of the solar projects will also generate significant annual economic benefits in local employment, direct and indirect spending at local businesses as well as positive sales and other tax benefits for the local area. Consequently, the cumulative social and economic effect of the future operations of the solar projects would be minor and beneficial.

Closure and Decommissioning

Evaluating the proposed action's cumulative impacts when future facility decommissioning occurs is highly speculative. Ultimate decommissioning is expected to occur in 30 to 40 years time. It is not possible to project with any confidence the likely future social and economic conditions of the local and regional study area. Similarly, it is very difficult to envision the future cumulative scenario conditions that appropriately represent the context within which the project would dismantle its facilities and site reclamation would occur. Simply stated, any presumptions of the future status for the other solar projects (e.g., continued operation, replacement or decommission) would directly determine the nature of the impact that discontinuation of the proposed action would be expected to have.

In any case, the proposed action is expected to be one of many similar solar projects within the eastern Riverside County region. As such, the proposed action's contribution and influence on the region's social and economic conditions would likely be proportional to: (a) its magnitude relative to the other developments projects in the region; and (b) the collective size and relationship of the combined development projects to the region's social and economic conditions. Consequently, from the current perspective and based on the currently and foreseeable future circumstance for the project and the region, there is no evidence to suggest that future decommissioning of the project would have anything but at most a very minor adverse cumulative impact on the local and regional area's economic or social environment.

Social

Construction

The cumulative impact of the many proposed future solar and non-solar development projects in Eastern Riverside County would result in considerable short-term construction activity at many locations throughout the region. Future cumulative demand for construction workers for these projects could exceed the available supply of skilled construction workers living in the region. In this case, construction workers from elsewhere in Riverside County, Southern California, or Arizona could be attracted to the area by the construction employment opportunities. The potential for adverse social impacts would be decreased if there is a sufficient suitable supply of housing and lodging to satisfy these workers' local housing demand. Therefore, in this case, no new residential or lodging growth would be expected to occur.

The ongoing construction activity in the region, influx of construction workers both commuting daily to the site from the regional area, and the more limited number who could choose to temporarily live in the local area could noticeably alter the social character and environment within Blythe and the other communities within the local area. A construction worker population of 7,780 would be equivalent to approximately 29 percent of the estimated total local study area population and, consequently, would be cumulatively likely to be very noticeable.

The potential influx of construction workers to the local area would be accompanied by an increase in economic activity from their spending in local business establishments. In addition, the planned new development projects would make purchases from local businesses for construction materials and supplies, and would place demands on various kinds of services.

The effects of the increased activity on local attitudes and quality of life may vary amongst residents. While some residents may be displeased by increased traffic, new visitors and temporary residents, other residents (particularly those employed or otherwise benefiting economically from the construction) could welcome the development.

However, an influx of new workers also could increase the demand for certain kinds of government services and infrastructure (e.g., police and fire services and medical facilities and services). There have been other past instances of rapid growth in rural areas as a result of energy-related development, most notably the energy boom in the 1970s in states such as Wyoming. A number of communities, such as Rock Springs and Gillette, Wyoming, became known as "boomtowns," and the local economic benefits from the new energy development in the region were accompanied by some social changes that were not seen as positive by many existing residents. These included changes such as growth in number of bars, higher crime rates, and perceived (by some) aesthetic degradation due to rapid growth occurring to accommodate the sudden increase in population.

The presence of existing larger communities (such as Indio and Coachella) that are within possible commuting range for construction workers could suggest that circumstances may differ substantially from those facing the more isolated Wyoming boomtown communities 35 years ago. However, there would remain a potential for temporary impacts in the Blythe area, particularly if the possibility of such social and economic impacts are not anticipated and are not managed.

Operation and Maintenance

As discussed in the corresponding economic cumulative analysis, the proposed action's future operations would be expected to have a minor and beneficial effect on the local and eastern Riverside County economy. Even conservatively assuming that up to 25 percent of the future operations labor force could be recruited from people living outside the region, there would be an in-migration population of only 320 operations workers. There is likely to be more than sufficient available local housing to accommodate the housing needs of these workers and their families. Furthermore, the relatively limited number of new residents would not be expected to result in any noticeable change to the local communities' social composition or character. The future operations of the solar projects also would generate significant annual economic benefits in local employment, direct and indirect spending at local businesses as well as positive sales and other tax benefits for the local area. Consequently, the cumulative social and economic effect of the future operations of the solar projects would be minor and beneficial.

Closure and Decommissioning

As discussed in the corresponding economic cumulative analysis, there is insufficient information to reliably project the conditions when decommissioning of the proposed facilities would occur in 30 to 40 years in to the future. Consequently it is highly speculative to attempt to characterize the future situation and circumstances under which facility decommissioning would occur.

In any case, the proposed action is expected to be one of many similar solar projects within the eastern Riverside County region. Consequently, from the current perspective and based on the currently and foreseeable future circumstance for the project and the region, there is no evidence to suggest that the future project decommissioning would have anything but at most a very minor adverse cumulative impact on the local and regional area's social environment.

Alternatives

Reconfigured Alternative 1

Construction and operation-related spending and employment for the Reconfigured Alternative 1 would be expected to be the same as that for the proposed action; consequently, the social and economic cumulative impacts would be the same.

Reconfigured Alternative 2

Construction and operation-related spending and employment for the Reconfigured Alternative 2 would be expected to be the same under either option as that for the proposed action; consequently, the social and economic cumulative impacts would be the same.

Reduced Acreage Alternative

The Reduced Acreage Alternative would also result in a smaller facility that would have approximately a 25 percent lower electrical production capacity. As a result, the social and economic cumulative impacts would be similarly decreased in magnitude.

No Action Alternative A

Since there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed on the site. As a result, the socioeconomic impacts of the project would not occur at the proposed site. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates. However, insufficient information is available at this time about what other projects could be developed, and is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS.

CDCA Plan Amendment/No Project Alternative B

Since the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. However, insufficient information is available at this time about what other types of projects or technologies could be developed, and is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS.

CDCA Plan Amendment/No Project Alternative C

Since the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, this No Project Alternative would not result in the socioeconomic impacts associated with the proposed project. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar socioeconomic and cumulative impacts in other locations.

4.13.4 Summary of Mitigation Measures

No mitigation measures are identified.

4.13.5 Residual Impacts after Mitigation Measures were Implemented

Because no mitigation measures would be implemented, no residual impacts would remain.

4.13.6 Unavoidable Adverse Impacts

No unavoidable adverse social or economic impacts would be expected to be associated with the proposed action or alternatives.

4.14 Impacts on Soils Resources

4.14.1 Impact Assessment Methodology

Direct and Indirect Impacts: Direct impacts of a project are caused by the project and occur at the same time and place. Indirect impacts of a project are also caused by the project but occur later in time or farther removed in distance, while still being reasonably foreseeable. The potential impacts discussed in this analysis relate to soil erosion and sand transport stemming from construction, operation and decommissioning of the project. For assessing impacts of the proposed action and alternatives on sand migration, direct impacts are considered to be impacts from the project footprint and "sand shadows" that form within the site boundary as a result of on-site wind fences. Indirect impacts would take the form of sand shadows that extend beyond the project disturbance boundary (PWA, 2010). Potential impacts of the proposed action and alternatives related to expansive and corrosive soils are analyzed in Section 4.12.9, *Geologic Hazards*.

Soil Erosion: Because soils at the site have not been previously mapped, the Applicant commissioned a general survey to characterize the soil conditions at the site. General soils data also was derived from the United States General Soil Map, as discussed in Section 3-15, Soils Resources. These data were used in conjunction with observations and laboratory testing at the site to detail soil characteristics including depth, texture, drainage, permeability, and erosion hazard of individual soil mapping units on the project site.

Sand Transport: Most sand transport (as opposed to dust transport) occurs close to the ground through the processes of rolling and saltation (bouncing of sand particles). This analysis assumes that all areas within the project boundary would be directly impacted (lost) as active sand dunes (dunes that have an active layer of mobile sand). Therefore, this assessment focuses primarily on off-site indirect impacts. The primary off-site impact would be disruption of sand transport to the sand transport corridor. The project has the potential to disrupt the Chuckwalla sand transport corridor because it includes a perimeter sand fence that would be 30 feet high and designed to stop sand from entering the solar array (PWA, 2010).

The sand fence is assumed to act as an effective barrier to sand transport, and create a sand shadow downwind. A sand shadow is an area downwind of a sand barrier where the wind removes fine sand but there is no replacement by sand from upwind. Over time, existing sand dunes in a shadow area will be deflated. They will shrink and become thinner and coarser as the fine sand is blown away by the wind. At a certain point downwind, the sand shadow disappears because diffusion is able to replace sediment into the area downwind of the fence obstruction. To quantitatively assess the area of sand shadow associated with the proposed action and alternatives, PWA (2010) developed a numerical model of sand transport. The model predicts areas of sand shadow in response to inputs of prevailing wind directions, distribution of wind around that mean, and the location of sand barriers (PWA, 2010). The percentage of sand reduction between pre-project and post-project conditions was modeled for the proposed action and alternatives. The percent sand reduction then was overlaid on the Sand Transport Zones

(Figure 3.15-3) to calculate an area of impact for the project and each alternative (PWA, 2010). Sand Transport Zone 4 (Figure 3.15-3) was not included in the assessment because wind transport is not a significant process in this zone and because the zone does not appear to be MFTL habitat (PWA, 2010).

The Applicant contested the wind shadow area estimates produced by PWA and submitted its own estimate of indirect impacts from wind transport (Kenney, 2010). The resulting sand shadows estimated by the Applicant are smaller than the areas calculated by PWA (2010). The Applicant's estimate of indirect impacts to sand transport used the same prevailing wind data as the PWA (2010) assessment, and assumed the same prevailing wind direction, primarily with a north and northwesterly direction. However, it sets the bar for impact as being lower than the PWA (2010) analysis. The following assessment of the proposed action and alternatives utilizes the results produced by PWA (2010) because they provide a more conservative analysis of impacts to sand transport from wind shadow areas within the Chuckwalla sand transport corridor.

4.14.2 Discussion of Direct and Indirect Impacts

Proposed Action

Erosion

The preliminary stages of construction, especially site grading, excavation, and soil stockpiling would leave loose soil exposed to the erosive forces of rainfall and high winds. Erosion is the displacement of solids (soil, mud, rock, and other particles) by wind, water, or ice and by downward or down-slope movement in response to gravity. Due to generally flat terrain, the Project site is not prone to significant mass wasting (gravity-driven erosion and non-fluvial sediment transport). Soil characteristics at the Project site allow for the potential for wind and water erosion.

Grading of the site would result in a less than 1% slope downward from the south to the north of the site. Earthwork associated with the project would include excavation for foundations and underground systems. The anticipated volume of total earth movement is approximately 4.5 million cubic yards. Cut and fill would be balanced on the site, and there would be no need to either import or export earthen material. The vast majority of project-related grading and excavation would occur on the site with only minor excavation needed for installation of a gas line within the linear right-of-way.

During construction, the solar plant site and those portions of the ROW supporting off-site linear facilities (i.e., the final transmission line, temporary construction power line, telecommunications line, and site access road described in Section 2.3, *Connected Actions*) would be disturbed. At that time, the surface of the disturbed areas would be devoid of vegetation and there would be the highest potential for erosion and associated effects, including soil loss and increased sediment yields downstream from disturbed areas. Development of the proposed action or one of the build alternatives would affect up to 3 acres of agricultural land (see Table 4.17-1, *Comparison of Direct and Indirect Impacts to Vegetation Communities and Special Status Plants from Proposed Action and Alternatives*).

Project grading and excavation would affect soil types present on the site, listed in Table 3.15-1. The runoff potential of these soils ranges from negligible to slow except during torrential showers, the water erosion hazard ranges slight to moderate, and the wind erosion potential is high. During construction, the area within the plant site fence line (2,970 acres) would be disturbed. During construction, soils would be exposed due to site grading, site clearing, excavation, and soil stockpiling; these activities would increase the potential for erosion by exposing loose soil to wind and water. Small, localized disturbance also would occur at the specific locations where transmission structures would be installed.

Wind Erosion

The potential for soil loss by wind erosion was estimated using the Wind Erosion Prediction System for pre-development (undisturbed), during construction, and operational conditions. The soils on the site have a high susceptibility to wind erosion. Under current conditions, soil loss is estimated to be 392 tons/acre/year (t/ac/yr; CEC RSA, 2010).

Construction activities would increase the potential for soil loss to an estimated 445 t/ac/yr for disturbed conditions without implementation of control measures. During the proposed action's operation period, soil loss is estimated to be 233 t/ac/yr (CEC RSA, 2010), which is less than natural conditions. The wind erosion values calculated exceed the loss tolerance for the soils present at the site. Soil tolerance is the rate at which soils form and is expressed as the maximum amount of a soil that can be lost and still maintain long term productivity. The predicted rates of wind-induced erosion at the site are very high due to the high sand content (95% by weight) of the soil Series (CEC RSA, 2010).

With the implementation of Best Management Practices (BMPs), changes to soil erosion, in comparison to current conditions or a condition of no action, would be minimal during project operations. Further, the proposed action would utilize soil stabilizers within the solar array area to reduce the amount of dust deposited on the solar collectors. Selected soil stabilizers would be consistent with state and local regulations regarding the application of soil stabilization products within erodible soils. Post-construction actions would include dust control through periodic watering (see to Section 4-19 for volumes and additional discussion), placement of gravel berms and detention structures to control sediment loss, and management of stormwater runoff. The power block areas would be graded to direct runoff and divert stormwater to surface swales directed to one of the three relocated washes. Diversion ditches and the dispersion area would be designed to accommodate flow from a 100-year storm event. Roads and paved areas would be kept free of dust, dirt and visible soil materials. Materials would be kept on site to implement temporary control measures during the operational life of the project. Decommissioning activities would have similar soil disturbing impacts as compared to construction activities and would increase the potential for soil loss from wind erosion. With implementation of BMPs and with application of Mitigation Measure Soil&Water-13, *Closure and Decommissioning Plan*, soil loss would be minimal during decommissioning activities for wind-related erosion.

Water Erosion

The runoff designations for the soils affected during site grading range from negligible to high and have moderately rapid to rapid permeability. Infiltration at the site is expected to be moderate to rapid. The potential for soil loss by water erosion (sheet and rill erosion) was estimated using the Universal Soil Loss Equation (USLE) for pre-development, construction, post-development, and operational conditions (CEC RSA, 2010).

Soil loss estimates are; 0.25 t/ac/yr for undisturbed conditions, 1.01 t/ac/yr during construction, and 0.46 t/ac/yr during operations (CEC RSA, 2010). Water erosion from sheet and rill erosion under the present undisturbed conditions are considered minimal. High infiltration rates, flat slopes, and low rainfall contribute to the low water erosions rates. When soils are disturbed (e.g., during construction), erosion rates could increase and thereby cause an impact. During construction, the bulk density of soils would increase due to compaction from heavy equipment, decrease soil infiltration rates, and could cause greater runoff, especially during high-intensity, rainfall events (CEC RSA, 2010). However, the implementation of proper BMPs could adequately protect the soils on site through soil stabilization and erosion control, applied so as to channel and retain such flows on site during the construction period. Additional information on the impacts of stormflow events on soils, and the BMPs and other mitigation measures to be applied, is presented in Section 4.19, *Water Resources*.

Because soil surface disturbance for the proposed action would be greater than one acre, specific erosion control measures would be identified as part of the National Pollutant Discharge Elimination System (NPDES) General Construction permit and Storm Water Pollution Prevention Plan (SWPPP) required for construction. During construction, erosion control measures would utilize Construction Water Quality BMPs to avoid or minimize soil erosion and off-site sediment transport. Examples of typical construction BMPs include scheduling or limiting activities to certain times of the year, in particular to avoid flash floods; installing sediment barriers such as silt fences and fiber rolls along the perimeter of the active construction area; maintaining equipment and vehicles used for construction in excellent working condition; and developing and implementing a spill prevention and cleanup plan consistent with state and local requirements. The SWPPP (and associated BMPs) would be prepared and implemented prior to commencing construction, and BMP effectiveness would be ensured through sampling, monitoring, reporting, and record keeping requirements contained in the construction general permit. In addition, the general construction permit required under the NPDES program would require that the topsoil be preserved in areas requiring grading to ensure proper implementation of post-construction BMPs for site restoration. Decommissioning activities would have similar soil disturbing impacts as compared to construction activities and would increase the potential for soil loss from water erosion. With implementation of BMPs and with application of Mitigation Measure Soil&Water-13, *Closure and Decommissioning Plan*, soil loss would be minimal during decommissioning activities for water-related erosion.

Sand Transport

The proposed action intrudes into the Palen Dry Lake-Ford Dry Lake sand migration corridor by more than a mile, cutting its width in half. The action would create a “sand shadow” downwind

(Figure 4.14-1; PWA, 2010). As noted above, sand shadows are areas where the upwind supply of sand is cut off by wind fences and other infrastructure, but where existing sand continues to erode downwind, resulting in the loss of the fine sand on which dune habitats are dependent. See also Section 4.17, *Impacts on Vegetation Resources*, which provides considerable analysis of impacts of the proposed action and alternatives related to sand transport corridors and related dune habitat.

Previous studies have shown that sand shadows result in dune deflation, substrate coarsening and complete loss of dune habitat within 4-17 years (PWA, 2010). The proposed action would cut off a supply of sand that otherwise would have been transported downwind to other dune areas (PWA, 2010). Dunes downwind of the site would deflate over time as sand output would not be matched by sand input. Additionally, new sand that would have been transported across the project footprint from upwind areas potentially would be cut off by drainage ditches, wind fences and above ground infrastructure related to the project.

If developed as proposed, the project would cause a total of 970 acres of direct impact to dune areas within the sand transport corridor and 1,113 acres of indirect (sand shadow) impacts downwind of the project site where deflation and dune loss within the life of the project would likely occur (PWA, 2010). Most of the indirect impacts that would be caused by the proposed action would be within the most sensitive area for sand transport -- Zone 2. This also is the same area where the greatest population of MFTL is found. For more detailed discussion about potential impacts to MFTL, see Section 4.21, *Impacts on Wildlife Resources*. The BLM considers the impacts to sand transport that would result from the proposed action to be a regionally-significant impact.

Following decommissioning of the project, all structures would be removed. Application of Mitigation Measure Soil&Water-13, *Closure and Decommissioning Plan*, as described for soil erosion, above, would, in part, ensure restoration and revegetation of disturbed areas. Following decommissioning, direct and indirect impacts to sensitive dune habitat, sand migration, and sand transport processes would be removed. Natural sand migration and dune habitat processes would resume.

Alternatives

In addition to impacts of the proposed action, this analysis evaluated impacts of Reconfigured Alternative 1, Reconfigured Alternative 2 (Options 1 and 2) and the Reduced Acreage Alternative, as well as No Action Alternative A, and CDCA Plan Amendment/No Project Alternatives B and C. Reconfigured Alternative 2 was developed specifically to reduce impacts of the proposed action on the sand transport corridor and its associated dune habitat (PWA, 2010). Figure 4.14-2 summarizes the direct and indirect impacts of the proposed action and alternatives on Zones 2 and 3 from intrusion into the sand migration corridor and subsequent establishment of a sand shadow down wind. For some alternatives, the indirect impact in Zone 3 increases relative to the proposed action. This is due to the alternatives generally being configured to reduce the project footprint in Zone 2 and subsequently increase the project footprint in Zones 3 and 4 (PWA, 2010). Thus, some reductions in direct impact to Zone 2 were partially offset by increases in indirect impacts in Zone 3 (PWA, 2010).

Reconfigured Alternative 1

Reconfigured Alternative 1 would change the shapes of both Units 1 and 2. The approximately 180-acre increase in footprint required for Units 1 and 2 would have only a minor impact on the analysis results. Soil erosion at the site of Reconfigured Alternative 1 would result from construction and operation activities. Impacts related to implementation of mitigation measures to minimize soil erosion from wind and surface water are anticipated to be similar to those associated with the proposed action. Reconfigured Alternative 1-related construction activities would disturb soils at the site and along the linear facilities route(s). The highest potential for erosion, as well as associated effects including soil loss and increased sediment yields downstream from disturbed areas, would occur at the time of disturbance. BMPs would be implemented to minimize the impacts of soil erosion during construction.

Quantification of impacts to sand transport corridors is provided in Table 4.17-2, *Direct Impacts to Inner and Outer Sand Corridors and the Direct and Indirect Impacts to Sand Dune Habitat*. Overall, Reconfigured Alternative 1 would cause direct impacts to 187 more acres within the sand transport corridor than the proposed action, including 90 more acres of direct impact to Zone 2 and vegetated, deep dune habitat and 60 more acres of direct impacts to Zone 3 and vegetated, shallow dune habitat. Indirect impacts of Reconfigured Alternative 1 to Zone 2 would be 100 acres fewer than the proposed action, whereas indirect impacts of this alternative to Zone 3 would be 227 acres greater.

As described for the proposed action, as part of decommissioning activities, soil loss would be minimal during for water related erosion with implementation of Mitigation Measure Soil&Water-13, *Closure and Decommissioning Plan*. Following decommissioning, direct and indirect impacts to sensitive dune habitat, sand migration, and sand transport processes would be removed, and natural sand migration and dune habitat processes would resume.

Reconfigured Alternative 2

Option 1

Impacts would be essentially the same as the proposed action in regards to wind and water-related soil erosion during construction, operation, and decommissioning. The grading and drainage detailed design for Option 1 would differ slightly from the proposed action; however, the drainage concept and grading approach would be the same. Soil erosion at the Reconfigured Alternative 2 Option 1 site would be affected by construction and operation. Impacts related to mitigation measures to minimize soil erosion from wind and surface water would be similar to those of the proposed action. Construction of Reconfigured Alternative 2 Option 1 would disturb site soils at the site and along the linear facilities route(s). The highest potential for erosion and associated effects (including soil loss and increased sediment yields downstream from disturbed areas) would occur at the time of disturbance. BMPs and mitigation measures (Soil&Water-13) would be implemented to minimize impacts to soil erosion during construction, operation, and decommissioning.

Reconfigured Alternative 2 Option 1 would change the shape of Unit 1 to avoid use of the northeastern third of the proposed solar field to reduce interference with part of the regional sand transport corridor. The reconfigured shape of Unit 1 would not entirely remedy the proposed action's interference with the sand transport process, but would greatly reduce direct and indirect impacts to the sand transport corridors.

Quantification of impacts to sand transport corridors is provided in Table 4.17-2, *Direct Impacts to Inner and Outer Sand Corridors and the Direct and Indirect Impacts to Sand Dune Habitat*. Option 1 would dramatically reduce direct impacts to very sensitive Zone 2 and vegetated, deep dune habitat (140 acres as compared to the proposed action's 430 acres) as well as indirect impacts to Zone 2 (130 acres as compared to the proposed action's 970 acres). Reconfigured Alternative 2 Option 1 also would reduce indirect impacts to Zone 3 by causing impacts to 14 acres rather than the proposed action's 53-acre impact on this resource. Following decommissioning, direct and indirect impacts to sensitive dune habitat, sand migration, and sand transport processes would be removed, and natural sand migration and dune habitat processes would resume.

Option 2

Reconfigured Alternative 2 Option 2 would change the shape of Unit 1. Unit 2 would remain unchanged from the proposed action. Impacts would be essentially the same as the proposed action in regards to wind and water related soil erosion during construction, operation, and decommissioning. The grading and drainage detailed design for Option 2 would differ slightly relative to the proposed project; however, the drainage concept and grading approach would be the same. Soil erosion at the site of Reconfigured Alternative 2 Option 2 could be impacted by the construction and operation of the alternative. Impacts related to mitigation measures to minimize soil erosion from wind and surface water are anticipated to be similar to those associated with the proposed action. Reconfigured Alternative 2 Option 2 construction activities would disturb site soils at the site and along the linear facilities route(s). At the time of this disturbance, the potential for erosion and associated effects would be highest from soil loss and increased sediment yields downstream from disturbed areas. BMPs and mitigation measures (Soil&Water-13) would be implemented to minimize impacts to soil erosion during construction, operation, and decommissioning.

Quantification of impacts to sand transport corridors is provided in Table 4.17-2, *Direct Impacts to Inner and Outer Sand Corridors and the Direct and Indirect Impacts to Sand Dune Habitat.* Option 2 would result in dramatically reduced direct and indirect impacts to Zone 2: 150 acres of direct impacts rather than the proposed action's 430 acres; and only 130 acres of indirect impacts rather than the proposed action's 970 acres. Indirect impacts of Reconfigured Alternative 2 Option 2 also would cause 37 fewer acres of indirect impacts to Zone 3. By contrast, direct impacts of Option 2 to Zone 3 would be 100 acres greater than would result from the proposed action. Following decommissioning, direct and indirect impacts to sensitive dune habitat, sand migration, and sand transport processes would be removed, and natural sand migration and dune habitat processes would resume.

Reduced Acreage Alternative

The Reduced Acreage Alternative would follow boundaries similar to those of the Reconfigured Alternative, but it would be about 25% smaller, occupying about 2,080 acres of land (as compared with 2,740 acres required for Units 1 and 2 of the proposed action). Impacts to soil erosion from wind and water would be the same as the proposed action for construction, operation, and decommissioning. Long-term construction impacts relating to soil erosion would be reduced since the construction period would be reduced and less land would be disturbed.

Of any of the alternatives, the Reduced Acreage Alternative would have:

1. The lowest direct impact on sand transport corridor Zone 2: 9 acres as compared to the proposed action's 430 acres of impact;
2. The lowest indirect impacts on sand transport corridor Zone 2: 55 acres as compared to the proposed action's 970 acres of impact; and
3. The lowest direct impacts to Zone 3: 290 acres of impact as compared to the proposed action's 540 acres of impact.
4. Indirect impacts of the Reduced Acreage Alternative to Zone 3 would be 184 acres greater than the proposed action.

Following decommissioning, direct and indirect impacts to sensitive dune habitat, sand migration, and sand transport processes would be removed, and natural sand migration and dune habitat processes would resume.

No Action Alternative A

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would remain in its existing condition, with no new structures or facilities constructed or operated on the site and no resulting ground-disturbance related impacts to soils or sand transport. Erosion would occur in a manner consistent with existing conditions relating to wind and stormwater runoff. However, the project site could become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative B

Because the CDCA plan would be amended to make the area unavailable for future solar development, it is expected that the site would remain in its existing condition, with no new solar energy-related structures or facilities constructed or operated on the site and no soil erosion or sand transport impacts. Erosion would occur in a manner consistent with existing conditions relating to wind and stormwater runoff. In the absence of the project, other renewable energy projects could be constructed to meet State and Federal mandates. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative C

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. As a result, impacts to soils from erosion and sand transport impacts within the sand migration corridor would result from the construction and operation of the solar technology and resulting ground disturbance and would likely be similar to the impacts to soils as the proposed action. Different solar technologies require different amounts of grading; however, it is expected that all solar technologies would require grading and maintenance. As such, this alternative could result in impacts to soils and sand transport similar to the impacts under the project.

4.14.3 Discussion of Cumulative Impacts

Impacts resulting from construction, operation, maintenance and decommissioning of the project could result in a cumulative effect on soils resources with other past, present, or reasonably foreseeable future actions, as discussed in Section 4.1.4, *Cumulative Scenario Approach.* The geographic scope of the cumulative effects analysis for soils is comprised of: (a) the Mojave Desert Air Basin because wind can transport soils offsite, and (b) the watershed boundary because surface flows also could carry eroded soils off-site. Potential cumulative effects on soils resources could occur at any point during the overall lifespan of the project, from pre-construction activities to the conclusion of facility closure and site restoration.

Existing conditions within the cumulative impacts analysis area reflect a combination of the natural condition and the effects of past actions and are described in this Chapter 3, *Affected Environment*. Direct and indirect effects of the proposed action are discussed above. In general, construction and decommissioning of the proposed action would result primarily in construction-related changes at the site that would increase local wind-borne soil erosion and storm water runoff-related erosion. As a result of the implementation of the mitigation measures summarized below, the proposed action and alternatives would be expected to contribute only a small amount to any possible construction –related erosion impact. Operation of the proposed action or alternatives would result in permanent changes at the project site. These changes could incrementally increase local soil erosion and storm water runoff-related erosion. Incremental contributions to air- or water-born erosion and sedimentation could combine with the incremental impacts of other past, present and reasonably foreseeable future actions making up the cumulative scenario (see Section 4.1.4, *Cumulative Scenario Approach*). Construction, operation and maintenance and closure and decommissioning activities, including grading, compaction, drilling, back-filling, driving on unpaved roadways, etc., could disturb soils at any work site, regardless of the type of project and regardless of the phase of its development. However, the combined vegetation removal anticipated as a result of the numerous proposed utility-scale renewable energy projects, including the proposed action, could expose soils to higher wind-borne erosion rates than the area otherwise would be exposed to. This also could exacerbate runoff rates, especially during high intensity, short duration rainfall events. The Reconfigured Alternative 1, Reconfigured Alternative 2, Reconfigured Alternative 3, Reduced Acreage Alternative and No Action Alternatives could be expected to contribute to a cumulative impact on soil resources in proportion to the amount of soil disturbance that could occur pursuant to each, but also based on their respective degrees of interference within each soil zone, as discussed previously.

During operations, the proposed action and alternatives would contribute substantially to cumulative impacts to sand dunes and related features, which provide habitat for species such as MFTL and several rare plants, such as Harwood's milkvetch. These contributions would be especially serious in light of anticipated indirect effects from obstructed winds and sand transport. As summarized in Table 4.17-5, the proposed action would contribute substantially to cumulative impacts from proposed and future projects in Chuckwalla Valley and NECO Planning Area. Following decommissioning, direct and indirect impacts to sensitive dune habitat, sand migration, and sand transport processes would be removed. Natural sand migration and dune habitat processes would resume and, thereby, avoid or reduce the project's contribution to cumulative sand migration impacts within the region.

4.14.4 Summary of Mitigation Measures

Implementation of the mitigation measures imposed by the Energy Commission as Conditions of Certification for the proposed action would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in Appendix B. The following would address impacts associated with soils resources:

1. Implementation of an erosion and sedimentation control plan (CIVIL-1)
2. Implementation of an Air Quality Construction Mitigation Plan (AQCMP) that includes wind erosion control techniques such as windbreaks, water, chemical dust suppressants, and/or vegetation (AQ-SC3) and an Operations Dust Control Plan for the site that describes such techniques (AQ-SC7)
3. Implementation of standard erosion control measures near desert washes and stabilization of all disturbed soils and roads within the site to reduce erosion potential during and following construction (BIO-8)
4. Approval of the final grading plans (including final changes) for erosion and sedimentation control work (CIVIL-4)
5. Implementation of a Drainage Erosion And Sedimentation Control Plan (DESCP) (SOIL&WATER-1)
6. Revised project drainage report and plans that consider the potential failure of the earthen berm located along the Corn Spring Wash crossing under I-10, detailed analysis and documentation demonstrating that onsite swales and drainage channels have adequate capacity to ensure that overtopping will not occur, etc. (SOIL&WATER -8)
7. A detailed hydraulic analysis utilizing FLO-2D which models pre- and post-development flood conditions for the 10-, 25- and 100-year storm events (SOIL&WATER-9)

8. Drainage Channel Design (SOIL&WATER-10)

9. Channel Erosion Protection (SOIL&WATER-11)

10. Channel Maintenance Program (SOIL&WATER-12)

11. Closure and Decommissioning Plan (SOIL&WATER-13)

12. Implementation of BIO-20 designed to address impacts to sand transport corridors and related dune habitat would offset the proposed action's direct contribution to the loss of habitat. It would not reduce the associated significant indirect effects of disrupted sand transport on downwind habitat. Accordingly, even with implementation of Condition of Certification BIO-20, residual impacts to sand-dependent landforms and species contributed by the PSPP would remain considerable. By contrast, the implementation of BIO-20 in connection with Reconfigured Alternative 2 (either option) effectively would reduce all direct and indirect impacts to sand transport and related habitats and species – no residual impacts would remain.

13. In order to ensure that water quality is protected, including groundwater and surface runoff during storm events, the applicant shall avoid the use of soil stabilizers on site which contain oils or salts, such that those oils or salts could become entrained in surface or groundwater and lead to water quality degradation.

4.14.5 Residual Impacts after Mitigation Measures were Implemented

Even with the implementation of the mitigation measures identified above to address potential impacts of the proposed action and alternatives related to erosion, some residual impacts are likely to remain due to the increased soil losses from construction, operation, and decommissioning.

With respect to impacts to sand transport corridors and related dune habitat, residual impacts would remain for the proposed action even after implementation of BIO-20; no such residual impacts would remain following the implementation of this measure in connection with the development of either option under Reconfigured Alternative 2.

4.14.6 Unavoidable Adverse Impacts

Impacts to soil resources particularly in relation to sand transport corridors and local sand transport processes would be unavoidable and adverse unless the proposed action is reconfigured to avoid the obstruction of sand transport processes.

4.15 Impacts on Special Designations

4.15.1 Impact Assessment Methodology

The CDCA Plan serves as a guide for the management of all BLM-administered lands in three desert areas: the Mojave, the Sonoran, and a small portion of the Great Basin. The CDCA Plan covers approximately 25 million acres, of which 12 million are public lands. The primary goal of the CDCA Plan is to provide overall maintenance of the land while planning for multiple uses and balancing the needs of people with the protection of the natural environment (BLM, 1980).

The NECO Plan is a landscape-scale, multi-agency planning effort that protects and conserves natural resources while simultaneously balancing human uses of the California portion of the Sonoran Desert ecosystem (e.g., the Colorado Desert) (BLM CDD, 2002). The NECO Plan amended the CDCA Plan. The CDCA Plan/NECO Plan is the comprehensive Federal land use and planning document for BLM and other public lands in the project area. The NECO Plan incorporated 23 wilderness areas (totaling over a million acres) established by the 1994 California Desert Protection Act in the CDCA. Areas of Critical Environmental Concern (ACECs) were designated within the NECO Plan for further development of site-specific conservation management actions. While desert wildlife management areas (DWMAs) were designated for conservation of species and habitats. DWMA's are managed as ACECs and feature a 1 percent limit on new[1] ground disturbance[2]. Since wilderness areas, the Chuckwalla DWMA and ACEC's are the only special designation that could be impacted by the project, this section was prepared using information from the CDCA/NECO Plans.

4.15.2 Discussion of Direct and Indirect Impacts

Proposed Action

There are no special designations on the project site and no new designations or amendments to existing designations that would include the site. However, the proposed action could cause a direct impact on the Chuckwalla DWMA/ACEC because approximately 4.5 miles of the redundant telecommunication line and 0.25 mile of the proposed gen-tie line would be constructed within the DWMA. The Chuckwalla DWMA/ACEC, which is mostly located south of I-10 in the eastern Chuckwalla Valley, consists of approximately 820,100 acres of which 465,300 acres (57%) are BLM lands, 187,800 acres (23%) are military lands, and 167,000 acres (20%) are State and private lands (Redlands Institute, 2002). In NECO, the BLM has designated the Chuckwalla DWMA as an area of "critical environmental concern" to protect Desert tortoise and other significant natural resources including special status plant and animal species and natural communities. Much of this area is within the Desert Tortoise Recovery Plan (Eastern Colorado Recovery Unit). Since the redundant telecommunications line would be hung on an existing 12.47 kV line, there would be no clearing, excavating, grading or other manipulation of the terrain; however, the gen-tie line could

1 The Record of Decision for the NECO Plan was signed on December 12, 2002.

2 New ground disturbance includes any clearing, excavating, grading or other manipulation of the terrain, whether or not a permanent use is proposed for the site.

result in 3.63[3] acres of impacts within the DWMA/ACEC. Since certification of the NECO ROD, there has been approximately 7.25 acres of permanent surface disturbance within the Chuckwalla DWMA/ACEC. The addition of 3.63 acres associated with the project would not exceed the one percent limit (not more than 8,201 acres of new surface disturbance) established under the NECO Plan. Therefore, the project would not result in an adverse effect to the Chuckwalla DWMA/ACEC.

The proposed action would not impact the other five ACECs located within 20 miles of the site because these areas were established to protect biological and cultural resources; visitor use in these areas is a secondary resource benefit. The Palen Dry Lake ACEC is located approximately 0.5 mile northeast of the project; it is approximately 3,632 acres in size and is managed as Multiple Use Class-M for the protection of prehistoric resources (BLM, 1980). The approximately 2,467-acre Corn Springs ACEC is located about 5.5 miles southwest of the site. Alligator Rock ACEC consists of 7,754 acres located six miles west of the site; it was established to protect archeological values (BLM, 1980). The Desert Lily Preserve ACEC consists of about 2,055 acres located six miles northwest of the site; it was established to protect botanical values (BLM, 1980). The 2,273-acre Chuckwalla Valley Dune Thicket ACEC is located approximately 17 miles southeast of the site; it is managed as Multiple Use Class M to protect wildlife habitat, specifically that of the desert tortoise. Therefore, since no project facilities would be located within these ACECs, there would be no adverse effects from the implementation of the project.

Indirect short-term or long-term impacts could result from the project to wilderness users' opportunities for solitude, and primitive unconfined recreation due to construction, operation or decommissioning activities in any of the surrounding wilderness areas. See also, Section 4.16, *Impacts on Transportation and Public Access - Off Highway Vehicle Resources*, Section 4.18, *Impacts on Visual Resources*, and Section 4.12, *Impacts on Recreation*, which discusses and finds no indirect impacts to recreational users, including those using wilderness areas and ACECs from air quality and noise would occur through implementation of the project.

Alternatives

Reconfigured Alternative 1

The Reconfigured Alternative 1 would have the same impact on special designations as the project because the gen-tie route would be the same. Therefore, like the project, there would be no adverse effects to special designations.

Reconfigured Alternative 2

The Reconfigured Alternative 2 Options 1 and 2 would have the same impact on special designations as the project because the gen-tie route would be the same. Therefore, like the project, there would be no adverse effects to special designations.

[3] For purposes of a conservative analysis, BLM assumes the permanent disturbance would include the 120 foot wide by 0.25 mile long corridor since the exact number of poles to be installed within the DWMA is not available at this time.

Reduced Acreage Alternative

The Reduced Acreage Alternative would have the same impact on special designations as the project because the gen-tie route would be the same. Therefore, like the project, there would be no adverse effects to special designations.

No Action Alternative A

For the No Action Alternative A, where the requested ROW would not be granted and no CDCA Plan amendment would occur, there generally would be no direct or indirect impacts to special designations. Instead, the project site would be available to other uses consistent with CDCA Plan use opportunities, potentially including another renewable energy project. However, insufficient information is available at this time about what other uses would be made of the site to allow for a meaningful analysis in this PA/FEIS.

CDCA Plan Amendment /No Project Alternative B

For the CDCA Plan Amendment/No Project Alternative B, where the requested ROW would not be granted and the CDCA Plan would not be amended to find the proposed site unsuitable for any type of solar energy development, impacts to special designations and associated effects could be similar to the proposed action if another type of renewable energy project were constructed. However, insufficient information is available at this time about what other uses would be made of the site to allow for a meaningful analysis in this PA/FEIS

CDCA Plan Amendment /No Project Alternative C

For the CDCA Plan Amendment/No Project Alternative C, where the ROW for the proposed action would not be granted and the CDCA would be amended to find the proposed action area suitable for any type of solar energy development, impacts to special designations and associated affects could be similar to the proposed action as other types of solar energy projects may be constructed.

4.15.3 National Park Service

The purpose of this subsection is to summarize the direct, indirect and cumulative impacts of the project on lands under the authority of the National Park Service; namely, Joshua Tree National Park (JTNP) and Joshua Tree Wilderness. The impacts are summarized below for the topics of viewshed, air quality, noise, wildlife, construction workers, and dark skies.

Viewshed

Direct Impacts

The proposed action would not result in direct physical modification to any portion of JTNP or its visual appearance for visitors. Instead, the proposed action would have a direct impact on views of the Chuckwalla Valley experienced by users of the portion of the park that would be within the project’s viewshed. The Chuckwalla Valley as seen from JTNP is relatively unencumbered by visual disturbances, although several small population centers (e.g., Desert Center and Lake Tamarisk) and utility corridors presently constitute cultural modifications that distract slightly from the valley's natural appearance. Due to the location of the project and its size and character, which would be largely industrial; it would have the potential to adversely affect the wilderness and solitude experience for backcountry hikers that access those portions of JTNP with views of the Chuckwalla Valley.

As analyzed elsewhere in this PA/FEIS, visitor use in this portion of JTNP is estimated to be low. The highly visited areas of JTNP—those with facilities that serve visitors, such as campgrounds, picnic areas, ranger stations, and developed trails—are further west and outside of the project's viewshed. There are only minor differences between alternatives in terms of the viewshed within JTNP boundaries. JTNP as a whole is approximately 800,000 acres; it is estimated that the project would be visible from a very small part of the park, i.e., less than one percent of the park's geographic area, and by a far lesser fraction of the park's visitors (see viewshed Figure 3.19-3).Further, all portions of JTNP are further than 5-miles in distance away from the project, transmission line and substation. For these reasons, the general impact to the visitor experience is expected to be low. The project's visual contrast from within park boundaries is estimated as follows:

KOPs 2 and 3 (Figures 4.18-6 and 4.18-7) provide two low-elevation views from the boundary of Joshua Tree Wilderness on the southeast side of the Coxcomb Mountains. This is the closest portion of Joshua Tree Wilderness to the project. As discussed in Section 4.18, *Impacts on Visual Resources*, simulations of the project into these views indicates a weak visual contrast within the landscape (for contrast definitions, see Table 3.16-1). This is due in large part to the effect of perspective foreshortening, which reduces the apparent size and scale of the Project due to a low elevation difference and the narrow angle of view. KOPs 2 and 3 are both over five miles away from the closest parts of the project; and the Eagle Mountains (a part of JTNP further west of the Coxcomb Mountains) are over 10 miles from the project. While elevated and mountainous portions of JTNP are further removed in distance, the increase in elevation would cause the size and shape of the Project to become increasingly apparent. As viewed from higher elevations, the level of contrast in form, line, and texture would increase substantially; but this increase in contrast would be tempered by a decreased dominance of the Project within the landscape as views become increasingly regional and expansive. From elevated portions of JTNP within the project's viewshed, the project could be visible, but it is unlikely to attract viewer attention due to the distances involved and because the more interesting and appealing elements of the scene would dominate viewer attention (i.e., sky, rugged mountain ranges and broad desert basin). There may be periods in the late afternoon when the parabolic mirrors, the viewer, and the sun are aligned, that the project would generate glint or glare (discussed in Section 4.18, *Impacts on Visual Resources*). During such periods, the project would create a greater contrast in the landscape and may attract viewer attention; however, it would not dominate the landscape due to the small portion of view that would be affected (i.e. moderate visual contrast).

During construction, dust plumes would be controlled using dust palliatives and limiting vehicle speeds, and through implementation of air quality measures AQ-SC3 and AQ-SC4, as described in the air resources analysis in Section 4.2, *Impacts on Air Resources*. Light pollution would be minimized with the implementation of mitigation measure MM-VR-3 and BLM-VIS-2. Other mitigation measures to reduce the Project's contrast in the landscape (e.g., VIS-1, VIS-2, VIS-4, BLM-VIS-1, and TRANS-6) would result in a moderate reduction in visual contrast in color and texture of the Project as viewed from elevated vantage points, but would not reduce the overall form and line contrasts of the project (which is primarily due to the shape, size and layout of the project).

For the reasons above, impacts to views of the Chuckwalla Valley for backcountry hikers accessing the eastern ends of JTNP would be minor, but elevated to moderate levels during periods of glare.

Indirect Impacts

There are no indirect effects on the viewshed.

Cumulative Impacts

Due to the number and extent of projects in the cumulative scenario, visual disturbances would dominate views of the Chuckwalla Valley from elevated vantage points in JTNP, resulting in a strong contrast with the existing visual environment. Affected viewers (backcountry hikers) would witness industrial landscapes and activities that are out of character with the desert landscape. The potential solar development areas, in combination, would be within the 15-mile viewshed of 14 percent of JTNP (Solar PEIS, 2010). Other projects within the cumulative scenario that are adjacent or west of the project are likely to affect a similar or greater area of JTNP than the project (see Figure 3-1). Given the project would be visible from less than one percent JTNP, it would represent a minor contributor to cumulative visual impact on NPS land. As discussed in Direct Impacts, above, the project on its own would have a minor to moderate impact on views of the Chuckwalla Valley for low numbers of backcountry hikers. This is primarily because the project would not dominate the view of the valley as a whole. However, the addition of numerous other projects in the cumulative scenario would substantially alter the character of the valley and result in strong levels of visual contrast (Solar PEIS, 2010). This would lessen the feeling of solitude, isolation and wilderness that is enjoyed by backcountry users of JTNP. Mitigation measures VIS-1 through VIS-4, and BLM-VIS-1 would lessen the adverse effects of a sprawling industrialized landscape along the surface of the I-10 corridor, as a result of the development of the cumulative scenario. The cumulative visual impact, however, would remain considerable due to the number and extent of projects that would disturb the Chuckwalla Valley landscape, although the project's contribution as seen from JTNP would be minor.

Air Quality

Direct Impacts

Section 4.2, *Impacts on Air Resources*, acknowledges that fugitive dust from project-related construction activities would create a temporary visual distraction for some users of JTNP. A detailed discussion of project-related fugitive dust and mitigation measures is presented in Section 4.2, *Air Resources*. Fugitive dust emissions during construction of the solar farm would occur primarily during daytime hours. The Applicant would implement a dust control plan that would include the use of dust suppressants during facility construction. Airborne dust generated from the site would be widely dispersed and greatly reduced in concentration by nighttime hours. Construction activity would be phased across the solar farm site over several months, limiting the amount of disturbed area that could produce fugitive dust from wind erosion at night. Therefore, project construction activities would not be expected to produce adverse changes in night sky visibility caused by fugitive dust, for users of JTNP.

Indirect Impacts

Development of the proposed action would replace natural vegetation and ground surface conditions with cleared land, solar troughs, buildings, equipment pads, gravel roads, and related features. There would be a change in wind erosion conditions associated with these land surface changes. However, it is estimated that development of the project would result in long-term reductions in fugitive dust emissions that would primarily be attributed to implementation of mitigation that would require the periodic application of dust palliatives. Therefore, development of the project would not be expected to increase the wind erosion susceptibility of the site. The net change in wind erosion would not be detectable by visual observation.

Cumulative Impacts

As discussed above, the project would not produce major dust-related changes in night sky visibility. The air quality effects from construction would not last long enough to alter current federal or state attainment status designations for particulate matter emissions for the project area. The timing for approval and construction of other cumulative projects could overlap with part of the construction period for the project. Consequently, there is the potential for short-term adverse cumulative fugitive dust effects from the project, in combination with other cumulative projects. All cumulative projects also would need to comply with local ordinances prohibiting nuisances or requiring dust control. Direct particulate matter emissions, such as fugitive dust emissions from construction activities, generally would have a more localized effect, with the most noticeable effects occurring within one-half mile or less of active construction sites. Fugitive dust emissions would be widely dispersed and greatly reduced in concentration with distance from the source. Due to the long distance between JTNP and the project and cumulative projects, and incorporation of dust control measures, the cumulative effects to night sky visibility, as a result of dust-related changes would not have an appreciable effect. Operational emissions would be minor and would not have the potential to increase regional cumulative emissions.

Noise Impacts

Direct Impacts

As indicated in Section 4.9, *Impacts on Noise*, noise from construction activity would generally be audible at locations less than 0.5 mile from the proposed site. Operational activities at the site would not generate substantial noise. During construction, the number of employees and vehicles present on the site on any given day is not expected to generate off-site adverse noise effects. It is unlikely that noise levels associated with construction or operations of the project would be audible at JTNP. Therefore, project construction and operational activities would not result in adverse noise-related effects on users of JTNP. A detailed discussion of the noise-related effects that would be associated with the project is presented in Section 4.9, *Impacts on Noise*.

Indirect Impacts

There would be no indirect noise-related effects associated with the project.

Cumulative Impacts

Cumulative noise effects would occur if multiple projects would happen in the same geographic areas at the same time or when sequential projects extend the duration of noise effects in a given area over a longer period of time. Current ambient noise conditions represent the cumulative effect of noise generation on a local geographic scale. Except for the I-10 vicinity, existing noise levels in the project vicinity are generally low. As indicated in Table 4.1-1, *Cumulative Scenario*, none of the cumulative projects has the potential to cause noise impacts that could interact with those of the proposed action to cause cumulative noise effects for the JTNP because the geographic extent of stationary construction-related noise of the project would be limited to distances of 1,000 feet, which is considerably shorter a distance than the nearest point of the JTNP to the project site.

Wildlife

Direct Impacts

There would be no direct impacts to wildlife within the JTNP and Joshua Tree Wilderness as construction and operation of the project would occur outside of Park or Wilderness area boundaries.

Indirect Impacts

The development of the proposed site would result in a permanent conversion of desert habitat to industrial/commercial uses within the NECO planning area, which includes the JTNP and the Joshua Tree Wilderness area. The loss of intermountain and foraging habitat would have indirect impacts to the long-term viability of wildlife that are found in or use the surrounding National Parks and Wilderness areas.

Intermountain movements provide a genetic connection with a larger metapopulation and are the source of colonization of vacant habitat. Intermountain areas of the desert floor that bighorn sheep traverse between mountain ranges are as important to the long-term viability of populations as are the mountain ranges themselves. Actions that impair the ability of bighorn sheep to move between mountain ranges include fencing along highways or other boundaries, canals, and high densities of human habitation. These will limit the potential for natural colonization and gene exchange, both of which are key to metapopulation viability. As discussed in Section 4.21, *Impacts on Wildlife Resources*, impacts of the project related to wildlife movement and connectivity would be addressed by the implementation of mitigation measures BIO-9.

Cumulative Impacts

Land use in the cumulative analysis area historically has been altered by human activities, resulting in conversion of undeveloped land and habitat loss, fragmentation, and degradation. Reasonably foreseeable future projects that could impact biological resources in the cumulative impacts area characterize overall development trends in the NECO planning area. Ongoing development in the area is dominated by renewable energy development. Major renewable projects require extensive access roads and new transmission lines to interconnect with the existing electrical grid. Other projects in the cumulative study area include several transmission lines and non-renewable energy development, as well as residential and commercial development (see Table 4.1-1). In consideration of the existing and future development in the region, the project would contribute to cumulative impacts on wildlife movement between the JTNP and wilderness areas and foraging habitat potential used by wildlife within JTNP and Joshua Tree Wilderness Area.

The incremental effects to these areas would be addressed by the implementation of mitigation measures summarized in Section 4.21.4, *Summary of Mitigation Measures*, and set forth in full in Appendix B.

Dark Skies

Direct Impacts

During construction, dusk-to-dawn security lighting would be required for the construction staging areas, parking area, construction office trailer entries, and other areas site access points, and the security guard booth. Most of these areas would be concentrated on relatively small areas of the proposed 2,970-acre project site. Lighting is not planned for typical construction activities because construction activities would occur primarily during daylight; however, if required, any lighting would be limited to that needed to ensure safety and would be temporary. Security lighting during operations would be limited to shielded, down-directed, area-specific lighting for the O&M facility, power blocks, switchyard, main entrance gate, and security guard booth. Service lighting would be provided by floodlights, which would be controlled by a local switch or lighting contactor and would only be used during the course of maintenance and emergency activities. Temporary portable service lighting could be used occasionally in other portions of the solar farm for operations and maintenance activities.

As described above, the lighting footprint of the project during construction and operation would be largely confined to small areas of the site. The Project Area as a whole would never be flooded with light. While it is not feasible to totally eliminate the amount of back-reflected light from shielded, down-directed lamps, the presence and extent of nighttime operations and maintenance lighting would not be substantially out of character with other existing lighting sources found scattered throughout the Chuckwalla Valley (see Chapter 4.18, *Impacts on Visual Resources* for a description of existing light sources). As such, the project represents a minor addition to the total nighttime light environment within the Chuckwalla Valley and the project is unlikely to contribute much to sky glow given that skies remain dark in spite of the presence, extent and character of existing light sources. Further, the visitor use of the eastern end of JTNP is considered low and the project would be visible from less than one percent of the park, as discussed in the viewshed section. Detailed information on the location, intensity and type of light sources would be specified in the lighting plan to be developed during the project's final design phase. Further, Mitigation Measure VIS-3 and BLM-VIS-2 (see Chapter 4.18, *Impacts on Visual Resources*) provides performance standards to be met in the development and implementation of a lighting plan.

Indirect Impacts

A decrease in night sky visibility via sky glow is an effect that is not limited to the project's viewshed. Light sources many miles away can decrease the visibility of the night sky for people in areas outside of the viewshed (e.g., the portion of JTNP that has developed visitor serving facility but is outside the Project's viewshed). However, as described above, the project's contribution to the existing light environment, with mitigation, would be minor.

Cumulative Impacts

Due to the number and extent of projects in the cumulative scenario, the lighting requirements of the solar facilities and other projects would have an appreciable effect on the visibility of the night sky for users of JTNP. Lighting mitigation requirements for individual projects are unlikely to reduce the cumulative effect to dark skies, and in combination, would be substantially out of character with the existing light environment. However, the project, due to its distance away from the JTNP relative to other projects in the cumulative scenario, would have a minor contribution to a cumulatively adverse visual impact.

Construction Workforce

Direct Impacts

There would be no direct impacts from project construction workers to JTNP and Joshua Tree Wilderness resources as construction and operation of the project would occur outside of JTNP and Wilderness area boundaries.

Indirect Impacts

The NPS has potential concerns that project construction workers might choose to camp within JTNP either at NPS-designated campsites or informally and commute daily to work at the proposed site.

Any impacts associated with construction workers for the project would be temporary and indirect. The majority of the project construction workforce would be Riverside County residents. project construction is expected to require an average of 566 employees over the 39-month construction period, with manpower requirements peaking at approximately 1,140 workers in Month 17 of construction.

Research shows that construction workers would commute as much as two hours each direction from their communities rather than relocate and the Applicant has indicated that the labor force for the project would be derived from Riverside County to the extent possible. The socioeconomic information and analysis in Section 4.13, *Social and Economic Impacts*, determine that there are more than sufficient unemployed Riverside County residents to meet the project's construction workers needs. Consequently, it is expected that minimal population in-migration would occur as a result of the project construction.

Similarly, it also is unlikely that the construction workforce would require housing in excess of the existing supply. Based on the data and analysis in Section 4.13, *Social and Economic Impacts*, any in-migration by the construction workforce could be accommodated by the available hotel rooms and housing vacancies in nearby cities.

Most of the JTNP campgrounds are located in the northwest area of the park and are too great a distance for project construction workers to commute from on a daily basis. Only the Cottonwood Campground is readily accessible from I-10. The campground has 62 individual sites available on a first-come first-served basis year round. There are also three group sites that can be reserved. There is a 30-day camping limit each year for park visitors (of which at most 14 nights total may occur from October through May). The Cottonwood Campground would likely be 45 minutes to an hour's drive from the proposed site. The campground has basic camping amenities of water and a dump station for RVs but no shower facilities or utility hook-ups are available. Consequently, the campground would likely have a limited attraction as overnight accommodations for project workers.

Informal camping by construction workers could be an issue in the areas of JTNP that are closest to the project site and less visited by other park visitors or park rangers. Proposed mitigation measure MM-NPS-03 specifically identifies measures to reduce the likelihood of informal camping occurring by project workers. Given these measures and the absence of any support facilities, informal camping within JTNP would likely have a limited attraction as overnight accommodations for project workers resulting in a minor impact on the NPS camping facilities and natural resources from construction workers.

Cumulative Impacts

Depending on their locations, other solar projects near the JTNP may cause similar impacts compared to the project. However, the other solar projects are either a similar or greater distance from the JTNP and therefore would be expected to have an equal or lesser impact (on a per worker basis) on park resources. As discussed in Section 4.13, *Social and Economic Impacts*, there will be sufficient employable Riverside County residents to meet the projects' cumulative construction workers needs. It is therefore expected that minimal population in-migration would occur as a result of the construction of the currently foreseen solar construction projects in Riverside County. Furthermore, there are substantial housing and overnight accommodations available in the region to meet any demand for project workers to temporarily relocate closer to their project site. Consequently, there would be a minor cumulative impact on the NPS camping facilities and natural resources from construction workers.

Mitigation Measures

The Record of Decision or ROW grant stipulations will recognize an Interagency Agreement between the BLM and NPS. This Interagency Agreement will establish roles and responsibilities, and the agencies will work cooperatively with the Applicant to develop an Environmental and Construction Monitoring and Compliance Program (ECMCP). The NPS will significantly contribute to the development of detailed criteria in the lighting, dust control, and noise mitigation and monitoring for the Project.

MM-SD-01: The NPS shall be afforded the opportunity to review and comment on the following pre-construction plans required for the project prior to approval of the plans by the BLM and CPUC: the Weed Management Plan (BIO-14), Dust Control Plans (AQ-SC-3 and AQ-SC-7), and Construction Traffic Control Plan (TRANS-4). Review and comment by the NPS must be within time frames specified by the BLM.

MM-SD-02: The Applicant shall enter into a funding agreement or other financial mechanism, as may be specified in the ROD or ROW grant, to reimburse the NPS for reasonable costs incurred in the monitoring of the following measures (whether applicant-proposed or BLM-recommended) to address temporary indirect impacts on the Joshua Tree National Park:

1. *Fugitive dust*: AQ-SC-3 and AQ-SC-7, requiring the development and implementation of dust control plans during construction and operations, and SOIL&WATER-1(H), requiring the development and implementation of measures designed to prevent wind and water erosion including application of chemical dust palliatives after rough grading to limit water use.
2. *Noise*: NOISE-6, limiting most construction activity to daytime hours.
3. *Nighttime lighting*: VIS-3, requiring the design and installation of a lighting mitigation plan concerning temporary and permanent exterior lighting.

MM-SD-03: A Signage and Guidance Plan shall be developed for JTNP by the Applicant and reviewed and approved by both the NPS and the BLM prior to the start of construction of the project. The intent of this plan is to address the potential indirect effects on NPS land as a result of the influx of workers associated with the mobilization, construction, and demobilization of the project. The plan shall include the following elements:

1. Design and installation of directional and informational signage that identify areas of JTNP available for day, overnight, and long-term stays; off-limit areas; and pertinent park rules and regulations;

2. Design and installation of strategically placed gates, bollards, or the like, inside the boundary of JTNP, where deemed necessary, for the purpose of vehicular control on NPS parkland located nearest the project boundary;

3. Educational instruction for project construction workers on park rules and regulations pertinent to JTNP and Joshua Tree Wilderness Area. This instruction shall be integrated into the Worker Environmental Awareness Program;

4. Requirements for the retention and/or removal of any items installed as part of the plan following completion of construction of the project; and,

5. Funding mechanism for implementing the plan.

Items installed as part of the plan shall have a nexus to the NPS's need to address the likely impacts associated with above normal numbers of users of JTNP facilities during the mobilization, construction, and demobilization period of the project.

4.15.4 Discussion of Cumulative Impacts

Incremental impacts on areas with special designations resulting from the project could combine with the incremental impacts of past, present, or reasonably foreseeable future actions to cause or contribute to a cumulative impact. The area established for potential cumulative impacts on these specially designated areas includes the range of areas from which sights, sounds, structures and other activities or developments could affect wilderness users' opportunities for solitude, naturalness and unconfined recreation within the Palen/McCoy, Big Maria Mountains, Little Chuckwalla Mountains, and Joshua Tree Wilderness Areas as well as the Chuckwalla DWMA/ACEC. Potential cumulative impacts could occur for the entire duration of the proposed action, from the initiation of construction to the conclusion of facility closure and site restoration.

Existing conditions within the cumulative impacts area reflect a combination of the natural condition and the effects of past actions and are described in Chapter 3, *Affected Environment*. Potential project-specific impacts are analyzed above. Past, present and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1.4, *Cumulative Scenario Approach.* Numerous energy-related development projects, including the proposed action, would adversely affect the viewscape by adding structures, fences and other features that could cause glint or glare or otherwise interrupt landscape views; would cause increased noise caused by equipment required for construction and operation, motor vehicle use, voices, music or other worker-related sounds; and would add facilities and structures to the landscape that are not currently present. Any of these activities individually or in combination could cause some users to seek out other areas of the desert for their wilderness activities and experiences.

Additionally, future foreseeable projects including the Devers-Palo Verde 2 Transmission Line Project (approximately 13 acres), Desert Southwest Transmission Line (499 acres), and the Red Bluff Substation (90 acres) could result in approximately 602 acres of new surface disturbance within the Chuckwalla DWMA ACEC (BLM and IID, 2005).

These potential cumulative impacts on specially-designated wilderness areas could, in turn affect visitor attraction to other specially-designated areas along the I-10 corridor, including the ACECs mentioned above, since the myriad projects in the cumulative scenario, in combination, would add large- and small-scale industrial, utility-related and other uses in the region. Surface impacts within the Chucwalla DWMA/ACEC in combination with past, present and reasonably foreseeable future actions would not exceed the one percent threshold defined by the NECO Plan. To the extent that No Action Alternative A and No Project Alternative B would not result in development of the site, no cumulative impact on special designations would occur. The information available about what use may be made of the site under CDCA Plan Amendment/No Project Alternative C, is insufficient, and therefore too speculative or conjectural, to allow for a meaningful analysis in this PA/FEIS.

4.15.5 Summary of Mitigation Measures

None required.

4.15.6 Unavoidable Adverse Impacts

Unavoidable impacts to designated wilderness areas would result because construction and operation of the proposed action would alter the adjacent scenery to a more industrial setting, as viewed from within the wilderness. The existing landscape setting would be restored upon reclamation. Thus, the effects on wilderness experiences would continue until project facilities are dismantled and the desert vegetation and landforms of the site reclaimed.

Unavoidable impacts to designated ACECs could result because construction and operation of the project may have a permanent effect on biological resources within the Chuckwalla DWMA ACEC. The project could also affect archeological, cultural, or historical artifacts that are potentially present in the Palen Dry Lake ACEC.

4.16 Impacts on Transportation and Public Access – Off Highway Vehicle Resources

4.16.1 Impact Assessment Methodology

Public Access

The CDCA and NECO Plans, which include a detailed inventory and designation of open routes in the vicinity of the project, were reviewed to determine impacts to open routes.

Transportation

This analysis focuses on potential impacts related to the construction, operation and decommissioning of the project on the surrounding transportation systems and roadways based on the Energy Commission's Revised Staff Assessment (CEC RSA, 2010). For impacts to local transportation systems, the Energy Commission evaluated impacts based on level of service (LOS) determinations, which is a generally accepted measure used by traffic engineers, planners, and decision-makers to describe and quantify the congestion level on a particular roadway or intersection in terms of *speed*, *travel time,* and *delay*.

In addition, the Energy Commission used methodology contained in the *Highway Capacity Manual 2000* to determine potential impacts to intersections from operations of the proposed action. This methodology was used to assess delays at an unsignalized intersection for movements operating under traffic control—a stop sign, for example. For an intersection at which the only stop-sign is placed at a side street, delay would be reported for movements controlled by the stop sign. The delay then would be assigned a corresponding letter grade to represent the overall condition of the intersection or level of service. These grades range from LOS A, free-flow, to LOS F, poor progression.

The assessment of transportation-related impacts is based on evaluations and technical analyses designed to compare the pre-project conditions to the post-project conditions.

4.16.2 Discussion of Direct and Indirect Impacts

Proposed Action

Public Access

OHV Routes

The site has approximately fourteen miles of designated open routes that would be closed to off-highway vehicle (OHV) use during construction and operations. These routes would be available for use upon project decommissioning. Designated travel routes and distances within the project site boundary are described in Table 4.16-1. The locations and directions of the OHV routes are illustrated in Figure 3.17-1.

TABLE 4.16-1
DESIGNATED ROUTES WITHIN PALEN PROJECT AREA

NECO Designated Route Number	Distance within project site (mi)
660379	0.414
660501	4.535
660502	0.390
660505	0.005
660511	1.014
660948	2.764
660949	1.385
660950	2.304
660951	0.588
660952	0.557
660957	0.179
Total	***13.784***

Construction of the gen-tie line and redundant telecom line would result in a temporary disruption to motorized vehicle use along portions of route 660501, 660502, 660379, and 660511. Users of these established routes could detour onto other routes and/or open washes to access the same locations. After construction activities were complete, these routes would be open again for public use.

During operations, other OHV routes would be closed during the life of the project. While elimination of these routes would impact the ability of OHVs to travel in this area, users could detour onto other routes and/or open washes to access the same locations. According to the BLM Rangers from the Palm Springs Field Office, OHV use in and around the site is minimal with not more than, conservatively, a few hundred visits in a year during the cool months (September-May). Moreover, there are a number of other alternative routes that provide access to the washes from the I-10 corridor so overall access for recreation would not be impacted. In general, sightseeing and day use touring by locals is the predominant use pattern on the affected routes; therefore, removal of approximately 3,110 acres of open space within a natural desert environment could impact OHV users who would access the site for hiking and camping from designated OHV routes.

Construction and operation of the proposed action would introduce a new industrial feature that could attract OHV operators in the surrounding viewshed to the site boundary via designated OHV open routes or overland. This could increase the opportunities for vandalism, illegal cross-county use and other disruptive behavior.

After decommissioning of the project, these OHV routes could again be open for public use.

Washes Open Zones

This project area is located in the Moderate Multiple Use Class (MUC M) which allows OHV travel in open washes. The navigable Primary and Secondary washes that transverse the site would be transected by the project site and would result in closure of the washes to OHV users; however, users could detour onto other routes and/or open washes to access the same locations.

Transportation

Construction

Workforce. Construction of the project would be completed over an approximately 39-month period beginning in 2011. The construction workforce would peak during month 17 at approximately 1,145 workers per day and average approximately 566 workers over the course of construction. In addition, a transmission line extending from the project site to a new Southern California Edison substation west of the project site would require approximately 30 workers. The construction schedule of the power line is not expected to coincide with construction of the solar facility. In addition, construction would not encroach onto a public right-of-way or coincide with peak construction employment.

The worst-case scenario for the project, where all workers during the peak construction period commute in their individual vehicles, yields a peak trip generation of approximately 1,145 inbound trips during the morning peak period and another 1,145 outbound trips during the evening peak hour. This results in a total of 2,290 daily one-way trips during the peak construction period of Month 17. During the average, non-peak construction month, the project would generate 566 worker trips during the morning peak period and another 566 trips during the evening peak period. This would result in an average of about 1,132 daily one-way trips during the average construction month.

To accommodate the worst-case scenario, a temporary parking area of approximately 10 acres would be required for construction personnel parking (assuming 350 square feet per vehicle) with additional area required for the staging and laydown of equipment, materials, and supplies. The project would include onsite laydown and parking areas during construction. Those areas would be relocated around the site as construction progresses. Safety and efficiency concerns require on-site parking and laydown areas. That is, a traffic hazard could occur if workers were to park on public roadways or if public roadways were used for the staging and laydown of equipment, materials, and supplies. Such a hazard could adversely impact the LOS on I-10 as well as the safety of the workers and drivers.

The construction workforce would commute from the surrounding areas. Workers from regional areas would find temporary housing in Blythe or Indio or both. Workers from Palm Springs, the Los Angeles basin, and the Indio area would travel east on I-10 to the project site, while workers from Blythe and the Arizona communities of Quartzsite, Ehrenberg, and Cibola would follow I-10 west to the project site (CEC RSA, 2010).

Table 4.16-2a compares peak hour traffic volume and LOS on all study roadways during the Year 2012 without the project and the Year 2012 with the project (during peak construction). Table 4.16-2b compares peak hour delay and LOS on all study intersections during the Year 2012 without the project and the Year 2012 with the project (during peak construction).

TABLE 4.16-2a
2012 PEAK HOUR VOLUMES AND LOS ON STUDY ROADWAYS DURING PEAK CONSTRUCTION

Roadway Segment	Construction Year (2012) Volume without Project	LOS	Construction Year (2012) Volume With Project	LOS
I-10: West of the project site	3,145	A	3,716	A
I-10: East of the project site	3,145	A	3,717	A
Corn Springs Road	Negligible	A	1,141	B

NOTES: Caltrans Year 2007 traffic volumes were expanded to Year 2012 using the same rate of expansion (3.74%/year) seen during 2004-2007.

SOURCE: CEC RSA, 2010 (Table 1)

TABLE 4.16-2b
2012 PEAK HOUR DELAYS AND LOS ON STUDY INTERSECTIONS DURING PEAK CONSTRUCTION

	Construction Year (2012) Conditions without Project				Construction Year (2012) Conditions with Project			
	AM Peak		PM Peak		AM Peak		PM Peak	
Study Intersection	Delay[a]	LOS	Delay	LOS	Delay	LOS	Delay	LOS
I-10 Westbound Ramps/ Corn Springs Road	Negligible	A	Negligible	A	38.1	E	5	A
I-10 Eastbound Ramps/ Corn Springs Road	Negligible	A	Negligible	A	23.0	C	5	A

[a] average delay (seconds per vehicle)

NOTES: Caltrans Year 2007 traffic volumes were expanded to Year 2012 using the same rate of expansion (3.74%/year) seen during 2004-2007.

SOURCE: CEC RSA, 2010 (Table 2)

Construction Truck Traffic

Project construction is expected to generate approximately 20 to 30 one way truck trips per day peaking at approximately 40 truck trips per day. The peak truck travel would not coincide with the peak month 17 construction timeframe.

In addition, several pieces of equipment that exceed roadway load or size limits would need to be transported to the site via I-10 during construction. This equipment includes the steam turbine generator and main transformers. The equipment would be transported using multi-axle trucks. To transport this equipment, the Applicant must obtain special ministerial permits from Caltrans to move oversized or overweight materials. In addition, the Applicant must ensure proper routes are followed; proper time is scheduled for the delivery; and proper escorts, including advanced warning and trailing vehicles as well as law enforcement control are available, if necessary. These roadways could be damaged due to project-related construction activities. Oversized or overweight trucks with unlicensed drivers could be hazardous to the general public and/or damage roadways.

Heavy equipment that would be used to construct a new transmission line from the project to a new SCE substation includes cranes, cement mixers and drilling equipment. Transmission line construction workers and delivery vehicles would be dispersed along the transmission line route. There are currently two proposed locations for the SCE substation, so the exact length (7.5 or 15 miles) and route of the transmission line would vary depending on the substation's final location. Regardless of the substation location, the transmission line would exit the northwest corner of the project and travel west and south through BLM lands, crossing I-10 and traveling south into the substation. Construction of the transmission line would not cause significant impacts to traffic volumes or LOS because it is not expected to occur at the same time as peak construction employment and the number of workers would be low.

Parking Capacity

Construction period parking demands would be accommodated by a temporary on-site parking area of approximately 10 acres, which would be relocated around the project site as needed during different stages of construction. This parking area would accommodate all construction workforce vehicles if workers commuted individually. Additional area might be required for the unloading of equipment, materials, and supplies.

During operations, employees would park on-site in a 47,500 square-foot parking area, which would accommodate about 135 parking spaces, assuming 350 square feet per vehicle is needed. This would adequately accommodate the 134-employee workforce, especially given the fact that employee shifts would be staggered. Because the project supplies an adequate amount of on-site parking, the project would not result in any parking spill-over to sensitive areas and would not create any adverse impacts.

Operation Impacts

Due to the nature and remote location of the project, a relatively minor amount of traffic would be generated to and from the site during standard operations (see Tables 4.16-3 and 4.16-4). During project operation, all study roadway segments and intersections would continue to operate at LOS A, the same LOS experienced currently at these locations prior to development of the project; therefore there would be no adverse effect to LOS.

TABLE 4.16-3
PEAK HOUR VOLUMES AND LOS ON STUDY ROADWAYS DURING PROJECT OPERATION

Roadway Segment or Intersection	Standard Operations Year (2014) Volume with Project	LOS
I-10: West of the project site	3,245	A
I-10: East of the project site	3,245	A
Corn Springs Road	125	A

NOTES: Caltrans Year 2007 traffic volumes were expanded to Year 2014 using the same rate of expansion (3.74%/year) seen during 2004-2007.

SOURCE: CEC RSA, 2010 (Table 3)

TABLE 4.16-4
PEAK HOUR DELAY AND LOS ON STUDY INTERSECTIONS DURING PROJECT OPERATION

	Standard Operations Year (2014) Volume with Project			
	AM Peak		PM Peak	
Study Intersection	Delay[a]	LOS	Delay	LOS
I-10 Westbound Ramps/Corn Springs Road	8.7	A	8.4	A
I-10 Eastbound Ramps/Corn Springs Road	9.2	A	9.4	A

a: average delay (seconds per vehicle)

NOTES: Caltrans Year 2007 traffic volumes were expanded to Year 2014 using the same rate of expansion (3.74%/year) seen during 2004-2007.

SOURCE: CEC RSA, 2010 (Table 4)

Operation of the project would require a labor force of about 134 employees to staff the facility 24 hours a day, 7 days a week. This translates to approximately 268 daily one-way trips, assuming that workers travel in their own individual vehicles. Because employees would arrive and depart at different times throughout the day, they would generate less than 100 daily peak hour trips, even if every employee commutes alone.

The operations workforce would be likely to use the same routes to access the project as would the construction crews.

Operation of the project would also generate minor truck traffic during activities such as supply delivery and off-site waste shipments. Project operation is anticipated to generate up to 6 truck trips per day, which would not affect the LOS on study roadways and intersections.

Alternatives

Reconfigured Alternative 1

The Reconfigured Alternative 1 would generally have the same impact on the traffic and transportation system including OHV designated routes and open washes as the project. This is due to the fact that the Reconfigured Alternative generally uses the same project area, access, and requires the same number of construction workers, operators, and truck deliveries. Mitigation proposed for the project, below, would be required under Reconfigured Alternative 1. Therefore, like the project, effects would not be adverse with incorporation of mitigation measures, and would not cause unacceptable LOS.

Reconfigured Alternative 2

Reconfigured Alternative 2 would generally have the same impact on the traffic and transportation system including OHV designated routes and open washes as the project. This is due to the fact that Reconfigured Alternative 2 generally uses the same project area, access, and requires a similar number of construction workers, operators, and truck deliveries. Mitigation proposed for the project, below, would be required under Reconfigured Alternative 2. Therefore, like the project, effects would not be adverse with incorporation of mitigation measures and would not cause unacceptable LOS.

Reduced Acreage Alternative

The Reduced Acreage Alternative would have a similar impact on the traffic and transportation system including OHV designated routes and open washes as the project. This is due to the fact that the Reduced Acreage Alternative generally uses the same project area, access, and numbers of construction workers, operators, and truck deliveries. However, the Reduced Acreage Alternative may result in less physical disturbance because of it smaller size. As discussed below in Section 4.16.4, mitigation proposed for the project would be required under Reduced Acreage Alternative. Therefore, like the project, effects would not be adverse with incorporation of mitigation measures and would not cause unacceptable LOS.

No Action Alternative A

Public Access and Transportation

For the No Action Alternative A, where the ROW for the proposed action would not be granted nor would the CDCA Plan be amended, there would generally be no direct or indirect impacts to OHV routes and values. Instead, the project site could become available to other uses consistent with CDCA Plan use opportunities. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative B

Public Access and Transportation

For the CDCA Plan Amendment/No Project Alternative B, the ROW for the proposed action would not be granted and the CDCA Plan would be amended to find the proposed action area unavailable for any type of solar energy development. Any other (non-solar energy) use could be made of the project site, consistent with the CDCA Plan. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative C

Public Access and Transportation

For the CDCA Plan Amendment/No Project Alternative C, the ROW for the proposed action would not be granted and the CDCA Plan would be amended to find the proposed action area suitable for any type of solar energy development. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

4.16.3 Discussion of Cumulative Impacts

Public Access

In addition to the project, there are many past, present, or reasonably foreseeable future actions that contribute to impacts on OHV use. During the CDCA and NECO planning process, a detailed inventory and designation of routes was developed. This route designation system, along with other land management actions such as ACECs and the designation of national parks and wilderness, has resulted in significant changes to OHV recreation opportunities in eastern Riverside County. Since the passage of FLPMA in 1976, the changes or reduction of OHV opportunities in Riverside County likely improved the recreational experience for some users who preferred remote camping and hiking and decreased the recreational experience for some users who prefer open OHV use areas rather than designated routes. Numerous energy-related development projects (i.e., Genesis, Blythe, First Solar/Desert Sunlight, etc.) including the proposed action, would result in the closure of some OHV open routes that may result in some users seeking out, legally or illegally, other areas of the desert for their activities and experiences. Therefore, the combined effect of the overall cumulative past, present, proposed and reasonably foreseeable projects in eastern Riverside County could adversely affect OHV opportunities through closures, rerouting, and use restrictions. However, decommissioning activities would restore these OHV opportunities.

Transportation

Construction

A number of solar projects are projected to be built within approximately 100 miles of the I-10 corridor (Desert Center to Blythe). The Genesis, Blythe and Desert Sunlight projects currently are proposed to be constructed on BLM land and currently are under review by BLM. These projects, as well as other projects in the vicinity of the project, could affect the I-10 corridor between Desert Center and Blythe due to construction traffic.

Construction of the project is scheduled to overlap with the construction schedules of three other projects in the area, two solar energy generation parabolic trough projects, the Blythe Solar Power Project and Genesis Solar Energy Project as well as the Desert Sunlight Photovoltaic Project. These three projects plus the project would result in approximately 3,623 workers traveling on I-10 to their work sites at the same time. The overlapping construction schedules of these projects would result in considerable effects to I-10 as well as to local streets, highways, and intersections in the vicinity of the project site.

Operations

For the Genesis, Blythe and Desert Sunlight projects, truck travel as well as other non-employee site visits would be small and typically would occur during non-peak periods. Moreover, the operational workforce would consist of approximately 285 full time employees. During operation years, I-10 is expected to carry low traffic volumes and operate at LOS A. Therefore, the addition of operational truck travel, non-employee site visits and 134 full time employees associated with the project would not result in a considerable impact. Consequently, cumulative operational impacts would not be significant and would not require mitigation.

Decomissioning

Decommissioning of the Genesis, Blythe and Desert Sunlight projects as well as the project is not anticipated to occur during the next 40 years and is not expected to result in adverse cumulative traffic and transportation impacts. These projects are not likely to be decommissioned at the same time and, if they were, any cumulative impacts could be mitigated by staggering construction employees' work schedules to ensure acceptable LOS levels. Consequently, cumulative decommissioning impacts are not anticipated to be significant and would not require mitigation.

4.16.4 Summary of Mitigation Measures

The implementation of mitigation measures imposed by the Energy Commission as Conditions of Certification for the proposed action would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in Appendix B. The following mitigation measures address impacts on transportation and public access – off highway vehicle resources:

> **Road Damage Repair (TRANS-3):** Implementation of this mitigation measure would ensure that all public roads, easements, and rights-of-way damaged by implementation of the PPSP project would be restored to original or near-original condition.

> **Construction and Operations Traffic (TRANS-4):** Implementation of this mitigation measure would ensure that a Traffic Control Plan is developed and implemented to address traffic issues related to movement of workers, vehicles, and materials, including arrival and departure schedules and designated workforce and delivery routes.

4.16.5 Residual Impacts after Mitigation Measures were Implemented

Public Access

There would be no residual impacts related to public access.

Transportation

LOS within the vicinity of the project would be at LOS C and E, greater than existing LOS A, during project construction.

4.16.6 Unavoidable Adverse Impacts

Public Access

Navigable washes and OHV routes would be transected by the project site which would result in closure to OHV users.

Transportation

There would be no unavoidable adverse impacts related to transportation.

4.17 Impacts on Vegetation Resources

4.17.1 Impact Assessment Methodology

This section analyzes potential impacts to vegetation resources from the construction, operation and decommissioning of the proposed action and alternatives. This analysis identifies and analyzes potential direct, indirect and cumulative impacts of the proposed action and alternatives (including ancillary facilities) to special-status plant species, sensitive natural communities and other significant vegetation resources and recommends mitigation measures where appropriate to address such impacts. Direct, indirect, and cumulative impacts are quantified where the data permits.

This analysis is based, in part, upon information from the following sources: the Application for Certification (AFC) (Solar Millennium 2009a) and Supplement to the AFC (Solar Millennium 2009b); additional information from the Applicant (Galati & Blek 2010i; Galati & Blek 2010j; AECOM 2010f; Solar Millennium 2010k; Solar Millennium 2010l); responses to CEC staff data requests (AECOM 2010a, Palen Solar 1 2010; Kenney 2010; Solar Millennium 2010m; AECOM 2010u); CEC staff workshops held on December 9 and 18, 2009, January 7, 10, 14 and 25, 2010, and April 28 and 29, 2010; site visits by agency staff on October 7, 2009, November 3, 2009, January 25, 2010, and April 8, 2010; communications with representatives from the California Department of Fish and Game (CDFG) and the U.S. Fish and Wildlife Service (USFWS); CEC's Revised Staff Assessment (RSA), including appendices, and final Commission Decision; as well as information contained within the BLM's Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) and March 2008 Handbook H-1740-2, Integrated Vegetation Management Handbook (BLM, 2008). The BLM was integrally involved in the preparation of this analysis with the CEC and other resource agencies.

This evaluation of potential impacts on vegetation resources considers the following areas: (1) the approximately 4,024-acre proposed action disturbance area and an associated buffer area, with a combined Biological Resources Study Area (Study Area) of 14,771 acres; (2) the approximately 4,366-acre disturbance area for Reconfigured Alternative 2 Option 1 (including a similar Study Area as noted for the proposed action); and (3) the approximately 4,330-acre disturbance area for Reconfigured Alternative 2 Option 2 (again, including the Study Area noted above).

4.17.2 Discussion of Direct and Indirect Impacts

Direct impacts are those resulting directly from project activities (e.g., excavation and grading), and occur at the same time and location as those activities. Indirect impacts also result from project activities, but can occur later in time and/or at more distant locations and are still reasonably foreseeable. The potential impacts discussed in this analysis are those most likely to be associated with construction and operation of the proposed action.

Impact analyses typically characterize effects to plant communities as temporary or permanent, with a permanent impact referring to areas that are paved or otherwise precluded from restoration to a pre-project state. In the desert ecosystems the definition of “permanent” and “temporary” must reflect the slow recovery rates of its plant communities. Natural recovery rates from disturbance in these systems depend on the nature and severity of the impact. For example, creosote bushes can resprout a full canopy within five years after damage from heavy vehicle traffic (Gibson et al. 2004), but more severe damage involving vegetation removal and soil disturbance can take from 50 to 300 years for partial recovery; complete ecosystem recovery may require over 3,000 years (Lovich and Bainbridge 1999). Consequently, due to the slow recovery rates of plant communities in desert ecosystems, impacts of the proposed action and alternative are considered temporary only if there is evidence to indicate that pre-disturbance levels of biomass, cover, density, community structure, and soil characteristics could be achieved within five years.

Proposed Action

The 4,024-acre disturbance area of the proposed action consists almost entirely of native habitats, including 3,422 acres of Sonoran creosote bush scrub, 285 acres of stabilized and partially stabilized desert dunes, 148 acres of desert dry wash woodland, and 164 acres of unvegetated ephemeral dry wash, as well as state waters and other resources (Table 4.17-1). The loss of vegetation on this acreage would result in the loss of ecological services the plant community provides, such as soil protection, food, water, and cover for wildlife. Other temporary and permanent indirect impacts from the proposed action could occur to surrounding vegetation communities from grading activities disturbing soils and creating air-born, fugitive dust, sedimentation, and erosion, which disruption of photosynthesis and other metabolic processes. The destruction of plants and soil crusts by windblown sand and dust also exacerbates the erosion of the soil and accelerates the loss of nutrients (Okin et al. 2001).

Sonoran Creosote Bush Scrub

Direct impacts to creosote bush scrub would include the permanent loss of, and fragmentation of, adjacent wildlife habitat and native plant communities, including ecological services such as wildlife cover, forage, microhabitat for other plants, and erosion protection.

Stabilized and Partially Stabilized Dunes

Direct impacts include permanent loss of habitat as well as potential accidental direct impacts to adjacent preserved habitat during construction and operation. Indirect impacts include disruption of sand transport corridor resulting in downwind impacts to sand dune habitat; introduction and spread of invasive plants; erosion and sedimentation of disturbed soils; fragmentation and degradation of remaining habitat.

Impacts to Sand Transport Corridor and Sand Dune Habitat

The northeastern portion of the project site lies within in the Palen Dry Lake-Chuckwalla sand transport corridor as mapped in the Preliminary Geomorphic Aeolian and Ancient Lake Shoreline Report (Geomorphic Report) (Solar Millennium 2010b). As described in RSA Soil & Water Appendix A, the project boundary appears to cover approximately 50% of the width of the corridor, though area does not correspond directly with sediment transport rates. The Geomorphic Report (page 22, Solar Millennium 2010b) divides the sand transport corridor into different zones based on the amount of sand transported, noting that Zone I (off the project site) transports “a minimum of 80%” of the total volume of sand within the corridor, sand migration within Zone II is described as “moderately strong”, and sand transport in Zone III is “relatively low.”

The intrusion of the proposed project within an active sand transport corridor, in Zone II and to a lesser extent Zone III, would have serious on-site and off-site impacts to the creation and maintenance of sand dunes. The PDL-Chuckwalla sand corridor is a major source of sand that supports downwind sand dunes and because most sand transport takes place close the ground (within 10 feet of the ground surface), wind fences and solar arrays would be effective at blocking sand transport.

The proposed project would cause direct impacts on approximately 1,781 acres within Zone II and within Zone III (CEC, Commission Decision). The proposed project also would have offsite impacts, cutting off the supply of sand within the Project Disturbance Area (which, for purposes of this analysis includes the area that could be disturbed as a result of the construction, operation or decommissioning of the proposed action or alternatives) that otherwise would have been transported downwind to other dune areas, and would deflate downwind sand dunes, gradually diminishing their depth and extent over time as sand output exceeds sand input. New sand that would have been transported across the project footprint from upwind would potentially be cut off by drainage ditches, wind fences and above ground infrastructure. The extent of this “sand shadow” would be approximately 1,113 acres (CEC, Commission Decision).

The proposed project also could have an impact on sand transport by eliminating the network of desert washes throughout the site and replacing them with engineered channels (CEC, Commission decision). Part of the sediment-delivery system that contributes to active sand dunes northeast of the project area consists of fluvial depositional areas fed episodically by ephemeral streams. Finer fluvial sediments (typically sand size and finer) are mobilized in the sand transport corridor, which may be recharged with fine-grained sediment during large flood events. Project construction on the alluvial fans and alteration of stream channels by channelization may reduce the amount of fluvial sediment reaching the depositional areas upwind of sand dunes.

Evidence indicates that Zone II has the greatest abundance of MFTL in the project area, and the majority (970 acres) of the indirect impacts from the proposed action would occur in Zone II. The direct and indirect impacts of the proposed action on sand dunes and the processes that support them also could impact other species, including Harwood’s woolly-star, Harwood’s milkvetch and sand dune-dependent insect species from deflating sand dunes. The plant species composition would be toward more drought-tolerant species and those species more amenable to coarser textured soil. See Section 4.21, *Impacts to Wildlife Resources*. These impacts to the sand transport system and active sand dunes on and off the project site would be substantial.

Ephemeral Washes and Sensitive Plant Communities

Grading within the Project Disturbance Area and its ephemeral drainages would cause a direct impact on these communities and would eliminate the hydrological, biogeochemical, vegetation and wildlife functions of these drainages. Desert washes downstream from the project area, comprising approximately 61 acres of State waters, also would be subject to an indirect impact as a result of changes to upstream hydrology, with downstream vegetation in washes deprived of flows or receiving lower or higher volumes and velocities of water than current conditions at discharge points along the stormwater conveyance channel. Diversions could greatly alter the hydrology and wash-dependent vegetation of any features that may occur downstream of the project area, an effect that is quite apparent below Interstate 10 (I-10) near the Corn Springs Exit. On the northern side of I-10 broad expanses of desert wash trees and shrubs have died in response to the construction of I-10 and the diversion of smaller channels into collector ditches on the southern side of I-10.

The Applicant has provided drainage plans that conceptually discuss how diffusers at the downstream end of the engineered channels would restore sheet flow downslope of the Project Disturbance Area (AECOM 2010a, Drainage Report for Pre-Development Hydrology and Post-Development Hydrology and Hydraulics). However, the drainage report alone does not provide sufficient information to establish the post-project flooding conditions or to determine potential impacts to downstream vegetation. Other potential indirect effects of the changed proposed drainage plans are erosion and resulting root exposure leading to the eventual death of vegetation. Washes upstream of the project area also could be affected by head-cutting and erosion; however, bank stabilization measures are proposed for the intake portion of the channel that would minimize or avoid this potential effect. All 61 acres of the ephemeral washes occurring downstream of the project boundaries would be adversely affected by the proposed project.

Direct impacts of the proposed project to ephemeral drainages and indirect impacts to additional drainages would be substantial. The extensive ephemeral drainage network at the site currently provides many functions and values, including landscape hydrologic connections, stream energy dissipation during high-water flows that reduces erosion and improves water quality, water supply and water-quality filtering functions, surface and subsurface water storage, groundwater recharge, sediment transport, storage, and deposition aiding in floodplain maintenance and development, nutrient cycling, wildlife habitat and movement/migration; and support for vegetation communities that help stabilize stream banks and provide wildlife habitat. The project would eliminate all of these functions and values.

Indirect impacts include permanent loss of hydrological connectivity downstream of the proposed project. Other indirect impacts include upslope head-cutting on drainages and downslope erosion/ sedimentation.

Impacts to Groundwater-Dependent Vegetation

Although no direct impacts were identified, the effects of pumping may take several-to-many years to appear, depending on the degree of separation in the confining layers between the shallow aquifer (supporting plants) and deep aquifers (where pumping would occur). Groundwater levels near the project’s water supply wells would decline during the project pumping (AECOM 2010a, Figures DR-ALT 207 1 & 2).

The average total annual water usage during operation of the proposed action is estimated at about 300 acre-feet per year (afy). Local decline of groundwater levels is expected within the cone of depression surrounding the project pumping well, extending a radius of approximately 2 to 3 miles around the well. The maximum predicted water table drawdown associated with the proposed project is approximately 57 feet in the area of the pumping well (which is located in the southwest portion of the proposed site), and the area where drawdown exceeds 1 foot is limited to within approximately 2 to 3 miles of the project pumping centroid (see Soil and Water Table 12 and Figures 11 and 12, Soil and Water Resources, RSA Section C.7, and AECOM 2010a, Figures DR-ALT 207 1 & 2).

Groundwater pumping could have a substantial impact to vegetation resources if it lowers the water table in areas where deep-rooted phreatophytes occur. Groundwater dependent plant communities near Palen Dry Lake could be affected adversely by the drop in water levels, with potentially substantial impacts to sensitive plant communities like mesquite bosque. The proposed groundwater pumping is not expected to greatly affect the health or status of the creosote bush scrub, which dominates the drier portions of the valley floor and surrounding alluvial fans and pediments, hundreds of feet above the groundwater level. These drought-adapted and shallow-rooted species are supported by precipitation, not shallow or deep groundwater.

Use of Groundwater by Phreatophytes

Within the 2- to 3-mile radius drawdown zone, the groundwater dependent ecosystems (GDEs) are dominated or defined by "phreatophytes". Phreatophytes have deep roots that extend down to, and extract water from a periodically stable water supply, including the capillary fringe, i.e., the zone just above the water table that is not completely saturated, where water is lifted up by capillary action, or surface tension (Brown et al 2007). Even though the groundwater may never be visible at the ground surface, as it is in a wetland or spring, phreatophytic ecosystems can still be groundwater-dependent (Naumberg et al 2005).

The use of groundwater may not be year-round by phreatophytes. In these instances, other water sources are used during the rainy season but groundwater is used in the dry season (Froend & Loomes 2004). In the vicinity of the proposed action, for example, phreatophytes may utilize precipitation, stormwater runoff, or temporary ponding on the playas during the rainy season, and use groundwater during the dry season. There also is growing evidence that the dimorphic shallow and deep root systems of some phreatophytes (e.g., honey mesquite) alternately act as conduits that potentially redistribute water from moist layers to dry layers, a phenomenon termed "hydraulic redistribution" (Hultine et al 2003). Mesquite may play an important role during summer drought for surrounding shallow-rooted species and perhaps for the larger ecosystem (Brown et al 2007; Caldwell et al. 1998).

Response to Water Stress

The response of these GDEs to change in these attributes is variable (SKM 2001). The phreatophytes known to occur in the project area are mostly facultative phreatophytes (Steinberg 2001; USFWS 1993; and others). Phreatophyte trees and shrubs have a range of strategies for dealing with water stress and some species are better adapted to deal with water stress than others, whether they are obligate or facultative phreatophytes. There is insufficient information available to assess whether facultative phreatophytes have a greater resistance to change in groundwater condition than obligate phreatophytes. However, obligate phreatophytes are less resilient than facultative phreatophytes and will grow only in areas where specific groundwater conditions exist, and require uninterrupted access to the water table; all of these species are groundwater-dependent. “Facultative” phreatophytes, such as honey mesquite, however, can use groundwater if it is available but they can also occur in settings where groundwater is not available (Naiman et al. 2005).

A plant affected by competition for water displays signs of stress (e.g. Manning and Barbour 1988). Stress can be manifested as anything from diminished physiological processes to plant death. Lowering the local water table from groundwater pumping has been demonstrated to cause habitat conversions and reduce plant cover where pumping causes water levels to drop below the effective plant rooting depths, increasing wind erosion of the soil and affecting air quality, and native habitats converted to invasive exotic communities (Patten et al 2007; Lovich 1999; Manning 2006).

Secondly, declining water tables may reduce the amounts of salts and water wicked to the surface by capillary action, potentially altering the chemistry of surface soils (Patten et al. 2007) around the playa (Palen Lake) margins. If the surface salinity decreases, it could render the habitat unsuitable for the halophytes (salt-adapted plants) that make up these ecosystems, which includes several rare or special-status plants, and cause a habitat conversion to non-halophytes (Dodd & Donovan 1999). Reduced surface salinity may be an expected response of regional groundwater withdrawal for urban expansion and other uses in the Great Basin and Mojave Deserts (Patten et al. 2007), and now also in the Sonoran Desert of California for solar thermal development and other groundwater uses.

As Elmore et al. (2006) and Manning (2007) showed in an Owens Valley, California study, as pumping lowers a water table, total live plant abundance (plant cover) on a site decreases correspondingly. Shallower rooted herbs are the first affected and least adapted; deep-rooted woody phreatophytes (such as mesquite) can take decades to die. Stress in woody species such as mesquite would be detected in other measures of plant vigor, such as die-back, long before plant cover changes might be measurable in an aerial photo. Lower plant cover can also lead to increased soil erosion, due to wind or water, leading to loss of nutrients, minerals, and structure necessary for seed germination of plants adapted to prior groundwater conditions on the site. Non-native opportunistic “weed” species (e.g., Russian thistle) are better adapted to nutrient-poor soils and wider variety of soil moisture regimes or conditions, and demonstrate a competitive edge. Animals, including mammals, reptiles, birds, and invertebrates, who may require certain plant species or a certain vegetation structure, may no longer find suitable food or living space. Local extirpations are compounded if the displaced animal is an important food source for another animal. The complex below-ground systems of bacteria, algae, and fungi, which provide many valuable ecosystems services (e.g., breakdown of organic matter, nitrogen fixation, carbon storage, and recycling of nutrients) also are disrupted when water tables are lowered. Ultimately, a decline in plant cover and change in species abundance due to groundwater withdrawal from groundwater-dependent ecosystems may result in severe consequences, depending on the organism(s) involved or the prevailing ecosystem processes (Manning 2009).

If the vegetation is dependent on the groundwater aquifer, but the decline in water table depth is minor and/or temporary (i.e., a minor drawdown and restored to spring baseline levels following construction), the ecosystem effects may be correspondingly minor or temporary, depending on the time required to refill the impacted aquifer.

Impacts to Springs

Impacts to Water Resources are addressed in PA/FEIS Section 4.19, *Impacts to Water Resources.* However, because the definition of surface water sites includes streams that could be jurisdictional, impacts to streams are addressed in this section. BLM has adopted this analysis of the potential impacts of project pumping to area springs follows (AECOM 2010a, DR 181-233):

> "Corn Spring appears to derive its water from precipitation falling onto the Chuckwalla Mountains, and movement of groundwater under pressure along an historic fault that bisects the mountains. Groundwater extraction from the project site would not affect Corn Spring. According to the NWIS database, seeps and surface discharge/outfall (along with streams, lakes, wetlands, and diversions) are categorized as 'surface water sites' and four sites are located in the Chuckwalla Valley Groundwater Basin. One of the four locations is the aforementioned Corn Spring Wash, while two other sites are located near the northern edge of the Chuckwalla Mountains approximately eight and 13 miles west of the project site. Water in these three sites appear to originate from infiltration of precipitation that falls on the Chuckwalla Mountains as all three sites are located either within the Chuckwalla Mountains or are less than one mile downslope from the Chuckwalla Mountains. At this great distance and given the source of water to the sites, groundwater extracted from the project site would not affect these three sites. The fourth 'surface water site' listed in the NWIS database for the Chuckwalla Valley Groundwater Basin is Coxcomb Wash, located approximately eight miles northwest of the project site. Coxcomb Wash is an ephemeral dry wash that flows southeastward from the Coxcomb Mountains. As a result, groundwater extracted from the project site would not affect the flow of water in Coxcomb Wash. The locations of Corn Spring and other 'surface water sites' identified in the NWIS database and through the several other data sources are shown on Figure DR-S&W-193. The sites are listed on Table DR-S&W-193-1."

McCoy Spring is located at an elevation of 889 feet at the outlet of a bedrock canyon near the toe of the western slope of the McCoy Mountains, approximately 15 miles to the northeast of the Project. According to the groundwater investigation conducted by Worley-Parsons (2009):

> "Springs may be considered surface extensions of the local groundwater system; however, springs and seeps that occur near the interface between bedrock mountains are often associated with base flow discharge or perched aquifers that are part of a separate groundwater flow system that originates in the surrounding mountains and do not have direct hydraulic connection to the adjacent basin aquifer system. Based on the close proximity of bedrock outcrops to the spring, it likely represents baseflow discharge from the McCoy Mountains. As such, it does not appear to have a direct hydraulic connection to groundwater levels in the Chuckwalla Valley Groundwater Basin, which occurs in the basin fill materials to the west of McCoy Spring. They concluded that a groundwater level drawdown of many feet would be required to cause a change in the baseflow discharge from the McCoy Mountains."

Noxious and Invasive Weeds

Construction activities and soil disturbance could introduce new noxious weeds to lands adjacent to the proposed solar plant site and its linear facilities, and could further spread weeds already present in the project vicinity. The spread of invasive plants is a major threat to vegetation resources in the Colorado Desert because non-native plants can displace native plants, increase the threat of wildfire, and supplant wildlife foods that are important to herbivorous species.

Tamarisk, Russian thistle, Sahara mustard, and Mediterranean grass are already present in the Project area and are expected to increase as a result of construction- and operation-related disturbance. The proliferation of these and other non-native species has dramatically increased the fuel load and frequency of fire in many desert ecosystems (Lovich & Bainbridge 1999). Unlike other ecosystems in California, fire was not originally an important part of the Colorado Desert ecosystems and most perennials are poorly adapted to even low-intensity fires, and the animals that coevolved are not likely to respond favorably to fire either. The potential spread or proliferation of non-native annual grasses, combined with the proximity to ignition sources could potentially increase the risk of fire, and the effects to these poor-adapted desert communities would be harmful, particularly to cacti and most native shrubs species. Burned creosote and other native shrubs are typically replaced by short-lived perennials and non-native grasses (Brown & Minnich 1986). Indirect impacts of increased human presence relating to the likelihood of increased fire frequency synergizes with the increased presence of fine fuels from non-native invasive plants. The corridor along I-10 is core area of ignitions in the Sonoran Desert in Riverside County creating swales which collect drain water. These sites may be incubators for the westward advance of buffelgrass, an exotic fire prone grass species. An infestation of buffelgrass (which is following the I-10 corridor) would alter the fire regime in the project area further with even higher fuel loading. Burning buffelgrass is very effective at permanent removal of Sonoran Desert dry wash woodlands

To address the potential spread of existing weeds and the introduction of new ones, an active weed management strategy and control methods must be implemented. The Applicant has submitted a draft Weed Management Plan (AECOM 2010a, DR-BIO 100) to avoid and minimize the spread of noxious weeds. The Weed Management Plan would cover weeds targeted for eradication or control and a variety of weed control measures such as establishing weed wash stations for construction vehicles and revegetation of disturbed areas with native seed mix. Implementation of this plan would adequately address potential impacts from introduction and spread of noxious weeds.

Special Status Plants

Harwood’s Woolly-star

A total of 13 GPS points totaling 169 Harwood’s woolly-star plants were found in the dunes to the east of the proposed project and east of the eastern solar blocks in each of the options under Alternative 2. No plants were found within the Project Disturbance Area and none are in very close proximity to the proposed action or alternatives, separated by 3,000 feet or more of dunes. Based on these results, no direct impacts, or indirect impacts from hydrologic changes downstream, would occur to Harwood’s woolly-star. However, concerns remain about the potential for the spread of Sahara mustard into the dunes north of the proposed project from construction-related disturbance near the dunes, transport of seeds on vehicles during construction and operation, and transport via the engineered channels. (AECOM 2010a DR-181-253 Soil & Water, page 122 and Figure 4 [pg 775]). Construction-related soil disturbance and sedimentation from the channel discharge render habitat vulnerable to noxious weed invasion, and the potential for the spread of Sahara mustard into the sensitive dune habitats north of the proposed project is very high and the ecological consequences would be considerable. Several large infestations of this highly invasive plant occur along the area roads and the channel intake. The potential for Sahara mustard to spread quickly and aggressively, and the severe ecological consequences, are well documented (Barrows & Allen 2007; Brooks et al 2004; Pavlik 2008, and others).

Harwood's Milkvetch

Direct impacts include loss of seven plants due to removal of all vegetation (5% of the occurrence in the study area in 2010.) Harwood's milkvetch plants also are found in dune habitat just downslope of the proposed project. Construction is not expected to result in direct loss of Harwood's milkvetch since the plants were found outside of the solar fields.

Indirect impacts include introduction and spread of invasive plants and increased threat of wildfire; erosion and sedimentation of disturbed soils; potential disruption of sand transport systems that maintain habitat below the Project; alteration of drainage patterns; herbicide drift; disruption of photosynthesis and other metabolic processes from dust, storm water runoff from the constructed channel could indirectly impact Harwood's milkvetch plants and habitat that occur within the flow path.

Spring 2010 surveys identified only seven Harwood's milkvetch individuals in the Project Disturbance Area (AECOM 2010u) out of a total population of ± 146 plants (Solar Millennium 2010l). However, many of the 139 plants documented in the buffer area for the proposed action (Solar Millennium 2010m) are located in close proximity to the northern boundary of the proposed site and downstream of the proposed engineered channel.

By comparison, approximately 700 Harwood milkvetch were documented in the nearby Genesis Solar Energy Project study area, and 2,748 plants were documents in the Blythe Solar Power Project and the Colorado Substation study areas. It is important to note that, although the 2010 populations are robust, significantly fewer plants (<100) were found in the disturbance area of three projects during the 2009 surveys—a relatively dry year. The local Harwood's milkvetch population size likely expands and contracts with the normal wide variations in annual rainfall, similar to many other desert annuals.

Although the direct impacts of the proposed project to Harwood's milkvetch would be minor, concerns remain about the close proximity of the off-site populations to the Project Disturbance Area and their position just below the engineered channel (see Solar Millennium 2010m). Because of the location of many plants just below the discharge points of the proposed engineered channel, plants could be indirectly affected through changes in surface drainage patterns and sediment transport. Harwood's milkvetch may respond favorably to disturbance (loose, sparsely vegetated soils) but most weeds also quickly colonize disturbed soils.

Fragmentation disrupts gene flow and renders remaining occurrences more vulnerable to extirpation in the future. These effects are harder for a species to withstand during droughts or in the face of projected climate change.

Ribbed Cryptantha

An area of approximately 406 acres (estimated 3.6 million plants) located within the Project Disturbance Area would be directly affected by the proposed project (AECOM 2010u).

Many similarly large occurrences of ribbed cryptantha have been found in the disturbance areas for the Genesis and Blythe solar projects (TTEC 2010a, GSEP 2009a, Solar Millennium 2009a, Solar Millennium 2010b, and Solar Millennium 2010 m), totaling over 100,000 plants. Given the large number of ribbed cryptantha plants detected by all the I-10 projects, within and outside of their project areas, ribbed cryptantha is likely to occur in similar habitats nearby. Because of the local abundance of ribbed cryptantha and its apparently stable range in California, the direct impacts of the project to this species are not substantial.

California Ditaxis

One group of 11 California ditaxis plants were observed within the Project Disturbance Area along the gen-tie alignment (see PA/FEIS Section 2.3, *Connected Actions*), approximately four miles west of the project. Another group of 11 plants were found in the survey buffer area (Solar Millennium 2010m, Table 3, and Solar Millennium 2010p, Figure 7).

In addition to the direct impacts to plants within the Project Disturbance Area (50% of the local population), plants adjacent to the alignment could be indirectly affected by the spread of Sahara mustard, which out-competes these plants, degrades the habitat and increases the risk of fire. Roads and transmission corridors are common vectors for the spread of Sahara mustard. Vehicles are also common ignition sources for roadside fires, and the weeds that typically recolonize disturbed soils along roads and transmission corridors tend to increase the flammability. The loss of half of the occurrence, combined with the indirect effects of Sahara mustard, would be substantial, given that there are no other documented occurrences of this species in the valley west of Desert Center. The direct loss of plants of this species could be avoided with implementation of the mitigation measures identified below.

"Palen Lake Atriplex" (*Atriplex sp.*)

. According to the Applicant's map of special-status plants in the preliminary 2010 botanical report (Solar Millennium 2010m, Figure 7), none of the potentially new taxon of saltbush (*Atriplex*) discovered on the saline playa margins of Palen Dry Lake in 2009 would be directly affected by the project; however, some of the 920 plants documented in the buffer occur in close proximity to the northeastern boundary of the proposed action and could be indirectly affected by construction or by saturation or discharges from the engineered channel. It is unclear how the hydrologic changes would affect them, but four-wing saltbush (if related) is reported to be intolerant of flooding late in the season (Howard 2003).

The proposed action also carries a greater risk of indirect impacts associated with the proposed groundwater pumping, which is estimated at 5,750 acre feet per day during the 39-month construction phase, with a predicted drawdown of 1 to 5 feet in the area just north of the northern project boundary.

Because the potential new taxon is reported to occur in the saline margins around dry lakes, and because a drawdown in the water table reduces salinity (Patten et al. 2007), there is a potential that the proposed action's groundwater pumping eventually could cause a habitat conversion from halophytic obligates (salt-loving plants) to non-halophytes in the affected area. This would render the habitat unsuitable for the new taxon. A detailed discussion of the impacts of groundwater pumping to dependent vegetation is provided above under *Impacts to Groundwater-Dependent Vegetation*.

Utah Vining Milkweed

One population of Utah vining milkweed was found east of the project site at least 2.5 miles east of the eastern boundary and outside of the Project Disturbance Area and buffer area (Solar Millennium 2010m). Therefore, no direct or indirect impacts would occur to this species.

Impacts to Summer- Fall Special-Status Plants

This section analyzes impacts to potentially occurring late-season special-status plants; plants that were not detected during summer-fall 2010 surveys but could still occur in the study area. Within the larger group of plants that can be identified only during late season surveys, there are two subgroups: 1) annuals that are triggered by warm summer rains of subtropical origin (typically minimum 10 mm events), and 2) perennials that bloom regardless of the summer rain, and are triggered instead by the appearance of cooler storms that originate in the Pacific northwest. Special-status summer annuals documented to occur in the California Sonoran Desert region include:

1. Abram's spurge, a CNDDB Rank 1 and CNPS List 2 species;
2. Flat-seeded spurge, a BLM Sensitive species, CNDDB Rank 1 and CNPS List 2,
3. Lobed ground cherry, a CNDDB Rank 1 and CNPS List 2 species.

Several of the late-season perennials have bloom seasons that overlap the spring season, and/or can be identified vegetatively and do not require flowers or fruit for identification. These include:

1. Glandular ditaxis, a CNDDB Rank S1/S2 and a CNPS List 2, and
2. California ditaxis, a CNDDB Rank 2 and CNPS List 3

Abram's Spurge. If Abram's spurge occurs within or near the Project Disturbance Area, direct or impacts would be substantial unless only a minor portion of its local population, or habitat, was affected. Even if the occurrence was off-site, it could be indirectly affected if it occurs in close proximity to construction. Concerns remain about the contribution of the proposed action to the spread of Sahara mustard and other invasive species. Construction-related disturbance, roads, transmission corridors, and the transport of seed via washes are common vectors for Sahara mustard and other weeds.

All but one primary wash through the center of the site, and two washes on the western and eastern edges, already were diverted by the construction of I-10 and the diversion of all sheet flow and washes into the three primary channels. The effects of this diversion are apparent in the many dead or declining ironwood trees, stunted creosote bush, and overall low cover and low diversity over much of the site. Although the site has a history of disturbance from military training exercises during World War II, the primary cause of the site's degraded habitat function and value (outside of the primary washes) is due to the changes in surface drainage patterns from the construction of I-10. Nevertheless, the site, north of I-10, has a large enough watershed to support the development of a few smaller washes (outside of the primary washes) in the northeast portion of the project site, washes that could potentially support Abram's spurge or other summer annuals the prefer similar habitat. Potential direct impacts to Abram's spurge could be addressed through implementation of the mitigation measures recommended below. Because plants were not detected during summer-fall 2010 surveys, likelihood of impacts to the species is very small.

Flat-seeded Spurge. The closest known occurrence of flat-seeded spurge is approximately 50 miles away. By virtue of its rarity and the distance to known occurrences, its occurrence in the project area is unlikely and speculative. However, it does occur along the western edge of the California desert and in Arizona and, therefore, on both sides of the site (Silverman pers. comm; Sanders pers. comm.). The absence of known occurrences in this area may be because it is easily over-looked (Reiser 1994) or because the area is generally under-surveyed.

If present, potential indirect effects include the spread of Sahara mustard and other invasive pest plants into dune habitat; the ecological impacts of Sahara mustard and the potential for restoration are described in Barrows & Allen (2007); Barrows et al. 2009; Pavlik 2008, and others). Channel diversion and the interruption of aeolian and fluvial sediment transport could also adversely affect its persistence, if detected in the project area. Because plants were not detected during summer-fall 2010 surveys, likelihood of impacts to the species is very small.

Lobed Ground Cherry. Though no plants were found in 2010 surveys, if present, impacts to lobed ground cherry would be considerable. Such an occurrence also would represent a range extension (i.e., occur at the periphery of its range in California). Potential indirect effects to the species, if present, could include the spread of Russian thistle and other alkaline-tolerant weeds into its habitat. Russian thistle already is present in the playa margin habitats and in the northeast portion of the project area. Construction-related disturbance and vehicle use along the existing roads are common vectors for the spread of invasive pest plants. Even if found off-site in the playa margins, it could be indirectly affected by alteration of the site hydrology or sedimentation, if located directly below the engineered channel discharge points. Because plants were not detected during summer-fall 2010 surveys, likelihood of impacts to the species is very small.

Indirect Impacts to Special-Status Plants

The following indirect impacts to special-status plants, i.e., impacts outside the Project Disturbance Area or that occur following construction, were considered: introduction and spread of invasive plants; alteration of the surface hydrology and basic geomorphic processes that support rare plants and their habitat (e.g., disrupted aeolian and fluvial sand transport processes from obstructions and diversions); population fragmentation and disruption of gene flow; potential impacts to pollinators; increased risk of fire; erosion and sedimentation of disturbed soils which render the habitat vulnerable to invasion by pest plants; disturbance of the structure and ecological functioning of biological soil crusts which affect seed germination, reduces soil nutrition, carbon sequestration, and renders the soil vulnerable to water and wind erosion (Belnap & Eldridge 2001); herbicide and other chemical drift; and disruption of photosynthesis and other metabolic processes from fugitive dust during construction and operation of the proposed action.

Changes to drainage patterns downslope of the project area could have substantial impacts to special-status plant species. The Applicant has proposed drainage diffusers that would minimize erosion downstream and potentially restore flows to the affected drainages (Solar Millennium 2010d). However, the design proposes evenly spacing the discharge points along the lateral diffuser and a fan diffuser to spread the water out across the area north of the project. This design is based on an assumption that stormwater sheet flows uniformly across the area downstream (north) of the project. The Pre-Development Drainage Conditions Report shows that the existing condition for these same areas primarily varies from 4 to 12 inches with some localized depressions carrying water at a depth of approximately 1.5 feet (Solar Millennium 2010d). Figure 3 from this report depicts a map of delineated washes downstream of the project, and Figure 2 indicates that a number of special-status plants occur in the area where flows would be discharged (Solar Millennium 2010 k). Some of these species are intolerant of flooding, while others are dependent on the natural disturbance patterns (sedimentation) within these localized depressions.

Following construction, invasive species could occupy disturbed soils within the Project Disturbance Area and diverted channels, and then spread into adjacent undisturbed habitats—naturally disturbed habitats such as dunes and washes are particularly vulnerable to colonization by weeds. The potential spread of Sahara mustard, which already is present along roads and near the freeway, is a continuing threat. The primary conduit for spread, however, is along roads and transmission corridors. The dramatic increase in vehicle use of the project vicinity roads and construction of transmission corridors and new roads is expected to increase the spread of this highly invasive wildland pest. Sahara mustard has shown a clear negative impact on native flora (Barrows et al. 2009). Sahara mustard can form dense stands and potentially crowd out native annual plants. Sahara mustard plants growing early in the season may dominate available soil moisture which may adversely affect native annuals which start growing a little later in the season (Barrows et al. 2009). Barrows et al. (2009) found that native annuals growing under a canopy of Sahara mustard were often taller and were etiolated, at the expense producing branches, flowers, and fruits. This led to a shift in the dominance of the following year's species composition from native annuals to Sahara mustard.

Tamarisk, Russian thistle, Sahara mustard and Mediterranean grass already are present in the project area and are expected to increase as a result of construction- and operation-related disturbance. The proliferation of many non-native plants has dramatically increased the fuel load and frequency of fire in many desert ecosystems (Lovich & Bainbridge 1999). Unlike other ecosystems in California, fire was not an important part of the Mojave Desert ecosystems and most perennials are poorly adapted to even low-intensity fires, and the animals that coevolved are not likely to respond favorably to fire either. The potential spread or proliferation of non-native annual grasses, combined with the proximity to ignition sources could potentially increase the risk of fire, and the effects to these poor-adapted desert communities would be harmful, particularly to cacti and most native shrubs species. Although there are few studies of fire effects on Sonoran Desert vegetation, we do know that burned creosote and other native shrubs are typically replaced by short-lived perennials and non-native grasses (Brown & Minnich 1986). The spread of invasive plants is a major threat to biological resources in the Colorado Desert because non-native plants can displace native plants, increase the threat of wildfire, and supplant wildlife foods that are important to herbivorous species.

Wildfires (caused by construction or downed transmission lines) are rare but the increase in daily vehicle use in the area from an anticipated 200 new jobs during operation and up to 1,000 jobs during construction could significantly increase the risk of ignition. Other temporary and permanent impacts from the proposed action could occur to surrounding vegetation communities from grading activities creating airborne, fugitive dust, sedimentation and erosion, which can disrupt photosynthesis and other metabolic processes. The destruction of plants and soil crusts by windblown sand and dust also exacerbates the erosion of the soil and accelerates the loss of nutrients (Okin et al. 2001).

Construction Impacts of Dust on Plants

Disturbance of the soil’s surface caused by construction traffic and other activities would result in increased wind erosion of the soil. Aeolian transport of dust and sand can result in the degradation of soil and vegetation over a widening area (Okin et al. 2001). Dust can have deleterious physiological effects on plants and may affect their productivity and nutritional qualities. The destruction of plants and soil crusts by windblown sand and dust exacerbates the erosion of the soil and accelerates the loss of nutrients (Okin et al. 2001).

Cacti, Yucca, and Native Trees

Teddybear, silver cholla, pencil cholla, common fishhook cactus, and possibly one cottontop cactus would be lost or salvaged from disturbed areas. These species provide microhabitats for other plants including special status plants, so those values would be lost. Native trees such as smoke tree, honey mesquite ironwood, blue paloverde, and ocotillo would be lost from the project disturbance area These plants provide similar microhabitat values for other plants including special status plants and provide perching and nesting sites for wildlife. These values would be lost within the project disturbance area.

Impacts Specific to Closure and Decommissioning of the Proposed Project

Potential impacts to vegetation resources from closure and decommissioning of the proposed project would involve residual disturbance of developed areas and altered hydrologic conditions (including the engineered drainage channels), as well as similar impacts from vehicle/equipment access and employees as noted for construction of the proposed project. The Applicant has prepared a Draft Conceptual Decommissioning Plan. Replanting and revegetation activities tied to closure and decommissioning are as yet unquantified, but would provide some benefit through reconnection populations and providing some ecosystem functions to the project disturbance area and surrounding plant communities in the long term.

Alternatives

Table 4.17-1 shows differences among alternatives in terms of direct and indirect impacts, if quantified. For the No Action and CDCA Plan Amendment/No Project Alternatives B and C, no impacts would be anticipated to vegetation communities and special status plants in the short term though impacts similar to those discussed for the proposed action, Reconfigured Alternative 1, Reconfigured Alternative 2 and Reduced Acreage Alternative could occur in the long term for CDCA Plan Amendment/No Project Alternatives A and C. Table 4.17-1 also summarizes direct and indirect impacts to ephemeral drainages (waters of the state) as a result of construction, operation and decommissioning of the proposed action and alternatives.

Table 4.17-2 compares impacts to Sand Corridors and Sand Dune habitat by alternative.

Reconfigured Alternative 1

The Reconfigured Alternative 1 site is approximately 3,097 acres in size (including the transmission line), and so smaller than the site of the proposed action. For this reason, this alternative is expected to have correspondingly smaller direct impacts to native vegetation communities. The site of Reconfigured Alternative 1 contains waters of the state including unvegetated, ephemeral dry washes (43 acres) and desert dry wash woodland (56 acres). The Reconfigured Alternative 1 site also supports stabilized and partially stabilized desert dunes (147 acres) and Sonoran creosote bush scrub (2,848 acres). The Reconfigured Alternative is partially within the sand transport Zones II and III shown in the Preliminary Geomorphic Aeolian and Ancient Lake Shoreline Report provided by the Applicant (Solar Millennium 2010b). This site provides habitat that would support similar species as the proposed action.[1]

Distinctions in anticipated impacts between Reconfigured Alternative 1 and the proposed action with respect to vegetation communities are presented in Table 4.17-1.

Reconfigured Alternative 1 would have reduced impacts relative to the proposed action with respect to the following vegetation resources:

1. Direct impacts to state waters would be 213 acres less with Reconfigured Alternative 1 compared to the proposed action, including 92 fewer acres of impacts to desert dry wash woodland and 121 fewer acres of impacts to unvegetated ephemeral dry wash.

2. Impacts to upland habitat would be 712 acres less with Reconfigured Alternative 1 compared to the proposed action, including 574 fewer acres of impacts to Sonoran creosote bush scrub and 138 fewer acres of impacts to stabilized and partially stabilized desert dunes.

[1] Biological Resources Appendix A of CEC RSA Part II provides a more detailed description of resources found within this area that would be affected by Reconfigured Alternative 1 is available at http://www.energy.ca.gov/2010publications/CEC-700-2010-007/CEC-700-2010-007-REV-PT2.PDF. An additional study, AECOM (2010u), provides transmission line acreages, which were added to this alternative to facilitate comparison of potential impacts.

TABLE 4.17-1
COMPARISON OF DIRECT AND INDIRECT IMPACTS TO VEGETATION COMMUNITIES AND SPECIAL STATUS PLANTS FROM PROPOSED ACTION AND ALTERNATIVES

Vegetation Community	Proposed Action (acres)	Reconfigured Alternative 1 (acres)	Reconfigured Alternative 2, Option 1 (acres)	Reconfigured Alternative 2, Option 2 (acres)	Reduced Acreage Alternative (acres)
Upland					
Sonoran creosote bush scrub	3,422	2,848	3,817	3,771	2,104
Stabilized and partially stabilized desert dunes	285	147	156	188	60
Subtotal Upland	*3,707*	*2,995*	*3,973*	*3,959*	*2,164*
Other Cover Types					
Agricultural Land	3	3	3	3	3
Developed	2	0	2	2	0
Subtotal Other Cover Types	*5*	3	5	5	3
Total Acres	***4,024***	***3,097***	***4,366***	***4,330***	***2,242***
Riparian					
Ephemeral Drainages (State Waters) - Direct Impacts:					
Desert dry wash woodland	148	56	208	198	20
Unvegetated, ephemeral dry wash	164	43	180	168	55
Total	**312**	**99**	**388**	**366**	**75**
Ephemeral Drainages (State Waters) - Indirect Impacts[1]:					
Desert dry wash woodland	0	16	0	0	<1
Unvegetated, ephemeral dry wash	32	29	19	18	58
Total	**32**	**45**	**19**	**18**	**58**
Special Status Plants					
Harwood's milkvetch	7 individuals, minor, Potential indirect from weeds, sand transport system	Similar to proposed action	Less than proposed action	Less than proposed action	Less than proposed action
Harwood's eriastrum (=Harwood's woolly-star)	No direct impact, Potential indirect from weeds, sand transport system	Similar to proposed action	Less than proposed action	Less than proposed action	Less than proposed action
California ditaxis	Loss of 11 plants (50% of population), Potential indirect from weeds	Similar to proposed action	Similar to proposed action	Similar to proposed action	Similar to proposed action

TABLE 4.17-1 (Continued)
COMPARISON OF DIRECT AND INDIRECT IMPACTS TO VEGETATION COMMUNITIES AND SPECIAL STATUS PLANTS FROM PROPOSED ACTION AND ALTERNATIVES

Vegetation Community	Proposed Action (acres)	Reconfigured Alternative 1 (acres)	Reconfigured Alternative 2, Option 1 (acres)	Reconfigured Alternative 2, Option 2 (acres)	Reduced Acreage Alternative (acres)
Special Status Plants (cont.)					
Ribbed cryptantha	Loss of many individuals though millions locally abundant, potential indirect from weeds, sand transport system (406.01)	(49.60)	(52.46)	(52.46)	Less than proposed action
New taxon of saltbush (=Palen Lake Atriplex)	No direct impact, potential groundwater pumping impact	Similar to proposed action	Similar to proposed action	Similar to proposed action	Similar to proposed action
Late season plants	Low potential impacts to those not detected in earlier surveys	Similar to Proposed Action	Lower potential, fewer acres	Similar to Reconfigured Alternative 2	Lower potential, fewer acres

SOURCES: CEC Commission Decision Biological Resources Tables 1, 2, 4, 5, 6; CEC RSA Part II Biological resources Table 7a

TABLE 4.17-2
DIRECT IMPACTS TO INNER AND OUTER SAND CORRIDORS AND THE DIRECT AND INDIRECT IMPACTS TO SAND DUNE HABITAT

	Proposed Action (acres)	Reconfigured Alternative 1 (acres)	Reconfigured Alternative 2, Option 1 (acres)	Reconfigured Alternative 2, Option 2 (acres)	Reduced Acreage Alternative (acres)
Direct Impacts to Zone 2 & dune habitat (vegetated, deep)[3]	430	520	140	150	9
Direct Impacts to Zone 3 & dune habitat (vegetated, shallow)[3]	540	600	540	640	290
Indirect Impacts to Zone 2 (25-50%, 50-75%, 75-100% [total])	310 260 490 [970]	260 230 380 [870]	80 39 11 [130]	68 10 1 [79]	38 12 5 [55]
Indirect Impacts to Zone 3 (25-50%, 50-75%, 75-100% [total])	0 0 53 [53]	0 0 280 [280]	3 6 5 [14]	6 9 1 [16]	49 48 140 [237]
Total	**2,083**	**2,270**	**824**	**885**	**591**

SOURCE: CEC RSA Part II Biological Resources Table 8b

3. Indirect impacts to sand transport corridor Zone 2 would be a total of 100 acres less with Reconfigured Alternative 1 compared to the proposed action, including 50 acres less impact in the 25-50% range, 30 acres less impact in the 5-75% range, and 110 acres less in the 75-100% range.

Reconfigured Alternative 1 would have greater impacts relative to the proposed action with respect to the following vegetation resources:

1. Direct impacts to sand transport corridor Zone 2 and dune habitat (vegetated, deep) would be 90 acres greater for Reconfigured Alternative 1 compared to the proposed action. This greater impact to dune habitat and intrusion into a sand transport corridor also would cause an indirect adverse impact on downwind dune habitat.

2. Direct impacts to sand transport corridor Zone 3 and dune habitat (vegetated, shallow) would be 60 acres greater for Reconfigured Alternative 1 compared to the proposed action. This impact to dune habitat and intrusion into a sand transport corridor also would cause an indirect adverse impact on downwind dune habitat.

3. Indirect impacts to sand transport corridor Zone 3 would be 227 acres greater with Reconfigured Alternative 1 compared to the proposed action, all of which would affect the 75-100% range; neither this alternative nor the proposed action would have any indirect impact to Zone 3 in the 25-50% range or the 50-75% range.

Reconfigured Alternative 1 would have comparable impacts relative to the proposed action with respect to the following vegetation resources:

1. Other cover types: the two would have the same impact on agricultural land (3 acres), and a slightly reduced impact to developed land (0 acres for this alternative; 2 acres for the proposed action).

2. Special status plants.

Reconfigured Alternative 2

Based on the nature and extent of potential impacts to a number of key biological resources from the proposed action (including sand transport corridors and related species), two alternative configurations were developed and are evaluated Reconfigured Alternative 2 Options 1 and 2. Reconfigured Alternative 2 would be developed in the same general location as the proposed action; however, the reconfiguration of the solar plant boundary would to avoid or reduce impacts to targeted biological resources.

These options, which are described in greater detail in Section 2.4.3, *Alternatives Considered*, would disturb approximately 4,366 acres (Option 1) or 4,330 acres (Option 2). This acreage consists almost entirely of native habitats, including, respectively for Option 1 and Option 2: (a) 3,817 and 3,771 acres of Sonoran creosote bush scrub, (b) 156 and 188 acres of stabilized and partially stabilized desert dunes, (c) 208 and 198 acres of desert dry wash woodland, and (d) 180 and 168 acres of unvegetated ephemeral dry wash.

The seven native vegetation communities described in Section 3.18, *Vegetation Resources*, and analyzed above occur within the proposed action Study Area (i.e., desert dry wash woodland [also known as microphyll woodland], unvegetated ephemeral dry wash, active desert dunes, stabilized and partially stabilized desert dunes, desert sink scrub, dry lake bed (playa), and Sonoran creosote bush scrub]. Four of these habitats also occur within the disturbance areas for Reconfigured Alternative 2, with Sonoran creosote bush scrub the most prevalent.

Reconfigured Alternative 2 would have similar impacts to most resources as the proposed action, with some notable exceptions. Except as distinguished below, vegetation-related impacts of Reconfigured Alternative 2 are expected to be comparable to those of the proposed action. (See also, Table 4.17-7, below, for a comparison of mitigation measures recommended for reconfigured Alternative 2 and the proposed action.)

1. Because this alternative would be approximately 340 acres larger than the proposed action, impacts to desert dry wash woodland, unvegetated ephemeral dry wash, and desert tortoise habitat would increase somewhat. Impacts to sand dunes, the sand transport corridor and related species, however, would be substantially reduced based on the reconfigured site boundaries.

2. This alternative would affect the same three washes as the proposed action, although direct impacts to desert dry wash woodland would be 60 acres (40 %) greater. This alternative also is closer to I-10, and so affects more of the central project area wash than the proposed action. Indirect impacts to desert dry wash woodland and unvegetated ephemeral dry wash woodland would be lower, but only because indirect impacts identified for the proposed action would be direct impacts under this alternative.

3. Reconfigured Alternative 2 (either option) would reduce the potential for groundwater pumping-related impacts to adversely affect groundwater dependent vegetation ecosystems north of the proposed site by shifting the location of the wells approximately 3,000 feet to the south and away from shallow groundwater area (shallow groundwater and GDEs occur between the northern site boundaries and Palen Dry Lake to the north).

4. Reconfigured Alternative 2 also would have a reduced impact on saltbush relative to the proposed action because the boundary of the alternative would be located farther from the margins of Palen Lake. Consequently, there would be a considerable buffer between the boundary of Reconfigured Alternative 2 and the location of the mapped saltbush (Solar Millennium 2010k): over 3,500 feet from the boundary of Option 1 and 2,000 feet from the boundary of Option 2.

5. Although reconfigured Alternative 2 would increase the number of acres of State waters that would be affected directly, it would reduce the number of acres of such waters that would be affected indirectly: Option 1 would have a direct impact on 388 acres of State Waters, Option 2 would have a direct impact on 366 acres, and the proposed action would have a direct impact on 312 acres. Concerning indirect impacts, Option 1 would affect 407 acres, Option 2 would affect 384 acres, and the proposed action would affect 344 acres.

6. Approximately 430 acres (10 percent) of Reconfigured Alternative 2 Option 1 were not included in the state waters survey area.

7. Botanical surveys covered this entire alternative; fall surveys were published on October 26, 2010. The results of these surveys do not present significantly new information under NEPA because this area's now-surveyed habitat type and quality are consistent with the adjacent habitat, which was unsurveyed when the SA/SEIS was issued. The studies confirm the previous assumptions that these areas do not differ in abundance or value from the adjacent intensively surveyed areas.

8. Reconfigured Alternative 2 would substantially reduce intrusion into the sand transport corridor, including the more sensitive Zone II areas, relative to the proposed action. As shown in Figure 3.15-3, *Sand Transport Zones Characterizing Varying Rates of Sand Transport*, the boundary of the proposed action covers approximately 50% of the width of the Palen Dry Lake- Chuckwalla sand transport corridor, including portions of Zones II through IV and resulting in approximately 1,781 acres of direct impacts and 1,113 acres of indirect sand shadow impacts. Based on the modification of associated site boundaries.

Reduced Acreage Alternative

The Reduced Acreage Alternative would have the lowest level of direct and indirect impacts compared to the proposed action. A comparative analysis of impacts of the Reduced Acreage Alternative is provided in Tables 4.17-1, 4.17-2 and 4.17-4, and is summarized as follows:

1. The Reduced Acreage Alternative would adversely affect 1,543 fewer acres of upland habitat than the proposed action and two fewer acres of other cover types.

2. The Reduced Acreage Alternative would cause a direct adverse affect on 237 fewer acres of state waters, including128 fewer acres of impact on desert dry wash woodland and 109 fewer acres of impact on unvegetated ephemeral dry wash.

3. The Reduced Acreage Alternative would have substantially fewer impacts to the sand transport corridor: 9 acres of direct impacts to sand transport Zone 2 and vegetated deep dune habitat as compared to the proposed action's 430 acres of impact on this resource; 250 fewer acres of direct impacts to Zone 3 and vegetated shallow dune habitat; and 915 fewer acres of indirect total impacts to Zone 2. By contrast, the Reduced Acreage Alternative would have greater indirect impacts to Zone 3: 237 acres as compared to the proposed action's 53 acres of impact on this resource.

4. Relative to the proposed action, the Reduced Acreage Alternative also would reduce direct impacts to state waters: 384 fewer acres of impact on desert dry wash woodland and 109 fewer acres of impact on unvegetated ephemeral dry wash. Indirect impacts on these resources would be slightly increased in that the Reduced Acreage Alternative would have an adverse indirect impact on 1 acre of desert dry wash woodland (whereas the proposed action would have none) and on 30 acres of unvegetated ephemeral dry wash (relative to the proposed action's impact on 16 acres).

No Action Alternative A

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would remain in its existing condition, with no new structures or facilities constructed or operated on the site, and no disturbance-related impacts to sensitive vegetation resources. However, the proposed site would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of the PSPP, other renewable energy projects could be constructed to meet State and Federal mandates, or other uses could be proposed that are consistent with the CDCA Plan MUC-M classification. Insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative B

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, new impacts to vegetation resources would not occur. As such, this alternative would avoid the impacts to vegetation resources that would occur under the proposed action. However, in the absence of the PSPP, other renewable energy projects or other uses could be developed. Insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative C

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. As a result, sensitive vegetation resources would be affected, and could be affected in like types and intensities as would occur with implementation of the proposed action. Although different solar technologies require different amounts of land, placement, grading and maintenance, it is expected that all the technologies would require a large use of land. As such, this Alternative is expected to result in impacts to vegetation that are comparable to those of the proposed action.

4.17.3 Discussion of Cumulative Impacts

Cumulative impacts associated with vegetation resources are analyzed in detail, including the full methodology behind the analysis, in Appendix I, *Biological Resource-related Cumulative Impacts*. The geographic scope of the analysis of cumulative effects on plant communities and general wildlife habitat is based primarily on a regional, quantitative (GIS-based) evaluation of past, present and future foreseeable projects encompassed by the NECO planning area. The NECO planning area is primarily in the Sonoran Desert region, but includes smaller portions of the adjacent southern Mojave Desert. This analysis uses the NECO plant communities dataset to map and quantify cumulative effects on foraging habitat. The NECO plant communities dataset is based on the 1996 California Gap Analysis Project conducted by the Biogeography Lab at the University of California, Santa Barbara and coordinated through the USGS Biological Resources Division. For certain resources, a different geographic scope (i.e., other than NECO) was warranted, such as the use of watershed boundaries to analyze cumulative effects to desert washes. Additionally, a qualitative approach was used for certain indirect impact assessments, such as habitat fragmentation and effects to GDEs, as these effects are not readily subject to direct measurement from GIS data.

Construction, operation and decommissioning of the project, as proposed, would contribute incrementally to cumulative impacts in nearly every vegetation resource area analyzed. Among these, the most significant relate to the Palen Dry Lake-Chuckwalla sand transport corridor and the related loss of habitat for the MFTL and other dune dependent species. This and other incremental contributions of the proposed action and alternatives to cumulative impacts to vegetation resources are analyzed below.

A number of past, present and reasonably foreseeable probable future projects were identified for the assessment of potential cumulative impacts (see Section 4.1.4, *Cumulative Scenario Approach*). Impacts of the proposed action or an alternative could combine with the impacts of one or more of these projects, as analyzed below, to cause or contribute to adverse cumulative effects.

Sonoran Creosote Brush Scrub and Desert Dry Wash Woodland

The proposed action would contribute incrementally to the cumulative loss of Sonoran creosote bush scrub (3,422 acres, or 1.5%) and desert dry wash woodland (148 acres, or 0.3%) habitats in the NECO planning area, with impacts to desert dry wash woodland in Chuckwalla Valley representing 1.4% of the total area. See CEC RSA Part II Biological Resources Tables 17 and 19. Associated impacts of the alternatives would vary as indicated in Table 4.17-5 in accordance with the extent of habitat loss.

The contribution of the proposed action and alternatives also has been evaluated in the context of cumulative effects to plant communities and landforms within three Multi-Species WHMAs in the vicinity of the project: Big Maria Mountains WHMA; the Palen-Ford WHMA, north of I-10; and the DWMA Continuity WHMA, which provides connectivity between the Chuckwalla DWMA/ACEC south of I-10 and the Palen-Ford WHMA. In both the Palen-Ford WHMA and the DWMA Continuity WHMA, the proposed action would be a major contributor to the cumulative effects related to the loss of Sonoran creosote bush scrub. In the Palen-Ford WHMA, the proposed project would contribute a loss of 3,738 acres (68%) of the 39,366 total acres of Sonoran creosote bush scrub habitat; in the DWMA Continuity WHMA, it would contribute a loss of 637 acres (64% of cumulative impacts and 5% of the total habitat area within the WHMA). The contribution to cumulative impacts related to desert dry wash woodland also would be considerable in the Palen-Ford WHMA: the proposed project would contribute a loss of 148 acres (73.3%) of the 13,104 total acres of desert dry wash woodland habitat. The proposed action would contribute nothing to any cumulative impact on these habitat types in the Big Maria Mountains WHMA. See CEC RSA Part II Biological Resources Table 16.

Sand Dunes and Transport Corridors

The proposed action and alternatives would contribute substantially to cumulative impacts to sand dunes and related features, which provide habitat for species such as MFTL as well as several rare plants, such as Harwood's milkvetch. These contributions would be especially serious in light of anticipated indirect effects from obstructed winds and sand transport. Appendix I, Biological Resources Table 20, illustrates that the Project's contribution to direct impacts to active dune habitat would be 17.7; whereas, the contribution of impacts from all present and reasonably foreseeable projects would be 10.3% of total habitat in the Chuckwalla Valley. Adding to this the Project's indirect effects from obstruction of the wind sand transport corridor, and the reasonably expected indirect effects of weeds, encroachment by roads and associated roadkills, and channel diversions, which impact the fluvial component of the maintenance of dunes.

Groundwater-Dependent Ecosystems

The uncertainties inherent in the discussion of potential project-specific impacts to GDEs equally affect consideration of cumulative impacts related to local groundwater tables and their relationships to biological resources. Mitigation measures are recommended to address these uncertainties (see Section 4.17.4, summarizing BIO-23 and BIO-24 and Appendix B, *Conditions of Certification*, which includes all mitigation measures set forth in full). Given the uncertainty and with the implementation of these mitigation measures, the incremental contribution of the proposed action or alternatives to cumulative impacts on GDEs is not expected to be substantial.

Waters of the State

The proposed project also would contribute incrementally to cumulative impacts on waters of the state. As reported in the CEC's Commission Decision, projects included in the cumulative scenario would affect approximately 40 miles of desert washes within the Palen watershed and 1,122 miles within the NECO planning area. See Table 4.17-3a and Table 4.17-3b.

Incremental impacts to waters of the state contributed by Reconfigured Alternative 2 would be slightly greater, due to minor increases in direct impacts (see Table 4.17-4). With the implementation of Mitigation Measures/Conditions of Certification BIO-21, BIO-7, BIO-8 and BIO-14, summarized below in Section 4.17.4, the incremental contribution of the proposed action or alternatives to cumulative impacts to waters of the state in the Palen watershed and NECO planning area would not be substantial.

Substantial cumulative effects to plant communities are expected to result from past, present and reasonably foreseeable probable future projects including in the following community types: playa (21.1%), Sonoran creosote bush scrub (5.9%), and desert dry wash woodland (7.1%). These figures do not address the indirect effects to remaining habitat from fragmentation, alteration of the surface drainage patterns that support many common and rare species, and both riparian and upland habitats.

The proposed action also is expected to contribute a substantial impact to cumulative conditions related to increased risk of fire associated with increased vehicle use of area roads and the introduction and spread of noxious weeds. Sahara mustard is of particular concern because it is already infesting many areas on and adjacent to the proposed site and has the potential to spread explosively if not carefully managed. Climate change is expected to exacerbate the effects of drought and noxious weed spread from larger and more frequent disturbances such as fire and weather events.

TABLE 4.17-3a
DESERT WASHES IN PALEN WATERSHED – CUMULATIVE EFFECTS

Total Desert Washes in Palen Watershed	Impacts to Habitat from Existing Projects[a] (percent of total watershed)	Impacts to Habitat from Future Projects[a] (percent of total watershed)	Contribution of Project to Cumulative Impacts (percent of total impacts from cumulative projects)
1,496 miles	34 miles (2.3%)	40 miles (2.7%)	5.3 miles (13%)

NOTE:
[a] Actual habitat impacts from existing and future projects may differ from those reported here. Although these estimations also may differ slightly from acreage associated with the cumulative projects identified in Section 4.1.4, *Cumulative Scenario Approach*, they provide the best available comparison of impacts.

SOURCE: CEC RSA Part II Biological Resources Table 10

TABLE 4.17-3b
DESERT WASHES IN THE NECO PLANNING AREA – CUMULATIVE EFFECTS

Total Desert Washes in NECO	Impacts to Habitat from Existing Projects[a] (percent of total washes in NECO)	Impacts to Habitat from Future Projects[a] (percent of total washes in NECO)	Contribution of Project to Cumulative Impacts (percent of total impacts from cumulative projects)
18,596 miles	190 miles (1.0%)	1,122 miles (6.0%)	5.3 miles (0.5%)

NOTE:
[a] Actual habitat impacts from existing and future projects may differ from those reported here. Although these estimations also may differ slightly from acreage associated with the cumulative projects identified in Section 4.1.4, *Cumulative Scenario Approach*, they provide the best available comparison of impacts.

SOURCE: CEC RSA Part II Biological Resources Table 11

The proposed action also could cause a considerable cumulative impact on groundwater-dependent ecosystems in the Palen Lake watershed as a result of the proposed construction-related groundwater pumping.

The project would contribute incrementally to the cumulative loss of Sonoran creosote bush scrub and desert dry wash woodland. Sonoran creosote bush scrub is a common and widespread community in the southeastern deserts of California; however, this broad designation does not reflect the importance of large, intact blocks of habitat to wildlife movement, or to foraging and breeding habitat for wildlife, including state and federal listed species. The NECO mapping of plant communities also does not reflect the many uncommon and even rare plant assemblages within creosote scrub that have been documented and are monitored by the CNDDB (CDFG 2003).

Noxious and Invasive Weeds

Although the proposed action and alternatives would have no direct effect related to noxious and invasive weeds, they would contribute indirectly to the spread of Sahara mustard and other weeds within the Chuckwalla Valley and its dune habitats in concert with other nearby projects.

TABLE 4.17-4
COMPARISON OF COMPENSATORY MITIGATION REQUIREMENTS FOR PROPOSED ACTION AND ALTERNATIVES

Resource	Mitigation Ratio	Proposed Project (acres)	Reconfigured Alternative 1 (acres)	Reconfigured Alternative 2 Option 1 (acres)	Reconfigured Alternative 2 Option 2 (acres)	Reduced Acreage Alternative (acres)
State Waters – Direct Impacts						
Desert dry wash woodland	3:1	444	168	624	594	60
Unvegetated, ephemeral dry wash	1:1	164	43	180	168	55
State Waters Subtotal		***608***	***211***	***804***	***762***	***115***
State Waters – Indirect Impacts						
Desert dry wash woodland	1.5:1	0	24	0	0	1
Unvegetated, ephemeral dry wash	0.5:1	16	15	10	9	29
State Waters Subtotal		***16***	***39***	***10***	***9***	***30***
State Waters Total		**624**	**250**	**814**	**771**	**145**

Special-Status Plants

This analysis of cumulative impacts to special-status plants is focused on Harwood's milkvetch, although impacts also would occur to Harwood’s phlox, ribbed cryptantha, California ditaxis, glandular ditaxis, Palen Lake saltbush, Abram's spurge, flat-seeded spurge and lobed ground cherry (Appendix I). This is because the mitigation measures recommended to address impacts on Harwood's milkvetch would avoid or reduce impacts on these other special status plant species as well (see summaries of BIO-8, BIO-14, BIO-19, BIO-20, and BIO-21 in Section 4.17.4). Harwood’s milk-vetch habitat would be disproportionately affected (almost 9 percent of its habitat in NECO) by the push for renewable development in NECO, and the species’ range in California is nearly restricted to the NECO planning area. In the Chuckwalla Valley, 12.9% of its habitat is affected by probable future projects and 8.3% has already been lost. See Table 4.17-5, which quantifies the contribution of the proposed action to cumulative impacts on plant communities, stratified by community type.

Table 4.17-5
Project Contribution to Cumulative Impacts on Vegetation Resources

Vegetation Resource	Cumulative Impact
Sonoran Creosote Bush Scrub	Contributes 1.5% to a cumulative loss of habitat, fragmentation, and indirect effects from future projects within the NECO Planning Area.
Stabilized and Partially Stabilized Dunes	Contributes substantially to cumulative impacts from future projects within Chuckwalla Valley and NECO Planning Area.
Ephemeral Drainages/ Sensitive Plant Communities	Contributes 0.5 % to cumulative loss of habitat from future projects within the NECO Planning Area; contributes 13% to cumulative loss from future projects within the Palen watershed
Groundwater-Dependent Plant Communities	Potential for substantial adverse effects to groundwater-dependent plant ecosystems (GDEs) near Palen Dry Lake, including loss of habitat function and value for wildlife, reduced plant cover which increases wind erosion and affects air quality, increase in weedy species, impacts to special-status species inhabiting the GDEs. Even minor incremental contributions to cumulative impacts to GDEs are considered considerable.
Harwood’s milkvetch	The project would contribute 0.7% to the cumulative loss of habitat within the NECO Planning Area, or 1,136 acres of the total habitat in this area (1,555,915 acres).[a]
Other Special-status Plants	Project’s contribution to spread of weeds, fragmentation, disrupted wind and fluvial transport systems, altered hydrology, and risk of fire is substantial from a cumulative perspective, avoided occurrences unless minimization measures implemented.

NOTE:

[a] Using the NECO dataset for selected landforms, 1,136 acres of Harwood’s milkvetch habitat were calculated; the total evaluated here, i.e., 1,555,915 acres, reflects a ground-based analysis.

SOURCES include CEC RSA Part II Biological Resources Table 14, among others

Cumulative Impacts to Existing Carbon Sequestration

Climate change-related impacts are inherently cumulative in nature. Accordingly, this section evaluates the impacts of climate change to vegetation resources only as a cumulative concern. Incremental contributions of the proposed action and alternatives to potential climate change-related impacts to plants are quantified where possible and, where quantification is not possible, are analyzed qualitatively.

In a recent study*, Climate Change and the Future of California's Endemic Flora* (Loarie et al 2009), anticipated climate change is projected to cause greater than 80 percent reductions in range size for up to 66 percent of California's endemic species within a century. These results are comparable to other studies, but projected reductions depend on the magnitude of future emissions and on the ability of species to disperse from their current locations. California's varied terrain could cause species to move in very different directions, breaking up present-day floras. However, these projections also identify regions where species undergoing severe range reductions may persist. Protecting these potential future refugia and facilitating species dispersal would be essential to maintain biodiversity in the face of climate change. These include the cooler, more mesic microclimates of the mountainous areas, which may protect significant components of biodiversity into the next century. Many of these areas are already in some degree of federal wilderness protection. However, the value of these refugia depends critically on the ability to of species to disperse, underscoring the importance of landscape connectivity and potential restoration in the face of increasing urbanization, land use change and disturbance.

Numerous studies conducted over the past 40 years have attempted to identify and quantify the major pools of carbon uptake for the various components of desert ecosystems as well as desert ecosystems as a whole (Schlesinger et al. 2009). The estimates of carbon uptake vary immensely between sites and researchers. In addition to vegetation, alkaline soils and biological soil crusts (BSCs), which are composed primarily of photosynthetic cyanobacteria, algae, lichens, and mosses, play a key role in arid and semi-arid ecosystems and are able to fix carbon. Schlesinger et al. (2009) point out, however, that those pools of carbon that biological crusts fix are relatively small.

New evidence suggests alkaline desert soils may be responsible for considerable uptake of carbon, and that potential increases in precipitation may also drive increases in the uptake of carbon in desert ecosystems (Campbell et al., 2009 as cited in the CEC RSA, 2010). Whether a result of biotic crusts, vegetation, alkaline soils, or an increase in average precipitation, the rate of carbon absorption in the soil has scientists considering whether desert ecosystems play a more critical role in the carbon cycle than previously believed (Stone 2008; Campbell et al. 2009 as cited in the CEC RSA, 2010). Some scientists, however, dispute these findings and attribute them to an anomaly caused by increased rain for the study period reported (Campbell et al. 2009 as cited in the CEC RSA, 2010). A study is currently underway by the University of Oregon "to determine whether the installation and operation of solar thermal plants would impact carbon sequestration capabilities of the Mojave Desert ecosystem and ecosystem services (assessment endpoint) to the extent that more carbon is released or inhibited from being stored than saved while utilizing solar technology" (Campbell et al. 2009 as cited in the CEC RSA, 2010).

Until the dispute about the sequestration benefits of alkaline soils and other carbon sinks is resolved, the answer may vary on a case-by-case basis. For example, project sites that are very sparsely vegetated with only a minor component of soil crusts may confer less sequestration capabilities than sites with a rich cover of biological soils crusts and succulent desert scrubs.

To build the proposed project under either the proposed action or one of the build alternatives, biotic soil crusts and alkaline soils would be damaged and possibly destroyed, and a portion of the total sequestered carbon that is currently stored therein would be released back into the atmosphere. The extent to which biotic soil crusts and alkaline soil layers could potentially re-form and continue sequestering carbon during the operation of the proposed project has not been evaluated here because sufficient/reliable scientific data on the re-formation of biotic soil crusts and alkaline soil layers following disturbance are not currently available. Therefore, using a the highest estimate, the analysis below presumes that all carbon that is currently stored in biotic soil crusts and alkaline soils would be released to the atmosphere as CO_2, and that installation and operation of the proposed project would entirely halt carbon uptake into biotic soil crusts and alkaline soils on the site.

According to Campbell et al. (2009 as cited in the CEC RSA, 2010), net carbon uptake in aboveground biomass in desert ecosystems ranges from 25 to 72 g C m^{-2} y^{-1}; biotic soil crusts fix (as opposed to sequester) approximately 42 g C m^{-2} y^{-1}; and alkaline and saline soils may absorb 62-622 g C m^{-2} y^{-1}. Taking the high end estimates for each of these ranges results in what is likely a very high overestimate of existing carbon sequestration on site: 736 g C m^{-2} y^{-1}. Applied over the entire disturbed surface of the proposed project (4,366 acres), and assuming that all carbon is converted to CO_2, this is equivalent to 47,681 MT CO_2 per year. However, as discussed in Section 4.3, *Impacts on Global Climate Change*, the proposed project would generate approximately 1,000,000 MWh of electricity per year with a net GHG emissions rate of approximately 0.02 MT CO_2/MWh (not accounting for impacts to natural carbon sequestration discussed here). As discussed in Section 4.3, *Impacts on Global Climate Change*, electricity generated by the proposed project would offset GHG emissions from fossil fueled power plants, which can range from 0.35 to 1.0 MT CO_2 emissions per MWh. Assuming 0.35 MT CO_2/MWh as a conservative estimate, the proposed project would still result in an offset of 330,000 MT CO_2 per year worth of fossil power, for an overall net emission rate, including loss of natural carbon sequestration, of approximately 282,000 MT CO_2 per year. Note that based on the assumptions disclosed above, this is likely a very low underestimate of the total net GHG emissions offset that would result from proposed project implementation. Therefore, loss of carbon sequestration associated with proposed project implementation would not result in a substantial incremental impact to GHG emissions or net carbon sequestration rates. No further mitigation or analysis is warranted.

4.17.4 Summary of Mitigation Measures

Mitigation measures including avoidance, minimization, and compensation are recommended to offset direct, indirect, and cumulative impacts to vegetation resources and to assure compliance with state and federal laws such as the regulations protecting waters of the state. The mitigation measures imposed by the Energy Commission as Conditions of Certification also would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in Appendix B, *Conditions of Certification*. Of them, the mitigation measures summarized in Table 4.17-6 would address impacts to some vegetation resources; others are described below.

In turn, Table 4.17-7, summarizes direct and indirect habitat impacts and identifies the recommended mitigation acreage for the proposed action (PA), Reconfigured Alternative 2 Option 1 (R2, O1) and Reconfigured Alternative 2 Option 2 (R2, O2). These habitat impacts also are summarized in Table 4.17-7 in connection with the various wildlife species of concern that depend on those habitats.

Noxious and Invasive Weeds

Contributions of the proposed action and alternatives to substantial cumulative indirect effects related to the spread of Sahara mustard and other invasive weeds into dunes and adjacent habitats would be addressed by the implementation of BIO-8 (Impact Avoidance and Minimization Measures) and BIO-14. (Weed Management Plan).

Climate Change

As discussed previously and in Section 4.3, *Impacts to Global Climate Change,* potential losses of carbon sequestration on site due to disturbance of natural processes would be minor in comparison to the operation of the proposed project, which would result in the offset of GHG emissions from fossil fueled power plants. Therefore, the proposed project, even when considering GHG emissions associated with construction and loss of naturally occurring carbon sinks, is anticipated to provide a net benefit in terms of GHG reduction. Additionally, implementation of recommended biological resources mitigation measures, which would be applied as mitigation for other biological resources impacts, would further offset GHG emissions due to the loss of naturally occurring carbon sequestration on site. These measures would compensate for loss of natural carbon sequestration potential and other impacts of climate change due to habitat loss by preventing the future development of desert lands through acquisition and permanent protection under conservation easements (BIO-12, BIO-19, BIO-20 and BIO-22), focusing the acquisitions into important linkages for species dispersal into critical refugia, restoring degraded portions of acquired lands (BIO-12 and BIO-19), minimizing the size of the disturbance area along the linears (BIO-8 and BIO-19), and requiring re-vegetation after closure and decommissioning (BIO-23).

Native Cacti, Succulents and Trees

2009 and 2010 surveys included an inventory of native cacti, succulents and trees that are not designated as special-status or rare species, but are regulated to prevent unlawful harvesting. Potential impacts to these and other applicable non-listed plant species from the proposed action and alternatives would be addressed through Mitigation Measures/Conditions of Certification BIO-8, BIO-14 and BIO-29.

TABLE 4.17-6
SUMMARY OF SELECTED IMPACTS AND MITIGATION MEASURES

Vegetation Resource	Impact / Mitigation Measures
Sonoran Creosote Bush Scrub	**Direct Impacts of the proposed action:** Permanent loss of 3,422 acres; fragmentation of adjacent wildlife habitat and native plant communities. **Indirect Impacts of the proposed action:** Disturbance (noise, lights, dust) to surrounding plant and animal communities; spread of non-native invasive plants; changes in drainage patterns downslope of proposed action; erosion and sedimentation of disturbed soils. **Cumulative Impacts:** Contributes 1.5% to a cumulative loss of habitat, fragmentation, and indirect effects from future projects within the NECO planning area. **Mitigation:** Off-site habitat acquisition and enhancement (BIO-12); implement impact avoidance and minimization measures (BIO-8) and weed control plan (BIO-14). **Alternatives:** The direct, indirect and cumulative effects of the proposed action and alternatives on Sonoran creosote bush scrub habitat in the NECO planning area would vary.
Stabilized and Partially Stabilized Dunes	**Direct Impacts:** Permanent loss of 285 a acres; potential accidental direct impacts to adjacent preserved habitat during construction and operation. **Indirect Impacts:** Disruption of sand transport corridor resulting in downwind impacts to 1,113b acres of sand dune habitat; introduction and spread of non-native invasive plants; erosion and sedimentation of disturbed soils; fragmentation and degradation of remaining habitat. **Cumulative Impacts:** Contributes substantially to cumulative impacts within Chuckwalla Valley and NECO planning area. **Mitigation:** These impacts would be reduced somewhat with implementation of BIO-20 (Sand Dune Community/MFTL Mitigation), and BIO-29, although these mitigation measures could not completely remedy the proposed project's interference with a natural geomorphic process that sustains the regions sand dunes. A configuration that avoids interference with the sand transport corridor is the only means of reducing this impact to less than substantial levels. **Alternatives:** Reconfigured Alternative 2 would shift the project footprint further out of the sand transport corridor, avoiding most impacts in Zone II and substantially reducing interference with sand transport and associated downwind impacts to sand dune habitats and dependent species. Further, the remaining downwind impacts would occur primarily in less sensitive habitats. Although these impacts would be reduced relative to the proposed action, BIO-20 and the other mitigation measures summarized herein still would be recommended.
Waters of the State/ Sensitive Plant Communities	**Direct Impacts:** Permanent loss of hydrological, geomorphic, and biological functions and values of 312 acres of state waters, including: a. 148 a acres desert dry wash woodland b. 164 a acres of unvegetated ephemeral dry wash **Indirect Impacts:** Permanent loss of hydrological connectivity downstream of the proposed action, including 32 a acres unvegetated ephemeral wash. Other indirect impacts include: a. head-cutting on drainages upslope and b. erosion/sedimentation downslope. **Cumulative Impacts:** Contributes 0.5% to cumulative loss of habitat within the NECO planning area and 13% of the habitat from within the Palen watershed (see PA/FEIS Table 4.17-4). The proposed action's incremental contribution to cumulative impacts would be considerable. **Mitigation:** a. Implementation of measures intended specifically to address impacts to state waters, including the acquisition of off-site state jurisdictional waters at a 3:1 ratio, financial assurances, implementation of a management plan, installation of culverts and Arizona crossings at stream crossings, diffusers, BMPs, and required notifications of changed conditions (BIO-21); b. Implementation of BIO-21 and other measures (BIO-29);

TABLE 4.17-6 (Continued)
SUMMARY OF SELECTED IMPACTS AND MITIGATION MEASURES

Vegetation Resource	Impact / Mitigation Measures
Waters of the State/ Sensitive Plant Communities (cont.)	c. Preparation and implementation of a Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) that includes accurate and up-to-date maps depicting the location of sensitive biological resources that require temporary or permanent protection during construction, operation and closure (BIO-7); d. Implementation of impact avoidance and minimization measures to manage the site and related facilities during construction, operation and maintenance so as to avoid or minimize impacts to biological resourcesBIO-8 and BIO-14 would address these incremental impacts (BIO-8); and e. Implementation of a Weed Management Plan (BIO-14).
Groundwater-dependent Plant Communities	**Direct Impacts:** None. Substantial adverse effects of pumping are not expected to occur; however, any such impacts could, if they developed at all, take several-to many years to appear, depending on the degree of separation in the confining layers between the shallow aquifer (supporting plants) and deep aquifers (where pumping will occur). Uncertainty **Indirect and Cumulative Impacts:** In light of the uncertainties associated with local groundwater tables and their relationships to vegetation and other biological resources, there is potential for serious adverse effects to groundwater-dependent plant ecosystems (GDEs) to result near Palen Dry Lake, including loss of habitat function and value for wildlife, reduced plant cover which increases wind erosion and affects air quality, increase in weedy species, impacts to special-status species inhabiting the GDEs. Even minor incremental impacts to GDEs are considered serious from a cumulative perspective. **Mitigation:** Monitoring GDEs near the site (BIO-23) and implementation of remedial action and compensatory mitigation if adverse effects are detected (BIO-24). **Alternatives:** Reconfigured Alternative 2 would reduce potential impacts relative to the proposed action because the associated wells would be located approximately 3,000 feet farther away from the originally proposed project wells. Nonetheless, to address uncertainty, BIO-23 and BIO-24 still would be recommended.
Special-status Plants	**Direct Impacts:** a. Harwood's milkvetch: Direct loss of seven plants (5% of occurrence in study area in 2010) in Project Disturbance Area b. Harwood's eriastrum: No direct impacts c. California ditaxis: Loss of 11 plants (50% of local population); d. Ribbed cryptantha: abundant throughout the vicinity e. "Palen Lake saltbush" – a potentially new taxon of saltbush observed near Palen Dry Lake: No direct impacts f. Late-season plants, including Abram's spurge, flat-seeded spurge and lobed ground cherry: potential for serious impacts to fall-blooming plants not detected during spring surveys. **Indirect Impacts:** Minor to potentially serious indirect impacts to all plants in close proximity to the site from introduction and spread of nonnative invasive plants; increased risk of fire; disruption of sand transport systems that maintain habitat; altered drainage patterns downstream of site; erosion and sedimentation of disturbed soils; accidental chemical and herbicide drift; disruption of photosynthesis and other metabolic processes from dust; fragmentation of population and impaired gene flow and increased vulnerability to local extinctions, and accidental impacts to avoided plants during construction. **Cumulative Impacts:** PSPP's contribution to spread of weeds, fragmentation, disrupted wind and fluvial transport systems, altered hydrology, and risk of fire is substantial, avoided occurrences unless minimization measures implemented. **Mitigation:** BIO-8 (Impact Avoidance and Minimization Measures), BIO-14 (Weed Management Plan), BIO-19 (Special-Status Plant Impact Avoidance, Minimization and Compensation), BIO-20 through BIO 24, and BIO-29.

SOURCES: CEC Commission Decision; CEC RSA II Biological Resources Table 5

TABLE 4.17-7
RECOMMENDED MITIGATION ACREAGE FOR PROPOSED ACTION AND RECONFIGURED ALTERNATIVE 2

	Acres Impacted			Mitigation Ratio			Recommended Mitigation Acreage		
Resource	**PA**	**R2, O1**	**R2, O2**	**PA**	**R2, O1**	**R2, O2**	**PA**	**R2, O1**	**R2, O2**
Desert Tortoise Habitat									
Within Critical Habitat	201	228	228	5:1	(same)	(same)	1,006	1,140	1,140
Outside Critical Habitat	3,537	3,977	3,909	1:1	(same)	(same)	3,537	3,977	3,909
Desert Tortoise Total	***3,738***	***4,205***	***4,137***	***N/A***	***(same)***	***(same)***	***4,542***	***5,117***	***5,049***
Mojave Fringe-toed Lizard (MFTL) – Direct Impacts									
Stabilized and partially stabilized sand dunes – direct impacts	285	156	188	3:1	3:1	3:1	855	468	564
Non-dune habitats occupied by MTFL (sand fields vegetated with sparse creosote bush scrub)	1,496	1,347	1,354	1:1	1:1	1:1	1,496	1,347	1,354
Mojave Fringe-Toed Lizard – Indirect Impacts	1,113	144	94	0.5:1	0.5:1	0.5:1	557	72	47
MFTL Total	***2,894***	***1,647***	***1,636***	***N/A***	***N/A***	***N/A***	***2,908***	***1,887***	***1,965***
State Waters – Direct Impacts									
Desert Dry Wash Woodland	148	208	198	3:1	3:1	3:1	444	624	594
Unvegetated Ephemeral Dry Wash	164	180	168	1:1	1:1	1:1	164	180	168
State Waters Subtotal	***312***	***388***	***366***	***N/A***	***N/A***	***N/A***	***608***	***804***	***762***
State Waters – Indirect Impacts from Changes in Hydrology									
Desert Dry Wash Woodland	0	0	0	1.5:1	1.5:1	1.5:1	0	0	0
Unvegetated Ephemeral Dry Wash	32	19	18	0.5:1	0.5:1	0.5:1	16	10	9
State Waters Subtotal	***32***	***19***	***18***	***N/A***	***N/A***	***N/A***	***16***	***10***	***9***
State Waters Total	**344**	**407**	**384**	**N/A**	**N/A**	**N/A**	**624**	**814**	**771**
Burrowing Owl Habitat – two pairs, four individuals, 19.5 acres each (per CBOC guidelines)	78	78	78	N/A	N/A	N/A	78	78	78

SOURCES: CEC Commission Decision Biological Resources Tables 4, 5 and 6.

Closure and Decommissioning

Potential impacts to vegetation resources from closure and decommissioning of the proposed project or build alternatives could be addressed in part by a Conceptual Decommissioning Plan, a draft of which has been prepared by the Applicant. However, more could be done to address these impacts. Accordingly, BIO-22 would require the Applicant to prepare a Decommissioning and Reclamation Plan and cost estimate that meets all applicable LORS.

4.17.5 Residual Impacts after Mitigation Measures were Implemented

The proposed project would have substantial impacts to vegetation resources, eliminating all of the Sonoran creosote bush scrub and other native plant and wildlife communities within the disturbance area. The proposed project would have substantial, unmitigated impacts to sand dune habitat sensitive species and to a regional sand transport corridor. Although Mitigation Measure BIO-20 would address direct impacts to sand dune habitats, indirect (downwind) impacts from the proposed action would remain substantial due to related sand shadow effects to the Palen Dry Lake-Chuckwalla sand transport corridor. These indirect impacts would be reduced below a level of significance under Reconfigured Alternatives 2 or 3, with implementation of Condition of Certification BIO-20.

It also would eliminate an extensive network of desert washes comprising 344 acres on-site and downstream. The proposed action would greatly alter the hydrology of the area by re-routing ephemeral drainages through three engineered channels, and would eliminate an important wildlife movement corridor provided by the ephemeral washes.

The proposed action also would fragment and degrade adjacent native plant and wildlife communities, and could promote the spread of invasive non-native plants.

The impacts of the proposed action and Reconfigured Alternative 1 to the sand transport corridor and sand dune habitat cannot be mitigated to less than substantial levels. Accordingly, impacts to sand dunes are considered unmitigable under the proposed action and Reconfigured Alternative 1. Compensatory mitigation for sand dunes associated with the Reduced Acreage Alternative would be the same as for the proposed action, except that it would be adjusted for the difference in acreage.

4.17.6 Unavoidable Adverse Impacts

Under the technology proposed in the four build alternatives (i.e., the proposed action, Reconfigured Alternatives 1 and 2, and Reduced Acreage Alternative), natural vegetation communities and individuals and local populations of special status plants not otherwise avoided under proposed mitigating measures would be lost from the project site, totaling 4,024 acres, 3,097 acres, 4,366 acres, 4,330 acres, and 2,242 acres, respectively. Unquantified indirect losses to these communities would occur adjacent to the proposed project. Despite mitigating measures, the chance of invasion and spread of weeds and the chance of human-caused wildfires would persist to the areas surrounding the proposed project, threatening the surrounding vegetation and special status plant species. Impacts to the sand transport system and active sand dunes on and off the project site would be substantial and unmitigable, with the exception of Reconfigured Alternative 2 and the Reduced Acreage Alternative. Compensatory mitigation could, in part, offset the loss of sand dunes by acquisition and preservation, but could not remedy the proposed action's and Reconfigured Alternative 1's interference with a natural geomorphic process that sustains the regions sand dunes.

4.18 Impacts on Visual Resources

This section discusses effects on visual resources that would occur with implementation of the proposed action and alternatives, cumulative effects, and mitigation measures to avoid or reduce visual effects. Overall, the project would result in long-term visual alteration to approximately 5,200 acres of land, nearly all of which has been classified as C-Quality[1] scenery and managed under an Interim VRM Class III designation. Issues of viewshed and visibility are discussed at length in this chapter, and the reader may find it useful to refer to the viewshed map of the project presented in Figure 3.19-3.

4.18.1 Impact Assessment Methodology

The proposed action and alternatives are analyzed for their effects on visual resources using an assessment of the visual contrast within the landscape created by components of the project. Impacts to the inventoried visual resource values (as summarized in Section 3.19.3, *Visual Resource Inventory*) and conformance with Interim VRM Class Objectives (as determined in Section 3.19.4, *Interim Visual Resource Management Classes*) are evaluated through a contrast rating process described below. The severity of adverse impacts of the project on visual values coincides with the level of visual contrast it creates in the landscape, and the degree to which it would change the inventory scores (i.e. visual quality) and outcome (overall visual value). Conformance with Interim VRM Class objectives is evaluated based on the following:

> **VRM Class III:** The VRM objective is to "***partially retain*** the existing character of the landscape. The level of change to characteristic landscape should be ***moderate***. Management activities may attract attention but ***should not dominate the view of the casual observer***. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape."

If the contrast rating reveals nonconformance of the proposed action with Interim VRM Class objectives, and mitigation measures are insufficient to bring the project into compliance, then either the project may not be approved or the land use plan amended. However, since the overall VRM goal is to minimize visual impacts, mitigating measures should be prepared for all adverse contrasts that can be reduced, even if the proposed action meets VRM objectives. In addition to permanent visual contrast created in the landscape, the proposed action and alternatives are analyzed for adverse effects due to lighting and glare, visible dust plumes, as well as temporary construction-related disturbances.

Visual Contrast Rating Process

The degree to which the proposed action and alternatives adversely affect the visual quality of a landscape is directly related to the amount of visual contrast between the alternative and the existing landscape character. The degree of contrast is measured by separating the landscape into major features (land/water, vegetation, structures) then assessing the contrast introduced by the

[1] Scenic quality is rated in three categories from A (most scenic) to C (least scenic). See Section 3.20 for a discussion of scenic quality ratings.

project in terms of the basic design elements of form,[2] line,[3] color, and texture. The contrast of the project with landscape elements is then rated as none, weak, moderate or strong, as defined in Table 4.18-1. The purpose of this method is to reveal elements and features that cause the greatest visual impact, and to guide efforts to reduce the visual impact of a proposed action or activity. This process is described in detail in Handbook H-8431-1, Visual Resource Contrast Rating, and documented using BLM Form 8400-4 (see PA/FEIS Appendix J).

TABLE 4.18-1
VISUAL CONTRAST RATINGS

Degree of Contrast	Criteria
None	The element contrast is not visible or perceived.
Weak	The element contrast can be seen but does not attract attention.
Moderate	The element contrast begins to attract attention and begins to dominate the characteristic landscape.
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

SOURCE: BLM Manual 8431

The criteria for visual contrast are aligned with the management objectives for each Interim VRM Class. For example, if a project results in a weak visual contrast, it is likely to be in conformance with Interim VRM Class II, whereas a project that results in a moderate contrast would likely be in conformance with VRM Class III objectives but would not conform to VRM Class II objectives. Only surface disturbances resulting in a strong visual contrast would not be in conformance with VRM Class III objectives.

Selection of Key Observation Points

The contrast rating is completed from the most critical viewpoints, or Key Observation Points (KOPs). The intent of establishing KOPs is to visualize the contrast created by the proposed action from locations most representative of how the public perceives the affected landscape. The "public" may include highway travelers, travelers on local roads, off-highway vehicle users, or dispersed recreational users in surrounding wilderness areas. The sensitivity of these diverse user groups to changes in the landscape are influenced by a number of factors, including how prominent the view of the proposed project is (in terms of scale, distance and angle of observation), the frequency and duration that viewers are exposed to the view, and whether the viewer groups are aware of their surroundings or expectant of high-quality views.

Information on the types and amounts of use within the vicinity of the project is generally limited. The BLM has no traffic counters or other means to determine accurate use of open OHV routes in

[2] Contrast in form results from changes in the shape and mass of landforms or structures. The degree of change depends on how dissimilar the introduced forms are to those continuing to exist in the landscape.
[3] Contrasts in line results from changes in edge types and interruption or introduction of edges, bands, and silhouette lines. New lines may differ in their sub-elements (boldness, complexity, and orientation) from existing lines.

the vicinity of the project site. Observations by BLM staff and Law Enforcement Rangers indicate that OHV use is relatively low on routes within the vicinity of the project site, not exceeding 200-300 visits per year. Recreation and off-highway vehicle use generally is limited to the cooler months of September through May and is nearly non-existent during the summer months. In addition, little data exists on the amounts, types, and trends of visitor use experiences (such as camping, hiking, or site seeing) within special designations. By far, I-10 is the most used travel corridor, with an estimated average annual daily traffic volume of 21,400 vehicles in 2008 (the most recent year for which Caltrans figures are available).

Based on the above factors, and in consultation with BLM staff, eleven KOPs were selected to evaluate the project site's existing conditions and potential visual contrast experienced by the public. The location and characteristics of each KOP is summarized in Table 4.18-2 and illustrated in Figure 4.18-1.

The basis of selecting these 11 KOPs was that each one displays a different location from which sensitive receptors can view the project, and represents how the project would appear when seen from different distance zones (foreground/middleground, or background). While Corn Springs Road leads to a campground, as indicated in the description for KOP-7 and KOP-11; the proposed action would not be visible from these campgrounds due to the distances involved, topographic screening, and low elevation differences.

Visual Simulations

Computer modeling and rendering techniques were used to produce the simulated images of the views of the project site as they would appear from each KOP after the completion of project construction. Existing topographic and engineering (ArcGIS and AutoCAD) data were utilized to construct 3D (eye level height [5.5 feet]) digital and photographic images of the generation and linear facilities. These images were combined with the digital photography from each KOP to produce a complete computer-aided image of the power generating facility and portions of the transmission system. Digital visual simulation images of computer renderings were combined with the digital KOP and "pre-project" photographs. The final "hardcopy" simulation images that appear in this PA/FEIS were produced from the digital image files using a color printer. Using the computerized visual simulations, predicted future visual effects of the project for each KOP are described in the section below, and contrast rating forms were completed based on the visual simulations.

4.18.2 Direct and Indirect Impacts

Proposed Action

There are no indirect impacts of the proposed action with respect to visual resources.

Project Appearance

The proposed action would convert approximately 4.85 square miles of naturally-appearing desert plain to an industrial facility characterized by complex, geometric forms and lines and industrial

TABLE 4.18-2
KOP LOCATION AND CHARACTERISTICS

ID	Name	Distance to Project Site and View Direction[a]	Distance Zone[b]	Primary User Type	Use Levels
KOP-1	Highway 177 and Palen Pass Road	13.5 to 16 Miles South	Background	Motorists	Moderate number of viewers traveling Highway 177 and Palen Pass Road
KOP-2	Highway 177 at the edge of Joshua Tree Wilderness	8 to 11 Miles Southeast	Background	Motorists	Moderate number of viewers traveling Highway 177 and low number of viewers in the Joshua Tree Wilderness
KOP-3	Desert Lily Sanctuary entrance/parking area	7 to 10 Miles Southeast	Background	OHV users, dispersed recreational users	Moderate number of viewers traveling Highway 177 and low number of viewers in the Desert Lily Sanctuary
KOP-4	Eagle Mountain Road	13 to 16 Miles Southeast	Background	OHV users, dispersed recreational users	Low number of viewers traveling the Eagle Mountain Road
KOP-5	I-10 Interchange at Desert Center	8.5 to 11.5 Miles East	Background	Motorists	High number of viewers traveling I-10
KOP-6	Residential community entrance/exit in Desert Center	8.5 to 11.5 Miles East	Background	Residents	Experienced by residents of, and visitors to, the town of Desert Center
KOP-7	Corn Springs Road at the edge of Chuckwalla Mountains Wilderness	1.5 to 4.5 Miles North	Foreground/ Middleground	Motorists, OHV users, access to Corn Springs Campground	Viewers exiting and entering the Chuckwalla Mountains Wilderness and ACEC
KOP-8	I-10 eastbound near the southwestern corner of the Project	0.7 to 3.7 Miles East	Foreground/ Middleground	Motorists	High number of viewers traveling I-10
KOP-9	I-10 westbound near the southeastern corner of the Project	2.5 to 5.5 Miles Northwest	Middleground/ Background	Motorists	High number of viewers traveling I-10
KOP-10	Palen-McCoy Wilderness	3.5 to 7 Miles Southwest	Middleground/ Background	Dispersed recreational users	Very Low levels of use
KOP-11	Chuckwalla Mountains Wilderness	4.5 to 8 Miles Northeast	Middleground/ Background	OHV users, Dispersed recreational users, access to Corn Springs Campground	Low levels of use

[a] Distance includes closest distance and furthest distance to the project site
[b] Distance zones as defined by BLM convention (0 to 5 miles is foreground/middleground, and 5 to 15 miles is background)

surfaces that are dissimilar to the surrounding natural landscape character. Much of the developed area would be covered with the arrays of parabolic mirrors that would be used to collect heat energy from the sun. Figure 4.18-2 presents an image of the Kramer Junction SEGS project solar troughs, which are smaller in scale than those proposed for the project, but provide a visual example of a solar plant using parabolic mirrors. In addition, Figure 4.18-3 presents aerial views of existing solar trough energy projects. Table 4.18-3 provides a list of the major project features that would contribute to the apparent visual change of the landscape, including their height and color. The arrays of solar collector assemblies, which would be a maximum of 22 feet high, would occupy most of the disturbed area. Two identical power blocks would occupy smaller areas, but would contain various buildings and structures needed for electrical generation, several of which would be as high as 50 feet. The proposed transmission lines leading away from the main generation facility would be approximately 75 feet high. The tallest structures would be the air cooled condensers, which would be approximately 150 feet high.

PA/FEIS Chapter 2 provides a detailed description of the Power Plant Civil/Structural Features. Generally, the collector field consists of multiple single-axis parabolic trough solar collectors, aligned on a north-south axis. Each parabolic trough focuses the sun’s rays on a linear, length-wise heat collection element at the parabolic focal point.

Construction-Phase Impacts

During the construction period, earth-moving activities and construction materials, equipment, trucks, and parked vehicles, all could be visible on the site and along the transmission line right-of-way. Construction would occur over a 39 month period, during which a number of activities would take place, including large-scale vegetation removal, earthwork, operation of a concrete batch plant, as well as foundation and equipment installation. From the more common viewpoints (e.g., I-10), these construction activities generally would result in a high degree of visual contrast within the landscape, which would be similar to or the same as the discussion of visual contrast ratings discussed under operation-phase impacts.

However, certain visual effects will be specific to construction activities, and could include the generation of large quantities of airborne dust and nighttime construction lighting. The affected viewers would be primarily motorists on I-10, low numbers of OHV users, Desert Center and Lake Tamarisk residents and dispersed recreational users in the surrounding designated wilderness. Although the construction period is estimated to be over 3 years, construction would be phased, so that it would not occur in any one place for the entire period. Activities that would generate dust, such as earthmoving, would occur episodically throughout the construction period, and nighttime construction lighting, if required, would not be needed on a continuous basis.

To address these potential impacts, construction activities would be conducted in a manner that minimizes (visible) dust emissions, as described in Mitigation Measure AQ-SC3 and AQ-SC4. These measures would include limiting the speed of vehicles, surfacing construction access roads, and controlling wind erosion on soil stockpiles and exposed earth. When nighttime construction activities take place, illumination would be provided that meets State and Federal worker safety regulations. To the extent possible, the nighttime construction lighting would be directed

TABLE 4.18-3
APPROXIMATE DIMENSIONS OF PROJECT STRUCTURES

Component	Dimensions (LxWxH) (Feet) / Capacity	Footprint (square feet)
Switch Yard	13 x 92	1,200
Overflow Vessel And Expansion Vessel	124 x 154	19,000 Ea
Ullage Coolers And Vessel	79 x 20	1,000
Nitrogen System	Incidental	800
Heat Transfer Fluid Heater	50 x 22 x 80 Stack	1,100
Steam Generators	90 x 10 x 24 Ea	900
Weather Station Building	68 x 68 x 24 (Two Level Bldg)	4,600
Parking	18 x 60	1,080
Balance Of Plant Electrical Building	67 x 67 x 24 (Two Level Bldg)	4,500
Reheaters	32 x 10 Ea	320
MCC Cooling Tower	33 x 40 x 32 High	1,320
Steam Turbine	111 x 50 x 40 High	5,500
Deaerator	125 x 57	7,100
Vacuum System	19 x 35 x 24 High	665
Compressed Air System	25 x 25 x 24 High	625
Generator Circuit Breaker	20 x 30 x 20	600
Warehouse	68 x 146 x 30	10,000
Chemical Injection Skid	46 x 47 x 24	2,000
Generator Step-Up Transformers	48 x 32 x 24	1,500
Emergency Diesel Generator	40 x 10 x 20	800
Cooling Tower	33 x 40 x 32 High	1,300
Water Tank (Ro Concentrate) (Ps1 Only)	40 Dia x 36 High / 340,000 Gal	1,590
Service Water Pumps	23' x 12' x 16'	275
Take Off Tower	30' x 35' x 50'	1,000
Blowdown Tanks	28' Dia Ea	570
Auxiliary Boiler	40' x 73' x 32'	2,900
Air Cooled Condenser	245' x 296' 150' High	73,000
Sample Panel & Lab Building	84' x 48' x 24' High	1,100
Demineralized Water Tank	16' Dia x 24' High	200
Water Treatment Area	192 x 148	28,000
Administration Building	60 x 60 x 24’ High	3,600
Control Building	68 x 68 x 36’ High	3,900
High Voltage Line	4 Dia x 140 High Poles	
Pipe Rack	40 High Misc.	
Treated Water Tank (Also Firewater Storage)	91 Dia x 24 High / 1 Million Gal	6,500
Propane Storage Tank	9’ 4-3/4" Dia x 40' 9-3/8" Lng /18,000 Gal	400
Transmission Line	7,000 linear feet	
Wind Fence (East and West)	64,600 linear feet	

downward or toward the area to be illuminated and would incorporate fixture hooding/shielding, as described in Mitigation Measure VIS-3. Task-specific lighting would be used to the extent practical while complying with worker safety regulations. Disturbed areas that would not be needed during operation and maintenance of the proposed action would be revegetated according to Mitigation Measure BIO-8, BIO-22, as well as VIS-2, which requires that temporarily disturbed areas be recovered with soil, brush, rocks, and natural debris.

In summary, the generation of large quantities of airborne dust and nighttime construction lighting could result in temporary adverse visual impacts to motorists on I-10 and other affected viewers. The level of dispersed recreational use in the area is low, and the highway travelers would only be exposed to the adverse construction related effects briefly. However, residents of Desert Center, Lake Tamarisk, and regular visitors to the area could experience strong visual disturbances from dust plumes and nighttime lighting due to the length of time such users would be exposed to the view and their sensitivity to the scenic quality of the area. These impacts would be reduced with implementation of Mitigation Measures AQ-SC3, AQ-SC4, VIS-2, VIS-5, VIS-6 and BIO-24. These mitigation measures would effectively address the visual impacts from airborne dust generation, nighttime construction lighting, and staging area disturbances. However, these measures would not substantially reduce the general level of visual contrast in the landscape from large-scale vegetation removal, earthwork, operation of a concrete batch plant, as well as foundation and equipment installation.

Operation-Phase Impacts

During the operation of the project, visual effects would be caused by the visible elements of the project. The discussion below is divided between visual effects that are not fully captured by visual simulations (nighttime lighting and reflected sunlight/glare) and the visual contrast ratings of the project simulated in each KOP.

Light and Glare (all KOPs)

While the potential for glint or glare, as well as nighttime lighting, is a component of visual contrast, these issues are treated separately because the simulations used in the visual contrast rating process model the daytime visual change (the general reflectivity of the mirrors), and do not consider the effect of nighttime lighting, or glint and intense glare.

Operational Lighting. Project operations would require onsite nighttime lighting for safety and security. The project would be in an area with few existing structures, and the use of uncontrolled or excessive lighting could be noticed by nearby motorists, residents of Desert Center and Lake Tamarisk, and could affect the nighttime experience for dispersed recreational users in surrounding wilderness. As described in Mitigation Measure VIS-3, to reduce offsite lighting impacts, lighting at the facility would be restricted to areas required for safety, security, and operation. Exterior lights would be hooded, and lights would be directed on site so that light or glare would be minimized. Low-pressure sodium lamps and fixtures of a non-glare type would be specified. Switched lighting would be provided for areas where continuous lighting would not be required for normal operation, safety, or security. The implementation of these measures would minimize the amount of lighting potentially visible to viewers of the site at night.

However, adverse effects of facility lighting are not necessarily limited to views of the site itself. Excessive lighting can also cause an adverse affect to viewers of the night sky via sky glow, which diminishes the visibility of the nighttime sky and stars. Prevention of offsite light spillage for ground observers does not necessarily prevent back-reflected light (i.e., light reflected off the ground and/or structures from down-directed lamps) from diminishing the visibility of the night sky. Normally, the contribution of project-related lighting is negligible when in an environment with abundant light sources; however, the area is highly valued in terms of the quality of its nighttime skies. This is attributable to the scarce and scattered nature of existing light sources in the surrounding area and the prevalence of federally administered land in the region, which limits opportunities for development. While the level of use in the surrounding wilderness is considered to be low, the high visibility of the nighttime sky and stars is an important component of the wilderness experience for many backcountry users, and is highly valued by residents of the area.

It is nonetheless estimated that the contribution of the project's lighting requirements to sky glow would be minor. Light sources currently include motorists on I-10; street lamps, residences, and other commercial/service land uses in the communities of Desert Center and Lake Tamarisk; lighting associated with the former Desert Center Airport (now a private, special-use airport); motorists on local roads; and widely scattered homesteads on private land in the region. Despite the presence of these existing light sources, the area remains highly valued for the quality of its night sky. Because permanent lighting would not be required for the arrays of parabolic mirrors, operational lighting would be confined to a small portion of the site that contains O&M facilities, power blocks and the switchyard, and is unlikely to be totally out of character with other existing lighting sources found scattered throughout the Chuckwalla Valley. Further, Mitigation Measure VIS-3 includes a standard that light intensity must be the minimum necessary to ensure worker safety and facility security, and that direct lighting does not illuminate the nighttime sky.

While these measures would not totally eliminate the light visible by surrounding user groups, facility lighting would be minimized and controlled such that it would not be a nuisance and would not detract from the ability for affected viewers to enjoy their surroundings.

Glint and Glare from Parabolic Mirrors. The large fields of parabolic mirrors could produce glint[4] and glare[5] at various times of the day. Potentially affected observers would be travelers along I-10 and nearby local roads, a low number of residents of Desert Center and Lake Tamarisk, and users of nearby designated wilderness and ACECs. It is possible that the back reflected light or light not absorbed by both the envelope and steel annulus of the Heat Collecting Element (HCE) could produce glare, particularly when the viewer, the project, and the sun are positioned in line. This glare is more apparent as the viewer increases in distance and elevation relative to the project. This glare could occur in any one place for several hours (e.g., a sunny afternoon) and would be similar in brightness and reflectivity as a water body or lake. This level of glare increases the color contrast of the facility in the landscape but, unlike glint or specular reflections, is not as intense as to cause discomfort or nuisance. It is generally captured in the photo simulations discussed later.

However, at the time of moving into or out of stow position or when viewed from elevated positions; the troughs have the potential to produce glint, which is the product of spread reflection of the direct image of the sun. This glint would be much more intense than the glare produced by diffused reflections, but would be momentary, and limited to periods shortly after dusk and

[4] A flash of light, also known as a specular reflection, produced as a direct reflection of the sun in the parabolic mirror surface.
[5] A continuous source of excessive brightness, relative to ambient lighting, also known as diffused reflections.

shortly before dawn. During such periods, the bright spot would move as the observer changes position relative to the sun and mirror, with the result that the bright spot appears to “follow” the observer. Figure 4.18-4 presents an image of the Kramer Junction SEGS project solar troughs, which are smaller in scale than the proposed action, but which provide an example of the visual impact that could occur momentarily at certain times of the day, and under very specific viewing conditions.

The glint or glare produced by the project would likely be more intense than any other natural or cultural features in the observer’s perspective. Glint from the solar arrays could be distracting or nuisance-causing, even from locations relatively distant from the project. Glare produced by diffuse reflections would increase the visual contrast of the project in the landscape, but would not be quite as intense or distracting. The project would include a 30 foot-high wind fence on the east and west borders of the solar field, substantially diminishing or eliminating glint and glare effects for viewers east and west of the project site at similar elevations, including residents of Desert Center and Lake Tamarisk, visitors to the Palen Dry Lake ACEC, and motorists on I-10 within the foreground distance zone. For viewers to the immediately north and south of the project site, the parabolic mirrors would be viewed from the side (because the mirrors face east-to-west), reducing the potential for direct reflections of the sun and associated glint.

Thus, viewers most likely to experience glint effects from the parabolic mirrors would be elevated viewers to the east and west of the proposed site, which could include distant portions of I-10 that are elevated relative to the project, and users of BLM wilderness and the JTNP. For these viewers, the reflected sunlight from the parabolic mirrors would momentarily elevate the level of visual contrast created by the project. In areas where the project otherwise is conformant with the VRM class objective (i.e., moderate contrast or less), glint or glare could briefly cause non-conformance with the VRM objective. From distant vantage points where the project otherwise would be either out of view or weakly perceived, glint and glare from the parabolic mirrors could momentarily cause an elevated level of contrast, and may also attract attention; however, given the great distance and minor dominance of the project in such views, the project is likely to remain in conformance with VRM Class objectives.

Because the design and operation of the solar arrays is integral to generating power for the project, the face of the parabolic mirrors cannot be color treated or dulled. However, several measures are available that would reduce the potential for and frequency of intense or distracting glare from the solar fields. Mitigation Measure TRAN-6 would require the mirrors to be (1) brought out of stowage before sunrise and aligned to catch the first rays of the morning sun; and (2) returned to stow position after sunset. This would prevent bright flashes due to movement in or out of stow position. The mitigation measure also requires mirror function to be continuously monitored both by operators and by system controls, and to ensure that any malfunctioning mirrors be automatically turned east in a manner that prevents reflection from the sun as it continues west. VIS-1 and BLM-VIS-1 would ensure that reflective surfaces be painted or treated so long as it would not impair proper function of the equipment or structure. This would include painting the backs of the parabolic troughs a color compatible with the surrounding landscape. Since the troughs would be continually moving to the west throughout the day, the backs of the troughs would be seen equally as often as the fronts (assuming a fixed vantage point). Therefore, BLM-VIS-1 would effectively reduce the length of time that the project produces glare and strong color contrast by about half.

These mitigation measures would avoid bright spot reflection associated with moving in and out of stow position, and would reduce the extent of reflective surfaces within the solar fields. However, the mitigation measures would not eliminate spread reflection off the face of the parabolic mirrors when out of stow position for viewers at higher elevations than the project. The contribution of glint and glare will be considered in the contrast discussion of each KOP below.

Glare from Power Block Buildings, Administrative Buildings, and Transmission Lines. Potential glare from power block facilities and the high-voltage transmission lines would be less intense and distracting, and would be reduced by applying mitigation measure VIS-1 and BLM-VIS-1. This would require that transmission lines be finished with non-specular and non-reflective material, and the insulators to be non-reflective and non-refractive. Building and structure paints and finishes would be selected to blend with the landscape. These measures would prevent glare or reduce glare to minimal levels that would not be noticeable or distracting to potential viewers.

Visual Contrast Ratings

To analyze the visual contrast in the landscape created by the project, the proposed action is simulated in photographs of the area for each of the KOPs described in Section 4.18.1, above. Figure 4.18-5 through Figure 4.18-15 present both the existing and simulated conditions at each of the 11 KOPs. Conclusions on the visual contrast of the project presented below do not take into consideration the nighttime contrast (lighting), which is discussed above. Documentation of the visual contrast ratings (BLM Form 8400-4, Visual Contrast Rating Worksheet) is included in Appendix J. A contrast rating worksheet is not available for KOPs 10 and 11 and thus the visual contrast rating is discussed fully in text.

For all of the KOPs, the effect of the project on the visual values as determined in the visual resource inventory of the landscape is minor. As discussed in Section 3.19.3, *Visual Resource Inventory*, the affected landscape was given a C-quality scenery rating based on the flatness and lack of visual variety in landform and presence of existing cultural modifications (i.e., presence of built structures). Because this is the lowest possible rating, the presence of the project could not lower the rating further. However, the presence of the project would likely further lower several of the scores for the seven factors that are rated in the inventory of scenic quality, such as presence of cultural modifications. The presence of the project would not lower the visual sensitivity or distance zone ratings assigned in the visual resource inventory.

KOP-1: Highway 177 and Palen Pass Road. This KOP represents the view for southbound motorists on Highway 117 (Figure 4.18-5). The project is located approximately 13 to 16 miles south of this KOP. The distance and the low angle of view greatly diminish the dominance and scale of the project in views of the landscape. This is due to perspective foreshortening, which reduces the apparent size of surfaces of areas or objects, when seen obliquely or at low viewing angles. In this background view, the prominent visible features of the Project would be the solar array and power block structures. The transmission line structures would be minimally apparent from this background distance. The degree of contrast assigned to the project from this viewpoint is as follows (see Appendix J):

4.18-4
DEGREE OF CONTRAST FOR KOPS 1, 2 AND 3

		Features											
		Land/Water Body				Vegetation				Structures			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Elements	Form	X					X			X			
	Line		X				X				X		
	Color			X			X			X			
	Texture			X			X				X		

According to the visual contrast rating, the project would result in a moderate to strong contrast in form and line, a weak to strong contrast in color, and a weak to moderate contrast in texture. However, the contrast rating did not consider that the distance of the project diminishes its scale and dominance within the view and that the solar array would be seen nearly edge-on. This reduces its apparent size, conceals its strong regular geometry, and causes it to repeat the horizontal line of the plain. This viewing relationship reduces the visual contrast to weak levels which would be in conformance with Class III Interim VRM objectives (VRM Class III allows projects to be seen, and even draw the attention of the viewer, but not visually dominate the landscape). As discussed previously, at times when the solar fields generate glint or glare, the project could attract viewer attention and increase the visual contrast of the project. However, given the distance of this KOP and the minor portion of the view that the proposed project would occupy, glint and glare from the project would not visually dominate the landscape scene. Glint and glare could momentarily increase the visual contrast of the project to moderate levels, but would remain in conformance with Class III Interim VRM objectives.

The visual contrast created by the project shall be reduced by applying Mitigation Measures TRANS-6, VIS-1, VIS-2, VIS-4, and BLM-VIS-1. These mitigation measures shall reduce the degree of contrast by applying color and texture treatments to project structures to blend in with the surrounding landscape, by revegetating disturbed areas, and by strategically placing structures and linear alignments to repeat the basic visual elements in the landscape. Mitigation Measure TRANS-6 would prevent bright flashes due to movement in or out of stow position, but would not fully mitigate the effects of glint and glare. In summary, the mitigation measures would reduce the length and intensity of glint and glare, and are likely to reduce the degree of color contrast in the landscape. Although the mitigation measures certainly would be visually beneficial, the proposed action still would be visible and could be perceived from KOP-1, so the degree of contrast would remain weak.

KOP-2: Highway 177 at the edge of Joshua Tree Wilderness. This KOP represents the view for southbound motorists on Highway 117 and views from low-elevation portions of the far-eastern end of Joshua Tree National Park (JTNP) (Figure 4.18-6). In this portion of the JTNP, there are no hiking trails, picnic areas, campgrounds or other visitor-serving facilities and thus visitor use in the area is expected to be low. The project is located approximately 8 to 11 miles southeast of this KOP, and all major elements of the project are visible, including the power block, solar arrays, and transmission line. The degree of visual contrast created by the project from this location is the same as described above for KOP-1 (see Table 4.18-4). Thus, for the same reasons described above, the visual contrast would be in conformance with the Interim VRM Class III objective and would represent weak to moderate levels of contrast, depending on whether glint or glare is observed. Implementation of Mitigation Measures TRANS-6, VIS-1, VIS-2, VIS-4, and BLM-VIS-1 would reduce the length and intensity of glint and glare, and is likely to reduce the degree of color contrast in the landscape, but would not totally eliminate the contrast of the project in the landscape.

KOP-3: Desert Lily Sanctuary entrance/parking area. This KOP represents the view for low numbers of visitors to the Desert Lily ACEC and OHV users (Figure 4.18-7). The proposed action is located approximately 7 to 10 miles southeast of this KOP, and all major elements of the project would be visible, including the power block, solar arrays, and transmission line. The degree of visual contrast created by the project from this location is the same as described above for KOP-1 (see Table 4.18-4). Thus, for the same reasons described above, the visual contrast would be in conformance with the Interim VRM Class III objective and would represent weak to moderate levels of contrast, depending on whether glint or glare is observed. Implementation of Mitigation Measures TRANS-6, VIS-1, VIS-2, VIS-4, and BLM-VIS-1 would reduce the length and intensity of glint and glare, and is likely to reduce the degree of color contrast in the landscape, but would not totally eliminate the contrast of the proposed action in the landscape.

KOP-4: Eagle Mountain Road. This KOP represents the view for low numbers of OHV users, and dispersed recreational users (Figure 4.18-8). The proposed site is located approximately 13 to 16 miles southeast of this KOP, and all major elements of the project would be visible, including the power block, solar arrays, and transmission line. The degree of visual contrast created by the proposed action from this location is the same as described above for KOP-1 (see Table 4.18-4). Thus, for the same reasons described above, the visual contrast would be in conformance with the Interim VRM Class III objective and would represent weak to moderate levels of contrast, depending on whether glint or glare is observed. Implementation of Mitigation Measures TRANS-6, VIS-1, VIS-2, VIS-4, and BLM-VIS-1 would reduce the length and intensity of glint and glare, and is likely to reduce the degree of color contrast in the landscape, but would not totally eliminate the contrast of the proposed action in the landscape.

KOP-5: I-10 Interchange at Desert Center. This KOP represents the view for eastbound motorists on I-10 at Desert Center (Figure 4.18-9). The site is located approximately 8.5 to 11.5 miles east of this KOP. The visible feature of the project from this KOP is the proposed transmission line. Vegetation and shrubbery provide screening for the solar arrays and power blocks. The degree of contrast assigned to the project from this viewpoint is as follows:

4.18-5
DEGREE OF CONTRAST FOR KOPS 5 AND 6

		Features											
		Land/Water Body				**Vegetation**				**Structures**			
		Strong	**Moderate**	**Weak**	**None**	**Strong**	**Moderate**	**Weak**	**None**	**Strong**	**Moderate**	**Weak**	**None**
Elements	Form				X				x		X		
	Line				X				X			X	
	Color				X				X		X		
	Texture				x				X			x	

See PA/FEIS Appendix J.

The proposed action would result in a weak to moderate contrast depending on design element. The contrast is primarily a result of the vertical structures and T-lines. Because the degree of contrast is weak to moderate, the simulation for this KOP demonstrates conformance with Interim VRM Class III objectives, except during glint or glare off of the transmission line poles. During such times, the transmission line may attract the attention of a common observer and would result in a strong visual contrast; which while temporary, would not be in conformance with the VRM objective.

The visual contrast created by the proposed action would be reduced by applying Mitigation Measures VIS-1, VIS-2, and VIS-4. These mitigation measures would reduce the degree of contrast by applying color and texture treatments to project structures to blend in with the surrounding landscape and reduce glare, by revegetating disturbed areas, and by strategically placing structures and linear alignments to repeat the basic visual elements in the landscape. Because texture and color treatments on the transmission line would effectively reduce the color contrast to a moderate level or less, Interim VRM Class III objectives would be met and adverse impacts on visual resources from KOP-5 would be substantially reduced.

KOP-6: Residential community entrance/exit in Desert Center. This KOP represents the view of the transmission line for residents in the Desert Center area (Figure 4.18-10). The project site is located approximately 8.5 to 11.5 miles east of this KOP. The visible feature of the project from this KOP would be the proposed transmission line. Intervening topography and structures screen views of the solar fields and power blocks from this viewpoint. The degree of visual contrast created by the proposed action from this location is the same as described above for KOP-5 (see Table 4.18-5). Thus, for the same reasons described above, the visual contrast would be in conformance with Interim VRM Class III objective through implementation of Mitigation Measures VIS-1, VIS-2, and VIS-4.

KOP-7: Corn Springs Road at the edge of Chuckwalla Mountains Wilderness. This KOP represents the view for northbound motorists on Corn Springs Road exiting the Chuckwalla Mountains Wilderness (Figure 4.18-11). The project site is located approximately 1.5 to 4.5 miles north of this KOP, and all major elements of the project would be visible, including the power block, solar arrays, and transmission line. The degree of contrast assigned to the proposed action from this viewpoint is as follows:

4.18-6
DEGREE OF CONTRAST FOR KOP 7

		Features											
		Land/Water Body				Vegetation				Structures			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Elements	Form		X				X			X			
	Line		X				X				X		
	Color	X					X			X			
	Texture		X				X				X		

See PA/FEIS Appendix J.

From this KOP, the proposed action would result in a moderate to strong contrast depending on design element and landscape feature. The strong contrast comes from the light blue color of the arrays and the form of the power block structures, which are cubed and rectilinear in a landscape that is otherwise largely absent of such forms. Because the degree of contrast is strong in form and color, the simulation for this KOP demonstrates non-conformance with Interim VRM Class III objectives, especially at times when the solar fields generate glint or glare. At all times, the proposed action would likely be a major focus of viewer attention, largely because the landscape is otherwise absent of large structures and other cultural features.

The visual contrast created by the proposed action would be reduced by applying Mitigation Measures TRANS-6, VIS-1, VIS-2, VIS-4, and BLM-VIS-1. These mitigation measures would reduce the degree of contrast by applying color and texture treatments to project structures to blend in with the surrounding landscape, by revegetating disturbed areas, and by strategically placing structures and linear alignments to repeat the basic visual elements in the landscape. Mitigation Measure TRANS-6 would prevent bright flashes due to movement in or out of stow position, but would not fully mitigate the effects of glare from diffuse reflections of the sun due to this viewpoint’s elevated position. While the color and texture treatments will aid greatly in reducing the color and, due to the size and scale of the proposed project, it is unlikely that mitigation measure would be sufficient to reduce contrasts in form to moderate levels. Mitigation measures would successfully reduce the color contrast to acceptable levels, except during periods of glare. Thus, the proposed action’s effect on visual resources from KOP-7 would not be brought into compliance Interim VRM Class III objectives and would remains adverse and unavoidable.

KOP 8: I-10 eastbound near the southwestern corner of the Project. This KOP represents the view for eastbound motorists on I-10 (Figure 4.18-12). The project site is located approximately 0.7 to 3.7 miles north of this KOP, and most major elements of the project would be visible, including the power blocks, solar arrays, and a portion of the transmission line. The degree of contrast assigned to the proposed action from this viewpoint is as follows:

4.18-7
DEGREE OF CONTRAST FOR KOP 8 AND 9

		Features											
		Land/Water Body				Vegetation				Structures			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Elements	Form	X				X				X			
	Line		X			X				X			
	Color		X			X				X			
	Texture		X			X				X			

See PA/FEIS Appendix J.

At this close viewing distance, the proposed action would result in a strong contrast for all of the design elements for the landscape features of vegetation and structures. Further, the contrast in landform is moderate to strong depending on design element. The strong contrast comes from the light blue color, and straight line edges of the arrays; and the form and color of the power block structures, which are cubed and rectilinear in a landscape that is otherwise largely absent of such forms. Because the degree of contrast for all design elements is strong, the simulation for this KOP demonstrates non-conformance with Interim VRM Class III objectives, especially at times when the solar fields generate glint or glare. At all times, the proposed action would likely be a major focus of viewer attention, largely because the landscape is otherwise absent of large structures and other cultural features, and the project would be dominant in the landscape.

The visual contrast created by the proposed action would be reduced by applying Mitigation Measures TRANS-6, VIS-1, VIS-2, VIS-4, and BLM-VIS-1. These mitigation measures would reduce the degree of contrast by applying color and texture treatments to project structures to blend in with the surrounding landscape, by revegetating disturbed areas, and by strategically placing structures and linear alignments to repeat the basic visual elements in the landscape. Mitigation Measure TRANS-6 would prevent bright flashes due to movement in or out of stow position, but would not fully mitigate the effects of glare from diffuse reflections of the sun due to this viewpoint’s elevated position. However, due to the size and scale of the project from this close distance, it is unlikely that mitigation measure would be sufficient to reduce contrasts in form, line and texture to moderate levels. Mitigation measures would successfully reduce the color contrast to acceptable levels, except during periods of glare. Thus, the proposed action’s effect on visual resources from KOP-8 would not be brought into compliance Interim VRM Class III objectives and would remain adverse and unavoidable.

KOP 9: I-10 westbound near the southeastern corner of the Project. This KOP represents the view for westbound motorists on I-10 (Figure 4.18-13). The project site is located approximately

2.5 to 5.5 miles northwest of this KOP, and most major elements of the project would be visible, including the power blocks, solar arrays, and a portion of the transmission line. The degree of visual contrast created by the proposed action from this location is the same as described above for KOP-8 (see Table 4.18-7). Thus, for the same reasons described above, the visual contrast would be in non conformance with Interim VRM Class III objective and is unlikely to be reduced to acceptable levels through implementation of Mitigation Measures TRANS-6, VIS-1, VIS-2, VIS-4, and BLM-VIS-1. The proposed action's effect on visual resources from KOP-4 would remain adverse and unavoidable.

KOPs 10 and 11: Palen-McCoy Wilderness and Chuckwalla Mountains Wilderness. These KOPs represent views for low numbers of dispersed recreational users in the Chuckwalla Mountains Wilderness and the Palen-McCoy Wilderness (Desert Quartzite, Mule Mountain Soleil)(Figure 4.18-14 and Figure 4.18-15). Due to the distances involved and the flat form of the valley floor, there is only a weak contrast with respect to landform features. The grading involved to create a nearly flat site is unlikely to be noticed from this distance and the solar arrays generally appear coincident in form with the flat valley floor. The rectilinear/boxy shape of the power block structures, however, presents a moderate contrast with the surrounding landforms (somewhat diminished due to their minor dominance in the scene). From these elevated views, the scale and area occupied by the proposed action would become more apparent. There would be a strong color contrast with the vegetation features that are characteristic of the landscape. The light golds, tans, sage greens and reddish browns of the landscape would have a strong contrast with the industrial and metallic character of the solar arrays. Further, the edges of the project would be straight and sharp, and would differ in the orientation of line features in the landscape. Edge types in background views of the landscape are generally discontinuous, horizontal and dull in appearance. The proposed action would be located in a landscape that is otherwise largely absent of large-scale cultural modification. For these reasons, the simulation for this KOP demonstrates non-conformance with Interim VRM Class III objectives, especially at times when the solar fields generate glint or glare.

The visual contrast created by the proposed action would be reduced by applying Mitigation Measures TRANS-6, VIS-1, VIS-2, VIS-4, and BLM-VIS-1. These mitigation measures would reduce the degree of contrast by applying color and texture treatments to project structures to blend in with the surrounding landscape, by revegetating disturbed areas, and by strategically placing structures and linear alignments to repeat the basic visual elements in the landscape. Mitigation Measure TRANS-6 would prevent bright flashes due to movement in or out of stow position, but would not fully mitigate the effects of glare from diffuse reflections of the sun due to this viewpoint's elevated position. However, due to the size and scale of the proposed project, it is unlikely that mitigation measure would be sufficient to reduce contrasts to moderate levels. Mitigation measures would successfully reduce the color contrast to acceptable levels, except during periods of glare (i.e., when the face of the parabolic mirrors). Thus, the proposed action's effect on visual resources from KOP-10 and KOP-11 would not be brought into compliance with Interim VRM Class III objectives and would remain adverse and unavoidable.

Impacts to BLM Wilderness Areas and Joshua Tree National Park

The four wilderness areas in the vicinity of the project site have no developed trails, parking/ trailheads, or other visitor use facilities. These areas are generally steep, rugged mountains, with no permanent natural water sources, thus limiting extensive hiking or backpacking opportunities. Visitor use within the wilderness areas is very light, though BLM has no visitor use counts. Observations by staff and Law Enforcement Rangers indicate only 100 to 200 hikers per year within the wilderness areas. Visitation to the desert peaks listed by the Sierra Club Angeles Chapter is discussed in Chapter 3. More popular is vehicle camping along roads that are adjacent to the wilderness areas. RV camping near wilderness areas, with associated hiking, OHV use, photography, sightseeing, etc. accounts for up to 2,000 visitors per year.

Figure 3.19-3 shows designated wilderness areas overlain on a viewshed map of the proposed action. The 15-mile viewshed of the proposed action would occupy 17,149 acres of the Chuckwalla Mountains Wilderness (or about 19 percent of the wilderness area), 5,938 acres of the Little Chuckwalla Mountains Wilderness (or about 20 percent of the wilderness area), 46,619 acres of the Palen/McCoy Wilderness (or about 21 percent of the wilderness area), and 6,707 acres of the JTNP and Wilderness (or less than one percent of the park). Views of the project from special designations would generally be in mountainous areas that offer elevated viewpoints similar to KOPs 4, 10 and 11. Users of these areas would be able to view the project, but opportunities for solitude and unconfined recreation would not be greatly impacted due to the distance of the project from the wilderness area. From the majority of wilderness areas, the project would be located in background zones or not visible at all. Where the proposed project would be readily visible in mountainous areas beyond five miles, the level of contrast would remain below “strong” because the project would not dominate the view as a whole. The open, unobstructed, and panoramic views would remain dominated by the more visually appealing elements of the scene, such as the rugged mountain ranges, the open sky, and the undisturbed portions of the valley floor. For portions of designated wilderness within five miles of the project, the level of contrast would be strong because the proposed project could begin to dominate views of the valley, and would not in compliance with VRM objectives, as discussed above for KOPs 10 and 11. The portion of JTNP where the proposed action could be visible would be within the background visibility zone and does not contain visitor-serving facilities such as hiking trails, campgrounds or picnic areas—these occur in the central and western portions of the park—area from which the proposed action would not be visible. For the reasons above, impacts to the visitor experience to BLM wilderness and JTNP would be minor.

Decommissioning

The purpose of decommissioning is to remove project -related structures and infrastructure so that affected lands could naturalize. However, until vegetative restoration is achieved, adverse visual impacts would be similar to those described in the operation-phase impacts, because large areas would be devoid of desert scrub vegetation. Visual effects from the proposed transmission lines would be likely to remain, however, since it seems likely that, once in use, such lines would remain in use regardless of whether the energy they transfer is generated by the project or another project. The impacts of decommissioning would be somewhat reduced in intensity, however, as compared to construction, because the contrast in color created by the power block structures and solar arrays would be removed. The contrast in the design elements of form and line would remain. Implementation of VIS-2 and VIS-4 would aid greatly in reducing the visual effects of decommissioning. VIS-2, BIO-8, and BIO 22 would require the Closure, Revegetation and Rehabilitation Plan to include reclamation of the area of disturbed soils used for laydown, project construction, and siting of the other ancillary operation and support structures. Further, VIS-4 would reduce the amount of disturbed area and blend the disturbed areas into the characteristic landscape. It would require replacement of soil, brush, rocks, and natural debris over disturbed areas; and would feather and thin the edges of cleared areas to reduce edge contrasts. Newly introduced plant species would be of a form, color, and texture that blends with the landscape. These measures would ensure the visual impacts of decommissioning are minor and short-term.

Alternatives

Reconfigured Alternative 1

Reconfigured Alternative 1 would not substantially reduce the visual effects of the project. In fact, the same number of solar fields would be scattered over a greater land area, thereby potentially increasing the portion of the horizon occupied by the project, especially for KOPs west and south of the project. The reconfigured units would use approximately 180 acres more land than the proposed Units 1 and 2, which were located on 1,380 acres each. Relative to the proposed action, Reconfigured Alternative 1 would result in extended visual disturbance and a greater dominance in views toward the site. However, the increased portion of the horizon line or valley floor occupied by the project would not be substantial enough to change the visual contrast determinations from the KOPs analyzed in the action alternative. Because of this, Reconfigured Alternative 1 would result in no change to the conclusions drawn in the analysis of the proposed action.

Reconfigured Alternative 2

Reconfigured Alternative 2 would have a similar effect with respect to visual resources. It may reduce some of the adverse effects related to form, line, and edge contrasts created by the perimeter of the project. Proposed Unit 1 (the eastern solar field) would be reconfigured to avoid use of the northeastern third of the proposed field and it would not retain a straight southern border. This alternative would have the beneficial effect of following landscape features. Under the proposed action, the project would have a rectangular shape, and site edges cut straight into natural landscape boundaries, as seen from many of the viewpoints analyzed. Under Reconfigured Alternative 2, site edges would more closely follow the lines in the landscape created by changes in vegetation type and the Palen Dry Lake. Due to the effect of perspective foreshortening at low elevations, this beneficial effect may not be obvious in some of the KOPs where the layout of the project is not discernable; however, within higher elevation views, such as KOPs 10 and 11, the line contrast of site edges would be reduced from strong to moderate levels. It is likely that visual resource impacts for Reconfigured Alternative 2 are diminished in intensity relative to the action alternative; however, because the color contrasts would remain strong and unchanged, visual resource impacts would remain adverse and unavoidable for this alternative.

Reduced Acreage Alternative

The Reduced Acreage alternative would have a similar effect as described for Reconfigured Alternative 2 because the northeastern third of unit two would be removed, and the site would more closely follow boundaries that naturally exist in the landscape. Further, because the overall acreage of the project would be reduced under this alternative, so too would the magnitude of the visual impact. This would be true from all of the KOPs analyzed due to a decrease of the dominance of the project in the scene, and a decrease in the contrast rating for line elements. While this alternative would reduce the contrast of certain elements and the general dominance of the project for effected viewers, the strong color contrast and glare effect would remain strong and adverse.

No Action Alternative A

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, none of the construction- or operation-related visual resources impacts from the proposed action would occur. However, the project site could become available to other uses that are consistent with BLM’s land use plan. Insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative B

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would remain in its existing condition, with no new solar energy-related structures or facilities constructed or operated on the site. As a result, the visual resources of the site would not be expected to change noticeably from existing conditions and, as such, CDCA Plan Amendment/No Project Alternative B would not result in visual resources impacts. However, the project site could become available to other uses that are consistent with BLM’s land use plan. Insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative C

Under CDCA Plan Amendment/No Project Alternative C, future solar energy development could be expected to affect visual resources to the same degree and extent as referenced in the proposed action. For example, if the acreage of the solar energy developed is 50 percent less than the proposed action, then impacts to visual resources would be 50 percent less intense.

4.18.3 Discussion of Cumulative Impacts

Impacts resulting from construction, operation, maintenance and decommissioning of the project could result in a cumulative effect on visual resources with other past, present, or reasonably foreseeable future actions. The geographic scope of the cumulative effects analysis for visual resources consists of the I-10 corridor (where visual impacts could be synergistic), and locations from which a viewer could see the proposed action along with views of other projects (where visual impacts could be additive). This geographic scope of cumulative impacts analysis was established based on the natural boundaries of the affected resource, i.e., potential shared viewsheds, and not on jurisdictional boundaries. Potential cumulative effects on visual resources could occur during the project's proposed 39-month construction period (e.g., from cumulative construction disturbances), during the projected 30-40 year lifespan of the proposed action (e.g., project contrast with the landscape, glint and glare), or result from closure and decommissioning (e.g., until restoration efforts return the landscape to its original condition).

Existing conditions within the area of cumulative effects analysis reflect a combination of the natural condition and the effects of past actions and are described in PA/FEIS Chapter 3. Direct and indirect effects of the proposed action and alternatives are analyzed above. Past, present and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1.4, *Cumulative Scenario Approach*. These include the Blythe, Genesis, Rice, Palen, Desert Sunlight, Chuckwalla, Eagle Crest Pump Storage, Nextera McCoy, Desert Quartzite, and Mule Mountain Soleil solar power project and associated generation-tie lines. These solar power projects are expected to result in synergistic visual impacts for travelers along I-10, as well as visual impacts to dispersed recreational users in the surrounding areas.

Motorists on I-10

Visual changes as a result of other projects in the cumulative scenario could be located within the line of sight for travelers along I-10 viewing the project. Other projects that could be located within the same view for motorists looking north on I-10 could include Desert Lily, NextLight Desert Center, and Chuckwalla Solar Projects. Further, the combined effect of large-scale landscape alterations that would be visible along the length of I-10 within the CDCA Plan area could substantially degrade the visual character and the general scenic appeal of the landscape.

Numerous existing cultural modifications are visible from the I-10 corridor, including transmission lines, pipelines, 4-wheel drive tracks, and widely scattered facilities and structures; however, the general character is of an unimpaired, isolated desert landscape. The cumulative scenario includes many large-scale solar plants whose scale, potential glare, and pervasiveness would have adverse cumulative effects. If all the cumulative projects included in Section 4.1.4, *Cumulative Scenario Approach*, were to be implemented (which is considered unlikely), they could convert about 123,592 acres along the I-10 corridor between roughly Desert Center and Blythe (approximately 50 miles) from an undeveloped desert viewshed to a more industrialized appearance (mostly with large solar array fields using both thermal and photovoltaic technologies).

In many cases, the apparent scale of the projects from motorists' perspective would be diminished greatly by favorable topographic relationships. The cumulative projects are at the same or similar elevation as the highway, and are reduced in prominence due to their distance from the highway and low angle of view. In many cases, the other projects in the cumulative scenario would blend in with the horizon line of the valley floor, and the rugged mountains would remain the dominant visual features in the landscape. In spite of this, because the landscape is currently undeveloped and valued by visitors for its isolated and unspoiled condition, the addition of numerous new large-scale solar projects would substantially degrade the scenic experience for many travelers along I-10, due to the projects' industrial character and visual contrast. Mitigation measures are available that reduce the color contrast of structures, or the line contrast of vegetation clearing; but the measures reduce the contrast of certain features or elements of the projects at various distances. No mitigation measure is available that would be sufficient to address features of the project that result in the most contrast in the landscape: the large-scale, color and reflectivity of the project's solar fields. Thus, the cumulative scenario would present an unavoidable and adverse impact for travelers along I-10.

Dispersed Recreational Users in Surrounding Mountains

Dispersed recreational users in the Palen-McCoy Mountains, Chuckwalla Mountains, JTNP, and Joshua Tree Wilderness surrounding the project —due to their elevated position and access to unencumbered, panoramic views of the valley below—could experience both additive and synergistic impacts in the cumulative scenario. The project, along with other projects in the cumulative scenario, would not result in direct visual alteration to BLM wilderness areas or JTNP; however, the scale and contrast created by numerous renewable energy projects would greatly alter views of the valley floor experienced by wilderness users. Existing cultural modifications on the valley floor are largely limited to linear alignments (e.g., roads and transmission lines), or other structures that are diminished in importance due to the considerable distance from which they are viewed. However, the cumulative scenario presents numerous large-scale renewable energy projects that would be readily apparent to most wilderness users.

The area that would be occupied by these projects and their cumulative viewshed has been examined in the Solar PEIS developed for the proposed BLM renewable energy zones. The potential solar development areas, in combination, would be within the 15-mile viewshed of 14 percent of JTNP, 16 percent of the Joshua Tree Wilderness, 57 percent of the Chuckwalla Mountain Wilderness, 58 percent of the Little Chuckwalla Mountains Wilderness, and 76 percent of the Palen-McCoy Wilderness (Solar PEIS, 2010). As discussed above, the project would contribute to the development visible from these areas. The project, in combination with other projects, would make the valleys surrounding the Palen-McCoy, Chuckwalla Mountains Wilderness, and Joshua Tree Wilderness appear to be increasingly industrialized, and could substantially diminish the remote and isolated character of the landscape as viewed from mountainsides facing the Chuckwalla Valley. While use levels in the mountains and wilderness surrounding the project are low, the remote and isolated character of the landscape is highly valued by its users, and could represent the primary attraction.

In addition, the cumulative scenario could have substantial adverse effects on nigh sky visibility for residences of the surrounding area and users of designated wilderness and JTNP. Night sky visibility is a highly valued attribute of the region, and park rangers at JTNP often conduct night sky programs for visitors. These programs are conducted in the western portion of the park outside the viewshed of the solar energy zone, but the effects from excess lighting can reach beyond the viewshed of a specific area. Due the project's distance from the JTNP and lighting controls imposed by Mitigation Measure VIS-3, the night lighting from project alone would be minimized and controlled such that it would not be a nuisance and would not detract from the ability for affected viewers to enjoy their surroundings. However, the cumulative scenario presents many developments in the Chuckwalla Valley that could together have an adverse affect on night sky visibility. The degree to which implementation of similar measures at other facilities would reduce the cumulative impact is difficult to quantify, but the potential exists for numerous additional light sources to contribute to sky glow. As such, additional lighting standards are recommended in Mitigation Measure BLM-VIS-2, which includes coordination with the National Park Service Night Sky Program Manager, and stricter standards for the type and intensity of facility lighting, during both construction and operations.

For the general visual degradation of the Chuckwalla Valley for backcountry hikers in the mountains seeking solitude and nature, available mitigation measures could not feasibly reduce the scale and contrast created by the projects in the cumulative scenario. Thus, the cumulative scenario presents an unavoidable and adverse impact for dispersed recreational users in surrounding, higher-elevation wilderness areas.

Alternatives

Cumulative impacts would vary by alternative to the project only to the degree to which direct and indirect impacts would vary by alternative.

4.18.4 Summary of Mitigation Measures

The implementation of mitigation measures imposed by the Energy Commission as Conditions of Certification for the project also would avoid or reduce impacts on the quality of the human environment. These mitigation measures are summarized above in connection with the impacts they would address, are summarized here, and are set forth in full in Appendix B.

VIS-1, Surface Treatment of Project Structures and Buildings

VIS-2, Revegetation of Disturbed Soil Areas

VIS-3, Temporary and Permanent Exterior Lighting

VIS-4, Project Design

TRANS-6, Reduction of Glint and Glare

AQ-SC3, Construction Fugitive Dust Control

AQ-SC4, Dust Plume Response Requirement

BIO-8, Impact Avoidance and Minimization Measures

BIO-22, Decommissioning and Reclamation Plan

In addition, the following mitigation measure would be imposed by the BLM to avoid or reduce impacts on the quality of the human environment. The following mitigation measures would avoid or minimize impacts on visual resources:

BLM-VIS-1: In addition to the requirements imposed by CEC Condition of Certification VIS-1, the project owner shall paint power blocks structures and other vertical construction shadow gray as shown on the BLM Color Chart. The backs of solar troughs shall also be color treated to minimize color contrasts.

BLM-VIS-2: In addition to the requirements imposed by CEC Condition of Certification VIS-3, the project owner shall consult with the National Park Service Night Sky Program Manager in the development of the lighting plan, and comply with stricter standards for light intensity. All permanent light sources shall be below 3,500 Kelvin color temperature (warm white) and shall have cutoff angles not to exceed 45 degrees of nadir. All lights, temporary and permanent, are to be fully shielded such that the emission of light above the horizontal will be prevented. Prior to construction, the Applicant and SCE shall submit to the BLM, CPUC, and NPS Joshua Tree NP for review and approval a Lighting Mitigation Plan that includes the following:

- Specification that LPS or amber LED lighting will be emphasized, and that white lighting (metal halide) would (a) only be used when necessitated by specific work tasks, (b) not be used for dusk-to-dawn lighting, and (c) would be less than 3500 Kelvin color temperature;
- Specification and map of all lamp locations, orientations, and intensities, including security, roadway, and task lighting;
- Specification of each light fixture and each light shield;
- Total estimated outdoor lighting footprint, expressed as lumens or lumens per acre;
- Definition of the threshold for substantial contribution to light pollution in JTNP, in coordination with the Night Sky Program Manager (see below);
- Specifications on the use of portable truck-mounted lighting;
- Specification of motion sensors and other controls to be used, especially for security lighting;
- Surface treatment specification that will be employed to minimize glare and skyglow;
- Results of a Lumen Analysis (based on final lighting plans), in consultation with the NPS Night Sky Program Manager (Chad Moore – (970) 491-3700), in order to determine the extent of night lighting exposures in the surrounding NPS lands. If the lighting exposure on NPS lands exceeds the allowable threshold (which is to be determined in consultation with the NPS Night Sky Program Manager), additional control measures will be instituted to reduce the lighting exposures to levels below the action threshold; and

- Documentation that the necessary coordination with the NPS Night Sky Program Manager has occurred.

4.18.5 Residual Impacts after Mitigation Measures were Implemented

Residual impacts of the project after implementation of mitigation measures would come from effects on the size and scale of the project. While mitigation measures VIS-1 through VIS-4 and BLM-VIS-1 would be helpful in reducing the level of contrast in form, line, color and texture for individual project features; the ability of these measures to reduce visual impacts decreases as the size and scale of the project increases. Thus, very few of the identified impacts are altogether eliminated through application of the proposed measures; however, the contrast in color and texture would be substantially reduced from several of the KOPs, with application of VIS-1 and BLM-VIS-1. Further, the impact of lighting, while not eliminated, also would be reduced substantially by implementation of VIS-3. The impact of glare is not fully mitigated with implementation of measure TRANS-6, but it is effective at preventing glint in the mornings and evenings due to movement of the mirrors in and out of stow position, and reduced the most intense and distracting glare effects. Generally however, as the angle of view increases, the size and scale of the project solar arrays would become the dominant contrasting factor because the face of the parabolic mirrors could not be treated or painted to blend in with the landscape.

4.18.6 Unavoidable Adverse Impacts

The project would cause three adverse impacts that cannot be mitigated; as such, these impacts would be unavoidable. These are discussed under the analysis of the proposed action, and summarized below:

1. Visual impacts to surrounding viewer groups (all KOPs) from sunlight reflected off of the parabolic mirrors (glare).

2. Visual impacts due to the general level of visual contrast of the project in the landscape, and non-conformance with Interim VRM Class III objectives.

3. Unavoidable and adverse cumulative impacts for travelers along I-10 and dispersed recreational users in the McCoy, Big Maria, and Little Maria Mountains and wilderness.

4.19 Impacts on Water Resources

4.19.1 Impact Assessment Methodology

This section analyzes potential direct, indirect and cumulative impacts of the proposed action and alternatives on water resources, including the project's potential to adversely affect groundwater supplies, alter geomorphic features/processes, modify drainage and flooding conditions, induce erosion and sedimentation, and degrade water quality. The analysis also considers the potential for incremental impacts of the project to combine with impacts of other projects and activities to adversely affect water resources. Mitigation measures to avoid or reduce potential impacts are identified (Appendix B), and the potential for residual impacts is evaluated. No unavoidable adverse effects are anticipated.

This analysis is based, in part, upon information from the following sources: the Application for Certification (AFC) (Solar Millennium, 2009), the Staff Assessment and Draft Environmental Impact Statement (CEC/BLM, 2010), Revised Staff Assessment (CEC RSA, 2010) and the CEC's Commission Decision (CEC Commission Decision, 2010). Additionally, technical reports and studies associated with these documents were also reviewed and considered in the preparation of this analysis.

4.19.2 Discussion of Direct and Indirect Impacts

Proposed Action

The following text analyzes groundwater supply and levels as relevant to construction, operation and decommissioning of the project, followed by a discussion of groundwater drawdown concerns. An analysis of groundwater quality, including the potential project-related environmental impacts and concerns, also is discussed. Thereafter, potential impacts on surface water and surface water hydrology are evaluated.

Groundwater Supply

The average total annual water usage during operation is estimated to be about 300 acre-feet per year (afy), which corresponds to an average flow rate of about 188 gallons per minute (gpm). Usage rates would vary during the year and would be higher in the summer months when the peak maximum flow rate could be as much as about 50 percent higher (about 275 gpm). Equipment sizing would be consistent with peak daily rates to ensure adequate design margin.

The project's water needs would be met by use of groundwater pumped from wells on the plant site. Water for domestic uses by project employees also would be provided by onsite groundwater treated to potable water standards. It is expected that two new water supply wells in the power blocks of the project site would adequately serve the project on a rotating basis. The second well would provide redundancy, an inherent backup water supply in the event of outages or maintenance of the first well.

Groundwater would supply water needed during construction and operation of the project. A concern has been expressed that the project's water demand could exceed the groundwater basin budget and lead to overdraft conditions.

A comparison was made between the average annual basin budget and the anticipated project water production requirements. Table 4.19-1 presents the project's anticipated water requirements along with the average annual basin budget for the 39-month construction and 30-year operation periods. Currently, the Chuckwalla Valley Groundwater Basin (CVGB) balance is positive by approximately 2,608 afy, whereby total inflow (approximately 13,719 afy) to the basin is slightly greater than estimated outflow (approximately 11,111 afy). Approximately 400 afy is attributed to subsurface outflow to the adjacent Palo Verde Mesa Groundwater Basin (PVMGB).

TABLE 4.19-1
ESTIMATED CHANGE TO CHUCKWALLA VALLEY GROUNDWATER BASIN BUDGET
(Average Year Conditions)

Project Component	Years	Annual Basin Budget Balance	Project Requirements (ac-ft/yr)	Net Budget Balance (ac-ft/yr)
Construction	1-3	2,608	480	2,128
Operation	4-33	2,608	300	2,308

SOURCE: CEC RSA, 2010

Construction and operation of the project would have an impact on basin balance in the CVGB, but pumping for the project would not exceed net average recharge to the basin.

The maximum predicted water table drawdown associated with the project is approximately 57 feet in the area of the pumping well. The area where drawdown exceeds 1 foot is limited to approximately 2 to 3 miles of the project pumping area (Table 4.19-2). Figure 4.19-1, and Figure 4.19-2, present groundwater level decline contours from the proposed production wells at the end of construction and end of operations, respectively.

Given the current understanding of the hydrogeology, as well as the current understanding concerning existing wells that may be affected by project-induced drawdown, it is unlikely that groundwater pumping for the project would cause any nearby wells to go dry or be severely impaired or rendered unusable by declining groundwater levels. However, groundwater levels would decline and could affect nearby wells. Monitoring of water levels in nearby wells would identify any such impacts.

Groundwater Drawdown Concerns

Project-related groundwater drawdown could have an impact on existing water wells in the basin, lower the water table in areas where deep-rooted phreatophytes are prevalent or affect halophytes (see Section 4.17, *Impacts on Vegetation Resources*), affect surface water features including springs, and/or induce permanent ground subsidence. Concerns also have been raised concerning potential effects to Colorado River water caused by Project-related groundwater pumping.

TABLE 4.19-2
RESULTS OF NUMERICAL MODELING FOR THE PROJECT

Model Scenario[1]	Objective	Zone 1		Zone 2		Year	Drawdown (feet)	Distance from Production Well to 1-ft Contour (feet)	Distance from Production Well to 5-ft Contour (feet)	Storage Change (acre-feet)
		Trans-missivity (ft^2/day)	Storativity	Trans-missivity (ft^2/day)	Storativity					
Run 7	Project only impacts assessment using only the single well on the project site.	1,000	0.2	6,300	0.2	2013	57.3	4,704	2,128	1,440
						2029	42.2	10,303	4,046	6,279
						2043	43.6	12,446	5,132	10,513
Run 19	Determine relative sensitivity of the aquifer parameters and a conservative radius of influence for Zone 1 delineation	26,000	0.2			2013	3.1	2,333	0	1,422
						2029	2.4	3,523	0	6,207
						2043	2.6	10,452	0	10,341
Run 20	Determine relative sensitivity of the aquifer parameters and a conservative radius of influence for Zone 1 delineation	10,000	0.2			2013	2.8	963	0	1,421
						2029	2.1	732	0	6,204
						2043	2.2	1,198	0	10,385
Run 21	Determine relative sensitivity of the aquifer parameters and a conservative radius of influence for Zone 1 delineation	1,000	0.2			2013	57.3	4,704	2,128	1,440
						2029	42.2	10,577	4,064	6,282
						2043	43.7	14,093	5,274	10,518

SOURCE: CEC RSA 2010.

Effects on Existing Wells

Drawdown imposed by a well on another nearby well can have adverse affects. This is referred to as interference drawdown or well interference. Specific potential adverse effects evaluated in this study include the following:

1. Interference drawdown can result in the water level of an aquifer being drawn down below the screen of the well (*i.e.*, the well goes dry);

2. Interference drawdown can result in the water level of an aquifer being drawn down to a point where the affected well's capacity to pump water is decreased and the well can no longer produce the amount of water that is needed for a particular use, or the well is at risk of becoming damaged and unusable over time due to exposure of the well's screen above the water table and resulting corrosion;

3. Interference drawdown can result in the water level in the affected well being drawn down to near the intake of the well's pump, requiring lowering of the pump intake in order for the well to remain operational; and/or

4. Interference drawdown can cause a decrease in groundwater level in the affected well such that the well and pump can continue to operate and produce adequate amounts of water, but pumping must occur at either greater frequency or duration, and/or water must be lifted to a greater height, resulting in greater operational and maintenance costs.

The extent and type of well interference experienced by an affected well is dependent on hydrogeologic conditions in the aquifer as well as the characteristics of the affected well. These include the following:

1. The amount of interference drawdown that is applied (which varies with the distance of the impacted well from the project well(s);

2. The depth and screened interval of the affected well;

3. The thickness of saturated sediments penetrated by the affected well;

4. Local variations in the transmissivity of the saturated sediments in which the affected well is completed, if any;

5. The condition and efficiency of the affected well;

6. The affected well's pump specifications, including its rating curve, the depth at which the pump intake is set, and the resulting pumping water level in the well during operation; and

7. The minimum required water production rate of the well.

Effects on Phreatophytes and Halophytes

Phreatophyte trees (such as mesquite, ironwood, and palo verde) have deep root systems that can extend tens of feet below the ground surface to the underlying water table. In addition, wet playas can harbor halophyte plant communities that depend on a shallow water table for their moisture. Lowering of the water table below the root depth of these plants could result in stress or death. The nearest potential wetland or halophyte communities would be near Palen Dry Lake, approximately 3-6 miles from the project site. The project is not anticipated to substantially alter water levels due to groundwater production beneath this area. A preliminary estimate of the groundwater level decline indicates approximately 0.2 to 0.6 feet at the end of 33 years of operation. There is additional discussion of these issues in Section 4.17, *Impacts on Vegetation Resources*.

Effects on Surface Water Features

As discussed in greater detail in Section 3.20, *Water Resources*, the nearest spring to the project is Corn Spring, which is located five to six miles southwest of the project site, in the center of the Chuckwalla Mountains, at an elevation of approximately 1,600 feet. Corn Spring appears to derive its water from precipitation falling onto the Chuckwalla Mountains, and movement of groundwater under pressure along an historic fault that bisects the mountains. Other springs, including McCoy Spring and Chuckwalla Spring, are located at a greater distance, 19 miles and 16 miles from the project, respectively. Other surface water discharge/outfall sites are located at least eight miles from the project site. As shown on Figure 4.19-2, implementation of the project at the end of operation would result in drawdown of the groundwater aquifer by a depth of approximately one foot at a distance of approximately two miles from the proposed well site. At the location of the nearest groundwater-dependent surface water feature (Corn Spring), drawdown would be negligible, and is not anticipated to affect the spring. In general, surface waters including Corn Spring and other springs in the vicinity of the project are not expected to be affected by proposed groundwater pumping, based on the distance of the project from these features, as well as the associated hydrogeologic and physiographic conditions in the vicinity of the project.

Coxcomb Wash, located approximately eight miles northwest of the project site, is an ephemeral dry wash that flows southeastward from the Coxcomb Mountains. This surface water feature is not dependent on groundwater, and therefore the extraction of groundwater from the project site would not affect the flow of water in Coxcomb Wash.

Tenajas located on site or in proximity to the project are areas that retain stormwater flows at the surface. Tenajas are not dependent on groundwater, and therefore would not be affected by any change in groundwater levels that would result from implementation of the project. Similarly, wildlife water guzzlers are man-made structures designed to retain stormwater for use by small and large game. These would not be affected by changes in groundwater levels.

The Ford Dry Lake playa is located approximately eight miles from the proposed well site, whereas the southern tip of Palen Dry Lake is located at least three miles northeast of the proposed well site. As discussed previously, one foot of groundwater drawdown would occur at a radius of approximately two miles from the proposed well site. Therefore, potential drawdown at Palen Dry Lake, a wet playa, would be on the order of several inches or less. Drawdown at Ford Dry Lake would be minor to negligible.

Ground Subsidence

Ground subsidence can occur as a result of water level decline in aquifer systems. When the fluid pressure in an aquifer is reduced as a result of changes in the groundwater level, a shift in the balance of support for the overlying materials causes the “skeleton” of the aquifer system to deform slightly. Reversible deformation occurs in all aquifer systems as a result of the cyclical rise and fall of groundwater levels associated with short and longer term climatic cycles. Permanent ground subsidence can occur when pore water pressures in the aquifer fall below their lowest historical point, and the particles in the aquifer skeleton are permanently rearranged and compressed. Soils particularly susceptible to such consolidation and subsidence include compressible clays in a confined aquifer system. Compressible clays are not anticipated on site in a thickness sufficient to result in subsidence as a result of groundwater drawdown under the project. This type of deformation is most prevalent when confined alluvial aquifer systems having thick compressible clay layers are overdrafted.

Based on the geologic/sedimentary characteristics of the CVGB, and on a lack of measured subsidence during previous, historic drawdown events, the potential for subsidence from groundwater level declines is believed to be remote. However, it is recommended that a monitoring and mitigation program be implemented to assess long term changes that may occur as a result of groundwater pumping in the area.

Colorado River-Related Concerns

Public/agency comments from the Colorado River Board of California, Center for Biological Diversity, Defenders of Wildlife, and EPA identify a concern that project-related groundwater use could affect the adjacent PVMGB by inducing flows from the Colorado River into that basin, and that any resulting use of Colorado River water without an entitlement would be illegal. However, given the distance of the project from the Colorado River, that the pumping elevation of the project would not draw groundwater from below the Colorado River Accounting Surface, project groundwater pumping is not expected to result in direct impacts to the PVMGB. Currently, the CVGB balance is positive by approximately 2,608 afy: inflow (approximately 13,719 afy) to the basin is slightly greater than estimated outflows (approximately 11,111 afy). Approximately 400 afy is attributed to subsurface outflow to the adjacent PVMGB. It is anticipated that groundwater extraction during project construction (approximately 480 afy) and operation (approximately 300 afy) would not exceed the existing positive yearly balance of 2,608 afy. Therefore, evidence shows that wells drawing groundwater for project use would not induce flow from the Colorado River. Nonetheless, because some uncertainty remains, mitigation measures are recommended to address the possibility of impacts related to Colorado River water (see Section 4.19.4, *Summary of Mitigation Measures*).

Groundwater Quality

There is a potential that significant groundwater quality impacts could occur during construction if contaminated or hazardous materials used during construction were to be released and migrate to the groundwater table. However, given proposed implementation of a hazardous material management plan during construction, along with adherence to the conditions of an NPDES General Permit for Construction Activities, the potential for such impacts to groundwater quality appears low.

A concern was expressed that, during construction and operation, project-related extraction of groundwater could induce vertical flow of high saline groundwater from beneath Palen Dry Lake to lower aquifers (being used for water production), which are located beneath the site. At the present time, no significant differential in groundwater quality has been identified beneath the project. Given the possibility that there is shallow groundwater below the lake and the lake serves as a point of discharge of groundwater, it is reasonable to presume that there could be high concentrations of TDS below the lake (CEC RSA, 2010). A calculation was conducted by AECOM (2010a as cited in the CEC RSA, 2010) using estimates of hydraulic conductivity, effective porosity, gradient and distance and where high saline groundwater was present beneath Palen Dry Lake and that the production wells planned for the project would induce a gradient towards the production well. Using the estimated values of the variables based on site specific data, the hand calculated results indicate that it would take between about 43 years to 4,424 years for groundwater to flow from beneath Palen Dry Lake to the project well. Given that there are probably low permeability sediments present beneath Palen Dry Lake and the analysis did not take into consideration retardation (associated with low permeability sediments), dispersion or dilution and/or interference from other producers, it is unlikely that vertical migration of poor quality water would degrade higher quality portions of the aquifer.

The project would produce two primary wastewater streams:

1. Non reusable sanitary wastewater produced from administrative centers and operator stations.

2. Reusable streams including: blowdown from the small ancillary equipment cooling tower for the ancillary equipment heat rejection system; reverse osmosis (RO) reject water, and boiler blowdown.

Sanitary wastewater production would consist of domestic water use. Maximum domestic water use is expected to be less than 166,000 gallons per month (5,500 gpd; approximately 6.1 afy). It is anticipated that the wastewater would be consistent with domestic sanitary wastewater and would have biological oxygen demand and total suspended solids in the range of 150 to 250 milligrams per liter (mg/L). Sanitary wastewater would be treated via septic system. The proposed septic system would meet minimum state and local requirements for septic system design, including requirements for percolation and vertical distance from the groundwater table. Therefore, the proposed septic system is not expected to result in substantial degradation of the groundwater underlying the project site.

The CRBRWQCB’s policies do not allow the surface disposal of reverse osmosis (RO) reject brines. The Applicant has proposed two alternatives (CEC RSA, 2010). The first alternative disposal option for RO reject water involves solidification of residual solids through a mechanical drying process (e.g., crystallizer), of the waste and off-site transport and disposal at an appropriately permitted facility. The second alternative would involve placing RO water in an appropriately designed and permitted surface impoundment or open-topped aboveground storage tank for evaporation. Solids remaining after evaporation would be collected and disposed off-site at an appropriately permitted facility. With regard to the operation of the Land Treatment Unit (LTU) on the project site, the material that would be placed in the LTU consists of soil that is impacted with Therminol® VP1 HTF as a result of minor leaks or spills that could occur during the course of regular operation and maintenance activities. At ambient temperatures, HTF is a highly viscous material that is virtually insoluble in water.

The two proposed solar fields would share the same Land Treatment Unit (LTU) to bioremediate soil contaminated from releases of Heat Transfer Fluid (HTF). The bioremediation unit would be designed in accordance with CRBRWQCB requirements and is expected to comprise an area of about 800 feet by 200 feet (3.8 acres). The bioremediation facility would utilize indigenous bacteria to metabolize hydrocarbons contained in non-hazardous HTF contaminated soil. A combination of nutrients, water, and aeration facilitates the bacterial activity where microbes restore contaminated soil within two to four months.

Operation of an LTU is not expected to impact surface water or groundwater quality beneath the site. The LTU would be surrounded on all four sides by berms (minimum of 2 feet above surrounding grade) that would protect the LTU from surface water flow (up to 100-year flood event). Because of the viscous and insoluble nature of HTF (~25 mg/L [Solar Millennium 2009a]) and the proposed leak detect and valve isolation system proposed for the project (Solar Millennium 2009a), it is not likely to mobilize from the soil downward to the water table.

The LTU would be operated under the requirements of CCR Title 23, Division 3, Chapter 15 and Title 27, Section 2000 et seq. and Title 23, Section 2510 et seq. It would be constructed with a 2-foot-thick clay layer on the floor (underlain by 3-feet of native soil that has been compacted to 95% compaction) that would serve as a protective barrier to the downward movement of contaminants from the LTU. Moreover, should any contaminants escape the LTU, the water table is approximately 195 feet beneath the LTU. In summary, because of the viscosity of HTF at ambient temperatures, the insolubility of HTF, the depth of the water table, and the placement of protective berms around the LTU, it is expected that surface water and groundwater quality beneath the site would not be impacted by LTU operation.

The use and application of septic fields is an established practice as a method of wastewater treatment. The closest septic field to the privately owned parcel of land is in excess of .5 mile. The septic system would have no effect on the surface water in or around the project site. The septic system would be installed approximately 5-6 feet deep. In addition, the Riverside County Department of Environmental Health has a Technical Guidance manual for Onsite Wastewater Treatment Systems and this requires a setback of 100 feet between this type of system and the nearest groundwater well.

Individual septic systems and leach fields are planned for each of the two power blocks and the project's administrative, warehouse, and control room and facilities. The proposed septic systems and leach fields for the various facilities are hydraulically down-gradient from the nearest offsite well. Therefore, operation of the septic systems and leach fields from these areas are not expected to impact groundwater quality at the nearest offsite wells.

The septic system and leach fields for the project would be constructed in accordance with the requirements of Riverside County:

1. Ordinance 650.5 (the Riverside County that amends Ordinance 650 that regulates the discharge of sewage in unincorporated areas of the County of Riverside and incorporates by reference Ordinance 725),

2. Title 15 Section 15.24.010 (the Uniform Plumbing Code) Appendix K for Private Sewage Disposal – General and Disposal Fields, and

3. Title 8 Section 8.124.030 (Approval and Construction Permit for Sewage Discharge) and Section 8.124.050 (Operation Permit for Sewage Disposal).

Table 4.19-3 lists septic system and leach field minimum setbacks as required by the County of Riverside and the setbacks for the project site.

TABLE 4.19-3
SANITARY FACILITY SET-BACKS REQUIREMENTS

County of Riverside Requirement	Minimum Set-Back	Project Set-Back	Reference
Minimum distance between groundwater and leach lines	5 feet	175 feet	Riverside County Ordinance 650.5 (& OWTS Guidance Manual)
Minimum horizontal distance from water supply wells	50 feet	5,800 feet	2007 California Plumbing Code (adopted by Reference as Riverside County Title 15, Chapter 15)

SOURCE: CEC RSA, 2010

Surface Water

Erosion

Erosion is the displacement of solids (soil, mud, rock, and other particles) by wind, water, or ice, as well as by downward or down-slope movement in response to gravity. Based on the United States General Soil Map and a site-specific soil investigation conducted by the Applicant, water-related sheet and rill erosion potential under the present undisturbed conditions can be considered negligible, and the site is not currently prone to significant mass wasting (gravity-driven erosion and non-fluvial sediment transport).

Construction of the project would be completed over a 39-month period, with associated earthwork and a total cut and fill volume of approximately 4.5 million cubic yards. Cut and fill would be balanced within the site, with no net import or export of material. The vast majority of the proposed grading and excavation would occur within the PSPP ROW, with only relatively minor excavation needed for installation of gen-tie facilities (e.g., at the locations of monopoles). Earthwork would require the use of heavy machinery for vegetation grubbing, grading, and installation of roads, pipelines, generation facilities, transmission facilities, administration buildings, the solar field, and other facilities. Construction of these facilities would involve the use of bulldozers, graders, semi-trucks, and various other types of heavy equipment, and would involve changes to on site topography. These activities could loosen existing surface soils and sediments, increasing the potential for erosion during storm events, along with associated effects such as increased downstream sediment yields from on-site disturbed areas.

Additionally, the use of equipment during construction and operation and maintenance activities would increase water-related erosion potential for most on-site soils relative to undisturbed conditions. Such activities could involve the accidental release of fuel, oils, brake dust, lubricants, antifreeze, HTF, and other potentially hazardous substances at the site. These water quality pollutants could become entrained in surface water during storm events, and/or be infiltrated into groundwater and the underlying aquifer, resulting in the degradation of water quality.

A Drainage Erosion and Sedimentation Control Plan (DESCP) is proposed to address potential project-related water erosion impacts. This plan would include applicable measures, such as best management practices (BMPs), to identify, avoid/reduce, monitor, and document potential erosion and sedimentation effects from the project. Mitigation measures imposed by the CEC as Conditions of Certification would address these potential issues and are summarized below in Section 4.19.4, *Summary of Mitigation Measures* (see, e.g., SOIL & WATER-1, SOIL & WATER-8 through SOIL & WATER-12).

Surface Water Hydrology

Compliance with the requirements of an NPDES General Permit for Construction Activities would be required during project construction, and would include implementation of best management practices (BMPs) and other measures for retaining or otherwise minimizing the release of potential water quality pollutants. Further impacts of the project on the local surface water hydrology would relate directly to the proposed construction and operation of a network of engineered collector/conveyance channels designed for the purpose of protecting the project from flooding. In short, the project would change both the extent and physical characteristics of the existing floodplain within the project site and downstream of the project site, as well as change the sediment transport and depositional characteristics of the project site.

The project Drainage Report (CEC RSA, 2010) provides a summary of discharges at the downstream property boundary which compares existing total outflow at the project boundary with post-development outflows at the project boundary. The post-development discharges are reported to be very close to the existing peak discharges as shown in Table 4.19-4. The distribution of these total flows at the downstream project boundary is substantially different for the pre- and post-development conditions. For the larger less frequent storm events these results appear to be reasonable as the onsite post-developed watersheds represents only about 9% of the total watershed area. However, for more frequent events, it appears that an increase in flows could result from the project site due to soil compaction and a more efficient drainage system.

An additional concern is that flow from the Corn Springs watershed appears to have the potential to break over into the adjacent watershed to the east, which could increase the flow entering the Center Channel. These potential breakout flows are contained by what appears to be an earthen berm that

TABLE 4.19-4
SUMMARY OF EXISTING AND PROPOSED PEAK FLOW RATES AT DOWNSTREAM PROJECT BOUNDARY

Channel ID	Existing Flowrate at Outlet of Site (cfs)			Proposed Flowrate at Outlet of Site (cfs)		
	Q_{10}	Q_{25}	Q_{100}	Q_{10}	Q_{25}	Q_{100}
West	6,864	9,434	13,742	6,876	9,452	13,770
Center	642	1,287	2,699	618	1,169	2,268
East	455	921	1930	517	1,009	1,983

is likely not engineered nor maintained. There was no discussion provided in the project Drainage Report as to the stability of this berm or the potential impacts of a failure.

Engineered drainage channels would be constructed along the project boundary wherever the detailed FLO-2D analysis indicates the potential for the interception of offsite surface flows exists. These channels would intercept offsite flows and convey them around and through the project for discharge along the northern project boundary. Onsite flows would be discharged into these major channels at discreet locations. The conceptual layout of the drainage system is provided on Figure 4.19-3.

Discharge of flow along the downstream project boundary would be through the use of what the Preliminary Civil Construction Plans (CEC RSA, 2010) for the project refer to as “fan diffuser” and “lateral diffuser” structures. The intent of both of these structures is to reduce flow velocities and allow flow to spread out in a manner that mimics existing sheet flow conditions downstream of the project.

Releasing flow back to native ground in a manner similar to existing conditions is of concern for two primary reasons. The first is that flow collected from a large area and discharged in a more concentrated area may result in the potential for increased erosion. The second potential concern is that the change in flow patterns could essentially “dry up” discreet areas downstream of the project potentially resulting in an impact to the existing biological resources beyond the project boundary. The potential for impacts to groundwater-dependent vegetation is discussed in Section 4.18, *Impacts to Vegetation Resources*.

Alteration of Drainage Patterns

Onsite Drainage. All existing washes and floodplains within the project boundary would be completely eliminated by the grading of approximately 4,000 acres to provide the flat, uniform and vegetation-free topography required for the construction and operation of the solar mirror array. Potential impacts of the project to local surface water hydrology would be related directly to the proposed on-site grading and the construction and operation of a network of engineered collector/conveyance channels. These channels would be designed to protect the project from flooding and erosion related to the conveyance of runoff from off-site watersheds across the site. On-site runoff would be controlled through appropriate grading and a network of engineered channels designed to collect and convey flow through the site for discharge to one of the larger peripheral channels which ultimately discharge off-site. The project would change both the extent and physical characteristics of the existing floodplain within and downstream of the project site, as well as the on-site sediment transport and depositional characteristics.

In addition, along the linear facilities (i.e., the transmission main), there would likely be localized grading at the drainages which cross the transmission main alignment to allow vehicular access during construction and operation of the facility. Localized grading along linear facilities can impact offsite portions of the existing drainages if not properly stabilized. Diversion and and/or channelization of existing drainages would not occur.

Offsite Drainage. The project would not impact the existing natural drainage system upstream of the project boundary as there are no plans for any diversions, basins, dams or other surface water controls beyond the upstream limits of the project. However, there is the potential for erosion of offsite areas upstream due to the formation of headcuts which could migrate laterally from the engineered channels if they are not stabilized and protected.

Physical modifications to the natural drainage system downstream of the project boundary are not proposed. However, there would be changes to both the existing drainage patterns and sediment transport characteristics as the result of the upstream diversion of flows and the subsequent release of those flows at discreet locations on the downstream side of the project. Certain downstream areas would receive more flow than under existing conditions, while other areas may no longer receive any surface flow beyond what may be the result of direct precipitation. The concentration of flows at the proposed diffuser structures may have the potential for increased erosion.

The assessment of the impacts to the existing surface flow patterns requires a detailed analysis utilizing FLO-2D or a similar model to clearly delineate the pre- and post-project conditions. Information obtained from such an analysis is critical to assess the extent and adequacy of the proposed flood control measures on the southern and western project boundaries as well as along the downstream project boundary where flow is released into the engineered channels. The applicant has provided the graphical results of a pre-development FLO-2D analysis, as well as a Technical Memorandum for the post-development FLO-2D analysis. The methodology and results of these analyses were not well documented, and as presented, did not allow for a thorough review of the changes in existing flow characteristics downstream of the project. Additionally, digital input files for independent review were not provided as requested in the project data request.

Flood Hazards

The project would be protected from flooding from offsite sources through the construction of engineered channels along upstream project boundaries. These channels would capture and convey up to the 100-year flow through and around the project and discharge it at along the northern boundary. The Drainage Report (CEC RSA, 2010) and Preliminary Civil Construction Plans (CEC RSA, 2010) for the project provide information on the design and performance of the proposed collector and conveyance channels, including preliminary plan and profile layout and hydraulic analysis using the HEC-RAS computer program. A conceptual plan view layout of the proposed collector and conveyance channel layout is provided on Sheets 4 to Sheet 8 of the Preliminary Civil Construction Plans (CEC RSA, 2010). Preliminary channel profiles were provided in Sheets 16 to Sheet 26 of the same plan set. In general, the preliminary plans were incomplete and inconsistent between the plan view, profiles, and typical sections.

The plans as provided do not adequately demonstrate a sound conceptual drainage design based on site specific conditions. Of particular concern were the channel profiles and typical sections which did not adequately reflect how the engineered collector channels would tie into existing grade near the boundary of the facility. They also do not adequately demonstrate how the proposed berm on the outside of the western drainage channel would function and how it would be protected from erosion along its face and at the proposed openings where concentrated flows would enter the channel. The use of berms in lieu of soil cement bank protection is of concern due to the tendency of berms to fail during large events leaving unprotected channel bank at risk for serious erosion and headcutting.

A detailed analysis of the extent and hydraulic characteristics of flows along the West Channel has not been provided to allow for a complete assessment of the suitability of the diversion berms as depicted in the preliminary plans. Proper design of the berm, openings, and soil cement spillways in the channel would require an estimation of flow quantities, depths and velocities along the structure. The analysis required to provide this data has not been completed; completion of this analysis would be required under mitigation applied within this document, as discussed below. Placement of soil cement spillways in the channel at the locations of the berm openings is also of concern. These types of features are generally subject to local scour and undercutting, and tend to be damaged during large flow events. The preliminary plans provide no accommodations for toe-down or erosion protection at the spillways. Additional mitigation has been applied, below, to ensure that drainage issues on site are adequately addressed.

A summary of the proposed channel geometry and hydraulic characteristics as provided in the Preliminary Civil Construction Plans (CEC RSA, 2010) and project Drainage Report (CEC RSA, 2010) is provided in Table 4.19-5. The data provided in the report indicate that nearly all portions of channels do meet established and reasonable guidelines for allowable channel velocities. Soil cement bank protection should be utilized in sections which have erosive velocities, or additional grade controls should be utilized to reduce channel slope.

The Preliminary Civil Construction Plans (CEC RSA, 2010) provide preliminary details of the proposed soil cement bank and slope protection at several locations within the project. The details appear to indicate a “slope paving” approach to construction of the soil cement, as opposed to construction in discreet lifts, usually 8 to 12 inches. The details also show 3:1 slopes are predominant for the soil cement. Experience has shown that anything less than approximately a 4:1 slope is impractical for this type of construction, and additional mitigation is warranted, as discussed below. During operation, the proposed collector and conveyance channel along the west project boundary would be exposed to incoming side flows along most of its extent. These

TABLE 4.19-5
SUMMARY OF PROPOSED COLLECTOR AND CONVEYANCE CHANNEL HYDRAULIC CHARACTERISTICS[a]

Channel ID	Design Discharge (cfs)	Length (ft)	Bottom Width (ft)	Channel Depth (ft)	Side Slopes (H:V)	10-Year Velocity Range (ft/s)
West	6,885	11,000	175	8–25	3:1	2.6–6.5
Center	2,268	12,200	150	8–9	3:1	2.6–3.6
East	1,983	9,000	100	5–15	3:1	3.0–3.7

NOTES:
[a] Does not include velocity and Froude numbers at the proposed drop structures which are not representative of general channel conditions.

inflows could include concentrated runoff at the more defined drainages, shallow sheet flow, and smaller more localized flows. All of these elements have the ability to cause erosion of unprotected channel banks as well as to create headcutting which would extend roughly perpendicular from the outer channel bank into the adjacent floodplain. These headcut features have the potential to achieve the same depth as the main collector channel and can extend upstream for several hundred feet over time due to numerous smaller flow events, or can occur very quickly from a single large event depending on the magnitude of flow at a given location. Impacts to areas beyond the project boundaries can occur due to these erosional features. Appropriate bank stabilization measures must be implemented to ensure that headcutting is prevented at all locations where flow enters the engineered channels.

On the southern project boundary flows from a large wash crossing under I-10 (Q_{100}=2,268 cfs) would hit the southern portion of the project and be guided though a large culvert crossing into the Center Channel. This type of transition and redirection of flow has the potential for both increased erosion and sediment deposition. The Preliminary Civil Construction Plans (CEC RSA, 2010) indicate that the southern extent of the improvements would be raised above existing grade and the resultant slope protected with soil cement. A detailed hydraulic analysis which characterizes the extents, depths and velocities of flow approaching the southern boundary of the project and showing how it would effectively be collected and conveyed in the Central Channel has not been provided by the applicant. Thus, mitigation including completion of an updated/finalized grading and drainage plan would be required, as discussed in greater detail below.

Operation of the proposed channels and erosion mitigation measures would require significant inspection and maintenance over the life of the facility to ensure that the channels are operating as intended and that potential and observed erosion issues are addressed promptly to minimize damage to the facility and areas beyond the project boundary. Relatively small problems and erosional features which develop during smaller more frequent events can become the focal point for problems during larger events.

The Applicant has prepared a Draft Channel Maintenance Plan to provide long-term guidance to implement routine channel maintenance projects in a feasible and environmentally-sensitive manner. The final Channel Maintenance Plan will be a process and policy document prepared by the Applicant and reviewed by the Compliance Project Manager (CPM). The purpose of such a plan is to maintain diversion channels to meet their original design intent to provide onsite and offsite flood protection, support the project mitigation, and maintain groundwater recharge. The draft plan addresses some of the potential issues associated with long term operation of the channels. However, it does not adequately address the issue of the collection of offsite flows or the use of soil cement along areas subject to inflows from offsite watersheds. The document also references the use of riprap for erosion mitigation which should not be allowed on the project. The implementation of mitigation measures imposed by the CEC as Conditions of Certification SOIL & WATER-1 and SOIL & WATER-8 through SOIL & WATER-12 are summarized in Section 4.19.4, *Summary of Mitigation Measures*, and would address these concerns by minimizing impacts related to flood hazards and erosion associated with construction and operation of the project and by providing basic information to assist the CPM to adequately review and assess the appropriateness of the proposed design within the context of the site-specific conditions.

Surface Water Quality

Project stormwater may encounter soil or chemicals deleterious to aquatic and terrestrial plants and wildlife. The Applicant proposes to implement BMPs for managing potentially harmful stormwater and protect water quality.

Potential water quality impacts could occur during operation and maintenance activities if contaminated or hazardous materials were to contact stormwater and drain offsite. Potential threats to surface water quality during construction include potential erosion and associated increases in sediment loads to adjacent streams and washes and accidental spills of hydrocarbon fuels and greases associated with construction equipment or of solvents, paints, and concrete. The project would alter natural stormwater drainages and use BMPs to reduce potential impacts related to concentrated drainage and ensuing soil erosion and sediment transport offsite. Recognizing these potential impacts, the Applicant has prepared a draft industrial SWPPP required by the general waste discharge requirements for industrial activity.

The use of RO reject water for dust control currently is prohibited by the CRBRWQCB. The Applicant has proposed two additional alternatives as previously discussed. Crystalization would involve on-site reduction in water volumes/drying of RO reject water, until a solid residue was formed. The crystallized solids then would be removed from the site and disposed of in a landfill. Placing RO reject water into an appropriately designed and permitted, open-topped surface impoundment or storage tank for evaporation would result in ongoing evaporation of water, combined with accumulation of solids on the bottom of the facility. Periodically, the solids would be collected and landfilled. Both of these methods for brine disposal would ensure that RO brine water would not contact surface or groundwater, thereby minimizing the potential for water quality degradation.

Potential threats to surface water quality during operation and maintenance activities include: potential increases in erosion and associated sediment loads to adjacent washes; accidental spills of hydrocarbon fuels and greases (including HTF fluid) associated with operation of equipment on site, and potential accidental releases of the LTU and evaporation ponds. Potential erosion and sedimentation impacts during operation of the project would be addressed through applicable elements of previously described mitigation measures. Potential impacts related to accidental spills and releases would be managed through: (1) appropriate design features (e.g., providing two feet of freeboard in evaporation ponds to minimize potential overtopping during larger storm events); (2) hazardous materials management requirements (see Section 4.12, *Hazardous Materials*); and (3) implementation of relevant elements of mitigation measure SOIL & WATER-6, which is summarized in Section 4.19.4, *Summary of Mitigation Measures*.

Decommissioning of the project is expected to result in adverse impacts related to water resources similar to construction impacts: Work could result in potential increases in sediment loads to adjacent streams and washes; and/or accidental spills of hydrocarbon fuels and greases and other materials associated with motorized equipment and construction work.

Alternatives

Reconfigured Alternative 1

Groundwater Basin Balance

Groundwater basin balance in the vicinity of the Reconfigured Alternative 1 site could be impacted as a result of construction and operation-related water use. The potential impact would be similar to that of the project.

Groundwater Levels

Groundwater levels in the vicinity of the Reconfigured Alternative 1 site could be impacted as a result of construction and operation-related water use. This potential impact would be similar to that of the project.

Groundwater levels near the Reconfigured Alternative 1's water supply wells would decline during the pumping. As discussed for the project, local decline of groundwater levels within the cone of depression could affect nearby wells. Implementation of mitigation (as discussed below) would be required.

Mitigation for potential impacts to groundwater-dependent vegetation is discussed in Section 4.18, *Impacts to Vegetation Resources*. Other effects associated with changes in groundwater levels would be similar to those discussed for the project.

Groundwater Quality

Similar to the proposed action, the operation of the LTU and septic fields would not be expected to result in degradation of groundwater quality below or in the vicinity of the Reconfigured Alternative 1 site. Therefore, the level of potential impact would be similar to the proposed action.

Surface Water Hydrology

The impacts and mitigation measures of Reconfigured Alternative 1 would be similar to those of the project. However, Reconfigured Alternative 1 would reduce impacts to the more defined drainages in the center of the project, which generally would be offset by the updated footprint area for the proposed solar fields. The change in impacts as they relate to the overall acreage of State Waters impacted is analyzed elsewhere in this PA/FEIS (see, e.g., Section 4.18, *Impacts on Vegetation Resources*).

All existing washes within the reconfigured portion of the site would still be eliminated by onsite grading and replaced with a system of engineered swales and channels. By splitting the project in the middle, the Central Channel could be eliminated and flow from the culvert under I-10 could pass through the project under more natural conditions for a longer distance. However, the floodplain associated with this drainage would still impact the eastern solar field, which would require protection along slopes, or a berm where the facility is at or below existing grade. A stabilized collector channel along the west project boundary still would be required. Mitigation of potential channel erosion and headcutting still would be required for all channels and slopes subject to flows.

The volume of offsite flow that would need to be collected and conveyed around the project would likely be higher along the western project boundary due to the reconfiguration of the western solar field. Drainage through the center of the solar fields could be passed through the site without the need for an engineered channel and diffuser structure. A FLO-2D analysis to examine at pre- and post-development flow extents, depths and velocities would be required to verify the viability of this option. Flows collected in the central solar field and the method for dispersion would be similar to the project. Additional flows would have to be captured along the west and south boundaries of the southeast most solar field and released on the north and east sides of that unit using flow diffusion structures. The overall changes to the floodplain downstream of Reconfigured Alternative 1 would likely be greater than the project due to the placement of the southeastern-most solar field.

Surface Water Quality

Surface water quality in the vicinity of the Reconfigured Alternative 1 site could be impacted as a result of surface grading. In addition, water quality impacts could occur during operation and maintenance activities if contaminated or hazardous materials being used were to contact stormwater and drain offsite. Moreover, Reconfigured Alternative 1 would alter natural stormwater drainages and potentially impact surface water quality. These and other potential water quality impacts associated with implementation of Reconfigured Alternative 1 would be similar to those of the project.

Reconfigured Alternative 2

Groundwater Basin Balance

Groundwater basin balance in the vicinity of the Reconfigured Alternative 2 site, Options 1 and 2, could be impacted as a result of construction and operation-related water use. The potential impact would be similar to that of the project.

Groundwater Levels

Groundwater levels in the vicinity of the Reconfigured Alternative 2 site, for Options 1 and 2, could be impacted as a result of construction and operation-related water use. The potential impact would be similar to that of the project.

Groundwater levels near the Reconfigured Alternative's water supply wells, for Options 1 and 2, would decline during the project pumping. As discussed for the project, a local decline of groundwater levels within the cone of depression could affect nearby wells, and implementation of mitigation (as discussed below) would be required.

Mitigation for potential impacts to groundwater-dependent vegetation is discussed in Section 4.18, *Impacts to Vegetation Resources*. Other effects associated with changes in groundwater levels would be similar to those analyzed for the project.

Groundwater Quality

Similar to the proposed action, the operation of the LTU and septic fields would not be expected to result in degradation of groundwater quality below or in the vicinity of the Reconfigured Alternative 2 site, for Options 1 and 2. Therefore, the level of potential impact would be similar to that of the proposed action.

Surface Water Hydrology

The impacts of and recommended mitigation measures for Reconfigured Alternative 2, Options 1 and 2, would be similar to those of the project. Reconfigured Alternative 2 would include updated project boundaries, in order to minimize impacts along the sand transport corridor and biological resources impacts, where Option 1 relies on public as well as private lands, while Option 2 relies on only public lands. However, in terms of surface water hydrology, these differences would result in only minor differences between the project and Reconfigured Alternative 2.

All existing washes within the reconfigured portion of the site, for both Option 1 and 2, still would be eliminated by onsite grading and replaced with a system of engineered swales and channels. Mitigation of potential channel erosion and headcutting still would be required for all channels and slopes subject to flows. A FLO-2D analysis to examine at pre- and post-development flow extents, depths and velocities would be required to verify the viability of this option. The overall changes to the floodplain downstream of Reconfigured Alternative 2 would be similar to those of the project, for Options 1 and 2.

Surface Water Quality

Surface water quality in the vicinity of the Reconfigured Alternative 2 site, for Options 1 and 2, could be impacted as a result of surface grading. In addition, water quality impacts could occur during operation and maintenance activities if contaminated or hazardous materials were to contact stormwater and drain offsite. Moreover, Reconfigured Alternative 2 would alter natural stormwater drainages and potentially impact surface water quality. These and other potential water quality impacts associated with implementation of Reconfigured Alternative 2 would be similar to those analyzed for the project, for Options 1 and 2.

Reduced Acreage Alternative

The Reduced Acreage Alternative would follow boundaries similar to those described for Reconfigured Alternative 1, but would be about 25 percent smaller.

Groundwater Basin Balance

Groundwater basin balance could be impacted as a result of the construction and operational water use. The potential impact would be approximately 25 percent less than the project, because the Reduced Acreage Alternative would use approximately 25 percent less water than the project. The potential impact would be similar to that of the project, except that the potential impact of the Reduced Acreage Alternative would be reduced proportionally to its reduced water demand.

Groundwater Levels

Groundwater levels in the vicinity of the Reduced Acreage Alternative could be impacted as a result of the construction and operational water use. The potential impact is expected to be approximately 25 percent less than for the project, because the Reduced Acreage Alternative would use approximately 25 percent less water.

Groundwater levels near the Reduced Acreage Alternative’s water supply wells would decline during pumping, during the operation and maintenance period. As discussed for the project, local decline of groundwater levels within the cone of depression could affect nearby wells; the implementation of mitigation measures (as discussed below) would be required. Therefore, potential impacts to groundwater levels under the Reduced Acreage Alternative would be to be similar to the proposed action, but with a reduced level of intensity as compared to the proposed action. Mitigation for potential impacts to groundwater-dependent vegetation is analyzed in Section 4.18, *Impacts on Vegetation Resources*.

Groundwater Quality

Similar to the proposed action, the operation of the LTY and septic fields proposed under the Reduced Acreage Alternative would not be expected to result in degradation of groundwater quality below or in the vicinity of the Reduced Acreage Alternative site. Thus, potential groundwater quality impacts would be similar to those analyzed for the proposed action, except further reduced in intensity due to the reduced project size under the Reduced Acreage Alternative.

Surface Water Hydrology

Potential impacts to surface water quality would be similar to those of the project. In comparison to the project, the Reduced Acreage Alternative would result in some reduction of impacts to the more defined drainages in the center of the project. All existing washes within the smaller developed portion of the site still would be eliminated by onsite grading and replaced with a system of engineered swales and channels. By splitting the project in the middle, the Central Channel could be eliminated, and flow from the culvert under I-10 could pass through the project under more natural conditions for a longer distance. However, the floodplain associated with this drainage still would impact the eastern solar field, which would require protection along slopes, or a berm where the facility is at or below existing grade. A stabilized collector channel along the west project boundary still would be required. Mitigation of potential channel erosion and headcutting still would be required for all channels and slopes subject to offsite flows.

The volume of offsite flow that would need to be collected and conveyed around the site would likely be higher along the western boundary than for the project due to the additional area in the western solar field. As previously indicated, drainage through the center of the solar fields could be passed through the site without the need for an engineered channel and diffuser structure. A FLO-2D analysis to examine at pre- and post-development flow extents, depths and velocities would be required to verify the viability of this option, and would be required under applied mitigation as discussed for the proposed action and below. Flows collected in the eastern channel and the method for dispersion would be similar to those of the project. The changes to the floodplain downstream of the Reduced Acreage Alternative would be similar to those of the project.

Surface Water Quality

Surface water quality in the vicinity of the Reduced Acreage Alternative site could be impacted as a result of surface grading. In addition, potential water quality impacts could occur during operation and maintenance activities if contaminated or hazardous materials were to contact stormwater and drain offsite. Moreover, the Reduced Acreage would alter natural stormwater drainages and impact surface water quality. Other potential water quality impacts associated with implementation of the Reduced Acreage Alternative would be similar to those analyzed for the project, although reduced in intensity due to the smaller footprint of the Reduced Acreage Alternative.

No Action Alternative A

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, potential impacts to hydrologic resources discussed for the construction and operation of the project would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan Insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative B

Under this alternative, the CDCA Plan would be amended to make the area unavailable for future solar development. Consequently, it is expected that the site would remain in its existing condition, with no new structures or facilities constructed or operated on the site and no potential impact to hydrologic resources. In the absence of the PSPP, other renewable energy projects could be proposed at the site to meet State and Federal mandates. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative C

Under this alternative, the CDCA Plan would be amended to allow for other solar projects on the site. Consequently, the site would likely be developed with the same or a different solar technology, and impacts to hydrologic resources related to the construction and operation of that technology could be expected to be similar to the impacts of the project, including erosion impacts and impacts to jurisdictional waters. Different solar technologies require different amounts of grading and water; however, it is expected that all solar technologies would require grading and maintenance. As such, CDCA Plan Amendment/No Project Alternative C could cause impacts to hydrologic resources that would be similar to the impacts of the project.

4.19.3 Cumulative Impacts

Impacts resulting from construction, operation, maintenance and decommissioning of the project could result in a cumulative effect on hydrologic resources with other past, present, or reasonably foreseeable future actions. The geographic scope of the cumulative effects analysis for hydrologic resources consists of the CVGB, where various project impacts to groundwater could be additive, synergistic or countervailing, and, for surface waters, the area within the watershed boundary. Potential cumulative effects on hydrologic resources could occur at any point during the construction, operation and maintenance, or decommissioning of the project. Table 4.19-6 lists projects in the cumulative scenario as well as the anticipated water use associated with each. Most of these projects have, are, or would be required to undergo their own independent environmental review under NEPA. Even if the activities described in Table 4.19-6 have not yet completed the required environmental review processes, they are considered in this cumulative impacts analysis.

Construction of the project is expected to result in short term adverse impacts. It is expected that some of the cumulative projects described above that are not yet built may be under construction the same time as the project. In addition, it is expected that others of the cumulative projects may be operational at the same time as the project. As a result, there could be substantial long term cumulative impacts during operation of these projects related to hydrologic water resources.

TABLE 4.19-6
REASONABLY FORESEEABLE FUTURE PROJECTS AND ANTICIPATED WATER USE

Project	Proponent	BLM Serial ID	Technology	Source	Use	Water Use – Renewable Projects (afy)									References
						2011	2012	2013	2014	2015	2016	2017	2018	2019–2043	
Chuckwalla Solar I	Chuckwalla Solar I LLC	CACA 48808	Photovoltaic (200 MW)	Chuckwalla Basin	Construction	20	20	10	—	—	—	—	—	—	Estimates
					Operation	—	5	7	10	10	10	10	10	10	
Desert Harvest Solar	enXco	CACA 49491	Photovoltaic (100 MW)	Chuckwalla Basin	Construction	—	10	10	—	—	—	—	—	—	Estimates
					Operation	—	—	—	5	5	5	5	5	5	
Desert Sunlight Solar Farm	First Solar	CACA 48649	Photovoltaic (550 MW)	Chuckwalla Basin	Construction	27	27	27	—	—	—	—	—	—	Estimates
					Operation	—	—	—	4	4	4	4	4	4	
Eagle Mountain Pump Storage	Eagle Crest Energy Company, LLC	FERC 12509001	Pump – Storage (1276 MW)	Chuckwalla Basin	Construction	—	308	308	8,066	8,066	8,066	8,066	—	—	Application to FERC
					Operation	—	—	—	—	—	—	—	2,688	1,763	
Genesis Solar Energy	Genesis Solar LLC	CACA 48880	Parabolic Trough (250 MW)	Chuckwalla Basin	Construction	1,368	616	616	—	—	—	—	—	—	Application to Energy Commission
					Operation	—	—		1,644	1,644	1,644	1,644	1,644	1,644	
Mule Mountain Soleil	enXco	CACA 49488	Photovoltaic (200 MW)	Chuckwalla Basin	Construction	—	20	20	—	—	—	—	—	—	Estimates
					Operation	—	—		10	10	10	10	10	10	
Palen Solar Power	Palen Solar I, LLC	CACA 48810	Parabolic Trough (500 MW)	Chuckwalla Basin	Construction	480	480	480	—	—	—	—	—	—	Application to Energy Commission
					Operation	—	—	—	303	303	303	303	303	303	
Totals						**1,915**	**1,526**	**1,518**	**10,048**	**10,048**	**10,048**	**10,048**	**4,670**	**3,745**	

As a result, there may be substantial short term and long-term cumulative impacts during construction and operation of the cumulative scenario related to: soil erosion, geomorphology, basin balance, groundwater levels, groundwater quality, surface water hydrology and surface water quality.

Groundwater Basin Balance

Concerns have been expressed that the amount of groundwater used for construction and operation of the project would place the groundwater basin into overdraft and deplete the CVGB. Groundwater overdraft is “the condition of a groundwater basin in which the amount of water withdrawn by pumping exceeds the amount of water that recharges the basin over a period of years during which water supply conditions approximate average conditions” (CDWR 1998). Any withdrawals that exceed the average natural recharge and exceed a percentage of the total amount of groundwater in storage would be an impact. The following discussion presents an analysis of the potential for overdraft and depletion of groundwater in storage to occur under the cumulative scenario.

A comparison was made between the average annual basin budget with the cumulative projects’ water production requirements. Table 4.19-7 presents the anticipated projects’ water requirements (Years 2011-2043) along with the average annual basin budget. Currently, the CVGB balance is positive by approximately 2,608 afy whereby inflow (approximately 13,719 afy) to the basin is slightly greater than estimated outflows (approximately 11,111 afy) from the basin.

TABLE 4.19-7
ESTIMATED CHANGE TO CHUCKWALLA VALLEY GROUNDWATER BASIN BUDGET
(Average Year Conditions)

Years	Annual Basin Budget Balance	Cumulative Project Requirements (afy)	Net Budget Balance (afy)	Cumulative Budget Balance (af)	Cumulative Positive/ Deficit as a Percent of Total Recoverable Storage[a]
2011	2,608	1,915	693	693	0.005%
2012	2,608	1,526	1,082	1,775	0.012%
2013	2,608	1,518	1,090	2,865	0.019%
2014	2,608	10,048	-7,440	-4,575	-0.031%
2015	2,608	10,048	-7,440	-12,015	-0.08%
2016	2,608	10,048	-7,440	-19,455	-0.13%
2017	2,608	10,048	-7,440	-26,895	-0.18%
2018	2,608	4,670	-2,062	-28,957	-0.19%
2019	2,608	3,745	-1,137	-30,094	-0.20%
2043	2,608	3,745	-1,137	-57,382	-0.383%

NOTES:
[a] Based on a total recoverable storage of 15,000,000 af

Cumulative groundwater extraction during construction of the project would range from 1,915 afy in Year 2011 and peak at 10,048 afy for Years 2014-2017. This would place the CVGB into overdraft conditions commencing in Year 2014, as shown on Table 4.19-7. Following construction of all of the cumulative projects, for Years 2019 through 2043 it is anticipated that groundwater extraction would be approximately 3,745 afy, which would exceed the basin balance by 1,137 afy and place the basin into overdraft for an extended period of time (~30 years).

However, the amount of total recoverable water that is in storage (approximately 15,000,000 af) in the basin greatly exceeds the amount of cumulative overdraft (57,000 af). In light of these facts, the project's contribution to the cumulative impact to basin balance is considered small.

The I-10 corridor within the CVGB has been targeted for renewable energy projects that have not been identified or quantified as to quantity of water required for development. Given that perennial surface water sources are non-existent and the only available water source is groundwater development, it is likely that these as yet unidentified projects could further develop the groundwater resources and exacerbate the cumulative overdraft conditions identified above. However, given the amount of total recoverable groundwater in storage (approximately 15,000,000 af), the combined impact of these projects is expected to be minor.

Groundwater Levels

The regional model used by AECOM (2010a) is a two-dimensional superposition model developed using MODFLOW code (Harbaugh et al. 2000) for the Parker-Palo Verde-Cibola area, which includes the CVGB and the project site. The model employed a simple vertical geometry and a large grid spacing to evaluate the impacts from groundwater pumping on regional aquifers. Results from the analysis of groundwater levels for cumulative impacts are shown for end of construction (Figure 4.19-4) and the end of operation (Figure 4.19-5).

The modeling results suggest (Table 4.19-8) that during the life of the cumulative projects, groundwater level declines of five feet or more would be located at a distance of approximately 9,000 feet from the proposed production wells. The closest existing well is located at a distance of 9,000 feet from production wells; therefore, based on modeling results, nearby wells could experience limited drawdown.

Modeling conducted by the Applicant indicated that water level declines would be less than what is conservatively presented here. While preliminary studies and calculations have been made to assess the potential for impact, the quantification of the impact is considered an estimate and could not be quantified accurately until actual long-term groundwater production occurs. Implementation of mitigation measures SOIL&WATER-3 through SOIL&WATER-5 and SOIL&WATER-16 is anticipated to mitigate potential impacts to groundwater users (wells) associated with the potential lowering of the groundwater table through monitoring and avoidance, replacement of wells, payment for increased electricity usage, and other well-related mitigation measures. Impacts and proposed mitigation associated with biological resources are discussed in Section 4.17, *Impacts to Vegetation Resources*, and 4.21, *Impacts to Wildlife.*

TABLE 4.19-8
RESULTS OF NUMERICAL MODELING FOR PROPOSED PROJECT AND ALL REASONABLY FORESEEABLE PROJECTS

Model Scenario[a]	Objective	Zone 1		Zone 2		Year	Drawdown (feet)	Distance from Production Well to 1-ft Contour	Distance from Production Well to 5-ft Contour	Storage Change (acre-feet)
		Trans-missivity	Storativity	Trans-missivity	Storativity					
Run 11	Cumulative impacts assessment following the projects listed on Soil and Water Resources Table 4.19-6	6,300	0.2			2013	10.4	4,455	255	9,145
						2029	8	17,256	150	188,456
						2043	9.9	30,919	1,726	322,757
Run 15	Cumulative impacts assessment following the projects listed on Soil and Water Resources Table 4.19-6	1,000	0.2	6,300	0.2	2013	57.3	4,695	2,115	9,147
						2029	42.3	12,745	4,185	188,490
						2043	44.2	17,699	8,938	322,818
Run 19	Determine relative sensitivity of the aquifer parameters and a conservative radius of influence for Zone 1 delineation	26,000	0.2			2013	3.1	2,333	0	1,422
						2029	2.4	3,523	0	6,207
						2043	2.6	10,452	0	10,341
Run 20	Determine relative sensitivity of the aquifer parameters and a conservative radius of influence for Zone 1 delineation	10,000	0.2			2013	2.8	963	0	1,421
						2029	2.1	732	0	6,204
						2043	2.2	1,198	0	10,385
Run 21	Determine relative sensitivity of the aquifer parameters and a conservative radius of influence for Zone 1 delineation	1,000	0.2			2013	57.3	4,704	2,128	1,440
						2029	42.2	10,577	4,064	6,282
						2043	43.7	14,093	5,274	10,518

Notes
1 - The pumping schedule for the water supply well onsite and those used for the cumulative impacts analysis are provided in Table 4.19-6.

SOURCE: CEC RSA, 2010

Based on the modeling results presented above, potential cumulative impacts to the Colorado River are not expected; and no measureable drawdown or reduction in flows associated with the Colorado River is anticipated. Nonetheless, mitigation measures are recommended to address any remaining uncertainty. With the implementation of these measures, potential impacts related to Colorado River hydrology either would be avoided entirely or would be off-set by a requirement that the Applicant apply for and receive an allocation. Under either scenario (the expected no impact or potential impact avoided), the project would not contribute any impact to cumulative Colorado River water conditions.

Groundwater Quality

There is a potential that cumulative groundwater quality impacts could occur if contaminated or hazardous materials used during construction and operation of the various projects were to be released and migrate to the groundwater table.

The project would be expected to contribute only a small amount to a possible cumulative impact related to groundwater quality, given the distance to the groundwater table (>100 feet bgs) over the CVGB and the proposed implementation of hazardous material management and monitoring plans associated with operation of LTUs, surface impoundments, septic systems and other various operations. With implementation of mitigation measures SOIL&WATER-6 and 7, the project's incremental contribution to any cumulative impact to groundwater quality is expected to be small.

Surface Water Hydrology

Cumulative impacts of the various projects on the local surface water hydrology would be related directly to proposed onsite grading and the construction and operation of a network of engineered collector/ conveyance channels designed for the purpose of protecting the various projects from flooding. The cumulative projects could change both the extent and physical characteristics of the existing floodplains within and downstream of each project site. There is not enough information available at this time for the proposed sites, nor has a regional study been completed to define the potential extent of cumulative effects on surface water within the watershed. However, it is assumed that each of these projects would be required to define their impacts and mitigate where required.

The project would be expected to contribute only a small amount to any possible cumulative impact related to surface water hydrology because the implementation of the mitigation measures specified in Appendix B, *CEC Conditions of Certification*, would reduce the project-specific impacts to low levels.

Surface Water Quality

It is expected that stormwater generated on the various project sites may encounter soil or chemicals deleterious to aquatic and terrestrial plants and wildlife. All of the projects would be required to implement BMPs for managing potentially harmful storm water and protecting water quality. Potential water quality impacts could occur during operation and maintenance activities if contaminated or hazardous materials were to contact storm water and drain offsite. It is expected that mitigation measures comparable to SOIL&WATER-1, 2, 6, and 12, which are recommended for the project, would be required.

All of the cumulative projects would alter natural storm water drainages and the expected use of BMPs would reduce potential impacts related to concentrated drainage and ensuing soil erosion and sediment transport offsite. The project would be expected to contribute only a small amount to any potential cumulative impact related to surface water quality with implementation of the mitigation measures SOIL&WATER-1, 2, 6, and 12.

4.19.4 Summary of Mitigation Measures

The implementation of mitigation measures imposed by the Energy Commission as Conditions of Certification for the project would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in Appendix B. The following address impacts on water resources:

> **Water Quality** (SOIL&WATER-1, SOIL&WATER-2, SOIL&WATER-6, SOIL&WATER-7, and SOIL&WATER-12): These mitigation measures provide for drainage-related erosion and sedimentation control, ensure compliance with applicable laws and other requirements related to stormwater discharges on site, design and operational requirements for the proposed septic system and leach field, and discharge requirements for the LTU system. Compliance with these measures would ensure that levels of construction-related sediment loading, erosion, and other water quality pollutants would be minimized, and that potential degradation of groundwater quality associated with the proposed septic system would be minimized.

> **Groundwater Level Mitigation** (SOIL&WATER-3, SOIL&WATER-4, SOIL&WATER-5, SOIL&WATER-16, and SOIL&WATER-17): Implementation of these mitigation measures would ensure that wells are properly sited and installed; ensure that the water usage rates proposed in this document, during construction and operation, are not exceeded over the life of the project; ensure implementation of a groundwater level monitoring, mitigation, and reporting plan during construction and operation; provide monetary or other reimbursement for potential impacts to wells; and provide for groundwater production reporting. As discussed previously, these measures would help ensure that potential reductions in groundwater levels are minimized, and that land subsidence is minimized.

> **Drainage and Flooding** (SOIL&WATER-1, SOIL&WATER-8, SOIL&WATER-9, SOIL&WATER-10, SOIL&WATER-11, and SOIL&WATER-13): These mitigation measures ensure that potential drainage and flooding related impacts of the project would be minimized. They include completion of a revised and updated Drainage Report that would include updated analysis and considerations for climate change related updates to the current Drainage Report; an updated hydraulic analysis; compliance with Riverside County guidelines for conveyance channels, revisions to preliminary grading and drainage plans, and implementation of a channel maintenance program during operation and maintenance of the project. These mitigation measures would ensure that potential impacts related to drainage and flooding are minimized.

Colorado River Effects (SOIL&WATER-14, SOIL&WATER-15 and SOIL&WATER-18): Evidence indicates that wells drawing groundwater for project use would not induce flow from the Colorado River. Nonetheless, some uncertainty remains. The implementation of SOIL&WATER-14, SOIL&WATER-15 and SOIL&WATER-18 would address the possibility of impacts related to Colorado River water by ensuring either that potential impacts related to Colorado River hydrology are avoided entirely or that if it ever became necessary, the Applicant applies for and receives an allocation of water from the Colorado River. Under SOIL&WATER-14, impacts to the Palo Verde Mesa Groundwater Basin would be avoided by implementing offset measures to avoid or offset changes in groundwater flow that would otherwise occur as a result of project implementation.

4.19.5 Residual Impacts after Mitigation Measures were Implemented

Implementation of the mitigation measures identified above would address potential project-related impacts on water resources. However, a small degree of residual impact could remain even following implementation of the proposed mitigation measures. The following text reviews the efficacy of the proposed mitigation measures, and discusses potential for residual impacts, including the efficacy of mitigation measures in avoiding residual impacts, for the following key impact categories.

Groundwater Level Mitigation: As discussed above, a relatively minor degree of residual groundwater level reduction would occur as a result of project implementation even with the implementation of SOIL&WATER-3, SOIL&WATER-4, SOIL&WATER-5, SOIL&WATER-16, and SOIL&WATER-17.

Colorado River Effects: Although evidence indicates that project wells would not induce flow from the Colorado River, some uncertainty remains. Implementation of the mitigation measures identified above (i.e., SOIL&WATER-14, SOIL&WATER-15 and SOIL&WATER-18) would avoid or offset potential impacts, if any, related to Colorado River water. Consequently, no residual impact would occur.

Water Quality: Even with the incorporation of SOIL&WATER-1, SOIL&WATER-2, SOIL&WATER-6, SOIL&WATER-7, and SOIL&WATER-12, a very small degree of residual surface and groundwater quality reduction is expected, primarily due to the introduction of treated leachates from the proposed septic system. Minor residual impacts also could be associated with the release of small amounts of HTF into the environment.

Drainage and Flooding: Even with the incorporation of SOIL&WATER-1, SOIL&WATER-8, SOIL&WATER-9, SOIL&WATER-10, SOIL&WATER-11, and SOIL&WATER-13, residual effects related to drainage and flooding could occur. Any such effects would be minor, and could include minor fluctuations in sediment transport along washes adjacent to and downstream of the project site.

4.19.6 Unavoidable Adverse Impacts

There would be no unavoidable adverse impacts.

4.20 Impacts on Wildland Fire Ecology

4.20.1 Impact Assessment Methodology

The potential severity of fire impacts in an area depend on three major components: (1) the natural setting, (2) the degree of human use and occupancy of the area, and (3) the ability of public services to respond to fires that do occur. The analysis in this section considers the arid ecosystem within which the project is proposed (see, Chapter 3, *Affected Environment*) and fire responders' response times relative to the project (see Section 4.12, *Impacts to Public Health and Safety*). Human use of the project area primarily is and would be related to vehicle use for construction, operation and maintenance activities and recreation (e.g., off-highway vehicles).

As described in Section 3.22, *Wildland Fire Ecology*, the primary causes of fire in the project area are lightning and vehicles. This section evaluates direct and indirect impacts of the proposed action and alternatives related to wildland fire ecology, especially as they may be caused by changes in human use of the affected area. This analysis is based, in part, upon information from the following sources: the Application for Certification (AFC) (Solar Millennium, 2009), the Staff Assessment and Draft Environmental Impact Statement (CEC/BLM, 2010), Revised Staff Assessment (CEC RSA, 2010) and the CEC's Commission Decision (CEC Commission Decision, 2010). Technical reports and studies associated with these documents also were reviewed and considered in the preparation of this analysis.

4.20.2 Direct and Indirect Impacts

Proposed Action

Wildfires are rare in the project area, but can be ignited by construction activities and downed transmission lines as well as by lightening. Increased daily vehicle use in the area from an anticipated 200 new jobs during operation and up to 1,362 jobs during construction would increase the risk of ignition.

Wildfire in arid ecosystems like the project area causes an impact on species diversity and abundance, where mortality can occur during the fire and habitat alterations result in its aftermath. Direct impacts of wildfire include mortality of plants and wildlife and loss of forage and cover. Wildfires alter nutrient levels and water absorption abilities of soil and microclimate conditions. Post-fire recovery is highly variable depending on factors such as burn location, intensity, and post-fire plant succession. Further, recolonization of burned areas may result in the establishment of different vegetation communities. Annual plants and burrowing wildlife would be less affected in the short term if seeds in the soil and animals under the soil are not consumed. Indirect impacts would result in changes to the vegetation communities and the wildlife supported by the communities.

Other temporary and permanent impacts from the project could occur to surrounding vegetation communities from grading activities creating air-born, fugitive dust, sedimentation, and erosion, which disruption of photosynthesis and other metabolic processes. The destruction of plants and soil crusts by windblown sand and dust also exacerbates the erosion of the soil and accelerates the loss of nutrients (Okin et al. 2001).

The spread of invasive plants, especially annual grasses, creates an increased potential for wildfires which can result in disastrous ecological change. Historically in the planning area, the occurrence of wildfires has been low. Repeated fires are known to decrease the perennial plant cover and to aid some invasive annual plants. In turn, where they gain widespread propagation, these invasive plants would provide fuel to carry flames, potentially resulting in larger fires in the future. Surface disturbing activities and vehicle use that promotes the introduction of invasive plants would increase the likelihood of larger fires in the future. Fires have not been common or large in the NECO planning area in the past, but may increase as the invasive, non-native grass cover increases.

Brooks (1998 as cited in the CEC RSA, 2010) performed the most in-depth analyses of the correlations between invasive annual plants and environmental impacts. He found that, despite comprising only 5 percent of the annual plant species in the desert, two invasive annual grasses – red brome (*Bromus madritensis ssp. rubens*) and Mediterranean split grass (*Schismus spp.*)– and one invasive forb – fileree (*Erodium cicutarium*) – accounted for 66 percent of total plant biomass during a high rainfall year. Biomasses of each were positively correlated with disturbances from off-highway vehicles and sheep grazing combined. He concluded that invasive annual grasses out-competed native species. Invasive annual grasses contributed greatly to fire fuels, and combustion of dry red brome produced flame lengths and temperatures sufficient to ignite perennial shrubs. He cited other literature (e.g., pp. 11-12) showing that around the world plant invasions are promoted by human disturbances. He also showed that soil nutrients played a significant role and that nitrogen deposition may enhance the rate of invasion.

Wildfire suppression efforts would result in reduced particulate (PM10) production and visibility impairment from smoke and wild-blown dust. Short term impacts from fire suppression potentially would increase levels of particulate from surface disturbance of firefighting equipment and operations. Fire fighting efforts would use minimal ground distributing techniques such as aerial fire suppression and ground crews with hand tools. Successful fire suppression efforts minimize the number of acres burned, and result in less vegetative loss, and thereby, less wind erosion of particulate matter.

Climate change would result in a small but general increase in temperature, and also could result in an increase in the frequency of extreme weather events that could exacerbate wildfire risks (e.g., increased frequency of drought and heat waves) during operation and maintenance of the project.

Alternatives

Although the project, Reconfigured Alternative 1, Reconfigured Alternative 2, and Reduced Acreage Alternative would involve different acreages and configurations, the generating capacity and construction and operation-related vehicle use would be similar among the alternatives. Long-term operation and maintenance phases of these action alternatives would tend to decrease or preclude recreation-related vehicle access to and through the project site, resulting in a reduced incidence of fire compared to CDCA Plan Amendment/No Project Alternative B.

With No Action Alternative A and CDCA Plan Amendment/No Project Alternative C, vehicle access to and through the site would be similar to access under the project; consequently, fire incidence and size for these alternatives would be similar in the short and long term, because future solar development would not necessarily be precluded. CDCA Plan Amendment/ No Project Alternative B would result in potentially greater recreation-related vehicle access in the long-term because solar energy development projects would be precluded from the Study Area. Such vehicle access in the long term would increase along present trends and increase the incidence of vehicle-related wildfires compared to No Action Alternative A or CDCA Plan Amendment/No Project Alternative C.

The chance for exotic annual weeds to establish and change the fire regime in the Study Area would vary with the slightly different footprint size of the alternative: project (4,024 acres), Reconfigured Alternative 1 (3,097 acres), Reconfigured Alternative 2, Option 1 (4,366 acres), Reconfigured Alternative 2, Option 2 (4,330 acres) and Reduced Acreage Alternative (2,242 acres).

4.20.3 Discussion of Cumulative Impacts

Incremental impacts of the project could result in a cumulative effect on wildland fire risk in combination with other past, present, or reasonably foreseeable future actions. For purposes of this analysis, the geographic scope of the cumulative effects analysis for fire resources consists of eastern Riverside County, which includes about 2,800 square miles (about 1,792,000 acres). Although potential fires would not be constrained by political boundaries, the natural conditions and existing fire response infrastructure are such that it would be reasonable to assume that a fire could be contained within this area. This boundary also is consistent with the California Department of Forestry and Fire Protection’s Fire Hazard Severity Zone boundaries (CDF 2010; CDF 2007). The Riverside County Fire Department (RCFD) is expected to respond or assist with a response to a fire on the proposed site. The two closest RCFD stations to the proposed site are located off of I-10 approximately 10 miles west. The Lake Tamarisk Station (#49) is located at 43880 Lake Tamarisk in Desert Center and the Terra Lago Station (#87) is located at 42900 Golf Center Parkway in Indio. Units from the two closest RCFD stations would arrive at the proposed site within 14 minutes after dispatch when responding to incidences of fire. Potential cumulative wildfire effects could occur over the course of 40 or more years, encompassing the entire lifespan of the project, from construction and operation and maintenance, through closure and decommissioning.

Existing conditions within the cumulative impacts area reflect a combination of the natural condition and the effects of past actions and are described in Chapter 3, *Affected Environment*. Direct and indirect effects of the project and alternatives are analyzed above. Past, present and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1.4, *Cumulative Scenario Approach*. Any of the cumulative projects that would use or store liquefied petroleum gas, install and operate transmission lines, and/or use equipment (including motor vehicles) that could spark or otherwise provide an ignition source could combine to cause or create a cumulative impact. Further, renewable energy projects that use or would use solar trough technology (such as the Blythe and Palen solar projects) are expected to use heat transfer fluid (HTF) that would be heated to a high temperature (about 750 degrees Fahrenheit). Management of this and other hazardous materials could complicate any necessary firefighting efforts. For example, in 1999, a 900,000 gallon HTF storage tank exploded at a solar power plant in the Mojave Desert, causing fire and related concerns about adjacent containers that held sulfuric acid and caustic soda. Additionally, the increased human presence and disturbance caused by the construction, operation and overall development that would occur under cumulative scenario could advance the rate of invasion by non-native vegetation and, thereby, contribute to fire fuel-loading that would burn with higher flames and hotter temperatures.

Cumulative impacts would vary by alternative only to the degree to which direct and indirect impacts would vary by alternative. In this case, the incremental impact of the action alternatives is not expected to vary materially from the proposed action, because similar types of construction, operation and maintenance and closure and decommissioning activities would occur. Development of the site for utility-scale power generation would preclude some OHV use, thereby decreasing cumulative wildfire risks associated with recreational uses. Solar energy development of the site also could occur under CDCA Plan Amendment/No Project Alternative B; therefore, the incremental contribution to cumulative conditions of this alternative is not expected to be materially different than the contribution of the proposed action. For No Action Alternative A and CDCA Plan Amendment/No Project Alternative C, wildfire risks would continue to be associated with OHV and other recreational use of the area, and so these alternatives would not contribute a beneficial impact in this respect relating to wildland fire risk.

4.20.4 Summary of Mitigation Measures

No mitigation measures would be needed because fire protection, vegetation treatment and weed management plans are incorporated into the proposed action, and also would be implemented as part of Reconfigured Alternative 1, Reconfigured Alternative 2 (both options), and the Reduced Acreage Alternative. The Applicant would be required install a fire protection/control system on site including a fire water supply system and associated infrastructure, and to comply with State and Federal regulations regarding worker safety and training. To further reduce potential impacts related to wildland fire, the Applicant shall implement the following mitigation measures, which have been imposed by the California Energy Commission as Conditions of Certification, are set forth in Appendix B, and are summarized below.

Under Mitigation Measure WORKER SAFETY-7, the Applicant would be required to provide funding to the Riverside County Fire Department to ensure available resources to fight potential fires on site. Although the risk of wildfire that could affect the project could increase as a result of climate change, these potential increases in risk are expected to be offset by ongoing compliance with the worker safety and fire protection regulations and mitigation measures.

Mitigation Measures BIO-6, Worker Environmental Awareness Program (WEAP), BIO-7, Biological Resources Mitigation Implementation and Monitoring Plan, BIO-8, Impact Avoidance And Minimization Measures, BIO-14, Weed Management Plan, BIO-19, Special-Status Plant

Impact Avoidance, Minimization and Compensation, and BIO-23, Groundwater Dependent Vegetation Monitoring, would reduce the incidence and size of wildfires and would tend to maintain the natural vegetation communities.

4.20.5 Residual Impacts after Mitigation Measures were Implemented

Despite implementation of Applicant-proposed plans and programs and BLM- and CEC-imposed mitigation measures as part of any of the "build" alternatives, the increased vehicle use required to access the area for construction, operation, and maintenance and changes in recreational vehicle use would increase the likelihood of wildfires in the vicinity of the project to a slight, but unknown degree.

4.20.6 Unavoidable Adverse Impacts

The residual impacts described above would be unavoidable consequences of development.

4.21 Impacts on Wildlife Resources

4.21.1 Impact Assessment Methodology

This section focuses on the wildlife resources associated with the proposed project, including potential direct, indirect and cumulative impacts related to construction, operation and maintenance, and closure and decommissioning of the proposed action and alternatives. As described in PA/FEIS Chapter 2, *Proposed Action and Alternatives*, the portion of the ROW area that would be disturbed as part of the proposed action encompasses approximately 4,024 acres, including the power plant site, access roads, and an associated off-site transmission line corridor. Mitigation measures are recommended where appropriate, to address impacts to wildlife resources. Residual impacts and significant unavoidable adverse impacts also are evaluated.

This analysis is based, in part, upon information from the following sources: the Application for Certification (AFC) (Solar Millennium 2009a as cited in the CEC RSA, 2010) and Supplement to the AFC (Solar Millennium 2009b) and additional information from the Applicant (Galati & Blek 2010i; Galati & Blek 2010j; AECOM 2010f; Solar Millennium 2010k; Solar Millennium 2010l as cited in the CEC RSA, 2010); responses to CEC staff data requests (AECOM 2010a, Palen Solar 1 2010; Kenney 2010; Solar Millennium 2010m; AECOM 2010u as cited in the CEC RSA, 2010); agency workshops held on December 9 and 18, 2009, January 7, 10, 14 and 25, 2010, and April 28 and 29, 2010; site visits by CEC staff on October 7, 2009, November 3, 2009, January 25, 2010, and April 8, 2010; communications with representatives from the California Department of Fish and Game (CDFG) and the U.S. Fish and Wildlife Service (USFWS); CEC's Revised Staff Assessment (RSA) and Commission Decision; and information contained within the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO).

4.21.2 Discussion of Direct and Indirect Impacts

Direct impacts result directly from project activities, and occur at the same time and place as those activities. Indirect impacts also are caused by a project, but can occur later in time or farther removed in distance while still reasonably foreseeable and related to the project. The impacts discussed in this analysis are those most likely to be associated with construction, operation, maintenance, and decommissioning of the proposed project.

Proposed Action

Desert Tortoise

Direct Impacts

Evidence from 2009 and 2010 surveys shows that few desert tortoise actually occupy the project site, as six live animals were found in the study area in spring, 2010, and other sign that indicates live animals was extremely scarce. It is likely that few, if any, desert tortoise would be detected during pre-construction/clearance surveys or related work. Nonetheless, construction, operation and decommissioning of the proposed action could have direct and/or indirect impacts on the species.

Potential direct impacts to the desert tortoise from the proposed action include:

1. Permanent loss of 3,738 acres of low to moderate quality occupied habitat, including 201 acres of designated critical habitat within the Chuckwalla Desert Tortoise Critical Habitat Unit (CHU);

2. Fragmentation/disturbance of adjacent habitat;

3. Disruption of connectivity corridors between CHUs located north and south of I-10;

4. Mortality from tortoises moving around the site and being directed towards I-10 (rather than following existing washes extending beneath the freeway corridor);

5. Mortality to individuals during construction activities, such as clearing, grading and trenching, as well as from vehicle/equipment use/access;

6. Illegal collection of desert tortoise or vandalism;

7. Disruption of desert tortoise behavior during construction and operation of facilities;

8. Disturbance of desert tortoise caused by noise or vibration;

9. Encounters with worker's or visitor's pets, particularly if pets are allowed off-leash; and

10. Effects from relocation/translocation efforts, such as injury or death from improper capture or handling techniques, as well as inherent risks and uncertainties in moving desert tortoises.

Impacts to desert tortoise habitat and critical habitat are identified in PA/FEIS Table 4.17-7, *Recommended Mitigation Acreage for Proposed Action and Reconfigured Alternative 2*. The project area overlaps with a portion of the Chuckwalla Desert Tortoise CHU (Chuckwalla CHU). The Chuckwalla CHU is 1,020,600 acres (USFWS 1994b as cited in the CEC RSA, 2010) and 201 acres of that would be directly impacted by the proposed project (AECOM 2010a as cited in the CEC RSA, 2010). Desert tortoise critical habitat includes the following six Primary Constituent Elements (PCEs):

1. Sufficient space to support viable populations within each of the six recovery units (the project Disturbance Area is in Unit #4) to provide for movement, dispersal, and gene flow;

2. Sufficient quantity and quality of forage species and the proper soil conditions to provide for the growth of such species;

3. Suitable substrates for burrowing, nesting, and overwintering;

4. Burrows, caliche caves, and other shelter sites;

5. Sufficient vegetation for shelter from temperature extremes and predators; and

6. Habitat protected from disturbance and human-caused mortality.

Based on the project site's characteristics relative to the six primary constituent elements of desert tortoise critical habitat, the Applicant concluded that all habitat in the Project Disturbance Area north of I-10 is considered low quality for desert tortoise, and critical habitat south of I-10 is moderate quality (Galati & Blek 2010b as cited in the CEC RSA, 2010). The functions and values as exemplified by the PCEs of desert tortoise critical habitat north of I-10, an area of approximately 183 acres, are relatively low. Three of the six primary constituent elements of critical habitat are not met north of I-10; poor quantity and quality of forage, lack of connectivity and high rates of disturbance because of I-10. South of I-10 the quality of the critical habitat (26.4 acres) is better for desert tortoise and generally increases with proximity to the Chuckwalla Mountains to the south as more PCEs are met. The Applicant considered only 1.2 acres of critical habitat within the Project Disturbance Area, south of I-10, to be of high quality. This would be the area affected by construction of the transmission line.

The Applicant also notes in their Incidental Take Permit application (Galati & Blek 2010b) that, as stated in the Determination of Critical Habitat for the Mojave Population of the Desert Tortoise; Final Rule (USFWS 1994b as cited in the CEC RSA, 2010), areas mapped as critical habitat may contain both suitable and unsuitable habitat for the species. The Applicant further states that although this CHU area is designated as critical habitat, such boundaries are often coarsely mapped and adjusted to match adjacent section lines in order to facilitate legal definitions, appearing to imply that the portion of critical habitat overlapping the project area may not be suitable as critical habitat.

Critical habitat mapping may contain suitable and unsuitable habitat for the species, as stated in the Determination of Critical Habitat for the Mojave Population of the Desert Tortoise; Final Rule (USFWS 1994b as cited in the CEC RSA, 2010). However, based on the definition of the term "suitable" as used in the critical habitat designation (59 FR 5822), the USFWS has determined that the critical habitat area overlapping the project site provides at least three of the PCEs; of these, the PCE of dispersal and gene flow is most important from a regional perspective. The critical habitat area overlapping with the project site contains at least three sizeable washes with major bridges that provide for dispersal and long term gene flow across I-10 which is needed to achieve population connectivity between the Chuckwalla and Chemehuevi critical habitat units. Given the PCE for dispersal and gene flow, the critical habitat designation was intended to include these three bridges and other culverts to maintain this biological process (USFWS file information). Based on the critical habitat designation and importance of maintaining dispersal across I-10, BLM's NECO plan established the Desert Tortoise Connectivity Wildlife Habitat Management Area on and adjacent to the project site, to provide a north-south population connectivity in the area east of Desert Center. The presence of desert tortoise sign found within and adjacent to critical habitat onsite provides further evidence that the area contains the PCEs necessary for nesting and foraging. Although I-10 has disrupted the hydrology and associated microphyll woodland components of the lesser washes, the shrub and herbaceous annual vegetative components between the washes remain hydrologically unaffected and support comparable community characteristics with areas south of I-10. Since desert tortoise forage predominantly on annual plants, the hydrologic effects on the tree canopy do not affect foraging habitat characteristics. Therefore, while the habitat in this area may be considered low quality for some PCEs, the area is occupied (based on the presence of sign) and provides a vital role and function of the critical habitat designation, as reflected in the PCE for maintaining inter-DWMA population connectivity espoused in the species' recovery plan (USFWS 1994a as cited in the CEC RSA, 2010).

The proposed project would cause increased risk to desert tortoise from roads and traffic. Vehicle traffic would increase as a result of construction and improvement of access roads, thereby increasing the risk of injuring or killing desert tortoise. The potential for increased traffic-related tortoise mortality is greatest along paved roads where vehicle frequency and speed is greatest though tortoises on dirt roads may also be affected. Census data indicate that desert tortoise numbers decline as vehicle use increases and that tortoise sign increases with increased distance from roads (Nicholson 1978; Hoff and Marlow 2002 as cited in the CEC RSA, 2010). Additional impacts may occur from unauthorized use of the access roads in the project area, including unauthorized trail creation.

Indirect Impacts

Indirect impacts to desert tortoise from the proposed action could include:

1. Increased predation from ravens,[1] coyotes, pet/feral dogs[2] and/or other predators;

2. Small mammal, fox, coyote, rabbit, lizard, snake, and tortoise road kills along I-10 provides an additional attractant and subsidy for opportunistic predators/scavengers such as ravens. Road kills would likely increase as a result of project-related traffic, further exacerbating raven/predator attractions and increasing desert tortoise predation levels;

3. Disruptions to connectivity as noted above under direct impacts;

4. Impacts from the construction-related introduction or spread of invasive plants that out compete native plants, and that can form dense monospecific stands of unsuitable habitat for the desert tortoise;[3]

5. Accidental wildfires could result during project construction and decommissioning (e.g., from vehicle/equipment sparks) and operation (e.g., from downed transmission lines); however, the potential for this to occur is low due to the relatively small length of transmission lines proposed as part of the proposed project; and

[1] Common raven populations in some areas of the Mojave Desert have increased 1,500% from 1968 to 1988 in response to expanding human use of the desert (Boarman, 2002). Since ravens were scarce in this area prior to 1940, the current level of raven predation on juvenile desert tortoises is considered to be an unnatural occurrence (BLM 1990, USFWS 2008a as cited in the CEC RSA, 2010) and one of many anthropogenic contributors to desert tortoise population declines.

[2] Feral dogs have emerged as major predators of the tortoise. Dogs may range several miles into the desert and have been found digging up and killing desert tortoises (USFWS 1994a; Evans 2001 as cited in the CEC RSA, 2010). Dogs brought to the project site with visitors may harass, injure or kill desert tortoises, particularly if allowed off-leash to roam freely in occupied desert tortoise habitat.

[3] Project-related spread of noxious weeds could reduce the quality of tortoise habitat, for example by replacing native plants that provide tortoise forage, increase the danger of wildfires, restrict tortoise movements, and/or produce toxic effects to tortoises if consumed (potential impacts on vegetation resources are analyzed in PA/FEIS Section 4.17).

6. Potential deposition of sediment loads as a result of construction-related sediment mobilization during heavy rain events and flooding downstream would impact existing desert tortoise burrows outside of the Project Disturbance Area.

The proposed project would cause increased risk to the desert tortoise from other indirect impacts**.** Construction, operation and maintenance of the proposed project also could attract tortoises to the construction area by application of water to control dust, placing them at higher risk of injury or mortality. Construction and operation and maintenance activities of the proposed project could attract tortoise predators such as the common raven, kit fox, and coyote to the project area due to the presence of water and food sources such as trash and road kill. Project structures would also provide new nesting and perching sites for ravens such as new transmission line towers and perimeter fencing. Common ravens were rarely observed within the Project Disturbance Area during surveys in 2009, although one pair was observed nesting in a desert ironwood tree in the north central portion of the Project Disturbance Area (Solar Millennium 2009a, Volume II, Appendix F as cited in the CEC RSA, 2010). Development of new elevated perching sites as a result of proposed project construction could increase raven numbers locally, including the probability that young ravens remain in the area after maturing, which, in turn, could result in increased predation on desert tortoise in the vicinity of the Project Disturbance Area.

Impacts of Relocation/Translocation

Capturing, handling, and relocating desert tortoises from the proposed site after the installation of exclusion fencing could result in harassment and possibly death or injury. Tortoises may die or become injured by capture and relocation if these methods are performed improperly, particularly during extreme temperatures, or if such handling causes them to void their bladders. Averill-Murray (2001 as cited in the CEC RSA, 2010) determined that tortoises that voided their bladders during handling had significantly lower overall survival rates (0.81-0.88) than those that did not void (0.96). Further, if multiple desert tortoises are handled by biologists without the use of appropriate protective measures, pathogens may be spread among both resident and translocated tortoises. For those tortoise near but not within the Project Disturbance Area, removal of habitat, especially the removal of known cover sites and burrows within a tortoise's home range, or segregating individuals from portions of their home range with a fence would likely result in displacement stress that could result in loss of health, increased exposure, increased risk of predation, increased intra-species competition, and possibly death. Tortoises moved outside their home ranges would likely attempt to return to the area from which they were moved, therefore making it difficult to isolate them from the potential adverse effects associated with proposed project construction.

The risks and uncertainties of translocation to the desert tortoise are well recognized in the desert tortoise scientific community. The Desert Tortoise Recovery Office (DTRO) Science Advisory Committee (SAC) has made the following observation regarding desert tortoise translocations (DTRO 2009, p. 2 as cited in the CEC RSA, 2010):

> As such, consensus (if not unanimity) exists among the SAC and other meeting participants that translocation is fraught with long-term uncertainties, notwithstanding recent research showing short-term successes, and should not be considered lightly as a management

> option. When considered, translocation should be part of a strategic population augmentation program, targeted toward depleted populations in areas containing "good" habitat. The SAC recognizes that quantitative measures of habitat quality relative to desert tortoise demographics or population status currently do not exist, and a specific measure of "depleted" (e.g., ratio of dead to live tortoises in surveys of the potential translocation area) was not identified. Augmentations may also be useful to increase less depleted populations if the goal is to obtain a better demographic structure for long-term population persistence. Therefore, any translocations should be accompanied by specific monitoring or research to study the effectiveness or success of the translocation relative to changes in land use, management, or environmental condition.

The Applicant has prepared a draft Desert Tortoise Relocation/Translocation Plan as part of the Incidental Take Permit application (AECOM 2010a, Attachment DR-BIO 47 as cited in the CEC RSA, 2010) which includes measures to avoid and minimize adverse impacts to resident and translocated desert tortoises. This plan would be reviewed and approved by CDFG, USFWS, BLM and CEC staff, and would be implemented to move any tortoises detected during clearance surveys. The Desert Tortoise Relocation/Translocation Plan would: analyze whether relocation or translocation is an appropriate action; would identify and prioritize potentially suitable locations for translocation; evaluate desert tortoise handling and transport considerations (including temperature) and animal health considerations; describe translocation scheduling, site preparation and management; and specify monitoring and reporting activities for evaluating success of translocation.

Movement and Habitat Connectivity of Desert Tortoise and Other Wildlife

Connectivity refers to the degree to which organisms can move among habitat patches and populations. Individuals must be able to move between patches to meet their resource needs, while populations must be connected to allow for dispersion, gene flow, and re-colonization. Surveys conducted by the Applicant (Solar Millennium 2010a as cited in the CEC RSA, 2010) and field observations by agency staff indicate that the culverts and associated major washes on and near the project site are used by a variety of wildlife, including deer, coyote, roadrunner, black-tailed jackrabbit, gray fox, Gambel's quail, woodrats, and other small rodents. The Applicant's biologists found both recent and old tracks indicating that culverts are important crossing points for wildlife as they move between mountain ranges and along the valley floor.

Further, the proposed project area may be especially important for desert tortoise movements between higher quality habitats available in the Palen Mountains to the northeast and the Chuckwalla Mountains to the south; the location of the project area connects these higher quality habitats (Galati & Blek 2010b as cited in the CEC RSA, 2010). Desert tortoises are known to use low-quality intermountain habitat, such as that present across most of the project area, as dispersal routes over time, providing connectivity between high-quality habitat areas in the surrounding mountains (Averill-Murray and Averill-Murray 2005 as cited in the CEC RSA, 2010). After the SA/DEIS was published, the Applicant conducted additional surveys and provided the report *Wildlife Movement and Desert Tortoise Habitat Connectivity* (AECOM 2010f). This report includes the location and photographs of 24 underpasses under I-10, along a 32-mile stretch between Desert Center and Wileys Well Road and is included in Appendix I. It includes further details describing the five underpasses closest to the proposed project. The majority of these underpasses are suitable enough to allow wildlife movement, and many provide moderate cover as well. This includes the underpasses closest to the proposed project. With the new information provided by the Applicant (AECOM 2010f as cited in the CEC RSA, 2010), desert tortoise connectivity impacts would be greatly reduced by proposed mitigation requiring construction of desert tortoise exclusion fencing on both sides of I-10 to direct desert tortoise and other wildlife to safe passage under the freeway bridges.

Currently, three large culverts under I-10, occurring along the existing washes in the project area, provide desert tortoise and other wildlife safe passage under I-10 in a north- south direction across the project area (Galati & Blek 2010b as cited in the CEC RSA, 2010). Although these I-10 major culverts would remain open to desert tortoise movement, the proposed project would disrupt local movement patterns by forcing tortoises to walk around the Project site. The engineered channel through the center of the Project site would not provide a safe movement corridor: individuals of the species could become trapped in the 4.3-mile long central channel and die from lack of cover and forage. The Applicant has proposed placement of a permanent desert tortoise exclusion fence at inflow and outflow points of the central channel to prevent such impacts. The three new engineered channels that would reroute flows through and around the site would not provide a desert tortoise or other wildlife movement corridor because of the lack of vegetative cover and nearby disturbance (Galati and Blek 2010b as cited in the CEC RSA, 2010).

Thus, tortoises north of the project site attempting to move in a southward direction would be diverted to the east or west, and the perimeter fencing around the Project site would direct tortoises towards I-10 on the traffic surface (AECOM 2010b as cited in the CEC RSA, 2010). Tortoise-proof fencing has not been installed along this segment of I-10, so the desert tortoise moving around the project site rather than moving through washes could experience increased rates of vehicular-related mortality. Increased mortality would further reduce local population levels and increase the adverse effects of habitat fragmentation by preventing dispersal between the Chuckwalla Mountains to the southwest and Palen Mountains to the northeast, and vice versa. The potential increase in desert tortoise road fatalities is considered to be quite serious. Mitigation measures are recommended in 4.21.4, below, to address these concerns.

The three large box culverts, ranging in width from 90 to 150 feet, provide an outlet for Corn Springs Wash and other drainages that flow beneath I-10. These culverts would remain open after proposed project construction, but their utility as a wildlife movement corridor would be substantially impaired because of the loss of downstream washes that connect to the culverts. Desert tortoise traveling around the project disturbance area from the north may attempt to cross I-10 at grade level rather than using the underpass, increasing risk of mortality. Fencing on the west side of the Project Disturbance Area could guide desert tortoise directly onto I-10. This impairment to connectivity could disrupt desert tortoise population dispersal from the Chuckwalla Mountains to the southwest with the Palen Mountains to the northeast, and vice versa (Galati and Blek 2010b as cited in the CEC RSA, 2010). Although the desert tortoise is not a migratory species, opportunities for local movements within its home range and dispersal are important for maintaining viable populations (Galati and Blek 2010b as cited in the CEC RSA, 2010). To facilitate desert tortoise movement and to connect the undercrossings south of the proposed project with open areas to the west, the Applicant has proposed installation of a large box culvert under the proposed access road leading to the project site from I-10. This, along with desert tortoise fencing along both sides of I-10 to direct desert tortoise to nearby under-crossings, would address impacts to connectivity.

Three Multi-Species WHMAs are located in the general Project vicinity: Big Maria Mountains WHMA, Palen-Ford WHMA, and the DWMA Continuity WHMA (which provides connectivity between the Chuckwalla DWMA/ACEC south of I-10 and the Palen-Ford WHMA north of I-10 in the immediate Project vicinity). The proposed action could impede wildlife movement in these corridors and obstruct connectivity for wide ranging wildlife such as burro deer, kit fox, coyotes, and badgers, and on a population level could impede gene flow for desert tortoises. Impacts relating to these areas are analyzed in PA/FEIS Section 4.17, *Impacts on Vegetation Resources*.

Mojave Fringe-toed Lizard

As described in PA/FEIS Section 4.17, *Impacts on Vegetation Resources*, the proposed action would result in substantial encroachment into the Palen Dry Lake-Chuckwalla sand transport corridor (including portions of Zones II through IV), which is a critical component in the creation/preservation of MFTL habitat.

The proposed action would directly impact 1,781 acres of MFTL habitat in the northeastern portion of the associated disturbance area, and would result in indirect impacts to 1,113 acres of off-site MFTL habitat through the previously described interruption of a regional sand transport corridor and creation of a sand shadow (The MFTL relies on vegetated sand dunes and a regular supply of fine wind-blown sand for its habitat). Other potential indirect impacts to the MFTL from the proposed Project include:

1. Eliminating the network of desert washes throughout the site and replacing them with engineered channels;
2. Mortality from construction vehicle strikes;
3. Introduction and spread of non-native invasive plants (including Sahara mustard, which increases sand compaction and degrading active dune communities);
4. Erosion and sedimentation of disturbed soils;
5. Edge effects including fragmentation and degradation of remaining habitat;
6. Increased road kill hazard from operations traffic;
7. Harm from accidental spraying or drift of herbicides and dust suppression chemicals; and
8. An increase in access for avian predators (such as loggerhead shrikes) due to new perching structures. Both the direct loss of on-site habitat through project construction, and the indirect degradation of off-site (downwind) habitat through creation of a sand shadow (and other indirect effects) would cause considerable adverse impacts to the MFTL.

The proposed project would eliminate MFTL and other dune-dependent species' habitat in the northeastern portion of the Project Disturbance Area, an area of active wind-blown sand with relatively shallow sand deposits, as well as areas of deeper and more active vegetated sand dunes. In addition to this direct and immediate loss of habitat, the proposed project would greatly affect downwind MFTL habitat (see RSA Soil & Water Appendix A). The northeastern portion of the proposed project interrupts the regional wind-borne sand transport corridor that moves sand southeast and east along the Chuckwalla Valley and toward the Colorado River (RSA Soil & Water Appendix A, Solar Millennium 2010a as cited in the CEC RSA, 2010).

Project-related impacts on sand transport corridors and related dune habitats are analyzed in PA/FEIS Section 4.17, *Impacts on Vegetation Resources*, and also in Section 4.14, *Impacts on Soils Resources*. As described in these sections, the proposed project could have an impact on sand transport and Mojave fringe-toed lizard habitat by also eliminating the network of desert washes throughout the site and replacing them with engineered channels. Project construction on the alluvial fans and alteration of stream channels by channelization may reduce the amount of fluvial sediment reaching the depositional areas upwind of sand dunes and MFTL habitat. Similar effects have been observed in the Coachella Valley, with adverse consequences for Coachella Valley fringe-toed lizard habitat (Griffiths et al. 2002 as cited in the CEC RSA, 2010).

The distribution of MFTL is naturally fragmented because of its obligate habitat specificity to a patchy habitat type, and many local populations of this species are quite small, with small patches of sand supporting small populations of lizards. This fragmented pattern of distribution leaves the species vulnerable to local extirpations from additional habitat disturbance and fragmentation (Murphy et al. 2007 as cited in the CEC RSA, 2010). The MFTL population in the Chuckwalla Valley, along with a very small population in Joshua Tree National Park's Pinto Basin, represents the southernmost distribution of this species (Barrows pers. comm. as cited in the CEC RSA, 2010). This southern population may represent an important gene pool in light of the likely warming and drying that would occur in this region as a result of climate change; these southernmost lizards that may be already adapted to hotter and drier conditions than those further north could represent a source of genetic variation that could stave off extinction of this species in selected refugia (Barrows pers. comm. as cited in the CEC RSA, 2010).

Western Burrowing Owl

A high amount of burrowing owl sign occurs within the Project Disturbance Area, and evidence from surveys (CEC RSA 2010) indicates that at least four owls (two adults and two juvenile/ fledglings) occupy the proposed site and would be impacted by development under the proposed action. Potential project-related direct impacts to burrowing owls include loss of nest sites, eggs, and/or young; the permanent loss of breeding and foraging habitat; and disturbance of nesting and foraging activities for burrowing owl pairs within or near the solar plant site or linear facilities. Burrowing owls and their active burrows within the Project Disturbance Area could be crushed or displaced during construction activities. Indirect impacts to burrowing owls during construction and operation can include increased road kill hazards, modifications to foraging and breeding activities from rearrangement or loss of habitat, and loss of prey items and food sources due to a decreased number of fossorial (burrowing or digging) small mammals from lost or degraded habitat.

Golden Eagle

The proposed action would impact approximately 3,570 acres of golden eagle foraging habitat within the NECO planning area and 3,882 acres within a 140-mile radius of the project site. The proposed project is not expected to result in direct disturbance to nesting golden eagles.

Golden eagles can be extremely susceptible to disturbance during the breeding season (Anderson et al. 1990; USFWS 2009b), and adverse effects are possible from various human activities up to (and in some cases exceeding) one mile from a nest site (Whitfield et al. 2008 as cited in the CEC RSA, 2010). Surveys documented two active nests approximately seven miles southwest of the proposed site in the Chuckwalla Mountains, three inactive nests approximately 6 miles southwest of the site in the Chuckwalla Mountains, one inactive golden eagle nest just over 10 miles southeast of the site in the Chuckwalla Mountains, and two active golden eagle nests just over 10 miles northeast of the site in the Palen Mountains (Solar Millennium 2010u as cited in the CEC RSA, 2010).

Based on guidance provided by the USFWS (74 FR 46836, September 11, 2009, "disturbance" was defined for purposes of this analysis as an activity that would result in injury to an eagle or that would substantially interfere with normal breeding, feeding, or sheltering behavior. For example, a nestling being knocked from the nest by a startled adult would be considered an injury. A nestling fed inadequately because adults were agitated in the vicinity of the nest due to construction-related noise and activity also would be considered substantial interference, as would a situation in which nestlings starve because the adults were excluded from their familiar foraging grounds and could not provide adequate food to their young.

Proposed project construction activities could potentially injure or disturb golden eagles if nests were established sufficiently close to project boundaries to be affected by the sights and sounds of construction. Such potential impacts are highly unlikely, because suitable nesting substrate (i.e., cliff ledges, rocky outcrops, or large trees) does not occur within one mile of the proposed project area. The only potential nesting substrate within one mile of project boundaries would be transmission line towers.

Special Status and Migratory Birds

Project-related impacts to avian species would include adverse effects to resident breeding birds at the site, including (among other species) loggerhead shrike, California horned lark, and Le Conte's thrasher. These species would be directly affected by the loss of desert dry wash woodland, unvegetated ephemeral dry wash, and Sonoran creosote bush scrub. Project impacts to Sonoran creosote bush scrub and desert dry wash woodland would contribute to the loss of foraging habitat, cover, and roost sites for these species on their migratory or wintering grounds, but would not contribute to loss of breeding habitat. Please refer to Section 4.17, *Impacts on Vegetation Resources*, for a discussion of impacts and acreages related to these habitat types. Additional potential direct effects would include the loss of cover, foraging and nesting and opportunities provided by native habitats, especially desert dry wash woodland. The site of the proposed action does not provide breeding habitat for Swainson's hawks, northern harriers, peregrine falcons, or yellow warblers, although these species could be present locally during migration or in the winter. Indirect impacts include increased road kill hazard from operations traffic, and collision with mirrors, towers or wires; contaminants from evaporation ponds; increased predation from ravens; disturbance from operations.

Development of the proposed project would have more substantial adverse effects to resident breeding birds at the site, which include loggerhead shrike, California horned lark, and Le Conte's thrasher among others. These species would be adversely affected by the loss of desert dry wash woodland, vegetated ephemeral swales, and Sonoran creosote bush scrub. Le Conte's thrasher, loggerhead shrike and other wash-dependent species in particular would be affected by the loss of the cover, foraging and nesting opportunities provided by the structurally diverse and relatively lush desert dry wash woodland. Dry washes contain less than 5% of the Sonoran Desert's area, but are estimated to support 90% of Sonoran Desert birdlife (CalPIF, 2006 as cited in the CEC RSA, 2010). The loss of active bird nests or young is regulated by the federal Migratory Bird Treaty Act and Fish and Game Code section 3503, which protects active nests or eggs of California birds. Potential impacts to these species are considered serious, and mitigation measures were recommended to address them (see Section 4.21.4).

Desert Kit Fox and American Badger

The desert kit fox is not a special-status species, but it is protected under California law (14 CCR 460), and potential impacts to individuals of this species must be avoided. Potential impacts to the desert kit fox and American badger from the proposed action would include the loss of foraging and denning habitat, fragmentation and degradation of adjacent habitat, crushing or entombing of animals in dens, increased risk of road kill hazard from construction traffic, and disturbance/harassment of individuals. Indirect impacts include disturbance from increased noise and lighting; and the introduction and spread of invasive weeds. Direct and indirect impacts on these species within the NECO planning area are considered serious, and mitigation measures were recommended to address these concerns (see Section 4.21.4).

Burro Deer

Burro deer is a subspecies of mule deer found in the Colorado Desert of Southern California, primarily along the Colorado River and in desert wash woodland communities and was found using large culverts under I-10. Development of the proposed project within the Palen watershed would have an impact on burro deer range, as depicted by NECO; however, this impact is expected to be minor because deer density is extremely low and deer primarily use the area for movement if they use it at all. Nonetheless, mitigation measures were identified (see Section 4.21.4) to address project effects.

Bats

The project site supports foraging and roosting habitat for several special-status bat species. Roosting opportunities for bats are available in tree cavities, soil crevices and rock outcroppings primarily within dry desert wash woodland habitats. Bat roosts are known to occur in the area, including sites in the McCoy Mountains, Eagles Nest Mine (Little Maria Mountains) and Paymaster Mine. Bats likely utilize habitats throughout the study area for foraging, but forage more commonly in areas such as desert washes where water and insects are more abundant. If not netted, evaporation ponds and their contaminants could be deleterious to bats. Mitigation Measures (see Section 4.21.4) are recommended to address potential impacts of the proposed project to bats.

Couch's Spadefoot Toad

If Couch's spadefoot toads are present in the Project Disturbance Area, impacts from construction would include loss of habitat and direct mortality during grading and construction. Construction activities that create pits or depressions during the summer rains could provide breeding habitat, which could either be vulnerable to additional construction impacts or be in substrate that is incapable of sustaining ponds for the necessary time. During proposed project construction and operation Couch's spadefoot toads could be crushed on access roads. The proposed project is near the western end of Couch's spadefoot toad range, but is not within the range for this species that has been identified by the NECO. Proposed project impacts are not included in cumulative impacts to habitat for this species in the NECO planning area.

The Palen site was assessed for evidence of ponding that could support breeding of this species (ponding that would last about nine days) and these areas were not observed. Therefore, the proposed project is not expected to impact this species or its habitat.

Nelson's Bighorn Sheep

The Project site is not within any of the bighorn sheep connectivity corridors identified in the NECO. NECO also identifies I-10 as a barrier to bighorn sheep movement (BLM CDD 2002 as cited in the CEC RSA, 2010). The Project site is not currently an important movement corridor because of the presence of I-10 and the width of the valley between suitable bighorn sheep habitat. The Society for Conservation of Bighorn Sheep has recommended a one mile buffer from the upper edge of any solar development to the base of the mountains to protect spring foraging habitat. The project site is over one mile from the base of either the Chuckwalla Mountains or Palen Mountains. Barriers between the Chuckwalla Mountains and the Project site (I-10) and the Palen Mountains and the Project site (sand dunes) further limit the availability and usefulness of the Project site for spring foraging habitat.

Also of interest are the potential impacts from proposed project groundwater extraction to seeps, springs, or other water resources that are currently available to bighorn sheep that occupy the Palen Mountains. The Applicant has provided information (AECOM 2010a DR-S&W 193 as cited in the CEC RSA, 2010) about the closest water features, and has concluded that groundwater extraction for the proposed project would not affect these features. After reviewing the data provided in the Data Responses, the proposed project is unlikely to affect springs and seeps available for use by bighorn sheep.

As discussed in the cumulative impact section the proposed project would not directly affect habitat within any NECO connectivity corridors or WHMAs, and would not conflict with Desert Bighorn Sheep Conservation goals and objectives outlined in the NECO.

Additional Impacts

Construction and Decommissioning Noise

Construction activities associated with the proposed action would result in a temporary, although relatively long-term (39-month) increase in ambient noise. Animals rely on hearing to avoid predators, obtain food, and communicate. Excessive construction noise could interfere with normal wildlife communication, potentially affecting contact between mated birds, warning and distress calls that signify predators and other threats, and feeding behavior and protection of young (CEC RSA, 2010). High noise levels also may render an otherwise suitable nesting area unsuitable or result in abandonment of active nesting sites. Behavioral and physiological responses to noise and vibration have the potential to cause injury, energy loss (from movement away from noise source), a decrease in food intake, habitat avoidance and abandonment, and reproductive losses (Hunsaker 2001; National Park Service 1994 as cited in the CEC RSA, 2010).

Studies have shown that noise levels over 60 A-weighted decibels (dBA) can result in nest abandonment by birds and intense, long-lasting noise can mask bird calls, which can reduce reproductive success (Dooling and Popper 2007; Hunsaker 2001 as cited in the CEC RSA, 2010). Sensitive bird nesting habitat occurs in adjacent creosote scrub and desert dry wash woodland.

The bighorn sheep WHMA, approximately 2.5 miles northeast of the project site, is a sensitive noise receptor due to the presence of breeding Nelson's bighorn sheep. However, distance attenuates noise. Noise impact studies on bighorn sheep have not identified numerical noise impact thresholds. Weisenberger et al. (1996 as cited in the CEC RSA, 2010) found that bighorn sheep responded to aircraft over-flights (92-112 dBA) with increased heart rates and altered behavior; however, animal response decreased with increased exposure.

Assuming average construction noise of 85 dBA at 50 feet from the noise center and noise attenuation of 6 dBA per doubling of distance (Solar Millennium 2009a as cited in the CEC RSA, 2010), normal construction noise would attenuate to about 60 dBA approximately 800 feet (0.15 mile) from the noise center. The majority of the construction activities would occur within the power blocks located approximately 3,750 feet (0.71 mile) from the project boundary. Therefore, it is anticipated that average construction noise levels would typically be less than 60 dBA in the bighorn sheep DWMA and surrounding the project site. The infrequent occasions when construction activities would occur near the project boundary and resultant noise levels would be temporarily elevated beyond 60 dBA surrounding the proposed project would not substantially impact sensitive wildlife and is not expected to impact Nelson's bighorn sheep.

Although average construction noise levels would usually attenuate to 60 dBA at the project boundary, unsilenced steam blows and pile driving produce short-term, sporadic, and loud noise that could substantially elevate noise levels in the bighorn sheep DWMA. The loudest proposed construction activity would be the steam blows required to prepare a steam turbine for startup during the final phase before operation. This process cleans the piping and tubing which carry steam to the turbines; starting the turbines without cleaning these systems would destroy the turbine. High pressure steam blows require a series of short steam blows, lasting two or three minutes each, which would be performed several times daily over a period of two or three weeks. These steam blows can produce noise as loud as 130 dBA at a distance of 100 feet. This would attenuate to about 88 dBA at a distance of 2.5 miles from the project site, and 77 dBA at 9 miles from the project site. Silenced steam blows, however, are commonly reduced to 89 dBA at 50 feet, which would attenuate to less than 53 dBA at the project boundary. The Applicant has proposed to use a low-pressure technique for steam blows, which would release steam over a continuous period of about 36 hours and would result in noise levels of about 80 dBA at 100 feet and less than 50 dBA beyond the project boundary. Another relatively loud and short-term construction activity is pile driving. If required, noise from this activity could be expected to reach 101 dBA at a distance of 50 feet and attenuate to less than 59 dBA at a distance of 2.5 miles from the site which would not be enough to substantially impact wildlife in the WHMA.

Operation and Maintenance Noise

The majority of operational noise would originate from the power block equipment (steam turbines, cooling towers, etc) which would be roughly centered at each site and surrounded by solar fields. Other minor operational noise sources include mirror rotation and maintenance activities (e.g., mirror washing). Excessive noise cause impacts like those identified above in connection with construction noise.

Based on the distance of approximately 6,000 feet from the closest power block within the project site to the nearest residence (at the northwestern site boundary), the modeled daytime operational plant noise levels are estimated to attenuate over this distance to approximately 42 dBA at the residence. Maximum short-term ambient noise at the western project perimeter ranged from 102 dBA to 58 dBA. Operational noise, anticipated to be less than 50 dBA at the site boundary, would be more consistent and at a much lower level than during construction. The power plant would operate 24 hours a day, but noise during the non-daylight hours is anticipated to be at levels reduced by approximately 20 dBA (Solar Millennium 2009a as cited in the CEC RSA, 2010). Based on these estimates, there would be no substantial impacts to surrounding wildlife from increased operational noise and no mitigation is proposed. For a complete analysis of operation noise impacts, refer to Section 4.9, *Impacts on Noise*.

Lighting and Nocturnal Collisions

Lighting plays a substantial role in collision risk because lights can attract nocturnal migrant songbirds and other wildlife species. Major bird kill events have been reported at lighted communications towers (Manville 2001 as cited in the CEC RSA, 2010) with most kills from towers higher than 300 to 500 feet (Kerlinger 2004 as cited in the CEC RSA, 2010). Many of the avian fatalities at communications towers and other tall structures have been associated with steady-burning, red incandescent L 810 lights used at communications towers (Gehring et al. 2009 as cited in the CEC RSA, 2010). Longcore et al. (2008 as cited in the CEC RSA, 2010) concluded that use of strobe or flashing lights on towers resulted in less bird aggregation, and, by extension, lower bird mortality, than the use of steady-burning lights.

Operation of the proposed action would require onsite nighttime lighting for safety and security, and would attract bats and disturb wildlife activities in the vicinity of the site. Security lighting in the project site power block and solar fields would operate during non-operating, non-sunlight hours, approximately 3,600 hours per year (AECOM 2010a as cited in the CEC RSA, 2010). Night lighting close to the ground at the project site also could attract bats and disturb wildlife that occur adjacent to the site (e.g., nesting birds, foraging mammals and flying insects). Because of the minimal other manmade sources of light in this remote area, when viewed from nearby offsite locations, the overall change in ambient lighting conditions at the project site may be substantial.

To reduce lighting impacts, lighting at the facility would be restricted to areas required for safety, security, and operation. Exterior lights would be hooded and lights would be directed on site so that light or glare would be minimized. Low-pressure sodium lamps and fixtures of a non-glare type would be specified. Switched lighting would be provided for areas where continuous lighting is not required for normal operation, safety, or security; this would allow these areas to remain un-illuminated (dark) most of the time and thereby minimizing the amount of lighting potentially visible off site. Bird collisions with structures would have a small impact since the tallest proposed project structure would be120 feet tall and major nocturnally migrating bird strikes occur with structures that are from 300 to 500 feet tall.

Solar Mirror Effects

The proposed solar mirrors and heat collection elements (HCEs or receiver tubes) are sources of bright light caused from the diffuse reflection of the sun. The diffuse light and reflection coming off the parabolic mirror troughs, from most visible angles during most hours of the day, would reflect the global irradiation of the sky including clouds. This leads to a lower intensity of light with respect to the sun itself. It is estimated that the diffuse reflections could vary from 200,000 candela[4] per square meter in the morning and afternoon to as much as 700,000 depending on scattering due to cloud patterns. For a human observer, this would be in all cases less intense then staring into the sky and not directly at the sun (AECOM 2010a as cited in the CEC RSA, 2010).

It is possible that the back-reflected light or light not absorbed by both the envelope and steel annulus of Heat Collecting Element (HCE) could be seen in the reflection of the parabolic mirror at certain angles above the horizon (i.e., not viewable to a human observer on the ground, but visible by birds and bats in flight). The intensity 11 feet or farther from the front of the vertex of the collector would be fully diverged direct (not diffuse) incidence luminance of the sun, but with a worst-case intensity approximately 20% less than the direct luminance of the sun; this would be similar to a human observer viewing a body of water from the sky (AECOM 2010a as cited in the CEC RSA, 2010).

However, glint and glare studies of solar trough technology found that pedestrians standing within 20 meters (60 feet) of the perimeter fence when the mirrors rotate from the stowed position to a vertical position may see a light intensity equal or greater to levels considered safe for the human retina (URS 2008 as cited in the CEC RSA, 2010). Any wildlife on the ground at a distance of 20 meters or closer could experience similar hazards from unsafe light intensity.

[4] "Candela" is a unit of luminous intensity: One candela is the luminous intensity, in a given direction, of a source that emits monochromatic radiation of frequency 540 × 1012Hz and has a radiant intensity in that direction of 1/683 watt per steradian.

Solar facilities present a new and relatively un-researched risk for bird collisions and other injuries. The solar collectors would be oriented in a northern-southern fashion and would track the sun's movement across the sky focusing the sun's rays on the parabolic trough collector and thus would not produce large lighting impacts during the day. Bird response to glare from the proposed solar trough technology is not well understood. Although the proposed project facilities are significantly shorter than 350 feet (the height above which is considered a collision danger for migrating birds), there is concern that the mirrors may appear to a bird as a no-hazard flight area. The mirrors reflect light and take on the color of the image being reflected (Ho et al. 2009 as cited in the CEC RSA, 2010). When viewed from an angle near the current direction of the sun, at a distance or an elevated position, the solar field at its most reflective point will mirror the sky and may appear like a lake at hours of the day when the mirrors are oriented toward the viewer (e.g., looking from the south with the sun behind the viewer on a sunny afternoon) (Solar Millennium 2009a as cited in the CEC RSA, 2010). Diurnal birds could also be at risk of injury and fatality from burns if they flew into the reflected sunlight between parabolic troughs or landed on the collector tubes of heat transfer fluid.

Collisions

Bird collisions with structures typically result when the structures are invisible (e.g., bare power lines or guy wires at night), deceptive (e.g., glazing and reflective glare), or confusing (e.g., light refraction or reflection from mist) (Jaroslow 1979 as cited in the CEC RSA, 2010). Collision rates generally increase in low light conditions, during inclement weather (e.g., fog, which is rare in the desert), during strong winds, and during panic flushes when birds are startled by a disturbance, fleeing from danger, or diving after prey. Numerous golden eagle fatalities have been documented near transmission lines where collisions apparently occurred from striking unmarked wires while diving for prey (Kerschner pers. comm. as cited in the CEC RSA, 2010).

The risk of such impacts is probably low, although very little research has been conducted on the risks of bird collisions at solar facilities. The only such research available is the bird fatality studies at the Solar One facility near Daggett, San Bernardino County (McCrary et al. 1986). Results of that study indicated that much of the bird mortality consisted predominantly of collisions with mirrors, in large part resulting from increased numbers of birds attracted to the adjacent evaporation ponds and agricultural fields. For the proposed project, likelihood of bird collisions would be low without such a nearby attractant to increased bird numbers. The barren nature of the lands in the immediate vicinity of the mirrors would discourage bird use of the area, as would the 30 foot tall wind fence running the length of the eastern and western perimeter of each solar field.

There is insufficient information available to conclude with certainty that the proposed project would not be an ongoing source of mortality to birds for the life of the proposed project. As a mitigation measure, the Avian Protection Plan would provide the information needed to determine if operation of the proposed project posed a collision risk for birds, and would provide adaptive management measures to mitigate those impacts to lower levels.

Electrocution

Large raptors such as the golden eagle, red-tailed hawk, and great-horned owl can be electrocuted by transmission lines when a bird's wings simultaneously contact two conductors of different phases, or a conductor and a ground. This happens most frequently when a bird attempts to perch or take off from a structure with insufficient clearance between these elements. In addition, distribution lines that are less than 69 kV but greater than 1 kV pose an electrocution hazard for raptor species attempting to perch on the structure. Configurations less than 1 kV or greater than 69 kV typically do not present an electrocution potential, based on conductor placement and orientation (APLIC 1996 as cited in the CEC RSA, 2010).

The proposed transmission lines would be 230 kV and would be fitted on top of monopole structures are expected to be 120 feet in height and an average length of 1,100 feet between poles (Solar Millennium 2009a as cited in the CEC RSA, 2010). The transmission line and pole fitting would be constructed in accordance with the guidelines of Institute of Electrical and Electronics Engineers (IEEE) Guide 524, *Guide to the Installation of Overhead Transmission Line Conductors*, and also would follow the Suggested Practices for Avian Protection on Power Lines (APLIC 2006 as cited in the CEC RSA, 2010). Also, the lines would be insulated from the poles using porcelain insulators engineered for safe and reliable operation at a maximum operating voltage of 242 kV (Solar Millennium 2009a as cited in the CEC RSA, 2010). To minimize risk of electrocution, the proposed project should impose a "raptor-friendly" construction design for the transmission line with conductor wire spacing greater than the wingspans of large birds to help prevent electrocution as described in Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006 (APLIC 2006 as cited in the CEC RSA, 2010).

Evaporation Ponds

The proposed action and Reconfigured Alternative 2 include two double-lined, 4-acre evaporation ponds to receive industrial waste streams that primarily would come from the proposed project's auxiliary cooling tower and boiler (Galati & Blek 2010i as cited in the CEC RSA, 2010). The proposed evaporation ponds would encompass contaminants including total dissolved solids (TDS) or selenium, and could pose threats to wildlife by creating a new water source that would: (1) attract ravens to the site, potentially increasing predation rates on juvenile desert tortoise in adjacent habitat; (2) attract waterfowl, shorebirds, and other resident or migratory birds that could attempt to drink, forage or nest at the ponds; and (3) attract Couch's spadefoot toads that could attempt to breed in the ponds, and thereby result in harm to toads and their eggs from selenium or the hyper-saline conditions that may result from high total-dissolved-solids concentrations (EPTC 1999; Lemly 1996; Windingstad et al. 1987 as cited in the CEC RSA, 2010). CEC Staff, CDFG and USFWS are concerned about these threats to wildlife posed by the evaporation ponds, and actions are recommended to address them.

Alternatives

Table 4.21-1 shows the differences in impacts to selected Wildlife Resources from each of the alternatives.

TABLE 4.21-1
COMPARISON OF IMPACTS TO SELECTED WILDLIFE RESOURCES FROM ALL PROJECT ALTERNATIVES

Resource	Proposed Action (acres)	Reconfigured Alternative 1 (acres)	Reconfigured Alternative 2 Option 1 (acres)	Reconfigured Alternative 2 Option 2 (acres)	Reduced Acreage Alternative (acres)	No Action Alternatives A, B, C
Desert tortoise[a]:						
Occupied DT habitat within CHU	201	197	228	228	27	0
Occupied DT habitat outside CHU	3,537	2,750	3,977	3,909	2,152	0
Total:	**3,738**	**2,947**	**4,205**	**4,137**	**2,179**	**0**
Mojave fringe-toed lizard – Direct Impacts[a]:						
MFTL (sand dunes)	285	147	156	188	60	0
MFTL (sand fields)	1,496	1,452	1,347	1,354	524	0
Total:	**1,781**	**1,599**	**1,503**	**1,542**	**584**	**0**
Mojave fringe-toed lizard – Indirect Impacts (sand dune, sand fields)[b] *Total:*	**1,113**	**1,120**	**144**	**94**	**292**	**0**
Burrowing Owl Habitat –19.5 acres each (per CBOC guidelines) *Total:*	**2 pair = 78**	**2 pair = 78**	**2 pair = 78**	**2 pair = 78**	**2 pair = 78**	**0**

a Acreages are from Solar Millennium 2010m and 2010l, and CEC SA/DEIS, 2010 (Biological Resources Appendix A).
b Acreages are from CEC SA/DEIS, 2010 (Biological Resources Appendix C).

Reconfigured Alternative 1

Reconfigured Alternative 1, which would be over 900 acres smaller than the proposed action, would have correspondingly smaller direct impacts to wildlife dependent on native vegetation communities. Direct impacts to ephemeral drainages would be 210 acres less than the Proposed Action with the Reconfigured 1 Alternative, including 90 acres of fewer impacts to desert dry wash woodland. This reduction in impacts includes preserving the main project area wash, which flows from the southwest to the northeast through the central portion of the site and provides many benefits including acting as an important local sand source, Mojave fringe-toed lizard habitat, and wildlife corridor.

Overall habitat loss for most wildlife species would be less than the Proposed Action with Reconfigured Alternative 1 (including 912 fewer acres of desert tortoise habitat loss). By preserving the central wash, wildlife connectivity would be impacted to a much lesser degree than under the proposed action. Impacts to Mojave fringe-toed lizard, however, would still be substantial but less (1,599 acres direct and 1,120 acres indirect as compared to 1,781 acres direct and 1,113 acres indirect for the proposed action). Impacts to Mojave fringe-toed lizard, a species dependent on fine, wind-blown sand, are intrinsically linked to impacts to dune and other sandy habitats. As with the proposed action, under Reconfigured Alternative 1, both direct and indirect impacts to MFTL habitat would be, and remain, quite serious.

Impacts to wide-ranging wildlife species that rely on desert washes as movement corridors are substantially less with the Reconfigured Alternative 1 as compared to the proposed action. By dramatically reducing impacts to the large, central wash, Reconfigured Alternative 1 would avoid the substantial direct impacts to wildlife connectivity corridors that would occur under the proposed action.

Other impacts to wildlife are also reduced under the Reconfigured Alternative 1. Impacts to migratory or resident bird species that prefer wash-dependent vegetation would be reduced. Impacts to desert tortoise habitat would be 2,947 acres including 197 acres in the Chuckwalla desert tortoise critical habitat unit (Chuckwalla CHU; compared to 3,738 acres of habitat under the proposed project, 201 of which is in the Chuckwalla CHU). Burrowing owls, American badger, and desert kit fox would be impacted by the Reconfigured Alternative 1, although less habitat and potentially fewer burrows would be affected. The Reconfigured Alternative would avoid one of the two burrowing owl pairs and three of the eight burrows that are on the Proposed Project site, but surveys were not conducted in the un-surveyed section of Unit 1, so there is no way to conclude that impacts to this species would be reduced because more burrowing owls could occur at that location.

Reconfigured Alternative 2

Reconfigured Alternative 2 would increase the number of acres of desert tortoise critical habitat affected relative to the proposed action (228 acres relative to 201 acres) as well as the number of acres of desert tortoise habitat that is not designated critical habitat (3,977 acres for Option 1 and 3,909 acres for Option 2, as compared to 3,537 acres for the proposed action).

Reconfigured Alternative 2 would dramatically reduce the number of acres of Mojave fringe-toed lizard habitat directly affected relative to the number of acres that would be affected by the proposed action: 1,647 acres for Option 1 and 1,636 acres for Option 2 as compared to 2,894 acres for the proposed action.

Option 1

Reconfigured Alternative 2 Option 1 would have similar impacts to most wildlife resources as the proposed action, with some notable exceptions. Specifically, because this alternative is approximately 340 acres larger than the proposed action, impacts to desert dry wash woodland, unvegetated ephemeral dry wash, and desert tortoise habitat would increase. Impacts to sand dunes, the sand transport corridor and related species, however, would be substantially reduced from that of the proposed action based on the reconfigured site boundaries.

This option would affect the same three washes as the proposed action, although direct impacts to desert dry wash woodland would be 60 acres (40%) greater. This alternative is also closer to I-10, and so affects more of the central project area wash than the proposed action. Accordingly, it would have a greater affect on wildlife dependent upon this habitat type.

Reconfigured Alternative 2 Option 1 would impact the same special-status wildlife species as the proposed action, including desert tortoise and western burrowing owl. Impacts to MFTL, a species dependent on fine, wind-blown sand, are inextricably linked to impacts to dune and other sandy habitats, which are analyzed in PA/FEIS Section 4.17, *Impacts to Vegetation Resources.* Specifically, direct impacts to MFTL under this alternative would be 1,503 acres, which is somewhat less than the proposed action’s impact on 1,781 acres. Indirect impacts of this alternative would be reduced substantially relative to the proposed action: 144 acres would be impacted, or 969 acres less than the proposed action.

Reconfigured Alternative 2 Option 1 would affect about 27 more acres of desert tortoise critical habitat, or slightly over 10% more than the proposed action. Wildlife currently use the three project area washes as movement corridors and this alternative is closer to I-10 than the proposed action, leaving less room for species to move past the site. The possibility that animals would cross I-10 headed to the south at grade level, thereby increasing the potential for vehicle-related mortality, would increase commensurately. The desert tortoise fencing recommended to reduce impacts of the proposed action would have to be extended slightly relative to the proposed action to reach the first passable undercrossing east of the site.

Because Reconfigured Alternative 2 was developed after the survey season for some biological resources had ended, some portions of the associated disturbance area (i.e., areas at the southern end of the proposed disturbance areas) were not surveyed. Specifically, approximately 350 acres (8%) of the disturbance area for this alternative were not surveyed for desert tortoise or burrowing owl. However, an in-field assessment of this area’s habitat type and habitat quality in relation to surveyed habitat indicates that the surveyed and adjacent un-surveyed habitat areas are consistent, and are not expected to differ, in abundance or value from the adjacent intensively surveyed areas. Therefore, the only expected difference of impact to special status species is the acreage. Pre-construction surveys as summarized in below in Section 4.21.4 and set forth in full in PA/FEIS Appendix B, *Conditions of Certification*, would adequately address potential impacts in these areas to wildlife resources.

Option 2

Reconfigured Alternative 2 option 2 would have similar impacts to most resources as the proposed action, with some notable exceptions. Specifically, because this alternative is approximately 300 acres larger than the proposed action, impacts to desert dry wash woodland, un-vegetated ephemeral dry wash, and desert tortoise habitat would increase. Impacts to species reliant upon sand dunes and the sand transport corridor, however, would be substantially reduced from that of the proposed action based on the reconfigured site boundaries.

This alternative would affect the same three washes as the proposed action, although direct impacts to desert dry wash woodland would be 50 acres (35%) greater than for the proposed action. This alternative also is closer to I-10, and so affects more of the central project area wash than the proposed action. Accordingly, it would have a greater impact on wildlife dependent upon this habitat type.

Reconfigured Alternative 2 Option 2 would impact the same special-status wildlife species as the proposed action, including desert tortoise and western burrowing owl. Direct impacts to MFTL would be 1,542 acres, which is less than under the proposed action (1,781 acres). Indirect impacts would be substantially reduced to 94 acres, which would be over 1,000 acres less than the proposed action. Under this alternative, total impacts to MFTL habitat would be reduced by over 40% compared to the proposed action. Compensatory mitigation for MFTL habitat (BIO-20) would be the same under this alternative as for the proposed action, although the acreage requirements would be adjusted to reflect this alternative’s reduced impact.

This alternative would affect a larger overall area than the proposed action’s impacts to wildlife habitat, including Sonoran creosote bush scrub. This alternative also would affect about 27 more acres of desert tortoise critical habitat, or slightly over 10% more than the proposed action. Wildlife currently use the three project area washes as a movement corridor and this alternative is closer to I-10 than the proposed action, which would leave less room for movement past the site. This would increase the frequency and risk that animals would cross I-10 headed to the south at grade level, and thereby would increase the risk of vehicle-related mortality. The desert tortoise fencing recommended to reduce impacts of the proposed action (BIO-9), would have to be extended slightly beyond what would be required for the proposed action, to reach the first passable undercrossing east of the site.

This alternative was developed after the survey season for some biological resources had ended; consequently, some portions of the associated disturbance area were not surveyed. Specifically, approximately 250 acres (6%) of the disturbance area for this alternative were not surveyed for desert tortoise or burrowing owl. The lack of surveys for these areas does not preclude analysis of impacts or the recommendation of mitigation measures to address such impacts. An in-field assessment of this area’s habitat type and quality in relation to adjacent surveyed habitat appeared to be consistent with the un-surveyed habitat. Further, these areas are at the southern end of the proposed disturbance areas, and include areas influenced and disturbed by the I-10 corridor. These areas are not expected to differ in abundance or value from the adjacent intensively surveyed areas. The same pre-construction surveys recommended for the proposed action also would apply to development of this alternative and, therefore would adequately address potential impacts.

Reduced Acreage Alternative

The Reduced Acreage Alternative, which would impact nearly 1,800 fewer acres than the proposed action, would have correspondingly smaller direct impacts to wildlife communities. Impacts to desert tortoise habitat would be 2,179 acres (compared to 3,738 acres of habitat under the proposed action). Burrowing owls, American badger, and desert kit fox still would be affected by the Reduced Acreage Alternative, although less habitat and potentially fewer burrows would be affected. Impacts to migratory or resident bird species that prefer wash-dependent vegetation also would be reduced. The Reduced Acreage Alternative would avoid one of the two burrowing owl pairs and three of the eight burrows that are on the site of the proposed action. The Reduced Acreage Alternative also would preserve the central project area wash, which would substantially reduce impacts to wildlife connectivity relative to the proposed action. Impacts to Mojave fringe-toed lizard, while still high (584 acres direct, 292 indirect) would be substantially lower under the Reduced Acreage Alternative than under the proposed action.

No Action Alternative A

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would remain in its existing condition, with no new structures or facilities constructed or operated on the site, and no impacts to sensitive wildlife resources. However, the project site would become available to other uses that are consistent with BLM’s land use plan. Insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative B

CDCA Plan Amendment/No Project Alternative B would not result in impacts to wildlife resources that would occur under the proposed action. In the absence of the PSPP, other (non-solar) renewable energy projects could be constructed to meet State and Federal mandates, as could other uses consistent with the CDCA Plan MUC-M classification. However, insufficient information is available at this time about what other uses would be made of the site; available information is too speculative or conjectural to allow for a meaningful analysis in this PA/FEIS. Appropriate NEPA analysis would need to be conducted before a future proposal could be approved.

CDCA Plan Amendment/No Project Alternative C

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. As a result, wildlife resources likely would be affected comparably to the proposed action. Different solar technologies require different amounts of land, placement, grading and maintenance; however, it is expected that all the technologies would require a large use of land. As such, the CDCA Plan Amendment/No Project Alternative C could result in wildlife resource impacts similar to those of the proposed project.

4.21.3 Discussion of Cumulative Impacts

"Cumulative impact" is defined in 40 CFR 1508.7 "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." Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Appendix I includes an extensive analysis of cumulative impacts from other past, present, and reasonably foreseeable future actions to special status wildlife, plants, and movement corridors (Figure 4.21-1). These impacts are further summarized in Table 4.21-2. Cumulative impacts would vary by alternative only to the degree to which direct and indirect impacts would vary by alternative.

Construction and operation of the project, as proposed, would have serious adverse impacts to many wildlife resources within the Chuckwalla Valley and the NECO area. These include: desert washes; MFTL; desert tortoise; movement and connectivity; golden eagle; burrowing owl; American badger and desert kit fox; LeConte's thrasher and other migratory desert birds.

For many wildlife resources, the proposed project's contribution to cumulative effects after mitigation would be relatively minor. However, the PSPP would cause substantial incremental contributions to cumulative impacts to MFTL, desert tortoise habitat loss and connectivity, and other wildlife habitat values.

For the golden eagle, the habitat loss from the proposed project contributes to a cumulative loss of foraging habitats in the Chuckwalla Valley and the NECO planning area. The proposed project's contribution to the cumulative impacts would be more substantial when combined with the reasonably foreseeable indirect effects of habitat fragmentation from the construction of projects in the cumulative scenario. The USFWS and others (USFWS 2009b; Kochert et al. 2002 as cited in the CEC RSA, 2010) estimate there are approximately 30,000 golden eagles in the western U.S., down from an estimated 100,000 in the late 1970s. Survey data from 2003 and 2006–2008 indicate a decline of 26 percent since 2003. Climate change is also expected to impact golden eagle by increasing drought severity, and CO_2 concentrations are expected to exacerbate the spread of non-native invasive plants, which displace native species and habitats, fuel wild fires, and alter fire regimes. Additionally, the proposed transmission lines for this and other proposed future projects are expected to increase raptor collisions and electrocutions.

TABLE 4.21-2
CUMULATIVE IMPACTS TO SELECTED WILDLIFE RESOURCES FROM THE PROJECT*

Wildlife Resource	Impact
Desert Tortoise	Contributes to cumulative loss of low to moderate value desert tortoise habitat (0.15% to 0.2 habitat value, 3.7% to 0.3 habitat value, 2.5% to 0.4 to 0.5 habitat value, and 0.02% to 0.6 to 0.7 habitat value) from future projects in the NECO Planning Area.
Mojave Fringe-Toed Lizard	Contributes substantially to cumulative loss of Mojave fringe-toed lizard habitat in the Chuckwalla Valley (24.3% of all impacts from future projects, Table 14). The proposed project's contribution to fragmentation and indirect impacts cumulatively considerable Cumulative increase in the already fragmented distribution of the Mojave fringe-toed lizards, and increase the risk of extirpation of isolated populations within the Chuckwalla Valley.
Western Burrowing Owl	Contributes 0.9% to cumulative loss from future projects within the NECO Planning Area. Indirect impacts would also be cumulatively considerable.
Golden Eagle	The proposed project's contribution to cumulative loss of foraging habitat within a 140-mile radius of the project: 0.3% Sonoran creosote scrub and 100% loss of dry desert wash woodland. Contributes to cumulative loss of foraging habitat within 10 miles of mountain (nesting) habitat within the NECO Planning Area: 1.6% of loss of Sonoran creosote bush scrub and 0.3% of desert dry wash woodland. The proposed project's contribution to fragmentation and indirect impacts also cumulatively considerable.
Special-Status Birds & Migratory Birds	Contributes 1.0% to cumulative loss of habitat from future projects within NECO Planning Area (see Appendix G, Mitigation Measures, Table 14, Le Conte's Thrasher), including 0.3% of desert dry wash woodland.
Nelson's Desert Bighorn Sheep	Contributes to 0% of cumulative impacts from future projects within the NECO Planning Area; 3.7% of total NECO Bighorn Sheep WHMAs; 5.6% of connectivity corridors in NECO.
Desert Kit Fox & American Badger	Contributes 0.9% to cumulative loss of habitat from future projects within the NECO Planning Area. PSPP's contribution to fragmentation and indirect impacts also cumulatively considerable
Special Wildlife Management Areas	**Wildlife Habitat Management Areas:** Contributes to 68% loss of Sonoran creosote scrub habitat from future projects within Palen-Ford WHMA, 73.3% loss of desert dry wash woodland to Palen-Ford WHMA from future projects, and 0% loss of sand dune communities within the Palen-Ford WHMA. Contributes to an approximately 5% loss to the DWMA Connectivity WHMA. No cumulative contribution to habitat loss in Big Maria Mountains WHMA. **Desert Tortoise Critical Habitat:** Approximately 201[a] acres of the southwestern corner of the PSPP overlaps the northern boundary of the Chuckwalla Desert Tortoise Critical Habitat Area.

* At this scale of analysis there is essentially no difference between the proposed action and any of the action alternatives.

Proposed future projects, within 10 miles of all mountains in the NECO planning area, would cumulatively displace over 300,000 acres of Sonoran and Mojave creosote bush scrub and desert dry wash woodland. The PSPP's contribution to the cumulative loss of foraging habitat within the NECO planning area would be adequately addressed by the proposed acquisition of 4,542 acres of Sonoran creosote bush scrub habitat through compensatory mitigation as addressed in Section 4.21.4.

4.21.4 Summary of Mitigation Measures

Mitigation measures, including avoidance, minimization, and compensation, are recommended to offset direct, indirect, and cumulative impacts to desert tortoise and other special-status species, and to assure compliance with state and federal laws such as the federal and state endangered species acts and regulations protecting waters of the state.

The mitigation measures imposed by the Energy Commission as Conditions of Certification for the PSPP would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in full in Appendix B, *Conditions of Certification*, and are summarized below as they address impacts to wildlife resources:

Desert tortoise: Several of the mitigation measures would address direct and indirect impacts to desert tortoise. For example, BIO-1 through BIO-12 and BIO-28 would address direct effects, and BIO-6, BIO-8 and BIO-29, as well as BIO-13 and BIO-14 would address indirect impacts. All recommended desert tortoise mitigation measures, including translocation if necessary (BIO-10), would be conducted pursuant to BLM, USFWS and CDFG guidance.

1. BIO-1 through BIO-8 are general measures that would benefit all biological resources, including the desert tortoise and associated habitat areas. BIO-1 through BIO-5 require qualified biologists, with authority to implement mitigation measures necessary to prevent impacts to biological resources, to be on site during all construction activities. BIO-6 requires the development and implementation of a Worker Environmental Awareness Program to train all workers to avoid impacts to sensitive species and their habitats. BIO-7 requires the project owner to prepare and implement a Biological Resources Mitigation Implementation and Monitoring Plan that incorporates the mitigation and compliance measures required by local, state, and federal LORS regarding biological resources, including wildlife. BIO-8 describes Best Management Practices (BMP) requirements and other impact avoidance and minimization measures, including the installation of a box culvert suitable for passage of desert tortoises (and other wildlife) under project access roads.

2. BIO-9 through BIO-12 are specific to the desert tortoise. BIO-9 involves the installation of security and desert tortoise exclusionary fencing around the entire Project Disturbance Area (including access roads), and along I-10 south of the site (with specific fencing requirements identified for the proposed action and Reconfigured Alternative 2). Its implementation would address impacts to tortoise movement and habitat connectivity. BIO-10 involves the development and implementation of a desert tortoise relocation/translocation plan to move tortoises currently within the Project Disturbance Area to identified relocation or translocation sites. Evidence has been offered that translocation can be an effective mitigation measure if done properly. BIO-11 requires verification that all desert tortoise impact avoidance, minimization, and compensation measures have been implemented. BIO-12 requires the acquisition and preservation of an appropriate acreage of desert tortoise habitat within the Colorado Desert Recovery Unit. Specifically, this would include a 5:1 replacement ratio for impacts to critical habitat in the Chuckwalla Desert Tortoise CHU, as well as a 1:1 replacement ratio for impacts to other tortoise habitat.

3. BIO-20 would address impacts relating to desert tortoise and other wildlife movement and connectivity.

4. BIO-28 provides an alternative way to satisfy the requirements of BIO-12, i.e., by providing appropriate funding to an approved in-lieu fee program rather than direct property acquisition by the project owner.

5. To address indirect impacts to desert tortoise, BIO-6, BIO-8 and BIO-28 (discussed above), as well as BIO-13, BIO-14 and BIO-29 should be implemented. Specifically, BIO-13 requires the implementation of a Raven Monitoring and Control Plan in conformance with applicable federal guidelines and payment of associated applicable fees; BIO-14 is discussed in the context of impacts to vegetation resources in PA/FEIS Section 4.17.4, *Summary of Mitigation Measures*: it entails implementing an approved Weed Management Plan.

Mojave fringe-toed lizard: Direct and indirect impacts of the proposed action on MFTL would be addressed somewhat through the implementation of BIO-20 and BIO-29.

1. BIO-20 (Sand Dune/Mojave Fringe-Toed Lizard Mitigation) would address potential impacts of habitat loss and direct impacts to Mojave fringe-toed lizard by requiring compensatory mitigation, which may include compensation lands purchased in fee or in easement at specified ratios. Security for the implementation of the mitigation measure, and the development of a Management Plan that reflects site-specific enhancement measures for the Mojave fringe-toed lizard habitat on the acquired compensation lands, would also be required.

2. The Project Construction Phasing Plan required in BIO-29 would address impacts to MFTL by requiring compensatory mitigation for the total Project Disturbance Area, including all lands disturbed in the construction and operation of the PSPP and all linear and ancillary facilities, as well as undeveloped areas inside the project's boundaries that no longer would provide viable long-term MFTL habitat.

Burrowing owl: Conditions of Certification BIO-18 and BIO-29 would address impacts to burrowing owls. BIO-29 is summarized above. Evidence indicates that implementation of these measures would adequately reduce potential impacts of the proposed action and alternatives to burrowing owls.

1. BIO-18 would require the Applicant to prepare and implement a Burrowing Owl Mitigation Plan that would include a description of suitable burrowing owl relocation/translocation sites, provide guidelines for creation or enhancement of at least two natural or artificial burrows per relocated owl, provide detailed methods and guidance for passive relocation of burrowing owls, and describe the proposed maintenance monitoring, reporting, and management of the relocated burrowing owls. BIO-18 also would require acquisition and enhancement of a minimum of 78 acres of off-site suitable nesting and foraging burrowing owl habitat to mitigate for displacement of at least four owls. This amount of compensation habitat expressly for burrowing owls would be supplemented by the compensation acreage required of the Applicant in connection with desert tortoise: the desert tortoise habitat acquisition also would provide substantial benefit to burrowing owls because the habitat requirements of these two species are quite similar in several key respects.

Golden eagle: A number of measures were identified to address impacts to golden eagle foraging habitats from the proposed action or alternatives, including Conditions of Certification BIO-8, BIO-12, BIO-14, BIO-16, BIO-22, and BIO-25. Of these, BIO-8 (Impact Avoidance and Minimization Measures), BIO-12 (Desert Tortoise Compensatory Mitigation) and BIO-14 (Weed Management Plan) are summarized above with respect to other wildlife resources and also would address impacts to golden eagle. The remaining recommended mitigation measures are summarized below. Evidence indicates that, with the incorporation of these mitigation measures, the incremental contribution of the proposed action or alternatives to golden eagle impacts would be addressed adequately.

1. BIO-16 would require an Avian Protection Plan to monitor the death and injury of birds; resulting data would be used to inform an adaptive management program intended to avoid and minimize project-related avian impacts. Consultation with BLM, CDFG and USFWS would be required.

2. BIO-22 would require a final Decommissioning and Reclamation Plan that would govern implementation of closure, decommissioning and reclamation activities consistent with BLM guidelines (43 CFR 3809.550 et seq.).

3. BIO-25 (Golden Eagle Inventory and Monitoring). This mitigation measure would require an annual inventory to be prepared during construction, collection of specified inventory data, protocol for determining unoccupied territory status, and a Monitoring and Adaptive Management Plan.

Migratory/special-status bird species: Several Conditions of Certification would address identified potential direct and indirect impacts to Le Conte's thrasher and other migratory or special-status bird species for the proposed action and alternatives, including the previously summarized BIO-8, BIO-12, BIO-15, BIO-16, BIO-20 and BIO-29, as well as BIO-15, BIO-21, BIO-23 and BIO-24. Evidence indicates that the implementation of these mitigation measures would adequately reduce potential direct and indirect impacts to migratory/special-status bird species.

1. BIO-15 would require appropriate pre-construction nest surveys.

2. BIO-21 would require mitigation for impacts to state waters, the implementation of which also would address impacts to Migratory/special-status bird species and their habitats.

3. BIO-23 and BIO-24 primarily would address impacts to groundwater-dependent vegetation; however, the implementation of these measures would also address impacts to Migratory/special-status bird species and their habitats.

Desert kit fox and American badger: Impacts to these species would be offset by implementation of the previously described Condition of Certification BIO-12, as well as by implementation of BIO-17. Evidence indicates that implementation of these mitigation measures would adequately reduce potential direct and indirect impacts to these species.

1. BIO-17 would require a qualified biologist to conduct pre-construction surveys for kit fox and badger dens concurrent with desert tortoise surveys (including areas within 250 feet of all project facilities, utility corridors and access roads).

Burro deer. Impacts to this species would be addressed by implementing BIO-21, which is summarized above.

Bats. Impacts to bats would be addressed through the implementation of BIO-12 and BIO-21, which would offset impacts caused by the project.

Additional impacts to wildlife resources: Various Conditions of Certification would address other impacts to wildlife resources identified above.

1. Noise-related impacts of the proposed action and alternatives on wildlife resources would be addressed by BIO-8 (Impact Avoidance and Minimization Measures), which is summarized above. This mitigation measure would minimize potential noise impacts by requiring the avoidance of loud construction activities (i.e., steam blowing and pile driving) that would result in noise levels over 65 dBA at potential wildlife breeding sites (such as dry desert wash woodland) between February 15 and April 15 (the height of the bird breeding season). With implementation of this measure, noise-related impacts from construction activities would be addressed adequately.

2. Disturbance to wildlife from lights would be addressed by previously-summarized BIO-8, which includes specifications that lighting atop the towers is shielded downward and turned off when not needed, and by VIS-3 (Temporary and Permanent Exterior Lighting). The implementation of these measures adequately would address potential impacts related to lighting and nocturnal collisions.

3. Risk of collision also would be addressed by BIO-16, which would require a determination of whether operation of the PSPP poses a collision risk for birds and adaptive management measures to address any such impacts.

4. Glint and glare-related impacts would be addressed by VIS-4, which would require the use of slatted fencing as the perimeter fencing. This not only would reduce impacts to motorists, but also would prevent glare exposure to wildlife on the ground within 20 meters of the site boundary. Implementation of this mitigation measure adequately would address related impacts to wildlife species.

5. Electrocution-related impacts to avian species would be addressed by BIO-8, which would require a “raptor-friendly” construction design for the proposed transmission lines, including use of conductor wire spacing greater than the wingspans of large birds to help prevent electrocution (pursuant to industry standards). Implementation of this measure adequately would address potential impacts related to large bird electrocution from the proposed action or alternatives.

6. Threats to wildlife species related to the proposed evaporation ponds would be addressed by BIO-26, which would require the installation of netting over the evaporation ponds to exclude access by birds and other wildlife, as well as a monitoring program to ensure the effectiveness of exclusion. Implementation of this measure adequately would address related concerns.

4.21.5 Residual Impacts after Mitigation Measures were Implemented

The proposed project would eliminate all habitat for wildlife within the project site. The PSPP would also directly and indirectly affect an extensive network of desert washes in the disturbance area, and would alter the hydrology of the site and surrounding area by re-routing these waterways through five engineered channels. Mitigating measures to avoid, minimize, or compensate for the loss would lessen the impacts to varying, but unquantified degrees, but would not completely offset those losses. Routes of wildlife movement along washes would be cut off, and wildlife movement from the mountainous southwest to the northeast would be severely curtailed due to perimeter fencing and the impacted washes. Wildlife trailing along the fence to find a suitable route would be subject to increased vulnerability to predation. Gaps in fencing, if not properly maintained, could trap desert tortoises, badgers, kit foxes, burro deer, or Nelson’s bighorn sheep, or allow access to I-10.

In addition to direct loss of habitat, the proposed project would fragment and degrade adjacent native wildlife communities, and could promote the spread of invasive non-native plants and increase the presence of desert tortoise predators such as ravens. These habitats provide foraging, cover, and/or breeding habitat for a variety of resident wildlife, including the state and federally-listed desert tortoise, American badger, desert kit fox, golden eagle, migratory birds, burrowing owl, Nelson’s bighorn sheep, burro deer, and MFTL.

Project-specific and cumulative residual impacts remaining after the implementation of recommended mitigation measures could be addressed only through a regional and coordinated effort aimed at preserving and enhancing large, intact expanses of wildlife habitat and linkages, including maintaining connections between DWMAs and other movement corridors. Ongoing collaborative efforts by federal and state agencies to develop a Desert Renewable Energy Conservation Plan and BLM’s Solar Energy Development Programmatic EIS offer an appropriate forum for such a regional mitigation approach. Appendix B of the RSA prepared by the CEC for this project describes additional DWMA management strategies that would offset residual effects on wildlife resources.

4.21.6 Unavoidable Adverse Impacts

Under the proposed action and alternatives for the project site, native wildlife communities would be lost on habitat totaling 4,024 acres (proposed action), 3,097 acres (Reconfigured Alternative 1), 4,366 acres (Reconfigured Alternative, Option 1), 4,330 acres (Reconfigured Alternative 2, Option 2), and 2,242 acres (Reduced Acreage Alternative). Unquantified indirect losses to wildlife habitats and communities would occur adjacent and downwind from the PSPP, including habitat for desert tortoise, MFTL, golden eagle foraging, American badger, burrowing owl, other special status and migratory birds, and kit fox, and would degrade and fragment adjacent wildlife communities, decreasing regional connectivity and dispersal of resident wildlife. Additionally, the proposed project is likely to promote the spread of invasive non-native plants and to subsidize desert tortoise predators. Construction, operation or maintenance activities could result in some death, harm, harassment, removal, or capture of wildlife, including eggs and nests and so constitute unavoidable loss of individual animals.

Impacts to most wildlife resources could be addressed adequately through the implementation of recommended mitigation measures. However, impacts of the proposed action to the sand transport corridor, sand dune habitat, washes in the project disturbance area, and dune-dependent species would remain quite serious if the proposed project were developed as proposed.

4.22 Irreversible and Irretrievable Commitment of Resources

The National Environmental Policy Act (NEPA) requires an analysis of the significant irreversible effects of a proposed action. Resources irreversibly or irretrievably committed to a proposed action are those used on a long-term or permanent basis. This includes the use of nonrenewable resources such as metal, wood, fuel, paper, and other natural or cultural resources. These resources are considered nonretrievable in that they would be used for a proposed action when they could have been conserved or used for other purposes. Another impact that falls under the category of irreversible and irretrievable commitment of resources is the unavoidable destruction of natural resources that could limit the range of potential uses of that particular environment.

The project would irretrievably commit resources over the 30-40 year life of the project. After 30-40 years, the project is planned to be decommissioned and the land returned to its pre-project state. This would indicate that potentially some of the resources on site could be retrieved. However, 30-40 years is a long time and many variables could affect the project over that period. In addition, it is debatable as to how well the site can recover to its pre-project state. Open desert lands and sensitive desert habitats can take a long time to recover from disturbances such as development. The project site is not currently entirely undisturbed due to the presence of off-highway vehicle use.

The project is a renewable energy project intended to generate solar energy to reduce reliance on fossil fuels. Over the 30-40 year life of the project, this renewable energy project would contribute incrementally to the reduction in demand for fossil fuel use for electricity-generating purposes. Therefore, this incremental reduction in expending fossil fuels would be a positive effect of the commitment of nonrenewable resources to the project.

4.23 Short-term vs. Long-term Productivity of the Environment

The short-term uses of the environment as a result of the PSPP and its built alternatives include those typically found with solar energy development. Short-term impacts associated with construction activities described elsewhere in Chapter 4, *Environmental Consequences*, include effects to the natural environment, cultural resources, and recreation resources. These can be compared to the long-term benefits of the proposed action and its built alternatives all of which would provide for the production of clean, renewable energy consistent with Federal and State goals to increase production of renewable energy to help reduce dependence on fossil fuels.

As discussed earlier in Section 4.22, *Irreversible and Irretrievable Commitment of Resources*, the proposed action and alternative could permanently damage sensitive desert habitats, which in turn could adversely affect the long-term productivity of the area. However, these built alternatives would all also provide a long-term benefit by providing electric power without any increase in the use of non-renewable resources such as fossil fuels, which would result in a benefit to air quality and a reduction in carbon-based emissions.

CHAPTER 5
Consultation, Coordination and Public Involvement

5.1 Interrelationships

BLM's authority for the proposed action includes Federal Land Policy and Management Act (FLPMA) of 1976 [43 United States Code (U.S.C.) 1701 et seq.], Section 211 of the Energy Policy Act of 2005 (119 Stat. 594, 600), and BLM's Solar Energy Development Policy of April 4, 2007. The FLPMA authorizes BLM to issue right-of-way (ROW) grants for renewable energy projects. Section 211 of the Energy Policy Act of 2005 states that the Secretary of the Interior should seek to have approved a minimum of 10,000 megawatts of renewable energy generating capacity on public lands by 2015.

The BLM coordinates its fire management activities with the actions of related federal and state agencies responsible for fire management. The Federal Wildland Fire Policy is a collaborative effort that includes the BLM, USFS, National Park Service (NPS), USFWS, Bureau of Indian Affairs, the National Biological Service, and state wildlife management organizations. The collaborative effort has formulated and standardized the guiding principles and priorities of wildland fire management. The National Fire Plan is a collaborative interagency effort to apply the Federal Wildland Policy to all Federal Land Management Agencies and partners in state forestry or lands departments. Operational collaboration between the BLM, USFS, NPS, and USFWS is included in the Interagency Standards for Fire and Fire Aviation Operations 2003. This federally approved document addresses fire management, wildfire suppression, fuels management and prescribed fire safety, interagency coordination and cooperation, qualifications and training, objectives, performance standards, and fire management program administration.

5.1.1 Department of Defense

BLM coordinates with Department of Defense prior to approval of rights-of-way for renewable energy, utility, and communication facilities to ensure that these facilities would not interfere with military training routes. A letter received from a Department of Defense representative indicates that the project will pose no conflicts for military over flights (see, AFC Appendix K).

5.1.2 U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers (USACE) has jurisdiction to protect the aquatic ecosystem, including water quality and wetland resources under Section 404 of the Clean Water Act. Under that authority, USACE regulates the discharge of dredged or fill material into waters of the United States, including wetlands, by reviewing proposals to determine whether they may impact such resources and, thereby, are subject to Section 404's permit requirement. The USACE may grant authorization under either an individual permit or a nationwide permit to address operations that may affect the ephemeral washes on the project site. Throughout the PA/DEIS process, the BLM has provided information to the USACE to assist the agency in making a determination regarding its jurisdiction and need for a Section 404 permit. The evaluation for jurisdictional waters that was performed on the site determined that the ephemeral drainages did not to conform to the requirements for designation as jurisdictional waters of the U.S., and discussions with the USACOE indicated that the drainages would not be considered jurisdictional waters of the U.S.

5.1.3 California Energy Commission

The Energy Commission has exclusive authority to certify the construction, modification, and operation of thermal electric power plants 50 megawatts (MW) or larger. Energy Commission certification is in lieu of any permit required by state, regional or local agencies and by federal agencies to the extent permitted by federal law (Cal. Pub. Res. Code §25500). The Energy Commission must review power plant applications for certification to assess potential environmental impacts including potential impacts to public health and safety, potential measures to mitigate those impacts (Pub. Res. Code §25519), and compliance with applicable governmental laws or standards (Pub. Res. Code §25523 (d)). Energy Commission staff analyses were prepared in accordance with Public Resources Code section 25500 et seq.; Title 20, California Code of Regulations, section 1701 et seq.; and CEQA (Pub. Res. Code § 21000 et seq.; 14 Cal. Code Regs. §15000 et seq.). These analyses include the March 2010 Staff Assessment and Draft Environmental Impact Statement prepared jointly with the BLM; September 2010 Revised Staff Assessment Parts 1 and 2; November 2010 Presiding Member's Proposed Decision, including errata; and December 2010 Commission Decision.

5.1.4 California Department of Fish and Game

The California Department of Fish and Game (CDFG) protects fish and aquatic habitats within the State through regulation of modifications to streambeds, under Section 1602 of the Fish and Game Code. CDFG regulates activities that could divert, obstruct or change the natural flow or the bed, channel, or bank of any river, stream, or lake in California that the agency has designated as one that is used by or provides benefit to a fish or wildlife resource. The agency also evaluates potential impacts to vegetation and wildlife resulting from disturbances to waterways during its permitting process. The BLM and the Applicant have provided information to CDFG to assist the agency in its determination of the impacts to streambeds, and identification of permit and mitigation requirements. The Applicant filed a Streambed Alteration Agreement with CDFG in November 2009. Compliance with the requirements of Streambed Alteration Agreement provisions is included as a recommended Condition of Certification/Mitigation Measure (see, e.g., Section 4.19.4, *Summary of Mitigation Measures*, and SOIL&WATER-12 in Appendix B).

CDFG also has the authority to regulate potential impacts to species that are protected under the California Endangered Species Act (CESA) (Fish and Game Code §2050 et seq.). Accordingly, the Applicant filed an application for a California Endangered Species Act Section 2081 (B) Incidental Take Permit and Revised Desert Tortoise Technical Report in January 2010. Evaluation of compliance with the requirements of incidental take authorization would be evaluated as recommended in Condition of Certification/Mitigation Measure BIO-11 (see Section 4.21.4, *Summary of Mitigation Measures*).

5.1.5 South Coast Air Quality Management District

The project site is located in the Mojave Desert Air Basin[1] and is under the jurisdiction of the South Coast Air Quality Management District (District). The District issued a Preliminary Determination of Compliance (PDOC) for the project on March 5, 2010; provided public notice with a 30 day comment period that began on April 15, 2010, and then provided a Revised Determination of Compliance (RDOC) on October 21, 2010. A 30-day public review period also was provided for the RDOC. The District issued a Final Determination of Compliance (FDOC) on December 1, 2010, after resolving agency comments and issues raised by the public. Compliance with District rules and regulations would be accomplished via the implementation of Conditions of Certification/Mitigation Measures AQ-1 through and including AQ-51 (see Section 4.2.4, *Summary of Mitigation Measures*.

5.1.6 California Department of Transportation

The California Department of Transportation (Caltrans) has jurisdiction over encroachments to Caltrans facilities and related easements and rights-of way. Caltrans approval would be required prior to the installation of a locked gate in the I-10 right-of-way fence, for maintenance of the I-10 fence and gate, for the installation of desert tortoise exclusion fencing along I-10 within the Caltran's right-of-way, and potentially also for the transport of hazardous materials or other deliveries. Compliance with Caltrans requirements would be required by the implementation of recommended Conditions of Certification/Mitigation Measures (see, e.g., BIO-9 [desert tortoise fencing], TRANS-1 [roadway use], TRANS-2 [hazardous materials transport], TRANS-4 [over-sized load permits]).

5.1.7 Riverside County

The County of Riverside has jurisdiction to issue building permits to the project. Building permits issued by the County are ministerial. The County also has jurisdiction to issue discretionary approvals for any easements, rights-of-way and or encroachment permits where County facilities are concerned.

1 The Mojave Desert Air Basin lies inland southeast of the San Joaquin Valley Air Basin, and northeast of the South Coast Air Basin. The desert portions of Kern, San Bernardino, Riverside, and Los Angeles counties are within its boundaries.

5.2 Description of Consultation Processes for ESA Section 7, NHPA Section 106, and Indian Tribes

5.2.1 U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) has jurisdiction over threatened and endangered species listed under the Endangered Species Act (ESA) (16 U.S.C. §1531 et seq.). Formal consultation with the USFWS under Section 7 of the ESA is required for any federal action that may adversely affect a federally-listed species. This consultation will be initiated through the preparation and submittal of a Biological Assessment (BA), which would describe the proposed action to the USFWS. Following review of the BA, the USFWS would be expected to issue a Biological Opinion (BO) that specifies mitigation measures, which must be implemented for any protected species.

5.2.2 Tribal Consultation and Section 106 Compliance

The BLM consults with Indian tribes on a government-to-government level in accordance with several authorities including NEPA, Section 106 of the National Historic Preservation Act of 1966 (NHPA) (16 U.S.C. 470), as amended; the American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996), as amended; and Executive Order 13007 (May 24, 1996), concerning Indian Sacred Sites. For the PSPP, in coordination and cooperation with the CEC, BLM expanded its consultation to include Native American groups not recognized by the federal government.

Adverse effects that the PSPP could have on cultural resources will be been resolved through compliance with the terms of a Programmatic Agreement (PA) reached on September 21, 2010, pursuant to NHPA Section 106 (16 USC Section 470; 36 CFR Section 800.14) in consultation with the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, Indian tribes, and other interested parties. Implementation of the terms of the Programmatic Agreement is identified as a recommended mitigation measure (see Section 4.4, *Cultural Resources*. The PA is provided in Appendix H, *Programmatic Agreement*.

In accordance with 36 CFR Section 800.14(b), PAs are used for the resolution of adverse effects for complex project situations and when effects on historic properties, resources eligible for or listed in the National Register of Historic Places (NRHP), cannot be fully determined prior to approval of an undertaking. For the PSPP, the BLM prepared a PA in consultation with the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, Indian tribes, and other interested parties. The PA would govern the conclusion of the identification and evaluation of historic properties (eligible for the NRHP), as well as the resolution of any adverse effects that may result from the proposed action or alternative actions.

Treatment plans regarding historic properties that cannot be avoided by project construction will be developed in consultation with stakeholders as stipulated in the PA. Analysis of impacts in this document and implementation of the terms of the PA would provide evidence of BLM's compliance with NHPA Section 106 and NEPA.

The BLM initiated consultation in the early stages of project planning by certified letter on July 1, 2009. Tribes were invited to a general scoping meeting and project site visit held on January 25, 2010. On February 10, 2010, the BLM Palm Springs/South Coast Field Office Manager and Archaeologist met with the Fort Yuma Quechan Tribal Council. They provided information on several solar energy projects, including the project, and answered questions. Letters requesting consultation among tribes, the Energy Commission, the Applicant, the State Historic Preservation Officer, and the Advisory Council on Historic Preservation to develop a PA for the PSPP were mailed out to the below-listed tribes on March 3, 2010.

An initial meeting regarding the PA was held on April 23, 2010 in Palm Desert, to which all interested tribes were invited. They also were notified of a workshop on the PSPP SA/DEIS, held on April 29, 2010, in the BLM Palm Springs/South Coast Field Office, where, the BLM also held an informational meeting for the tribes on May 25, 2010. The BLM issued a draft PA for the PSPP on June 17, 2010, allowing 30 days for public and Native American comment. Appendix I of the draft PA included a log-to-date of BLM's consultation with specific individuals and groups.

Most recently, BLM held a meeting in Palm Desert on August 11, 2010, to review and discuss the revised draft PA; some Native Americans were in attendance. At this meeting, representatives of two organizations (California's for Renewable Energy and La Cuna de Aztlan Sacred Sites Protection Circle) expressed concern over geoglyphs and other sacred sites and ancient trails that solar development in the Chuckwalla Valley and on Palo Verde Mesa could affect. As a result of consultation efforts, Native Americans identified no additional cultural resources relative to those analyzed in the SA/DEIS that could be affected by the project.

Thirteen tribes or related entities were identified and invited to consult on the project, including:

1. Ramona Band of Mission Indians
2. Torres-Martinez Desert Cahuilla Indians
3. Augustine Band of Cahuilla Mission Indians
4. Agua Caliente Band of Cahuilla Indians THPO
5. Morongo Band of Mission Indians
6. Twentynine Palms Band of Mission Indians
7. Fort Yuma Quechan Indian Tribe
8. Colorado River Indian Tribes
9. Chemehuevi Reservation
10. Colorado River Reservation
11. San Manuel Band of Mission Indians
12. Quechan Indian Tribe
13. Fort Mojave Indian Tribe

5.3 Implementation, Monitoring and Enforcement

BLM will continue to involve and collaborate with the public during implementation of this project. Opportunities to become involved during implementation and monitoring could include development of partnerships and community-based citizen working groups. BLM invites citizens and user groups within the project area to become actively involved in implementation, monitoring, and enforcement of decisions. BLM and citizens may collaboratively develop site-specific goals and objectives that mutually benefit public land resources, local communities, and the people who live, work, or play on the public lands.

BLM would monitor activities throughout the life of the project to ensure that decisions are implemented in accordance with the approved ROD and ROW grant. Monitoring would be conducted to determine whether decisions, BMPs and approved mitigation are achieving the desired effects. Effectiveness monitoring would provide an empirical data base on impacts of decisions and effectiveness of mitigation. Effectiveness monitoring also would be useful for improving analytical procedures for future impact analyses and for designing or improving mitigation and enhancement measures.

5.4 Scoping

The BLM solicited internal and external input on the issues, impacts, and potential alternatives to be addressed in this EIS for the project, as well as the extent to which those issues and impacts would be analyzed in the document. This process is called “scoping” (40 CFR 1501.7). Internal input was provided by BLM and cooperating agency staff, as an interdisciplinary process, to help define issues, alternatives, and data needs. External scoping involved notification and opportunities for feedback from other agencies, organizations, tribes, local governments, and the public. Formal public scoping begins following publication of a Notice of Intent (NOI) to prepare an environmental impact statement for a proposed action.

The Notice of Intent to prepare an environmental impact statement for the project was published in the *Federal Register* on November 23, 2009 (74 Fed. Reg. 61169). Publication of the NOI began a 30-day public comment period, which ended on December 23, 2009. BLM provided a website with information about the project that also described the various methods of providing input on the project, including an email address where comments could be sent electronically (CAPSSolarPalen@blm.gov). Twenty comment letters were received within the comment period.

On December 11, 2009, the BLM held a Scoping Meeting at the University of California-Riverside, Palm Desert Campus. Seventy-five attendees were documented by signing in on a voluntary sign-in sheet.

A draft scoping report was released for public review and comment in January 2010. (See Appendix D, *Results of Scoping*). Three general categories of comments were received: i) issues or concerns that could be addressed by effects analysis; ii) issues or concerns that could result in an alternative and/or a better description or qualification of the alternatives; and iii) issues or concerns outside the scope of the EIS. Issues analyzed in this PA/FEIS are summarized in Section 1.5, *Issues Analyzed in this EIS*.

The BLM also gave a presentation at and participated in the CEC’s January 25, 2010, Informational Hearing in Blythe, California, and Site Visit for the project. In addition to property owners and persons on the general project mail-out list, notification was provided to local, state and federal public interest and regulatory organizations with an expressed or anticipated interest in this project. Also, elected and certain appointed officials were similarly notified of the hearing and site visit.

5.5 Public Comment Process

5.5.1 Introduction

The CEC and the BLM distributed the joint Staff Assessment/Draft Environmental Impact Statement (SA/DEIS) for the project for public and agency review and comment on March 18, 2010. The comment period ended on July 1, 2010. Eight comment letters were received. Table 5-1 lists all individuals, agencies and organizations that provided written comments on the SA/DEIS.

TABLE 5-1
COMMENTERS ON THE PALEN SOLAR POWER PROJECT
DRAFT ENVIRONMENTAL IMPACT STATEMENT

Comment Letter	Commenter	Letter Available in Appendix K, Page
1	Joshua Tree National Park	K-3
2	Brendan Hughes, Individual	K-11
3	Center for Biological Diversity	K-12
4	California/Nevada Desert Energy Committee of the Sierra Club (Sierra Club)	K-46
5	The Wilderness Society and the Natural Resources Defense Council (NRDC)	K-60
6	California Unions for Renewable Energy (CURE)	K-73
7	Western Watersheds Project	K-334
8	Metropolitan Water District of Southern California	K-346

Upon receipt, each comment letter/e-mail was assigned a unique number. Individual comments within each letter/e-mail were numbered individually as well. For example, comment 1-01 is the first substantive comment in Comment Letter 1. “1” represents the commenter; the “01” refers to the first comment in that letter. Comment, so delineated, are provided in Appendix K, *Agency and Public Comments on SA/DEIS*.

Section 5.5.2, *Common Responses,* provides common (consolidated) responses for topics regarding which a number of similar or related comments were received. In turn, Section 5.5.3, *Individual Responses,* provides responses to all individual comments.

5.5.2 Common Responses

A number of the comments received on the SA/ SA/DEIS discussed the same issues or environmental concerns. Rather than repeat responses, the Common Responses identified here and set forth below were prepared:

Common Response 5.5.2.1: Consistency of the Proposed Action with the CDCA Plan, NECO Plan and other Plans

Common Response 5.5.2.2: Consistency of the PA/FEIS with NEPA and FLPMA

Common Response 5.5.2.3: Adequacy of Data Relied Upon

Common Response 5.5.2.4: Purpose and Need

Common Response 5.5.2.5: Alternatives

Common Response 5.5.2.6: Supplementation / Recirculation

Common Response 5.5.2.7: Biological Resources

Common Response 5.5.2.9: Air Quality

Common Response 5.5.2.8: Climate Change / Greenhouse Gases

Common Response 5.5.2.10: Water Resources

Common Response 5.5.2.11: Cultural Resources

Common Response 5.5.2.12: Public Health and Safety

Each of the Common Response sections lists the Comment Letter and specific Comment Number for each comment that pertains to the issue or environmental concern that the Common Response addresses.

5.5.2.1 Consistency of the Proposed Action with the CDCA Plan, NECO Plan and other Plans

Commenters and Comments Addressed

Commenter	Comments
Center for Biological Diversity	3-001, 3-012, 3-016, 3-025, 3-026, 3-025, 3-027, 3-028, 3-029, 3-032, 3-033, 3-034, 3-053
California/Nevada Desert Energy Committee of the Sierra Club (Sierra Club)	4-18, 4-24
The Wilderness Society and the Natural Resources Defense Council (NRDC)	5-01, 5-02, 5-03
California Unions for Renewable Energy (CURE)	6-002, 6-026, 6-117

Summary of Issues Raised

1. ***Relationship with Master Plans and Policies:*** Comments question the relationship of the proposed action to the goals and policies of the BLM's master planning documents (e.g., the CDCA Plan and NECO Plan)

2. ***Adequacy of Analysis and Land Use Considerations:*** Comments question the adequacy of analysis, including analysis of resource impacts.

Response

A land use plan is a set of decisions that establish management direction for land within a BLM administrative area, as prescribed under the planning provisions of Federal Land Policy and Management Act (FLPMA); it is an assimilation of land-use-plan-level decisions developed through the planning process outlined in 43 CFR Part 1600, regardless of the scale at which the decisions were developed. BLM land use plans, including the California Desert Conservation Area Plan (CDCA Plan) and Northern and Eastern Colorado Desert Coordinated Management Plan (NECO Plan), are designed to provide guidance for future management actions and development of subsequent, more detailed and limited-scope plans for specific resources and uses.

Long-range plans that cover large geographic areas such as the California Desert provide a framework for decision-making; they are "living" documents with the flexibility to address changing conditions over time as more detailed land use information is provided through amendments, special area plans, or other more focused planning documents. See., e.g., James B. Ruch, California State Director Bureau of Land Management, "Dear Reader" Letter [Introducing the CDCA Plan, as amended] (March 1999) (The CDCA Plan "is a statement of management guidance designed to be useful today and it contains an amendment process so that it is adaptable to tomorrow.")

California Desert Conservation Area Plan (CDCA Plan)

The CDCA Plan is a comprehensive, long-range plan that was adopted in 1980; it since has been amended many times. As described in PA/FEIS Table 1-1, the CDCA is a 25-million-acre area that contains over 12 million acres of BLM-administered public lands within the area known as the California Desert. As described by BLM's California State Land Director in his letter presenting the CDCA Plan:

> The California Desert Plan encompasses a tremendous area and many different resources and uses. The decisions in the Plan are major and important, but they are only general guides to site-specific actions. The job ahead of us now involves three tasks: 1) Site-specific plans, such as grazing allotment management plans or vehicle route designation; 2) On-the-ground actions, such as granting mineral leases, developing water sources for wildlife, building fences for livestock pastures or for protecting petroglyphs; and 3) Keeping people informed of and involved in putting the Plan to work on the ground, and in changing the Plan to meet future needs.

The CDCA Plan initially was prepared and continues to provide guidance concerning the use of the California desert public land holdings while balancing other public needs and protecting resources. More specifically, it establishes goals and specific actions for the management, use, development, and protection of the resources and public lands within the CDCA. It is based on the concepts of multiple use, sustained yield, and maintenance of environmental quality. The CDCA Plan's goals and actions for each resource are established in its 12 elements, each of which provides both a desert-wide perspective of the planning decisions for one major resource or issue of public concern and a more specific interpretation of multiple-use class guidelines for a given resource and its associated activities.

The Multiple Use Class (MUC) Guidelines in Table 1 of the CDCA Plan state that solar electrical generation facilities may be allowed in an MUC Moderate (M) area after NEPA requirements are met and the CDCA Plan is properly amended (see also PA/FEIS Table 3.9-2, *Multiple-Use Class-M Land Use and Resource Management Guidelines*). The proposed action, if approved, would amend the CDCA Plan following the process anticipated in the CDCA Plan to identify the site as suitable for the proposed solar energy use. The CDCA Plan amendment would only apply to the

BLM-administered land being evaluated for the project. Accordingly, the proposed CDCA Plan amendment and the overall amendment process would be consistent with the CDCA Plan.

The CDCA Plan anticipated that renewable power generation facilities would be proposed in the California Desert. Accordingly, it made allowances for the review of such applications, including a provision that all proposed applications “associated with power generation or transmission not identified in the [CDCA] Plan will be considered through the Plan Amendment process.” (See also, PA/FEIS Section 1.3.2, *Land Use Plan Conformance and Consistency*). The intention of this provision was to ensure that the BLM would take a planning view of all of the renewable energy applications proposed and that such projects would require an amendment to the CDCA to maintain consistency throughout the plan. Amendments to the CDCA Plan can be site-specific or global, depending on the nature of the amendment.

Concerns from the public regarding the multiple use mission of the BLM and the loss of this large section of public land to a single use are addressed in the strict enforcement of mitigation measures for habitat and other measures that ensure a one-to-one replacement of lands lost to a single use. Implementation of these mitigation measures similarly address concerns that the current process is a piecemeal approach inconsistent with the goals and purposes of the CDCA Plan, as amended by the NECO Plan. Regarding claims that the range of alternatives analyzed failed to adhere to the CDCA Plan requirement, particularly when viewed in light of NEPA, see Common Response 5.5.2.5.

CDCA Plan Amendment Process

The BLM received a number of comments expressing concerns about the scope, nature and specifics of the proposed amendment to the CDCA Plan. The proposed CDCA Plan amendment is described in PA/FEIS Section 1.3.2, *Land Use Plan Conformance and Consistency*. As noted above, amendments to the CDCA Plan can be site-specific or global, depending on the nature of the amendment.

The construction and operation of a solar energy generating project on the proposed site would require the BLM to amend the CDCA Plan specifically to identify the site as suitable for such use; for the project, the requisite amendment would identify the proposed site as suitable for the proposed action, i.e., the project. The CDCA Plan amendment for this project would not result in changes to the Class M (Moderate Use) land use designation; instead, it would be site-specific, limited to the allowance of a solar energy use on the proposed site. Nonetheless, the PA/FEIS acknowledges an adverse cumulative impact on approximately one million acres of desert lands that are proposed for possible solar and wind energy development in the southern California Desert (see, e.g., Section 4.8.3, *Discussion of Cumulative Impacts [relating to Multiple Use Classes]*). The proposed CDCA Plan amendment for the project would be limited by the accompanying ROW grant. The CDCA Plan amendment, if adopted, would not result in any change in land use designations or authorized uses of land anywhere else in the CDCA.

Northern and Eastern Colorado Desert Coordinated Management Plan (NECO Plan)

The NECO Plan amended the CDCA Plan in 2002 to make it compatible with desert tortoise conservation and recovery efforts. As described in PA/FEIS Table 1-1, *General Laws,* *Ordinances, Regulations and Standards (LORS)*, the NECO Plan is a landscape-scale planning effort that covers most of the California portion of the Sonoran Desert ecosystem, including over five million acres and two desert tortoise recovery units. No NECO Plan amendments are recommended or proposed as part of the proposed action or alternatives.

California Desert Renewable Energy Conservation Plan (DRECP)

The DRECP is a Natural Community Conservation Plan that will help provide for effective protection and conservation of desert ecosystems while allowing for the appropriate development of renewable energy projects. The DRECP will provide long-term endangered species permit assurances, facilitate the California Renewables Portfolio Standard, and provide a process for conservation funding to implement the DRECP. It is anticipated that the DRECP also would serve as the basis for one or more habitat conservation plans (HCPs) under the Federal Endangered Species Act (FESA) and provide biological information necessary for consultation under FESA Section 7.

The DRECP is intended to advance federal and State conservation goals in the California desert region while facilitating the timely permitting of renewable energy projects under applicable federal and State laws. However, because the DRECP process remains underway, it does not govern the BLM's consideration of the proposed action and alternatives.

Other Land Use Planning Areas

The PA/FEIS considered impacts of the proposed action at an appropriate geographic scale; recognizing that existing land use plans apply in geographic contexts of various sizes. Analyzing impacts within too large an area tends to dilute the consequence of the impact; similarly, analyzing impacts within too small an area could tend to magnify them. In either instance, the impacts of the proposed action would be inaccurately characterized, which would lead to uninformed decision-making.

For each issue area considered in the PA/FEIS, the BLM analyzed the direct, indirect and cumulative impacts of the proposed action and alternatives at the land use planning scales that provide the most meaningful context (see PA/FEIS Ch. 4, *Environmental Consequences*). In some cases the proper geographic scope of analysis (i.e., the area within which analysis neither overstates nor understates impacts) consists of the CDCA planning area; in other cases, it is the Mojave Desert Air Basin, eastern Riverside County, along the I 10 corridor, or elsewhere.

Solar PEIS

The BLM generally prefers to develop programmatic NEPA documentation and, thereafter, to use it as a basis for site-specific projects. When final, the Programmatic Environmental Impact Statement to Develop and Implement Agency-Specific Programs for Solar Energy Development (Solar PEIS) will serve this function. However, the Solar PEIS remains in draft form. Because it has not been fully vetted by the requisite and appropriate agency and public review processes, and has not been approved as a formal, final decision by the BLM through the issuance of a Record of Decision, the draft Solar PEIS bears on the BLM's consideration of the project only as a reasonably foreseeable probable future aspect of the cumulative scenario.

Because the Solar PEIS is under development, it, and any decisions the BLM ultimately makes based on its analysis, will not govern BLM's decision-making efforts for the project. The BLM has a responsibility to perform a timely environmental review in response to individual applications. For this reason, the BLM will consider the project pursuant to FLPMA, NEPA, and applicable planning documents, in accordance with the BLM's existing Solar Energy Development Policy. Nonetheless, additional information about the Solar PEIS is provided below.

In response to direction from Congress under Title II, Section 211 of the Energy Policy Act of 2005, as well as Executive Order 13212, Actions to Expedite Energy-Related Projects, the BLM and the DOE are collaborating to prepare the Solar PEIS pursuant to NEPA and CEQ regulations. The draft Solar PEIS evaluates utility-scale solar energy development in a six-state area, including that portion of the CDCA that is open to solar energy development in accordance with the provisions of the CDCA Plan. The proposed planning area for the Solar PEIS does not include lands within the CDCA that have special designations, such as National Monuments, Wilderness Areas, Wilderness Study Areas, Wild and Scenic Rivers, National Historic and Scenic Trails, Areas of Critical Environmental Concern, or other special management areas that are inappropriate for or inconsistent with extensive, surface-disturbing uses. The proposed planning area for the Solar PEIS also does not include lands within the National Landscape Conservation System.

A Notice of Intent to Prepare the Solar PEIS was published in the Federal Register on May 29, 2008. The Draft Solar PEIS was published, and the related 90-day comment period was initiated, on December 17, 2010. Public meetings are scheduled in February and March 2010. The first such meeting was held in Washington, DC on February 2, 2011; the last in the series of meetings is scheduled to be held in Salt Lake City, Utah on March 10, 2011. The BLM will consider all comments on the Solar PEIS that are received or postmarked by March 17, 2011. Thereafter, the BLM will evaluate the draft Solar PEIS in light of comments received, will develop responses to those comments, and will determine whether to approve, deny or modify the proposal. The schedule to complete the Final Solar PEIS or adopt the ROD is not yet known (Solar PEIS, 2011).

5.5.2.2 Consistency of the PA/FEIS with NEPA and FLPMA

Commenters and Comments Addressed

Commenter	Comments
Center for Biological Diversity	3-006, 3-008, 3-025, 3-026, 3-027, 3-030, 3-032, 3-033, 3-034, 3-035, 3-037, 3-050, 3-053, 3-071, 3-086, 3-087, 3-088
California/Nevada Desert Energy Committee of the Sierra Club (Sierra Club)	4-16, 4-17, 4-18, 4-20, 4-23
The Wilderness Society and the Natural Resources Defense Council (NRDC)	5-27, 5-28, 5-31
California Unions for Renewable Energy (CURE)	6-001, 6-002, 6-003, 6-009, 6-016, 6-017, 6-020, 6-026, 6-028, 6-029, 6-030, 6-031, 6-032, 6-033, 6-117, 6-167
Western Watersheds Project	7-07

Summary of Issues Raised

1. ***Consistency with NEPA:*** Several comments question whether the environmental review process for the proposed action complies with NEPA requirements, including about segmentation, the scope of analysis, the identification of impacts (including cumulative impacts), the identification of adequate mitigation measures, and other requirements of NEPA.

2. ***Compliance with FLPMA:*** Several comments question whether the proposed action is consistent with the mandates of FLPMA.

Response

Consistency with NEPA

In an EIS, NEPA requires the BLM to take a "hard look" at the impacts of the proposed action and alternatives. This means that the effects analysis provides a level of detail that is sufficient to support reasoned conclusions by comparing the amount and the degree of change (impact) caused by the proposed action and alternatives (40 CFR 1502.1). As explained in Section 6.8.1.2 of the BLM's NEPA Handbook H-1790-1, "A "hard look" is a reasoned analysis containing quantitative or detailed qualitative information."

Public Participation. The Council on Environmental Quality (CEQ) regulations require that agencies "make diligent efforts to involve the public in preparing and implementing their NEPA procedures" (40 CFR 1506.6(a)). There are a wide variety of ways to engage the public in the NEPA process. During preparation of the environmental analysis for the project, the BLM and CEC invited public participation in the following ways:

- Through a website set up specifically to keep interested parties apprised of the project; and by
- Holding noticed public workshops on December 9, 2009, and on January 7, April 28 and 29, and May 7, 2010;
- Holding a public scoping meeting on December 11, 2009, at the University of California-Riverside, Palm Desert Campus;
- Holding an Informational Hearing and Site Visit for project, which included a joint presentation by the BLM and the Energy Commission, on January 25, 2010;
- Holding resource-specific workshops, including the April 16, 2010, Biological Workshop;
- Mailing information and inviting participation of tribes and others interested in potential impacts of the proposed action and alternatives on cultural resources (see PA/FEIS Section 5.2.2, *Tribal Consultation and Section 106 Compliance*);
- Circulation of the SA/DEIS to numerous State and local libraries for public comment; such libraries include the Energy Commission's Library in Sacramento and the California State Library in Sacramento; public libraries in Eureka, Fresno, Los Angeles, San Diego, and San Francisco; and local libraries in the vicinity of the project, including the Riverside Main Library, Palo Verde Valley District Library, Lake Tamarisk Library, Coachella Branch Library, and Cathedral City Branch Library;

- Circulation of the AFC to all state and local agencies that would have had permitting responsibilities except for the exclusive siting authority of the Energy Commission (members of the public could review that document at agency offices);
- Federal Register notices on November 23, 2009 (74 FR 61169-02) and April 7, 2010 (75 FR 17765-02). An additional Federal Register notice was published for the PSPP by the Environmental Protection Agency on April 2, 2010 (75 FR 16786-01).
- These responses to comments.

Further, members of the public had opportunities to review and comment on aspects of the project that have been developed since publication of the DA/DEIS, including the addition of evaporation ponds and an on-site concrete batch plant. See, e.g., the CEC's September 2010 Revised Staff Assessment and December 20210 Commission Decision. In addition, receipt of comments about these elements as part of the BLM's post-SA/DEIS environmental review process indicates that interested parties availed themselves of the opportunities presented.

Moreover, the public is being given an additional opportunity to review and comment on the environmental review following publication of the PA/FEIS. As indicated in the Dear Reader letter accompanying the issuance of the PA/FEIS, the BLM will accept comments for a 30-day period after the PA/FEIS notice is published in the Federal Register to allow the public and agencies additional time to consider and provide comments on the PA/FEIS. Comments received during this time will be reviewed, analyzed and responded to if necessary in the Record of Decision (ROD).

Scope of Analysis/Segmentation. Segmentation can occur under NEPA when an action is too narrowly defined or broken down into small parts in order to minimize the significance of potential impacts. The proper scope of environmental review of an action considers connected, cumulative and similar actions. The PA/FEIS for the project considers these elements, resulting in an adequate analytical scope.

Connected actions, including Southern California Edison's proposed Red Bluff Substation Project are described in PA/FEIS Section 2.3, *Connected Actions*. These closely-related actions are not part of the proposed action (e.g., they are not proposed by the PSPP Applicant and do not in all cases require BLM approval). However, these connected actions are discussed and analyzed in the PA/FEIS. See, e.g., PA/FEIS Section 4.1.7, *Incorporation of the Analysis of the Red Bluff Substation Project by Reference*. The anticipated development of these components was identified in the SA/DEIS (see, e.g., March 2010 Executive Summary, p. 4). However, final locations and other details were not available at that time (see, e.g., SA/DEIS § B.1.4.2, "Although the route has not been finalized, the gen-tie line is expected to proceed. . . ."). This PA/FEIS provides further detail in relation to the information previously known with additional information developed since publication of the SA/DEIS.

The cumulative scenario is identified in PA/FEIS Section 4.1.4, *Cumulative Scenario Approach*; cumulative impacts are analyzed on a resource-by-resource basis throughout Chapter 4, *Environmental Consequences*. As described in Section 6.5.2.3 of the BLM's NEPA Handbook, similar actions are proposed or reasonably foreseeable federal actions that have similarities that provide a basis for evaluating their environmental consequences together with the proposed action (see also, 40 CFR 1508.25(a)(3)). Common timing or geography can provide a basis for determining that actions are similar. Multiple utility-scale solar and other renewable development projects recently have been approved or are under consideration in the California desert. These projects are considered, and the potential for their environmental impacts to combine with those of the proposed action, are analyzed as part of the cumulative scenario (see, PA/FEIS Section 4.1.4, *Cumulative Scenario Approach*).

The CEC's Revised Staff Assessment Part 2 Biological Resources Appendix B for the project identified three NECO Plan land use plan amendments and stated, "Except for the No Action Alternative, the following proposed Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) amendments would apply to all alternatives." This was an error in the CEC document. The BLM is not, as part of this proposed action, proposing any NECO land use plan amendments. Therefore, no analysis of such a change is required in this PA/FEIS. Because the connected actions are described and analyzed by the BLM in the PA/FEIS, the PA/FEIS does not improperly segment the review of associated impacts (see, e.g., PA/FEIS Section 2.3, *Connected Actions*, and Section 4.1.7, *Incorporation of the Analysis of the Red Bluff Substation Project by Reference*).

Cumulative Impacts. Several comments question the adequacy of the PA/FEIS's assessment of cumulative impacts. A cumulative impact is "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. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." 40 C.F.R. § 1508.7; see also, BLM NEPA Handbook H-1790-1 § 6.5.2.2, *Cumulative Actions*. The PA/FEIS considers the potential for incremental impacts resulting from construction, operation and maintenance, and closure and decommissioning of the project to cause or contribute to a cumulative effect in each of the issue areas for which the project could cause an impact.

The PA/FEIS for the project identifies cumulative projects and provides quantified and detailed information about them. See Table 4.1-1 (Cumulative Scenario). On an issue-by-issue basis, Chapter 4, *Environmental Consequences*, identifies the geographic and temporal scope of the cumulative impacts analysis area, provides a basis for the boundaries of each, identifies existing conditions within each cumulative impacts assessment area, identifies the direct and indirect effects of the proposed action and alternatives, and identifies past, present and reasonably foreseeable future actions making up the cumulative scenario. See, for example, PA/FEIS Water Resources Table 4.19-6, and PA/FEIS Wildlife Resources Table 4.21-2, *Cumulative Impacts to Selected Wildlife Resources from the PSPP*. The several renewable energy (solar and wind) projects being considered by the BLM's California Desert District are identified in Table 4.1-2, including the number of projects, acreage and total megawatts under consideration in the Palm Springs, Barstow, El Centro, Needles, and Ridgecrest Field Offices. Renewable energy projects on State and private lands are identified in Table 4.1-3. Also part of the cumulative scenario, existing projects along the I-10 corridor in eastern Riverside County are identified in Table 4.1-4 and future foreseeable projects in this area are identified in Table 4.1-5. The PA/FEIS's analysis of cumulative impacts is adequate. The PA/FEIS analyzes cumulative impacts of past, present and reasonably foreseeable future actions, including utility-scale renewable and other development projects, on each of the resource areas in Chapter 4, *Environmental Consequences* including mitigation measures to address cumulative impacts.

Mitigation Measures. NEPA requires that an EIS include consideration of mitigation measures to reduce adverse environmental impacts. See, e.g., 42 U.S.C.A. § 4321 (purposes of NEPA include "to promote efforts which will prevent or eliminate damage to the environment. . . ."). As described in Section 1508.20 and the CEQ's January 14, 2011, *Memorandum for Heads of Federal Departments and Agencies concerning Appropriate Use of Mitigation and Monitoring [etc.]*, mitigation includes:

(a) Avoiding the impact altogether by not taking a certain action or parts of an action.

(b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.

(c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.

(d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

(e) Compensating for the impact by replacing or providing substitute resources or environments.

Although NEPA does not impose any substantive requirement that mitigation measures be implemented, the BLM discusses mitigation measures in the PA/FEIS in sufficient detail to ensure that environmental consequences have been fairly evaluated. See, for example, the summaries of mitigation measures recommended on a resource-by-resource basis throughout Chapter 4, *Environmental Consequences*; see also, PA/FEIS Appendix B. The BLM is not required to formulate and adopt complete mitigation plan: to comply with NEPA the mitigation plans proposed or recommended in connection with a project need not be legally enforceable, funded, or even in final form. The final mitigation measures that will be implemented as part of the project will be disclosed in the ROD.

The SA/DEIS and the PA/FEIS include extensive mitigation measures addressing the potential adverse project impacts of the proposed action and alternatives. Many of these are measures have been developed in coordination with the agencies primary authority over the resource area and/or have produced the anticipated results when implemented for other projects elsewhere in the State. Consequently, the recommended mitigation measures are anticipated to effectively address the adverse project impacts. In addition, many of the measures include standards or other requirements that, if not met, would trigger the need for additional mitigation. Many of the mitigation measures require the preparation of detailed plans during final design and prior to any activity on the project site. This is consistent with the requirements of NEPA because these measures identify the impacts intended to be addressed by those plans and key activities that would be included in those plans to mitigate the identified impacts. In summary, the mitigation measures recommended in the PA/FEIS are adequate to address the adverse project impacts. Where there are adverse impacts that mitigation measures cannot entirely mitigate, these impacts have been identified as unavoidable adverse impacts of the proposed action and other alternatives, as applicable.

Consistency with FLPMA

As indicated in PA/FEIS Sections 1.2.1, *Major Authorizing Laws and Regulations [BLM]*, Table 1-1, *General Laws, Ordinances, Regulations and Standards (LORS)*, and elsewhere, the BLM processes applications for commercial solar energy facilities as right-of-way grants under Section 501(a)(4) of FLPMA and Title 43, Part 2804 of the CFR. FLPMA establishes public land policy; guidelines for administration; and provides for the management, protection, development and enhancement of public lands. In particular, the FLPMA's relevance to the proposed action is that Title V, Section 501, establishes BLM's authority to grant rights-of-way for generation, transmission and distribution of electrical energy. The BLM is processing the Applicant's application within the FLPMA framework.

5.5.2.3 Adequacy of Data Relied Upon

Commenters and Comments Addressed

Commenter	Comments
Center for Biological Diversity	3-007, 3-013, 3.-014, 3-017, 3-018, 3-019, 3-034, 3-035, 3-037, 3-038, 3-042, 3-043, 3-045, 3-057, 3-066, 3-072, 3-098
California/Nevada Desert Energy Committee of the Sierra Club (Sierra Club)	4-04, 4-14, 4-16
The Wilderness Society and the Natural Resources Defense Council (NRDC)	5-13, 5-17, 5-27, 5-30,
California Unions for Renewable Energy (CURE)	6-003, 6-004, 6-006, 6-009, 6-010, 6-025, 6-027, 6-031, 6-076, 6-077, 6-078, 6-080, 6-081, 6-123, 6-167, 6-171

Summary of Issues Raised

1. ***New Significant Information Available:*** Some comments suggest that the PA/FEIS is inadequate because new information has become available since issuance of the SA/DEIS, including the Energy Commission's RSA and a number of surveys.

2. ***More and Updated Information Required for Analysis:*** Other comments suggest that the PA/FEIS is inadequate because more information is needed to establish existing conditions (e.g., for sensitive species, habitat and connectivity corridors, including MFTL, desert tortoise, MFTL, Western burrowing owl, the golden eagle, Coachella Valley milk-vetch, other special-status wildlife, as well as for the Palen Dune system, and vegetation and cultural resources) or to update references used to define the need for the project.

Response

NEPA requires the disclosure of relevant environmental considerations that were given a hard look by an agency, and thereby to permit informed public comment on agency's proposed action and alternatives that could be pursued with less environmental harm. To take the required "hard look" at the impacts of a proposal, an agency must rely on information that is of "high quality" (40CFR § 1500.1). Such information may include, for example, accurate scientific analysis, expert agency comments and comments resulting from public scrutiny. The requisite hard look does not require relevant data to be complete in all respects or to be generated if it is unavailable. Instead, a "hard look" under NEPA consists of a reasoned analysis containing quantitative or detailed qualitative information. See, BLM NEPA Handbook H-1790-1 (Jan. 30, 2008). The data and analyses provided should be commensurate with the importance of the impact, with less important material summarized, consolidated, or simply referenced (40 CFR 1502.15).

The SA/DEIS and PA/FEIS rely on quantitative data where possible, and detailed qualitative data under other circumstances. The BLM may rely on the best available information (even if it is not all the information that could be generated with unlimited time and funding about a resource or type of impact) provided that it is sufficient to allow a reasoned analysis of particular impacts, and the BLM need not necessarily postpone its consideration of a proposal while additional data is being developed –the endless loop of analysis that might otherwise result surely would lead to significant regulatory delays. Data and other information relied upon in preparing the PA/FEIS are identified in the individual sections as well as in the References section.

Energy Commission's RSA

The Energy Commission issued an RSA for the PSPP in September 2010. The RSA is neither a substantial change in the proposed action nor significant new information. Instead, it is the State's functional equivalent of this PA/FEIS. The BLM and Energy Commission cooperatively prepared the draft environmental analysis for the project in accordance with NEPA and CEQA; they agreed to prepare stand-alone final documents, one for NEPA (this PA/FEIS) and one for CEQA (the RSA). The BLM reviewed and relied on the RSA in the preparation of this PA/FEIS because the substantive analysis and conclusions of the federal and State environmental review processes are substantially similar even though the format of the documentation is different. For example, because the BLM and Energy Commission developed mitigation measures for the project in concert with one another, the resulting measures apply equally to the Energy Commission's process as "conditions of certification" and the BLM's process as "mitigation measures." The CEC's analysis of environmental impacts of the proposed action is not a "change in the proposed action" at all, much less a substantial one.

Similarly, "new information" is only "significant new information" such as may trigger a need to supplement a draft EIS only if it could alter the results of an agency's original environmental analysis or, in other words, shows that the proposed action would affect the quality of the human environment in a new or more intense way than already considered. While it is true that the RSA was issued after the SA/DEIS was circulated for agency and public review, the RSA does not identify a new or more intense effect than those previously analyzed. Accordingly, the RSA is not "significant new information" under NEPA.

Subsequent Studies and Reports

A number of comments stated that new data in the form of reports, studies and plans that are required in the SA/DEIS were not available or were insufficient at the release of the draft document. The BLM acknowledges that it anticipated that additional reports, studies and plans would be prepared and completed after the SA/DEIS was issued for agency and public input. As noted above, NEPA does not require mitigation plans proposed or recommended in connection with a project to be in final form, or even funded or legally enforceable. No studies or reports have become available subsequent to issuance of the SA/DEIS that has caused a substantial change in a proposed action or is "significant" for purposes of NEPA. To the contrary, any such studies or reports have merely clarified or complimented earlier understandings or assumptions.

Additional surveys are anticipated to be required or completed as a result of other agencies' statutory or regulatory obligations, or within specific areas of expertise. For example, the FWS Endangered Species Act Section 7 consultation remains in progress. This process is independent of and separate from the NEPA process for the project, and will be prepared in accordance with the schedule and procedures established in the relevant regulatory regime. Studies required or completed in satisfaction of other agencies' requirements that become available before the ROD is issued will be evaluated by the BLM prior to its decision on the PSPP. BLM is making every effort to complete these processes in coordination with NEPA, and to finalize these other processes before the issuance of the ROD. Other agencies and the public would have the opportunity to review such reports to the full extent of the relevant governing law.

Mitigation Measures and Further Study

As explained in Section 6.8.4 of the BLM NEPA Handbook H-1790-1, "Mitigation includes specific means, measures or practices that would reduce or eliminate effects of the proposed action or alternatives." Mitigation may be used to reduce or avoid adverse impacts, whether or not they are significant in nature. Reasonable, relevant mitigation measures that could improve the project are provided in Appendix B, *Conditions of Certification*, and are called out on an issue-by-issue basis throughout Chapter 4, *Environmental Consequences*, regardless of agency jurisdiction. BLM-specific mitigation measures, developed consistent with CEQ guidance, also are identified and generally work in coordination with the Energy Commission's conditions of certification. Mitigation measures are identified to reduce or eliminate adverse effects to biological, physical, or socioeconomic resources even in instances where the precise extent of impacts is somewhat uncertain because of the complexity of the issues or variability (see, e.g., 4.19.4, *Summary of Mitigation Measures [relating to Water Resources]*).

Multiple mitigation measures would require surveys. Surveys serve myriad purposes, including refining baseline information, defining parameters, assessing compliance, and identifying areas where adaptive management may be appropriate. As noted above, the BLM has used the best available science in the PA/FEIS, including site-specific data collected over appropriate timeframes, under the proper protocol, by the proper experts in the field, and recommends additional survey work to confirm assumptions and inform adaptive management. The purpose of such surveys is to avoid or more effectively mitigate possible impacts on the human environment.

Mitigation measures that would require supplemental plans would be developed in consort with the appropriate resource and regulatory agency. The Tortoise Relocation/Translocation Plan required by BIO-10, for example, would be developed in accordance with the performance standards established in the mitigation measure, would be consistent with current USFWS approved guidelines, would include all revisions deemed necessary by BLM, USFWS, CDFG and Energy Commission staff, and would be subject to agency approval. The information provided in the PA/FEIS about the Tortoise Relocation/Translocation Plan is detailed and of high-quality. In any event, other agencies and the public would have an opportunity to comment on the proposed plan pursuant to the approval process.

Similarly, where a mitigation measure allows for the acquisition of lands, any required studies would be performed according to FWS and CDFG protocol at the time that specific land is proposed for evaluation as habitat for mitigation. It would not be possible to provide such studies for agency or public review until the land has been identified.

Some comments suggest that the BLM should require the Applicant to develop additional information after project approval, in the form of pre-construction surveys, in order to avoid or further reduce impacts. In the context of the desert tortoise, the Energy Commission has recommended that additional areas be surveyed; however, the Applicant instead may elect, consistent with requirements, to presume that desert tortoises are present, forgo the survey, and acquire sufficient mitigation lands.

In this context, mitigation measures that predicate future actions and obligations on data, analysis and results of future studies do not improperly defer mitigation or deprive the public of a meaningful opportunity to comment on the adequacy of the mitigation measures. To the contrary, the mitigation measures proposed in the PA/FEIS provide performance standards that are sufficiently detailed to allow for meaningful agency and public review. Requirements for the timing, coverage and contents of the surveys are established, as are standards for Surveyor Qualifications and Training. Requirements for operational plans that have yet to be developed also are established in great detail. See, e.g., BIO-13 (requiring the development and implementation of a Raven Monitoring and Control Plan) and BIO-14 (requiring the development and implementation of a Weed Management Plan).

5.5.2.4 Purpose and Need

Commenters and Comments Addressed

Commenter	Comments
Center for Biological Diversity	3-039, 3-040, 3-089, 3-096
California/Nevada Desert Energy Committee of the Sierra Club (Sierra Club)	4-21, 4-22, 4-23
The Wilderness Society and the Natural Resources Defense Council (NRDC)	5-16, 5-19
California Unions for Renewable Energy (CURE)	6-008, 6-158, 6-162, 6-166

Summary of Issues Raised

1. ***Narrow BLM Statement:*** Several comments suggested that the BLM's statement of Purpose and Need is too narrow.

2. ***DOE's Statement:*** Other comments provided input concerning the DOE's statement of purpose and need.

Response

The BLM's Statement of Purpose and Need

BLM has discretion in defining the purpose and need of the proposed action (40 CFR 1502.13). As explained in Section 6.2.1 of the BLM NEPA Handbook H-1790-1, a carefully crafted purpose and need statement can "increase efficiencies by eliminating unnecessary analysis and reducing delays in the process." The statement of purpose and need dictates the range of alternatives, because action alternatives are not "reasonable" if they do not respond to the purpose and need for the action. As correctly noted in several comments on the project, the narrower the purpose and need statement, the narrower the range of alternatives that must be analyzed; the converse also is true. Guidance provided in BLM Instruction Memorandum 2011-059, *National Environmental Policy Act Compliance for Utility-Scale Renewable Energy Right-of-Way Authorizations* (Feb. 8, 2011), states:

> For most renewable energy projects the BLM's purpose and need for action will arise from the BLM's responsibility under the Federal Land Policy and Management Act (FLPMA) to respond to a right-of way application requesting authorized use of public lands for a specific type of renewable energy development. The purpose and need statement should also describe the BLM's authorities and management objectives with respect to renewable energy and public lands (see example below). Additionally, offices should include a description of the BLM's decision(s) to be made as part of the purpose and need statement to help establish the scope of the NEPA analysis (BLM NEPA Handbook Section 6.2). In responding to a right-of-way application the BLM may decide to deny the proposed right-of-way, grant the right-of way, or grant the right-of-way with modifications. In accordance with the right-of-way regulations, modifications may include modifying the proposed use or changing the route or location of the proposed facilities (43 CFR 2805.10(a)(1)).

Several comments requested that the BLM substantially expand its statement to address more broad (and less specific) purposes in order to allow for consideration of a broader range of alternatives. However, the BLM's purpose and need for the proposed action, as stated in Section 1.1.1, *BLM Purpose and Need,* of the PA/FEIS, is consistent with applicable law and BLM policy. It is based on two key considerations: (i) the potential action the BLM could or would take on the specific proposed action; and (ii) the response of the BLM in meeting specific directives regarding the implementation of renewable energy projects on federally-managed lands. The primary action that BLM is considering is a response to a specific ROW grant application from the Applicant to construct and operate a specific solar project on a specific site managed by the BLM. As a result, the BLM determined that a key purpose of this project was to determine whether to approve, approve with conditions, or deny that ROW application for the total 500 megawatt (MW) PSPP (two units of 250 MW each). A statement of this breadth led the BLM to consider three additional "build" or "action" alternatives on the same site (Reconfigured Alternatives 1 and 2 and a Reduced

Acreage Alternative), one no action alternative (No Action Alternative A) and two no project alternatives pursuant to which the CDCA Plan would be amended but the PSPP would not be approved (CDCA Plan Amendment/No Action Alternative B and CDCA Plan Amendment/No Action Alternative C) (see PA/FEIS Section 2.4.3, *Alternatives Considered*).

The BLM declined requests to expand the statement to include "implement[ing] Federal policies, orders and laws that mandate or encourage the development of renewable energy sources … and the Federal policy goal of producing 10% of the nation's electricity from renewable resources by 2010 and 25% by 2025… and to support the State of California's renewable energy and climate change objectives…." The purposes in this statement are outside the purview of the BLM because the need for increased energy from renewable sources is not BLM's responsibility. However, the BLM can respond, within the context of specific directives under which it operates, to those needs by considering ROW grant applications for projects that would produce renewable energy on federally-administered lands. As a result, the BLM purpose for the project responds in part to the specific directives related to renewable energy production that are summarized in PA/FEIS Section 1.1.1, *BLM Purpose and Need.* As noted there, these directives authorize the BLM to act expediently in increasing the production of nonrenewable energy within the bounds of its other authorities regarding the management of federal lands. The BLM is not in the business of developing and operating energy production facilities; its responsibilities are to consider and to approve, approve with modification, or deny issuance of a ROW grant to any qualified individual, business, or government entity and to direct and control the use of rights-of-way on public land in a manner that:

1. Protects the natural resources associated with public lands and adjacent lands, whether private or administered by a government entity;

2. Prevents unnecessary or undue degradation to public lands;

3. Promotes the use of rights-of-way in common considering engineering and technological compatibility, national security and land use plans; and

4. Coordinates, to the fullest extent possible, all BLM actions under the regulations with State and local governments, interested individuals and appropriate quasi-public entities.

As directed by Secretarial Order 3285, the BLM has identified renewable energy projects on federally-administered lands as a priority throughout the lands it manages. As a result, the BLM is considering ROW grants for various renewable energy projects throughout California and other western states. Each of these projects is considered by the BLM on its own merits and with consideration of the impacts of the specific project on a specific site. Therefore, the statement of purpose and need for each project, including the project, is specific to each project within the broader scope of the directives prioritizing renewable energy development on federally managed lands. The PA/FEIS considers other applications for energy projects in the cumulative impacts analyses provided in PA/FEIS Section 4.1.4, *Cumulative Scenario Approach.*

The BLM believes that the purpose and need for the PSPP is consistent with the directives described above and the requirements of Title V of FLPMA, and satisfies the requirements of

NEPA. Therefore, the purpose and need for this project was neither revised in response to these comments nor replaced wholesale in favor of replacement statements proposed in comments.

Other comments suggest that, in light of the DOE's statement of purpose and need, the SA/DEIS should have considered alternatives that would provide funding to other types of projects. It did so. The full range and variety of alternatives considered in the SA/DEIS is described in PA/FEIS Section 2.4, *Alternatives Development and Screening Process,* including other solar technologies, types of renewable energy, and alternative methods to generate electricity.

5.5.2.5 Alternatives

Commenters and Comments Addressed

Commenter	Comments
Joshua Tree National Park	1-18
Brendan Hughes, Individual	2-04
Center for Biological Diversity	3-002, 3-004, 3-005, 3-007, 3-010, 3-011, 3-090, 3-091, 3-092, 3-093, 3-094, 3-095, 3-096
California/Nevada Desert Energy Committee of the Sierra Club (Sierra Club)	4-11, 4-13, 4-21, 4-25
The Wilderness Society and the Natural Resources Defense Council (NRDC)	5-08, 5-10, 5-11, 5-20, 5-21, 5-22, 5-23, 5-24, 5-25, 5-26
California Unions for Renewable Energy (CURE)	6-006, 6-043, 6-085, 6-144, 6-145, 6-160, 6-161, 6-162, 6-163, 6-164, 6-165, 6-166, 6-199, 6-210
Western Watersheds Project	7-01, 7-02

Summary of Issues Raised

1. ***Range of Alternatives:*** Several comments suggested that the range of alternatives was unreasonably narrow and should be expanded to address impacts, specifically and generally.

2. ***Alternatives Selection and Analysis*:** Other comments allege that the SA/DEIS failed to provide a sufficient foundation for rejecting alternatives from further consideration and proposed that certain of the alternatives should have been carried forward for more detailed analysis.

Response

NEPA directs the BLM to "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal that involves unresolved conflicts concerning alternative uses of available resources" (NEPA § 102(2)(E)). As explained in BLM Instruction Memorandum 2011-59, "the BLM must explore alternative means of meeting the purpose and need for the action. For a renewable energy right-of-way application, alternatives will include denying the application (the No Action Alternative) and granting the application as submitted by the applicant following the pre-application process (the Proposed Action). The BLM must consider other reasonable alternatives through the NEPA process, including modifications to the right-of-way application as submitted, that meet the purpose and need for the action and provide a clear basis for choice among options (40 CFR 1502.14).” A discussion of alternatives need not be exhaustive. What is required is information sufficient to permit the BLM to make a “reasoned choice” among alternative so far as environmental aspects are concerned (40 CFR 1502.14; see also, BLM NEPA Handbook H-1790-1 § 6.6).

In order to establish the reasonable range of alternatives to be considered, the defined project purpose and need functions as the first and most important screening tool. Thereafter, the range of alternatives is based on the applicant’s proposed action, alternatives that would reduce or avoid adverse impacts of the Applicant’s project, and appropriate No Action Alternatives. The full range of possible alternatives may be narrowed to a “reasonable number” that covers the full spectrum of alternatives. In determining the alternatives to be considered, the emphasis is on what is “reasonable” rather than on whether the proponents or others like or are capable of implementing the alternative. See BLM NEPA Handbook H-1790-1 § 6.6.1 and BLM Instruction Memorandum 2011-59.

Alternatives Considered

The number and range of alternatives considered in the EIS is reasonable. In total, 24 alternatives to the proposed action were considered by the BLM. Six were carried forward, in addition to the proposed action, for more detailed review. Three of the six are action alternatives (Reconfigured Alternatives 1 and 2 and the Reduced Acreage Alternative); one is a “no action” alternative, under which no project and no CDCA Plan amendment would be approved (No Action Alternative A); and two are “no project” alternatives under which the CDCA Plan would be amended but the PSPP would not be approved (CDCA Plan Amendment/No Action Alternatives B and C).

Alternatives Eliminated from Further Consideration

Alternatives that were considered but eliminated from detailed analysis, as well as the rationale for their elimination (40 C.F.R. 1502.14(a)), are described in SA/DEIS Section B.2.8, *Alternatives Considered but Not Evaluated in Further Detail*, and PA/FEIS Section 2.4.5, *Alternatives Considered but Eliminated from Detailed Analysis*. The BLM believes the number of alternatives described to be reasonable in light of the breadth of the statement of purpose and need. Further, the alternatives carried forward for more detailed consideration in the PA/FEIS sufficiently cover the full spectrum of alternatives because the scope of impacts assessed went from none (no action) to some (reduced acreage) to lessened in some respects (reconfigured).

Because the range of alternatives considered in the EIS is reasonable and covers the full spectrum of concerns, NEPA does not require the BLM to consider additional alternatives. Nonetheless, the BLM agrees that additional detail could have been provided explaining the rationale for eliminating some alternatives from further consideration (40 CFR 1502.14(a)). Consequently, PA/FEIS Section 2.4.5, *Alternatives Considered but Eliminated from Detailed Analysis* has been clarified to provide additional details.

For example, some comments suggested that the BLM should consider an *all-private-lands* or *public-private lands* alternative. However, the BLM did not carry forward such an alternative for further consideration because the BLM's role in managing its lands includes facilitating land uses on its lands while appropriately balancing and responding to multiple interests concerning federal mandates, collaborating agencies' directives, and BLM's own interests. As a result, the alternatives considered in the SA/DEIS and the PA/FEIS focus on alternatives that would require an action by the BLM and that respond to the specific application for a ROW grant received by the BLM for the PSPP (see, e.g. BLM NEPA Handbook H-1790-1, § 6.6.1, *Reasonable Alternatives*). Further, an all-private-lands or a public-private lands alternative, would present considerable challenges, including difficulties associated with obtaining sufficient site control from a number of different landowners who may or may not be motivated to allow utility-scale energy generation facilities to be developed on their property, the large number of acres that would be required for a viable project of this type, and the absence of any clear environmental benefit associated with development on private versus public land. Accordingly, BLM declined to accept suggestions that it consider the placement of the proposed utility-scale renewable energy projects, such as the project, on private lands or a combination of public and private lands other than the combinations analyzed in the PA/FEIS. Suggestions that Applicants must provide additional evidence of efforts to obtain site control on private lands are dismissed, since such evidence would not meaningfully inform or expand the range of alternatives.

Other comments suggested that sites *closer to urban areas* or on *previously disturbed lands* should have been considered. The BLM did not consider such alternatives in the SA/DEIS because the consideration of the three alternative sites described above was adequate in identifying and considering alternative sites. Further, locating a utility-scale renewable energy generating facilities in an urban area or on previously disturbed lands would present considerable challenges, such as those described above, relating to site control, negotiations with numerous landowners, and overall acreage needs. *Alternative sites on other BLM managed lands* were not considered because the BLM is responding to the application for the specific parcel identified in the Applicant's ROW grant application. In addition, there are many other renewable energy projects that have submitted applications for the use of BLM-administered lands. Consequently, other possible BLM-administered lands in the vicinity of the site already are subject to applications from other applicant and, thus, are not considered by the BLM to be available for alternative projects until those applications are considered and either approved or rejected by the BLM. Finally, many of the areas that previously have been disturbed or are closer to urban areas are not within the jurisdiction of the BLM and, therefore, would require no action by the BLM.

In addition, the PA/FEIS discusses, and in some cases includes more information, with respect to the following alternatives that specifically were identified in comments on the SA/DEIS: conservation and demand side management; a distributed generation solar alternative; and alternative technologies, e.g. linear Fresnel technology. A reduced power alternative and a reduced acreage alternative each were considered in the analysis, as were alternative sites. The BLM has declined to consider alternative locations for the Red Bluff Substation Project because this connected action is not part of the proposed action (see Common Response 5.5.2.2, *Consistency of the PA/FEIS with NEPA*). Other comments suggested alternatives that would provide *funding to other types of projects*, such as community projects for training and implementation of conservation measures and reduce the need for additional power sources and provide GHG offsets. Again, this alternative was not considered because the BLM is responding to the application for the specific parcel identified in the Applicant's ROW grant application. A suggested alternative that would involve *less grading area of the site* (e.g., leaving strips of vegetation) was explored in Solar Power Tower Technology alternative in the PA/FEIS.

Although the PA/FEIS provides additional information about potential alternatives that were identified in the SA/DEIS, such information is not "significant" under NEPA (40 CFR 1502.9).

5.5.2.6 Supplementation / Recirculation

Commenters and Comments Addressed

Commenter	Comments
Center for Biological Diversity	3-007, 3-031, 3-035, 3-036, 3-038, 3-042, 3-054, 3-057, 3-058, 3-066, 3-072, 3-076, 3-095, 3-098
California/Nevada Desert Energy Committee of the Sierra Club (Sierra Club)	4-020
The Wilderness Society and the Natural Resources Defense Council (NRDC)	5-17, 5-19, 5-27, 5-30, 5-31
California Unions for Renewable Energy (CURE)	6-003, 6-007, 6-008, 6-009, 6-010, 6-011, 6-012, 6-014, 6-015, 6-016, 6-017, 6-018, 6-019, 6-020, 6-021, 6-022, 6-023, 6-024, 6-025, 6-027, 6-033, 6-034, 6-073, 6-102, 6-139, 6-171
Western Watersheds Project	7-08

Summary of Issues Raised

1. ***Need to Supplement and Recirculate SA/DEIS***. Comments suggest that supplementation and recirculation of the EIS is required for a variety of reasons.

Response

As explained in Section 5.3 of the BLM NEPA Handbook H-1790-1, supplementing an EIS is required only in the following limited circumstances:

1. When substantial changes to the proposed action are made and are relevant to environmental concerns (40 CFR 1502.9(c)(1)(i));

2. When a new alternative is added that is outside the spectrum of alternatives already analyzed (see Question 29b, CEQ Forty Most Asked Questions Concerning CEQ's NEPA Regulation, March 23, 1981); and

3. When there are new significant circumstances or information relevant to environmental concerns and have bearing on the proposed action or its effects (40 CFR 1502.9(c)(1)(ii).

Substantial Changes to Proposed Action. Changes in elements of the proposed action that have been made since issuance of the SA/DEIS include the following: a minor refinement of the daily construction schedule, proposed use by the waste water system of two 4-acre evaporation ponds per power block; and the use of an on-site concrete batch plant. The revised construction schedule and descriptions and analyses of the evaporation ponds and concrete batch plant were provided in the CEC's September 2010 RSA and December 2010 Commission Decision. No modification has been made to the configuration of the project. The development and refinement of Southern California Edison's proposal for the Red Bluff Substation (including associated access roads and spur roads) are not part of the proposed action (see PA/FEIS Section 2.3, *Connected Actions*, and Section 4.1.7, *Incorporation of the Analysis of the Red Bluff Substation Project by Reference*). Drainage facilities have not been redesigned for the project site. These changes, and the CEC's analysis of related impacts, have been independently reviewed by BLM.

These changes are not "substantial" under NEPA. As explained in Section 5.3.1 of the BLM NEPA Handbook, "'substantial changes' in the proposed action may include changes in the design, location, or timing of a proposed action that are relevant to environmental concerns (i.e., the changes would result in significant effects outside of the range of effects analyzed in the draft or final EIS)." None of the minor changes identified since the issuance of the SA/DEIS would result in significant effects outside of the range of effects analyzed in the DEIS:

Refinement of the Daily Construction Schedule. The resource areas potentially affected by the clarification in the daily work schedule are primarily noise and air quality. Noise impacts could be different because the additional work hours would occur outside normal work hours and include nighttime hours where ambient noise levels are lower than during the day. Also, the impacts of project emissions on ambient air quality are affected by meteorological conditions. There are calm atmospheric conditions during non-daylight hours including the hours around dawn and dusk that must be taken into account when analyzing the impacts of construction activities in those times of the day. With respect to noise impacts, the Applicant has agreed to limit construction activities outside the previously proposed work hours, consistent with the intent of Riverside County Noise Ordinance. This ordinance prohibits construction activities outside of specified hours when within 0.25 mile of an existing residence. The proposal to refine and limit work hours in this way would not cause noise impacts that are substantially different than those previously analyzed. Air quality impacts associated with the limited additional nighttime operations proposed have been modeled and conclude that adverse air quality impacts would not result. Based on the results of the ambient air quality impacts analysis, the project would not have an adverse impact to air quality resources given the constraints outlined within this discussion. Accordingly, refinement of the daily construction schedule would not cause impacts that are substantially different than those previously analyzed.

Newly Proposed Evaporation Ponds for Wastewater. The resource areas that could be affected by the use of evaporation ponds include water resources (groundwater) and wildlife (birds and other creatures that could be attracted to the ponds as a source of drinking water or landing surface). Operation of the ponds would be regulated heavily by waste discharge requirements to reduce and mitigate environmental impacts. Consistent with the analysis conducted by the CEC, the BLM has determined that the implementation of mitigation measures such as SOIL&WATER-4 (compliance with waste discharge requirements issued Groundwater Level Monitoring, Mitigation and Reporting), BIO-26 (Evaporation Pond Netting and Monitoring) and others would reduce potential impacts associated with the evaporation ponds to an insubstantial level.

New on-site Concrete Batch Plant. The construction-related use of a concrete batch plant could cause air quality concerns from dust, water supply concerns associate with demand, water quality concerns from wash water runoff, and waste concerns from piles of improperly mixed or leftover concrete. Consistent with the analysis conducted by the CEC, the BLM has determined that the additional emissions, water demand and other impacts would be similar to those already analyzed and, with the implementation of mitigation measures, would not cause new or different, more intense impacts than those already identified.

New Alternative Added. One new alternative was identified after the SA/DEIS was issued but before the CEC issued its RSA and Commission Decision: Reconfigured Alternative 2.

Reconfigured Alternative 2 is within the spectrum of alternatives already analyzed: it proposes a reconfiguration of the proposed site (like the Reconfigured Alternative analyzed in the SA/DEIS) that would reduce potential impacts of the proposed action on targets resources (like Reconfigured Alternative 1 and the Reduced Acreage Alternative, each of which were analyzed in the SA/DEIS).

The same as the proposed action, this alternative would be developed primarily BLM-administered public land and could include some privately-owned land. Reconfigured Alternative 2, inclusive of Options 1 and 2, is proposed in the same general location as the proposed action: there would be significant areas of overlap between the respective footprints. Also the same as the proposed action, Reconfigured Alternative 2 would have a nominal output of 500 MW and consist of two independent 250 MW power plants. Unit 1 would be reconfigured under either Reconfigured Alternative 1 (which was analyzed in the SA/DEIS) or the new Reconfigured Alternative 2, although the shape of the reconfigurations would be different. The purpose of the reconfiguration in both instances would be to reduce impacts to the sand dune habitat and the Mojave fringe-toed lizard in the northeastern portion of the site. Unit 2 would be the same under Reconfigured Alternative 2 as it would be under the proposed action. Similar on- and off-site facilities would be required for the new alternative as would be required for the proposed action. Accordingly, NEPA does not require supplementation of the EIS on this basis.

New Significant Circumstances or Information. The NEPA process is designed to provide information to examine impacts and allow for the creation of mitigation measures and alternatives to identify ways to improve a project while further minimizing its impacts. The information disclosure and sharing process inherent in NEPA does not exist in a vacuum. Improvements, additional mitigation, and/or project design features frequently are added to a proposed action as a result of comments received on a draft EIS. The overall design of, and impacts related to, the project as analyzed in the PA/FEIS have not greatly changed since the SA/DEIS, and none of the information that became available after the SA/DEIS has been considered “significant” for NEPA purposes, after a thorough review.

The data relied upon in the SA/DEIS was adequate to inform the BLM’s consideration of the project and to allow a reasoned choice among alternatives. Accordingly, the additional information requested in various comments is not necessary for NEPA adequacy and therefore would not trigger a need to supplement. Further, for example, although the Energy Commission’s RSA and additional studies have become available since the issuance of the SA/DEIS, this information merely compliments or clarifies prior understandings or confirms earlier assumptions. Additional rationale for the elimination of alternatives from further consideration similarly compliments or clarifies information already provided. None of the new information identified by comments and addressed in the PA/FEIS, as appropriate, is considered "significant," including new survey results including data from special-status plant and golden eagle surveys conducted this year; CEC's Revised Staff Assessment or final Commission Decision for project, neither of which was available in the SA/DEIS; revised impacts to cultural resources in the reconfigured alternative; confirmed and consistent project disturbance area (amount of disturbed acreage); and confirmed and consistent estimated amount of cut and fill for the project. NEPA does not require supplementation or recirculation under these circumstances.

Accordingly, it is not necessary to affirmatively establish compliance with LORS in the FEIS. Therefore, the allegation is unfounded that supplementation and recirculation of the EIS would be required on this basis.

The SA/DEIS and the PA/FEIS contain sufficient information, including information regarding resources on the BLM-administered lands on the project site, and analyses to understand and document the effects of the project, the Agency Preferred Alternative, the other action alternatives, and the no action alternatives and, therefore, supplementation and recirculation of the environmental document is not required.

5.5.2.7 Biological Resources

Commenters and Comments Addressed

Commenter	Comments
Brendan Hughes, Individual	2-05, 2-06, 2-07
Center for Biological Diversity	3-001, 3-002, 3-011, 3-020, 3-021, 3-030, 3-032, 3-042, 3-045, 3-046, 3-048; 3-049, 3-050, 3-051, 3-052, 3-053, 3-054, 3-055, 3-056; 3-057, 3-058; 3-060, 3-061; 3-062; 3-063, 3-064; 3-065; 3-068, 3-069
California/Nevada Desert Energy Committee of the Sierra Club (Sierra Club)	4-02, 4-03, 4-05, 4-06, 4-07, 4-08, 4-09, 4-10; 4-12; 4-14, 4-15, 4-17, 4-18, 4-19
The Wilderness Society and the Natural Resources Defense Council (NRDC)	5-06. 5-08, 5-09, 5-28, 5-30
California Unions for Renewable Energy (CURE)	6-005, 6-026, 6-027, 6-035, 6-036, 6-037, 6-038, 6-039, 6-040, 6-041, 6-042, 6-044, 6-045, 6-046, 6-047, 6-048, 6-049, 6-050, 6-051, 6-052, 6-053, 6-054, 6-055, 6-056, 6-057, 6-058, 6-059, 6-060, 6-062, 6-063, 6-064, 6-066, 6-068, 6-069, 6-070, 6-071, 6-072, 6-073, 6-074, 6-075, 6-079, 6-083, 6-084, 6-086, 6-088, 6-089, 6-090, 6-091, 6-093, 6-094, 6-095, 6-096, 6-098, 6-117, 6-123, 6-124, 6-125, 6-169, 6-170, 6-171; 6-172, 6-173, 6-174; 6-175; 6-176; 6-177; 6-178, 6-179; 6-180, 6-181, 6-182, 6-183, 6-184, 6-185, 6-186, 6-187, 6-188, 6-189, 6-192, 6-194, 6-195, 6-197, 6-198, 6-200, 6-201, 6-202, 6-203, 6-204, 6-205, 6-206, 6-207, 6-209
Western Watersheds Project	7-02, 7-03, 7-05, 7-07, 7-08

Summary of Issues Raised

1. ***Adequacy of Baseline Data and Resulting Analysis*:** Various comments question the adequacy of analysis, including whether: baseline information or surveys are adequate and, therefore, whether the impact analyses reliant upon them are adequate; the identification of affected special-status species is adequate and, therefore, whether the impact analyses based on these identifications, are adequate; and the cumulative impact analysis is adequate.

2. ***General Biological*:** Various comments express opinions about general biological issues, including: whether impacts can be fully mitigated; concerns with adequacy of compensation mitigation; concerns with toxic compounds to be used for weeds; concerns that recovery from the proposed action would be slow, over longevity of mitigation; about the adequacy of commitments for mitigation implementation and flexibility.

3. ***Vegetation*:** Comments state that special-status plants were not adequately evaluated or surveyed.

4. ***Wildlife*:** Comments express concern about bighorn sheep surveys, impacts and mitigation; about insects; about badgers and kit foxes, including relocation concerns; about surveys, impacts and mitigation of burrowing owl; concern about impacts and mitigation identified for MFTLs, particularly connectivity and movement; desert tortoise monitoring, impacts, movements, relocation; other special-status wildlife besides desert tortoise; lasting effects to wildlife; the impacts of proposed evaporation ponds and mirrors, including whether the proposed mitigation of such impacts are adequate; and Golden eagles, including about the adequacy of the impact analysis and proposed mitigation for impacts on foraging habitat.

Response

Adequacy of Baseline Data and Resulting Analysis

The SA/DEIS and PA/FEIS based upon it adequately analyze impacts on biological resources, including vegetation and wildlife. The Applicant and consultants coordinated with BLM, USFWS, CDFG and CEC on the requirements for species-surveys and survey protocols, if any. A great deal of current baseline information was acquired for the project study area, including that presented in the Application for Certification (AFC), SA/DEIS, and the CEC's RSA and Commission Decision. See PA/FEIS Section 3.18, *Vegetation Resources*; Section 3.22, *Wildland Fire Ecology*; and Section 3.23, *Wildlife Resources*, which describe these respective affected environments. Most biological data relevant to the project study area were collected in the last three years. Additionally, reports regarding fall 2009 and spring 2010 surveys for rare plants and wildlife (CEC RSA, 2010) were used in preparation of the RSA and the PA/FEIS. Protocol surveys were reviewed and approved by appropriate agencies. Further, surveys have necessary limitations inherent in their designs, but the designs are to maximize detection for the unit of effort expended.

Mitigation Measure and CEC Condition of Certification BIO-19, *Special-Status Plant Impact Avoidance, Minimization and Compensation*, requires the Applicant to complete late-season botanical surveys for special-status plants that could have been missed by spring surveys; surveys are consistent with BLM and CDFG plant survey protocols. The protocols specify floristic surveys and qualifications for surveyors to ensure that any new species not previously anticipated are detected. If late-season rare plants are detected during the surveys, BIO-19 also specifies detailed performance standards for when mitigation would be required and the measures required to compensate for those impacts. BIO-19 has been revised to include a requirement for triggers and performance standards for mitigation based on the results of late-season botanical surveys, off-site mitigation through compensation (acquisition) or restoration and enhancement, site design modifications to avoid peripheral occurrences of special-status plants, and other impact avoidance and minimization measures for rare plants. BIO-19 is summarized in PA/FEIS Section 4.17.4, *Summary of Mitigation Measures [relating to Impacts on Vegetation Resources]*, and set forth in full in Appendix B, *Conditions of Certification*.

More survey information, whether for special-status plants or endangered animals, is always preferable when doing environmental analysis for NEPA, CEQA, or the federal and State endangered species acts. Even so, the special-status plant surveys for the project were extensive, professional, consistent with agency protocol, covered multiple years, and are by any standard a legally sufficient analysis. The survey data were entirely sufficient for reviewing agencies to determine that the project's impacts to late-season special-status plants are significant, that avoidance and other mitigation are required, and to allow decision makers to make intelligent judgments about the project.

The desert tortoise surveys conducted by the Applicant provide an adequate basis for assessing impacts of the project and BLM concurs with the characterization of the project site as having low tortoise densities. The Applicant conducted updated, spring 2010 protocol-level surveys for desert tortoise within the project area, and the results have been included in the CEC's RSA and Commission Decision and BLM's PA/FEIS. PA/FEIS Section 4.21, *Impacts to Wildlife Resources,* provides a detailed analysis of the impacts of the project on desert tortoise.

In response to other specific comments regarding biological resources data, a full census of all individuals of the whole kit fox population is not necessary to analyze impacts of the proposed action and alternatives and to formulate appropriate mitigation measures. Underreporting the amount of active western burrowing owls on the project site and within the buffer area would not serve the interests of the Applicant as pre-construction surveys are required and mitigation measures are required of all western burrowing owl locations in the project disturbance area. Also, the presence of burrowing (fossorial) mammals, such as badgers, can be detected while performing other surveys for other focal burrowing species, such as desert tortoises and western burrowing owls. Badger population size and dynamics are not necessary to determine if the proposed action could impact badgers, or by what means any such impacts would manifest themselves. The PA/FEIS acknowledges at least two pairs of resident western burrowing owls within the project disturbance area in PA/FEIS Section 4.21, *Impacts to Wildlife Resources*. Incidental sightings of MFTL matched the distribution of suitable habitat, and all suitable habitat is considered occupied. The impact analysis was performed on that basis.

Avian point counts were conducted at the project site in spring 2009, providing some quantitative information about resident and migratory birds at the site. Additional information from more bird surveys during project operation would not improve the impact analysis for bird-mirror collision potential. Information about current bird use at the site would provide little insight as to the number of birds that might occur in a barren, graded solar field, or the likelihood of those birds colliding with mirrors. Mitigation Measure BIO-16, *Avian Protection Plan*, requires data to be collected to determine if such impacts occur, and requires development and implementation of adaptive management to avoid and minimize avian deaths or injuries should they occur.

Further, more analysis went into determination of special-status plants to be surveyed than one person's opinion. PA/FEIS Table 3.18-2, *Vegetation Resources*, identified Coachella Valley milk-vetch as having potential to occur in the project study area. The analysis includes the direct, indirect and cumulative impacts of the project on Harwood's milkvetch, ribbed cryptantha and other special-status plants in PA/FEIS Section 4.17, *Impacts to Vegetation Resources*.

The baseline information and surveys conducted for and reported in the SA/DEIS and PA/FEIS are adequate, as is the analysis of direct, indirect and cumulative impacts that was conducted based on that baseline information.

General Biological

Impacts and Mitigation Measures. PA/FEIS Section 4.17, *Impacts to Vegetation Resources*, Section 4.21, *Impacts to Wildlife Resources*, and Appendix I, *Biological Resource-related Cumulative Impacts*, address the impacts to vegetation and wildlife resources, as well as discuss residual impacts and unavoidable adverse impacts from the proposed action and alternatives.

The PA/FEIS identifies residual impacts and unavoidable adverse impacts at the ends of Sections 4.17, *Impacts to Vegetation Resources*, and 4.21, *Impacts to Wildlife Resources*. These would constitute lasting impacts to biological resources even after mitigation measures are implemented.

Compensatory habitat will be acquired to address project-related habitat loss for desert tortoise, burrowing owl and MFTL among other sensitive plant and wildlife species. Designated critical habitat for Desert tortoise would be compensated at the maximum ratio of 5:1 or replaced via the deposit of funds into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF) (see, BIO-12 as summarized in PA/FEIS Section 4.21.4, *Summary of Mitigation Measures*, and set forth in full in Appendix B, *Conditions of Certification*). The SA/DEIS does not include any evidence demonstrating there is adequate, private compensatory land in the region available for mitigation of impacts to not only the Desert Tortoise, but the MFTL, western burrowing owl, and other special-status species. Agencies have determined that sufficient compensatory mitigation lands are available in the appropriate areas to fulfill this acquisition requirement. Sufficient controls and criteria are included in the mitigation measure to ensure that appropriate habitat is found.

Uncertainty is a common factor in predictions of environmental effects, whether natural or anthropogenic. Several of the mitigating measures have monitoring and adaptive management components in case predictions do not match reality. In the development of weed or fire management plans, for instance, adaptive management components deal with issues of uncertainty. Mitigation measures have become more specific and refined since the SA/DEIS. Details such as schedules for plans or implementing various measures were developed, methods for verification of implementation were specified, and funding mechanisms and flexibility were explored. Mitigation measures are recommended for the identified losses of species and special habitats identified in the WHMAs.

The proposed action and any action alternative would be required to comply with the requirements detailed in the Decommissioning Plan. Mitigation Measure and California Energy Commission Conditions of Certification BIO-23 states that no fewer than 30 days prior to the start of project-related ground disturbing activities the Applicant shall provide a draft Decommissioning and Reclamation Plan. The plan would be finalized prior to the start of commercial operation and reviewed every five years thereafter. It is recognized that recovery of the site would be measured in decades, not years.

Cumulative Effects and Connectivity. The analysis of cumulative effects related to vegetation and wildlife, including wildlife movement and connectivity, is provided in PA/FEIS Section 4.17, *Impacts on Vegetation Resources*, Section 4.21, *Impacts on Wildlife Resources*, and in Appendix I, *Biological Resources Cumulative Impacts*. The analysis of cumulative impacts is not an exercise in determining current conditions and trends, but rather evaluates the combined effects of past, present and reasonably foreseeable probable future actions.

Local resource agencies were consulted on the occurrences of wildlife movement corridors in the project area in determining the effects of the project on sensitive plant and wildlife species. Scientific literature also was consulted, including data available in the NECO Plan. As discussed in PA/FEIS Section 4.21, *Impacts to Wildlife Resources*, the project would not directly affect habitat within any NECO Plan connectivity corridors or WHMAs and would not conflict with Desert Bighorn Sheep Conservation goals and objectives outlined in the NECO Plan.

Regarding effects of proposed fencing, Mitigation Measure BIO-9 includes criteria and specifications for desert tortoise exclusion and perimeter security fencing, including maintenance and repair at channels after flood/heavy rainfall events, as does Mitigation Measure Water-14 for channel, fence and gate maintenance. Impacts of fencing are discussed in PA/FEIS Section 4.21, *Impacts to Wildlife Resources*, including the subsection on residual impacts.

Alternatives. As analyzed in PA/FEIS Sections 4.17, *Impacts on Vegetation Resources*, and 4.21, *Impacts to Wildlife Resources*, Reconfigured Alternative 1, Reconfigured Alternative 2 (under Option 1 or Option 2) and the Reduced Acreage Alternative would cause impacts to vegetation and wildlife resources, respectively. These impact differences are shown in Table 4.17.-1 for vegetation and Table 4.21-1for wildlife resources.

Vegetation

As explained in Section 7.3 of the BLM NEPA Handbook, “significance” is a NEPA term of art: it is defined specifically to include effects that are of sufficient context and intensity to require an environmental impact statement; the meanings of “context” and “intensity” are provided in the CEQ regulations (40 CFR 1508.27). To determine the severity of an impact under NEPA, several considerations, including those set forth in Section 7.3 of the BLM NEPA Handbook are evaluated. In the NEPA context, there are no "significance criteria" akin to those established under CEQA. Consequently, the number of sensitive plant species affected by a project does not alone determine whether the project would cause a "significant" impact under NEPA.

Differing alternatives avoid different amounts of habitat. The relative intensity of impacts to Desert Dry Wash Woodland and Unvegetated Ephemeral Dry Wash are set forth in Table 4.17-1. A detailed cumulative impact analysis is found in Appendix I, *Biological Resources Cumulative Impacts*.

Toxic compounds are not intended to be used to suppress dust. For example, AQ-SC-3, *Construction Fugitive Dust Control*, would allow the use only of "appropriate dust suppressant compounds," which may include chemical dust suppressants. Weed control would be accomplished via implementation of BIO-14, which would require a Weed Management Plan to be finalized in accordance with the Safe Use of Herbicides provision of the mitigation measure. The BLM's *Final Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic EIS* and relevant federal, State and local regulations also would apply.

Wildlife

PA/FEIS Section 4.21, *Impacts to Wildlife Resources*, and Appendix I, *Biological Resources Cumulative Impacts*, discuss the direct, indirect and cumulative effects of the proposed action and alternatives to bighorn sheep. As discussed in PA/FEIS Section 4.21, *Impacts to Wildlife Resources*, the project would not directly affect habitat within any NECO Plan connectivity corridors or WHMAs and would not conflict with Desert Bighorn Sheep Conservation goals and objectives outlined in the NECO Plan.

Kit fox and badgers. All habitat surrounding the project site is potentially suitable for kit fox and badger, and biological studies showed suitable habitat is found throughout the study area and outside the disturbed areas of each of the action alternatives. However, any relocation/ translocation effort is likely to entail risk to the translocated animal, be it badger or kit fox. It is recognized that translocation is an imperfect means to address impacts. When animals such as badgers or kit fox are moved into new areas already occupied by individuals of the same species, conflicts for food, water, cover and space can, and do, occur. Additional studies on translocated animals would be impractical given the small numbers of animals involved. "Take" is a recognized type of impact and as such, is not a trigger for studies of the nature suggested. Mitigation Measure BIO-17 requires that the pre-construction surveys for badger and kit fox dens in and near the project area and requires implementation of passive relocation measures to protect them from direct construction impacts. This measure was developed in close consultation with CDFG. The BLM disagrees with the suggestion that passive relocation would cause take as defined by CDFG.

Insects. During the scoping period no issues were raised relative to insects. The Applicant and consultants coordinated with BLM, USFWS, CDFG and CEC on the requirements for species-surveys and survey protocols and checked with the California Natural Diversity Database for occurrences of special-status species in or near the project study area. Additionally, reviews of literature and databases for special-status species revealed no special-status insects within the project study area. No special-status insects occur in the project study area. PA/FEIS Sections 3.18, *Vegetation Resources,* and 3.23, *Wildlife Resources,* discuss the unique biota adapted to sand dunes, noting that sand dune habitats support a number of endemic species which are unique, sensitive to disturbance, and at high risk of species-level extinction. While we are not aware of any dune-endemic insect species listed as endangered or threatened that might occur at the project site, BLM's analysis of impacts to sand dunes in PA/FEIS Section 4.17, *Impacts to Vegetation Resources,* and Section 4.21, *Impacts to Wildlife Resources,* were based on the assumption that sand dunes are unique and threatened habitat types that support unique and unusual species, whether or not those species had been formally petitioned for threatened or endangered status, or identified on the site.

Desert Tortoise. Both the SA/DEIS and the PA/FEIS show that the desert tortoise is one of many native species that would be adversely affected by the project. Direct, indirect and cumulative impacts to its critical habitat and movement, including habitat fragmentation and movement barriers, are discussed in PA/FEIS Section 4.21, *Impacts to Wildlife Resources*, and Appendix I, *Biological Resources Cumulative Impacts*. Neither the SA/DEIS nor the PA/FEIS means to imply a lack of forage resources for desert tortoises. A comprehensive set of mitigation measures, including compensation, are proposed to address impacts to the desert tortoise. These are summarized in Section 4.21, *Impacts to Wildlife Resources*, and set forth in full in Appendix B.

Considerable coordination occurred between CEC, BLM, USFWS and CDFG on the best options for avoiding impacts to desert washes and ultimately avoiding impacts of the project on regional desert tortoise connectivity and movement. These alternatives were analyzed in the CEC's RSA and final Commission Decision, as well as in this PA/FEIS. Following publication of the SA/DEIS, CEC staff requested additional data from the Applicant on how the project would not impair wildlife movement, primarily desert tortoise movement and connectivity, in the project area. The Applicant provided "Wildlife Movement and Desert Tortoise Connectivity" (CEC RSA, 2010), which CEC staff and BLM used in their respective analyses of impacts to wildlife movement and connectivity (primarily in relation to desert tortoise). With 24 undercrossings under Interstate 10 over a distance of 32 miles, the BLM and CEC each concluded that adequate opportunities would remain for desert tortoise movement and connectivity north and south of I-10.

Mitigation Measure BIO-10, *Desert Tortoise Relocation/Translocation Plan,* requires the Applicant to develop and implement a final plan that is consistent with current USFWS approved guidelines no later than 30 days before site mobilization. It is recognized that translocation is an imperfect method to address impacts because any relocation/translocation effort is likely to entail risk to the translocated animal. All modifications to the approved Plan shall be made only after approval by BLM's Authorized Officer and the CPM, in consultation with USFWS and CDFG.

In consultation with USFWS and CDFG, mitigation at a 5:1 ratio (critical habitat) and at a 1:1 ratio (outside critical habitat) through land acquisitions or an assessed financial contribution based on the final construction footprint would address habitat loss within the project disturbance area. This compensatory mitigation is consistent with measures in Incidental Take Permits issued by CDFG for projects in the region, and with requirements described in the NECO Plan.

Mitigation Measure BIO-12 (Desert Tortoise Habitat Compensation) was developed to reflect these ratios (BIO-12 is set forth in full in Appendix I, *Conditions of Certification*).

Extirpation of the desert tortoise from the cumulative impacts of solar projects is not predicted.

Mojave fringe-toe lizard (MFTL). Considerable coordination occurred between CEC, BLM, USFWS and CDFG on the best options for avoiding impacts to sand dune habitat and ultimately avoiding impacts of the project on regional MFTL, connectivity and movement. These alternatives were analyzed in the CEC's RSA and final Commission Decision, as well as in this PA/FEIS. Reconfigured Alternative 2 (including Options 1 and 2) was developed to reduce the severity of impacts to the MFTL relative to the proposed action.

The 3:1 mitigation ratio recommended for stabilized and partially stabilized sand dunes is consistent with the NECO Plan. Non-dune habitats occupied by MTFL (sand fields vegetated with sparse creosote bush scrub) are mitigated at a ratio of 1:1; and indirect effects to MFTL habitat at a ratio of 0.5:1 as reflected in Mitigation Measure BIO-20, *Sand Dune/Mojave Fringe-Toed Lizard Mitigation*, which is summarized in PA/FEIS Section 4.21, *Impacts to Wildlife Resources*, and set forth in full in Appendix B, *Conditions of Certification*. Off-site and edge effects were analyzed for MFTL and other species in PA/FEIS Section 4.21, *Impacts to Wildlife Resources*, including edge effects such as fragmentation, increased road kill hazard from operations traffic, harm from accidental spraying or drift of herbicides and dust suppression chemicals, and increased access for avian predators due to new perching structures.

The PA/FEIS analyzes impacts beyond the edges of the project footprint for MFTL in PA/FEIS Section 4.21, *Impacts to Wildlife Resources*.

Migratory birds. Impacts to migratory birds and migratory bird habitat in desert dry washes was analyzed in PA/FEIS Section 4.21, *Impacts to Wildlife Resources*. Concave mirrors that track the sun are unlike other mirrors for which bird strikes have been documented. Uncertainty over the scale of impacts (such as bird strikes on mirrors) prompted the development of BIO-16, which includes preparation of an Avian Protection Plan with adaptive management features. As a performance standard of Mitigation Measure BIO-16, data must be collected to determine if impacts occur and, if so, other measures would be developed and implemented to avoid or minimize avian deaths or injuries. A draft Avian Protection Plan is not needed to conclude that such a plan would be sufficient to reduce impacts.BIO-16 requires that a final Avian Protection Plan that has been reviewed by CDFG and USFWS to be submitted before commercial operation of any of the power plant units. Mitigation Measures BIO-16 and BIO-26, *Evaporation Pond Netting and Monitoring*, both summarized in PA/FEIS Section 4.21.4, *Summary of Mitigation Measures*, and set forth in full in Appendix B, would address impacts to migratory birds from evaporation ponds and other hazards. Additionally, the evaporation ponds are discussed in PA/FEIS Section 4.11, *Public Health and Safety*, and Section 4.19, *Water Resources*.

One comment suggested that the chemical constituents of the heat transfer fluid (HTF) could pose a hazard to birds. Proposed leak detection would trigger prompt response in the event of an HTF leak: Visual inspection would occur throughout the solar field on a daily basis to detect leaks occurring at ball joints or other connections; the configuration of the looped system would allow different sections of the loops to be isolated if necessary; and remote pressure sensing equipment and remotely actuated valves would detect and isolate any large leak in the piping system. Nonetheless, some HTF leaks can be expected to occur. The two solar fields to be installed at the project site each would include an approximately 4-acre land treatment unit (LTU) (for a project total of 8 acres) to bioremediate soil contaminated by an HTF release. The LTUs would be designed in accordance with Colorado River Basin Regional Water Quality Control Board requirements and utilize indigenous bacteria to metabolize hydrocarbons contained in non-hazardous[2] HTF-contaminated soil. A combination of nutrients, water, and aeration would facilitate the bacterial activity where microbes restore contaminated soil within two to four months.

Golden eagle. The PA/FEIS describes the golden eagle resource in the vicinity of the project in Section 3.23, *Wildlife Resources*. PA/FEIS Section 4.21, *Impacts to Wildlife Resources*, and Appendix I, *Biological Resources Cumulative Impacts*, analyze direct, indirect and cumulative impacts to the golden eagle from the proposed action and alternatives. Additionally, Mitigation Measure BIO-25, *Golden Eagle Inventory and Monitoring*, is recommended to address impacts to golden eagle: it is summarized in Section 4.21, *Impacts to Wildlife Resources*, and set forth in full in Appendix B, *Conditions of Certification*. Also, Mitigation Measure BIO-12, *Desert Tortoise Compensation*, would compensate with like habitat in the same area for the lost golden eagle foraging habitat.

Golden eagles were surveyed in 2010 concurrently with the surveys for Blythe and Genesis projects, and that survey information is current as of the publication of this PA/FEIS. The Applicant's report, entitled *Golden Eagle Survey Results for the Palen Solar Power Project*, is dated September 13, 2010 (Solar Millennium, 2010). The report summarizes golden eagle survey results completed in 2010 and clarifies and confirms prior assumptions and understandings.

The SA/DEIS and PA/FEIS consider all species mentioned in the comments and many others. A full list of vegetation and wildlife resources considered in the affected environment is found in PA/FEIS Section 3.17, *Vegetation Resources*, and 3.23, *Wildlife Resources*.

5.5.2.8 Climate Change / Greenhouse Gases

Commenters and Comments Addressed

Commenter	Comments
Center for Biological Diversity	3-081, 3-082, 3-084, 3-085
The Wilderness Society and the Natural Resources Defense Council (NRDC)	5-18, 5-29
Western Watersheds Project	7-04

[2] The California Department of Toxic Substances Control (DTSC) has determined for a similar thermal solar power plant that soil contaminated with up to 10,000 mg/kg of HTF is classified as a non-hazardous waste.

Summary of Issues Raised

1. ***Air Quality*:** Whether the analysis adequately identifies GHG emissions impacts.

2. ***Biological Resources*:** Whether the analysis of effects of global climate change on the affected environment is adequate, including with respect to the importance of wildlife movement corridors and habitat connectivity and identification of strategies to monitor climate change effects on groundwater or special-status species.

3. ***Carbon Sequestration:*** Whether the analysis of effects of global climate change is adequate, including to what extent the proposed action would result in reduced carbon sequestration and/or emission of carbon stored in soil organic matter and vegetation currently located on site.

4. ***Hydrology*:** Whether the analysis of effects of global climate change is adequate, including to what extent climate related changes to hydrologic resources could affect the proposed action or be exacerbated by the proposed action. Specific issues include drainage, flooding and water supply.

5. ***Hazards:*** Whether the analysis of effects of global climate change is adequate in terms of potential hazards, including increases in potential heat-related hazards, as a result of climate change.

6. ***Soils*:** To what extent the climate change analysis provided in the EIS should address potential changes in erosion patterns as a result of changes in flooding frequency and other drainage issues that could be exacerbated by climate change.

Response

A discussion of climate change, including the effects of the proposed action on climate change, was included in SA/DEIS Chapter C.1, Air Quality. The BLM acknowledges that additional discussion is warranted given recent federal directives regarding the consideration of climate change in planning documents promulgated by the United States Department of the Interior. Therefore, PA/FEIS Section 4.3, *Impacts on Global Climate Change*, provides updated, supplementary information relative to the SA/DEIS, including a review of the potential contribution of GHGs by the project, the potential climate change-related benefit that would be provided by the project, and the potential impacts of climate change-related effects (such as increases in flooding or decreases in water supply) on the project.

Air Resources

Air resources, including fugitive dust and GHG emissions are discussed in SA/DEIS Chapter C.1, Air Quality, and PA/FEIS Sections 3.2 and 3.3 (*Affected Environment*, air quality and climate change, respectively) and PA/FEIS Sections 4.2 and 4.3 (*Environmental Consequences*, impacts to air quality and climate change, respectively). Concerning impacts to air resources, PA/FEIS Section 4.2, *Impacts on Air Resource*, includes a detailed dispersion modeling analysis of PM10 and ozone emissions for the construction phase and operation phase of the project, including those emissions that would occur as a result of fugitive dust. The implementation of Mitigation Measure AQ-SC3, *Construction Fugitive Dust Control*, would be required during construction.

The Applicant also would implement similar fugitive dust controls during the operations phase of project, as discussed PA/FEIS Section 4.2, *Impacts on Air Resource*.

Mitigation Measure AQ-SC7, *Operations Dust Control Plan*, would mitigate operation period fugitive dust emissions to ensure compliance with State and local regulations and requirements. Although climate change could result in some degree of reduction of soil moisture, as discussed below, soil moisture is already very low under current conditions. Any further reduction in soil moisture would be minimal in terms of the absolute amount of water contained in soils on the proposed site. Therefore, any potential further reductions in soil moisture associated with climate change are not anticipated result in a substantial increase in fugitive dust emissions. AQ-SC7's Operations Dust Control Plan and other air quality-related mitigation measures recommended in the SA/DEIS and PA/FEIS would be sufficient to meet federal, state and local requirements regarding fugitive dust.

Sulfur hexafluoride (SF6) emissions would be associated with incidental leakage from the circuit breakers proposed as part of the high voltage power transmission facilities for the PSPP, as discussed in PA/FEIS Section 3.3, *Global Climate Change*. SF6 and the other GHGs analyzed in PA/FEIS are measured in units of carbon dioxide equivalent (CO2e). Emissions calculations relied upon in the PA/FEIS were provided in the sources identified in Section 4.3, *Impacts on Global Climate Change*. As demonstrated by the analysis in that section, the action and action alternatives would result in a substantial net reduction of GHG emissions by replacing conventional high GHG-producing energy sources with low GHG-producing renewable solar power. Therefore, there is no need to provide additional GHG emissions offsets for construction emissions. Short-term GHG construction emissions associated with the project easily would be offset by project operations within the first several months of project operations. Further, given the operation-related net reduction in GHG emissions, no additional mitigation measures are recommended.

GHG emissions associated with water use and the life-cycle of building materials are not included in the analysis. It is acknowledged that there would be additional indirect emissions associated with these sources; however, the emissions related to water use would not significantly change the emissions totals presented in PA/FEIS Table 4.3-1, *PSPP Construction-related Greenhouse Gas Emissions*, or Table 4.3-2, *PSPP Operating Greenhouse Gas Emissions*. The assumptions that would be required to analyze life-cycle emissions of the building materials would be speculative; guesses would not likely provide an accurate representation of such emissions.

Biological Resources

Biological resources could be affected by climate change. Distribution patterns of species generally are expected to shift according to regional changes in temperature and precipitation. The location of wildlife migration corridors and the extent of invasive species also may be altered.

Concerning fisheries, the project does not contain any perennial or other surface waters that contain fisheries resources. Therefore, there would be no direct, indirect or cumulative contribution to climate change by the project, and climate change-related impacts on fisheries resources would not affect the project.

Concerning mitigation value waterways to be acquired and protected, as discussed in SA/DEIS Chapter C.2 and PA/FEIS Sections 4.17, *Impacts on Vegetation Resources*, and 4.21, *Impacts on Wildlife Resources*, impacts of the proposed action could be avoided or reduced by the implementation of mitigation measures that would require the replacement or substitution of biological resource values that would be lost as a result of implementation of the project. Also as discussed, the proposed mitigation lands would be required to be equivalent in terms of habitat value, and at a replacement ratio of at least 1:1 (typically greater than 1:1, as specified in SA/DEIS Chapter C.2) for direct impacts. Unfortunately, climate change could result in adverse effects on biological resources located on these mitigation lands. However, given that mitigation lands must be similar in biological resources value as compared to lost resources on site, it is anticipated that climate-related effects for the mitigation lands would be similar to those located at the proposed site, if the project were never built. Therefore, potential reductions in the biological resources values of mitigation land values resulting from climate change are expected to be similar to on-site conditions in the absence of the project.

It would be extraordinarily difficult, if possible at all, to provide a broad-based climate analysis to a particular special-status species or habitat. Distribution patterns of species are generally expected to shift according to regional changes in temperature and precipitation, while the location of wildlife migration corridors and the extent of invasive species may also be altered. Project impacts on habitat fragmentation, habitat linkages, and cumulative impacts of multiple projects on corridors and connectivity are analyzed in the PA/FEIS and are only heightened in their importance by the effects of global climate change. As discussed in PA/FEIS Section 4.3, *Impacts on Global Climate Change*, adverse impacts of global climate change are expected to continue; however, international, national and regional efforts, as well as the proposed action, are expected to reduce the rate at which such change occurs, and, thereby, to benefit the environment by minimizing the environmental impacts of climate change. Appropriate climate data would be collected while groundwater monitoring and special-status species monitoring occurs. Analysis of monitoring resource and project effects would consider available climate data when evaluating trends.

Carbon Sequestration

Another comment raises the issue of potential loss or destruction of existing carbon sinks. These include losses of soil carbon from desert soils, loss of existing vegetation on site, and loss of carbon sequestration that would have occurred on site over the life of the project, if the proposed action and action alternatives were not developed. Potential carbon-related effects related to land use changes have been a subject of scientific, government, and interest group interest and research for the last several years, and many researchers have provided estimates of the amount of carbon contained in desert soils and vegetation, and the amount of carbon taken up annually by ecosystems in the Mojave Desert and similar climates. Estimates vary substantially based on the specific location of interest.

In response to comments on this topic, additional information has been included in PA/FEIS Section 4.3, *Impacts on Global Climate Change*. As indicated in that section, there has been much discussion regarding carbon capture sequestration (CCS) and its potential to reduce carbon emissions from fossil power plants. However, to date, only pilot-scale CCS projects have been implemented in the U.S. Therefore, the fossil power that the proposed action would displace would not include CCS. Almost all of California's fossil-based electricity is supplied from natural gas without carbon capture, and carbon emissions California's existing grid mix of power would be many times higher than the IGCC with CCS case that is considered under the proposed action. Therefore, while the BLM acknowledges that the proposed action would result in increased carbon emissions due to land use changes on site, the total mass of carbon emitted due to these land use changes would be significantly less than the net carbon emission savings of the power plant, based on displacement of existing fossil power production.

Hydrology

A discussion of climate change, including the effect of the proposed action on climate change, as well as the effects of climate change on the proposed, was included in SA/DEIS Chapter C.1, *Air Quality*, and is included in PA/FEIS Section 4.3, *Impacts on Global Climate Change*. Given recent federal directives regarding the consideration of climate change in planning documents, PA/FEIS Section 4.3.2, *Direct and Indirect Impacts of the Proposed Action on Global Climate Change*, includes supplemental information addressing direct and indirect impacts of climate change.

As discussed in SA/DEIS Chapter C.9, *Soil and Water Resources*, the proposed action would include a series of engineered facilities, including rerouted drainage/flood channels, berms and on-site drainage facilities that would channel, retain and otherwise manage stormwater and flood flows on site and in the areas immediately surrounding the project. Also discussed in SA/DEIS Chapter C.9, the proposed action would be designed to account for stormwater drainage and flood flows. Energy Commission Conditions of Approval SOIL&WATER-11 through -13 (see PA/FEIS Appendix B) would require revisions to the proposed drainage report and plans, completion of a detailed FLO-2D analysis, and implementation of drainage channel design and channel erosion protection measures.

As discussed in SA/DEIS Chapter C.9 and PA/FEIS Section 4.19, *Impacts on Water Resources*, the project is not expected to affect Colorado River water; however, because some uncertainty remains, mitigation measures are recommended to avoid any impact should it occur. In the event that climate change results in reduced precipitation within the project area and its vicinity, some degree of associated reduction in groundwater recharge could occur. However, this situation would not result in increased water requirements by the project, and would not result in additional groundwater pumping during project construction or operations. Additionally, as discussed in SA/DEIS Chapter C.9 and PA/FEIS Section 4.19, *Impacts on Water Resources*, the rate of groundwater pumping for the PSPP would be minor in comparison to the total volume of groundwater contained in storage. Therefore, even with potential reductions in total precipitation volume associated with future climate change, the ability of the project to meet its water needs would not be reduced, and no increase in pumping would be required as a result of the effects of climate change.

Hazards

Potential risks associated with wildfire are discussed in SA/DEIS Chapter C.14, *Worker Safety and Fire Protection*, and PA/FEIS Sections 3.22 and 4.20, concerning wildland and fire ecology.

SA/DEIS Chapter C.14 and PA/FEIS Section 3.12 and 4.11, *Public Health and Safety*, discuss potential fire-related risks, and also ensure that adequate fire control personnel, infrastructure, and associated planning would be completed and/or available to the project, to ensure compliance with federal, state and local regulations, and to ensure worker safety.

Climate change would result in a small but general increase in temperature, and could also result in an increase in the frequency of extreme weather events that could generate wildfires, such as increased frequency of drought and heat waves, during operation of the project. In compliance with applicable regulations and mitigation proposed in SA/DEIS Chapter C.14 and PA/FEIS Chapter 4, *Environmental Consequences*, the Applicant would be required install a fire protection/control system on site in including a fire water supply system and associated infrastructure, and to comply with State and federal regulations regarding worker safety and training. Additionally, under Energy Commission Condition of Certification WORKER SAFETY-7 (see, PA/FEIS Appendix B), the Applicant would be required to provide funding to the Riverside County Fire Department to ensure available resources to fight potential fires on site. Although the risk of wildfire that could affect the site could increase as a result of climate change, these potential increases in risk are expected to be offset by ongoing compliance with the worker safety and fire protection regulations and mitigation measures specified in SA/DEIS Chapter C.14 and PA/FEIS Sections 4.11, *Impacts on Public Health and Safety* and 4.20, *Impacts on Wildland Fire Ecology*. No additional mitigation is recommended.

Concerning heat waves, the frequency of occurrence and the severity of heat waves could increase as a result of climate change. Heat waves could result in increased potential risk to project employees. However, as discussed in SA/DEIS Chapter C.14 and, PA/FEIS Section 4.3, *Impacts on Global Climate Change,* Energy Commission Condition of Certification WORKER SAFETY-2 (see PA/FEIS Appendix B) would require implementation of an operation period heat stress protection plan that is based on and expands on Cal-OSHA requirements. This plan would provide measures to protect workers against the effect of heat-related hazards, whether or not those hazards are caused by climate change. Although the frequency and/or intensity of heat wave events could increase as a result of future climate change, the heat stress protection plan would meet State requirements for worker safety. No further mitigation measures are recommended concerning this concern.

Soils

As discussed in SA/DEIS Chapter C.9, *Soil and Water Resources*, and PA/FEIS Sections 3.15, *Soil Resources* and 4.14, *Impacts on Soil Resources,* concerning the affected soil resources environment and environmental consequences relating soils resources, respectively, almost all rainfall that occurs in this region of California is lost through evaporation and evapotranspiration. Soil moisture on the project site and in its vicinity is characteristically low. As discussed previously, although precise changes are impossible to predict, climate change could result in increases in extreme weather events, including droughts and heat waves, and an overall reduction in precipitation. These conditions could result in a concurrent reduction in soil moisture content at the proposed site and regionally. However, reductions in soil moisture content would not affect project operations, and would not require any change in water resources usage. Additionally, the proposed facilities would in no way support additional drying of soils on site, or otherwise exacerbate potential changes in soil moisture associated with climate change. Therefore, no additional change would occur.

5.5.2.9 Air Quality

Commenters and Comments Addressed

Commenter	Comments
Joshua Tree National Park	1-19
Center for Biological Diversity	3-067, 3-083
California Unions for Renewable Energy (CURE)	6-021, 6-102, 6-103, 6-107, 6-108, 6-109, 6-110, 6-112, 6-113, 6-114, 6-115, 6-116

Summary of Issues Raised

1. ***Construction-Related Impacts:*** Whether the PA/FEIS adequately identifies construction-related impacts of construction exhaust emissions and fugitive dust and identifies adequate mitigation measures.

2. ***Cumulative Analysis:*** Whether the analysis of cumulative air quality impacts relies on an adequate cumulative setting.

Response

Adequacy of Mitigations for Construction-Related Emissions and Fugitive Dust

PA/FEIS Section 4.2, *Impacts to Air Quality*, summarizes mitigation measures to be implemented during the construction, operation and decommissioning of the project. Several of the mitigation measures in PA/FEIS Section 4.2, *Impacts to Air Quality*, are meant to reduce or treat exhaust (i.e., post-combustion emissions) from construction equipment. For example, AQ-SC6, *Emission Standards Vehicles*, and AQ-4, *Dust Plume Response Requirement*, states that tests shall be conducted to determine the oxygen levels in the exhaust; AQ-SC5, *Diesel-Fueled Engine Control*, states that all precautions must be made to reduce emissions from diesel-fueled engines. Fugitive dust mitigation measures that would substantially reduce potential fugitive dust emissions during construction also are identified in PA/FEIS Section 4.2, *Impacts to Air Quality*, and include AC-SC3, *Construction Fugitive Dust Control*, AC-SC4, *Dust Plume Response Requirement*, and AQ SC-7, *Operations Dust Control Plan*, which require the Applicant to develop and implement construction and operational fugitive dust control plans, respectively. The full text of these and other mitigation measures are set forth in full in PA/FEIS Appendix B.

A comment suggests many feasible mitigation measures to be used during commercial/industrial operations that have been identified by a number of California air districts. Some of these measures are accounted for in PA/FEIS Section 4.2, *Impacts to Air Quality*, and all mitigations identified are meant to reduce emissions during each phase of the project. For example, Mitigation MeasureAQ-3, *Propane-fired Equipment*, discusses equipment that shall be fired exclusively with propane.

Mitigation Measure AQ-SC6, *Emission Standards Vehicles*, and AQ-SC7, *Operations Dust Control Plan*, also include the Applicant's stipulated operations emission mitigation, to limit exhaust emissions and fugitive dust emissions during project operation to the extent feasible. Mitigation Measure AQ-13, *Operating Time Limit*, addresses limitations on the construction activities that may be conducted beyond after standard workday hours. A revised construction schedule would result in a shift of some construction activity from daytime to nighttime hours, it does not propose extended operations that would result in a substantial increase in the overall hours of heavy-duty diesel powered construction equipment. Therefore, construction emissions would not be substantially different than those analyzed in the SA/DEIS.

A comment suggests implementing emission limits on new off-road engines that have been established by U.S. ESA and ARB. To be certain that there would be no risk to public health from construction NOx, ROG and/or PM10 emissions, off-road construction equipment should be mitigated by requiring the use of equipment that meets the latest U.S. EPA and ARB engine emission standards. Implementing appropriate off-road equipment emission control measures, such as those described in Mitigation Measures AC-SC5, *Diesel-Fueled Engine Control*, and AC-SC-6, *Emission Standards Vehicles*, would substantially reduce potential off-road equipment tailpipe emissions potential during project construction.

Cumulative Analysis

A list of projects considered in the cumulative scenario, which includes past, present and reasonably foreseeable probable future projects, is provided in PA/FEIS Section 4.1.4, *Cumulative Scenario Approach*. Specific to the air quality analysis, PA/FEIS Table 4.1-1, *Cumulative Scenario*, identifies the affected air basin as the geographic area of cumulative concern and the air resource-related issues of interest for the project, as well as a variety of BLM renewable energy projects (e.g., Chuckwalla Solar project, the Genesis Solar Energy Project and the EnXco project), other BLM-authorized actions and other known actions/activities (e.g., the Chuckwalla Valley Raceway). The cumulative analysis adequately considers the project's contribution to localized cumulative impacts. Mitigation measures summarized in PA/FEIS Section 4.2, *Impacts to Air Quality*, and set forth in full in Appendix B adequately would address localized cumulative air quality impacts.

5.5.2.10 Water Resources

Commenters and Comments Addressed

Commenter	Comments
Joshua Tree National Park	1-06, 1-08, 1-10, 1-11, 1-12, 1-13, 1-14, 1-15, 1-16, 1-17
Center for Biological Diversity	3-008, 3-073, 3-074, 3-075, 3-076, 3-077, 3-078
The Wilderness Society and the Natural Resources Defense Council (NRDC)	5-12
California Unions for Renewable Energy (CURE)	6-022, 6-026, 6-143, 6-148, 6-151, 6-152, 6-153, 6-154, 6-155, 6-156, 6-157
Western Watersheds Project	7-09
Metropolitan Water District of Southern California	8-04, 8-05, 8-06

Summary of Issues Raised

1. ***Groundwater Resources and Water Supply:*** Direct, indirect and cumulative impacts to groundwater and connectivity to the Colorado River; water balance, supply and usage (including during construction); cumulative context; and concerns about the effectiveness of proposed mitigation measures and the adequacy of the water model used and graphic representations of historical data.

2. ***Streams and Other Water Resource Issues:*** Water resources impacts to downstream flow and sedimentation, natural drainage channels and streambed effects, including geologic effects; and impacts to vegetation, biological resources and dune ecosystems.

3. ***Water Use for Cooling:*** How the proposed dry-cooled project will affect water resources.

4. ***Water Rights:*** Whether the Applicant has sufficient rights to water needed for construction and operation of the project, or whether such rights will be needed to be obtained; the necessary limitations of water rights contracts; and the extent of geographic area considered for the impacts of extracting Colorado River water.

Responses

Groundwater Resources and Water Supply

The impact assessment contained in PA/FEIS Section 4.19, *Impacts to Water Resources*, including the potential impacts to groundwater resources in the Chuckwalla Valley Groundwater Basin (CVGB), is an analysis of the anticipated direct and cumulative effects of the project, in comparison to the various alternatives, as required under NEPA. The analysis quantifies the extent of groundwater depletion that would be expected (see PA/FEIS Tables 4.19-1 and 4.19-7). The data that were used in support of the impact analysis, including level of significance designations, are included in this PA/FEIS for review. Comments refer to CEQA significance criteria, which are not incorporated into this PA/FEIS for the NEPA analysis.

A comment states concern with the long-term water level trends presented in the SA/DEIS (hydrographs). The purpose of these hydrographs is to illustrate historic groundwater levels in the vicinity of the project site, and also to disclose historic trends in water level, as data are available, from as early as the 1950s. Data collection at these wells was unfortunately sporadic. However, taken together, these data generally show relatively stable water levels in the basin until the 1980s, a period of decline in the 1980s, and then a resurgence in water levels during the 1990s. To the extent possible, similar scales were used along the vertical axes of each chart, in order to allow the reader to easily compare historic water levels among each of the ten well sampling sites. Updating the charts to show a more expanded vertical scale would limit the reader's ability to easily compare water levels at each of these well sites. Therefore, no update to the figure was made.

A comment suggests that the total recoverable amount of water within the CVGB could be limited to 75,000 or 3,000 acre-feet; however, this value appears to use an incorrect formula based on storativity and other parameters that were included in Table 7 in the SA/DEIS, which is the same as Table 4.19-2 in this PA/FEIS. Consequently, the proposed value is not an appropriate point of comparison.

A comment further proposes to use a basin storage value of 9.1 million acre-feet, as compared to 15 million acre-feet, citing that the 9.1 million acre-feet storage value is a more conservative estimate and is consistent with documentation from a pumped hydrologic storage project in the vicinity of the project. The studies completed in support of the project were completed as recently as 2010 with the most up-to-date data available at the time of printing that is directly relevant to the project. A comment uses groundwater storage documentation prepared in support of a separate project (Eagle Crest Energy), which is expected to include significantly different study and boundary assumptions. Use of the Eagle Crest Energy data is not anticipated to result in more accurate basin storage estimates relevant to the project and would not be consistent with other BLM documentation for regional solar power projects. Therefore, the BLM declines to rely on the Eagle Crest Energy reports.

As discussed in PA/FEIS Section 4.19.3, *Cumulative Impacts [relating to Water Resources]*, potential cumulative impacts to groundwater are considered in light of basin balance, levels and water quality. Cumulative impacts to the Colorado River are not expected; nonetheless, mitigation measures are recommended to address any remaining uncertainty. With the implementation of these measures, potential impacts related to Colorado River hydrology either would be avoided entirely or would be off-set by a requirement that the Applicant apply for and receive an allocation. Under either scenario (the expected no impact or potential impact avoided), the project would not contribute any impact to cumulative Colorado River water conditions.

Comments raise concerns regarding adherence to mitigation and monitoring and suggest oversight of monitory by USGS or the California Department of Water Resources. However, requiring oversight of the groundwater level monitoring program by an outside agency such as those indicated would be inefficient in terms of agency coordination and cost. Additionally, the proposed mitigation monitoring plan is expected to be sufficient to meet such needs. Therefore, additional mitigation, including third party oversight, is not warranted to effectively mitigate potential impacts.

A comment states that geohydrologists sometimes assume that a “relatively undeveloped desert basin like the CVGB is in a quasi-equilibrium condition with respect to… water balance.” However, as discussed in PA/FEIS Section 3.20, *Water Resources*, this assumption, and the conclusions that the comment draws from it, are not correct. The basin had been overdrafted to support of historic agricultural production during previous decades and still appears to be in the process of recovering from that period. Using basin outflow as an indicator of basin budget for a basin that is recovering from overdraft would likewise result in a flawed analysis, wherein the total basin balance would be substantially underestimated due to reduced outflow under recovery conditions. Use of other substantially lower estimates of groundwater basin balance, as suggested by the comment, would therefore not be justified, and would run counter to the best available data and information regarding groundwater levels and basin balance for the CVGB system.

As discussed under the *Groundwater Levels* subsection of PA/FEIS Section 4.19, *Impacts to Water Resources*, the maximum predicted water table drawdown over the lifetime of the project would be 57 feet, in the area immediately adjacent to the pumping well, resulting in a radius of approximately 2-3 miles from the project site where groundwater would be drawn down by up to 1 foot. Furthermore, the nearest potential halophyte communities to the project are located approximately 3-6 miles from the project site, and estimates of groundwater level drawdown in that area are expected to range from 0.2 to 0.6 feet. Additional detail regarding the extent of drawdown can be gained by reviewing groundwater level modeling documentation, as well as the figures included in the PA/FEIS. With implementation of the several recommended mitigation measures, these potential impacts would be reduced. Thus, the level of detail contained in the PA/FEIS is adequate under NEPA.

Text in the cumulative impacts analysis of PA/FEIS Section 4.19, *Impacts to Water Resources*, reflects the values shown in PA/FEIS Tables 4.19-6 and 4.19-7.

PA/FEIS Table 4.19-1 has been updated to show the following values for the net budget balance column: 2,128 acre-feet/yr during construction and 2,308 acre-feet/yr during operations.

PA/FEIS Table 4.19-7 has been updated to show 3,745 acre-foot/yr and -1,137 acre-foot/yr, respectively.

Groundwater modeling specific to the project was completed by AECOM (2010a as cited in the CEC RSA, 2010). PA/FEIS Table 4.19-2 provides a summary of numerical results from the groundwater model, including figures and tables drawn from that report, and a discussion of associated findings. This model is considered to be sufficient for the purposes of impact assessment under NEPA. For additional modeling details, including development, calibration, and additional results from the groundwater model used in support of the project, please refer to AECOM (2010a as cited in the CEC RSA, 2010).

The groundwater model used by AECOM is based on the United States Geological Survey (USGS) model developed by the USGS used to define the Colorado River accounting surface, and was modified slightly to account for project-specific properties. Additional documentation on the properties of this model, including the detailed technical characteristics relating to model calibration, results of modeling runs, sensitivity analysis, and other items, can be found in AECOM (2010a as cited in the CEC RSA, 2010) as well as the California Energy Commission's Revised Staff Assessment and supporting documentation for the project.

Water consumption needs analyzed in the PA/FEIS reflect water use associated with concrete batch plant operations (see PA/FEIS Section 4.19, *Impacts on Water Resources*). Total water consumption that would occur under the project is summarized in PA/FEIS Table 4.19-1, and amounts to 480 acre-feet/yr during construction (1,440 acre-feet total for construction over 3 years) and 300 acre-feet/yr during operation (9,000 acre-feet total for operation over 30 years). No additional water use is proposed.

Streams and Other Water Resource Issues

The PA/FEIS acknowledges the project's potential impact on existing washes located on site, as well as immediately downstream of the project area, including related potential impacts associated with loss or interference with biological habitats and dune ecosystems. Specifically, discussion of groundwater use and groundwater pumping (including as it may affect the Colorado River as well as groundwater dependent ecosystems), natural springs, wildlife and fire ecology are provided in PA/FEIS Section 4.17, *Impacts on Vegetation Resources*, Section 4.20, *Impacts on Wildland Fire Ecology*, and Section 4.21, *Impacts on Wildlife Resources*. These sections disclose potential biological resources impacts, and recommend a suite of mitigation measures to address potential impacts associated with loss of habitat and other effects on biological resources. No further potential impact categories related to the use of groundwater were identified.Potential impacts to the sand transport corridors and the dunes themselves are evaluated in PA/FEIS Section 4.14, *Impacts on Soils Resources*, and Section 4.17, *Impacts on Vegetation Resources*. These sections recommend mitigation measures to address potential impacts of the project to the sand transport corridors and the dunes to minimize potential impacts on these sensitive resources. Additional analysis is not warranted.

The project would use only groundwater. The project would not require the use of surface water for construction or operation. Groundwater levels within the CVGB in areas potentially affected by or hydrologically downstream of the project are sufficiently below the ground's surface, such that no change in surface water infiltration rates would occur as a result of any potential project-related groundwater drawdown. Flood waters associated with desert washes in the vicinity of the PSPP would be routed around the project site and would not be captured or detained. Potential effects on the Colorado River would be mitigated as discussed in Chapter 4.19, *Impacts on Water Resources*.

As discussed in PA/FEIS Section 4.19, *Impacts to Water Resources*, the existing natural drainages that are located on site would be re-routed around the project, and the project would be sited to avoid interference with some larger washes. The potential changes that would result in downstream flow was assessed in the Project Drainage Report (CEC RSA, 2010), via HEC-HMS and FLO-2D modeling. The Applicant will be preparing additional drainage engineering and design work, including adherence to proposed mitigation measures requiring an updated drainage plan. Compliance with Riverside County guidelines for conveyance channels, revisions to preliminary grading and drainage plans, and implementation of a channel maintenance program during Project operations are also considered. However, the purpose of this work is to provide engineering-level details of project design for project drainage, within the scope of the drainage facilities that have been disclosed for the project within the PA/FEIS. The overall scope and nature of the drainage facilities proposed in the PA/FEIS will not change, and thus are adequate for assessing potential impacts associated with the project.

As discussed above, the maximum predicted water table drawdown over the lifetime of the project would be in the area immediately adjacent to the pumping well, resulting in a radius of approximately 2-3 miles from the project site where groundwater would be drawn down by up to 1 foot. The nearest potential halophyte vegetation communities to the project are located approximately 3-6 miles from the PSPP site, and estimates of groundwater level drawdown in that area are expected to range from 0.2 to 0.6 feet. Additional detail regarding the extent of drawdown can be gained by reviewing groundwater level modeling documentation, as well as the figures included in the PA/FEIS. As discussed in PA/FEIS Section 4.19, *Impacts on Water*

Resources, with application of recommended mitigation measures, potential impacts would be reduced. Thus the level of detail contained in the PA/FEIS is adequate under NEPA.

As discussed in PA/FEIS Section 4.19, *Impacts to Water Resources*, the potential for subsidence associated with groundwater withdrawal is anticipated to be remote, based on the geologic/sedimentary characteristics of the CVGB, and on a lack of measured subsidence during previous, historic drawdown events. Earth fissuring would not be supported by the sandy soils located on site. Potential for interference with wells is addressed in PA/FEIS Section 4.19, *Impacts on Water Resources*. As discussed therein, drawdown of groundwater levels associated with the project could result in reductions in water levels at nearby wells, causing various problems. These potential impacts would be mitigated via the incorporation of mitigation measures that are discussed in the PA/FEIS, including pump monitoring to ensure that the water usage rates proposed in this document, during construction and operation, are not exceeded over the life of the project; implementation of a groundwater level monitoring, mitigation and reporting plan during construction and operation; provisions for monetary or other reimbursement for potential impacts to wells; and provisions for groundwater production reporting.

In regards to modifications associated with transmission lines and access roads, potential effects of access roads to support access to the project site are included in the assessment of the main project site, while potential effects on drainage associated with proposed transmission lines and associated access roads are discussed separately within PA/FEIS Section 4.19, *Impacts on Water Resources*. Briefly, localized grading along these facilities could adversely affect offsite portions of existing drainages, if it is not stabilized properly. Mitigation measures are identified to reduce the intensity of this potential impact. Also, diversion or channelization of existing drainages would not occur as a result of installation of the proposed transmission line.

As discussed in PA/FEIS Section 4.19, *Impacts on Water Resources*, and above, the PSPP is not expected to affect the Colorado River; however, because uncertainty remains, mitigation measures are identified to address potential effects. As further discussed in PA/FEIS Section 4.17, *Impacts on Vegetation Resources*, Section 4.19, *Impacts to Water Resources*, and 4.21, *Impacts on Wildlife Resources*, the PSPP would not otherwise affect surface water, including springs or seeps, such that wildlife or other biological resources would be affected. As discussed in PA/FEIS Section 3.20, *Water Resources*, the only surface water features located on site or adjacent to the project are ephemeral desert washes. The project would not draw water from these washes, and would not otherwise require or use surface water in support of construction or operations.

Water Use for Cooling

As discussed in PA/FEIS Chapter 2, *Proposed Action and Alternatives*, the proposed action would include an air-cooled condenser that would provide air-based cooling for the power generation train of the plant. The incorporation of air cooling into the project was proposed by the Energy Commission as a potential measure to offset most of the water use requirements for the PSPP. As a result, dry cooling has been incorporated into project design, and thereby would substantially reduce the total groundwater withdrawal requirements that would occur as a result of the project as proposed.

Some auxiliary functions of the plant still would require water-based cooling (see, e.g., PA/FEIS Section 2.2.2, *Major Project Components*, which identifies one wet cooling tower to be installed in each power block for ancillary equipment, and Section 2.2.3, *Power Plant Civil/Structural Features*, describing the power plant's two cooling systems). Impacts associated with the proposed auxiliary cooling are analyzed in PA/FEIS Chapter 4, *Environmental Consequences* (see, e.g., Section 4.19, *Impacts to Water Resources*). As revised, the project would require substantially less water than would be required for a wet-cooling system. Further, with the implementation of dry cooling (which reduces the efficiency of power production), the amount of power generated per acre of solar thermal field is, in comparison to most utility scale photovoltaic (PV) systems being installed at present, more efficient in terms of the amount of power that can be generated per acre of land area.

Water Rights

As analyzed in PA/FEIS Section 4.19, *Impacts to Water Resources*, implementation of the project is not expected to draw water from the Colorado River or otherwise affect existing water rights allocations. Because some uncertainty remains about whether groundwater pumping for the project could affect the Colorado River and, therefore, implicate water rights concerns, the implementation of recommended mitigation measures would avoid any such effects. Accordingly, regardless of whether the recommended mitigation measures ultimately are triggered by the project, development of the project would not interfere with any existing water rights.

5.5.2.11 Cultural Resources

Commenters and Comments Addressed

Commenter	Comments
The Wilderness Society and the Natural Resources Defense Council (NRDC)	5-13, 5-14
California Unions for Renewable Energy (CURE)	6-023, 6-031, 6-126, 6-127, 6-128, 6-129, 6-130, 6-131, 6-132

Summary of Issues Raised

1. ***Use of Programmatic Agreement:*** Whether use of a Programmatic Agreement (PA) impermissibly defers evaluation, mitigation and treatment of potential impacts on cultural resources.

2. ***Native Tribes Consultation:*** Need to collaborate with Native peoples of the region, through government-to-government consultation to adequately consider potential impacts of these projects on Native peoples.

3. ***Adequacy of Data to Determine Impacts and Mitigations:*** Whether the analysis of cultural resources, including of the reconfigured alternative, is adequate, in light of the status of pending additional information and analysis on cultural resources.

Responses

Use of Programmatic Agreement to Comply with NHPA

Regulations implementing the National Historic Preservation Act (NHPA) (36 CFR Part 800) provide for the use of a Programmatic Agreement (PA) when effects on historic properties cannot be fully determined prior to approval of an undertaking. PAs commonly are used to comply with Section 106 of the NHPA on large projects like the PSPP.

As discussed in PA/FEIS Section 5.2.2, *Tribal Consultation and Section 106 Compliance*, adverse effects that the PSPP could have on cultural resources will be been resolved through compliance with the terms of a PA reached on September 21, 2010, pursuant to NHPA Section 106 (16 USC Section 470; 36 CFR Section 800.14) in consultation with the Advisory Council on Historic Preservation (ACHP), the California State Historic Preservation Officer (SHPO), Indian tribes, and other interested parties. Implementation of the terms of the Programmatic Agreement is identified as a recommended mitigation measure (see Section 4.4, *Cultural Resources*. The PA is provided in Appendix H.

The approved PA will govern the conclusion of the identification and evaluation of historic properties (eligible for the NRHP), as well as the resolution of any adverse effects that may result from the proposed action or alternatives. Treatment plans regarding historic properties that cannot be avoided by project construction will be developed in consultation with stakeholders as stipulated in the PA. Analysis of impacts in this document and implementation of the terms of the PA would provide evidence of BLM's compliance with NHPA Section 106 and NEPA.

Cultural resources information for the alternatives, including Reconfigured Alternative 2, has been compiled and considered in the PA/FEIS: Direct, indirect and cumulative impacts on cultural resources identified within the Area of Potential Effects for the proposed action and alternatives are analyzed in PA/FEIS Section 4.4, *Impacts to Cultural Resources*.

Consultation with Native American Tribes

As stated in PA/FEIS Section 5.2.2, *Tribal Consultation and Section 106 Compliance*, the BLM initiated consultation in the early stages of project planning by certified letter on July 1, 2009. Tribes were invited to a general scoping meeting and project site visit held on January 25, 2010. On February 10, 2010, the BLM Palm Springs/South Coast Field Office Manager and Archaeologist met with the Fort Yuma Quechan Tribal Council. They provided information on several solar energy projects, including the project, and answered questions. Letters requesting consultation among tribes, the Energy Commission, the Applicant, the SHPO, and ACHP to develop a PA for the PSPP were mailed out to the below-listed tribes on March 3, 2010.

An initial meeting regarding the PA was held on April 23, 2010, in Palm Desert, to which all interested tribes were invited. They also were notified of a workshop on the PSPP SA/DEIS, held on April 29, 2010, in the BLM Palm Springs/South Coast Field Office, where, the BLM also held an informational meeting for the tribes on May 25, 2010. The BLM issued a draft PA for the PSPP on June 17, 2010, allowing 30 days for public and Native American comment. Appendix I of the draft PA included a log of BLM's consultation with specific individuals and groups. The

BLM also held a meeting in Palm Desert on August 11, 2010, to review and discuss the revised draft PA; some Native Americans were in attendance. At this meeting, representatives of two organizations (California's for Renewable Energy and La Cuna de Aztlan Sacred Sites Protection Circle) expressed concern over geoglyphs and other sacred sites and ancient trails that solar development in the Chuckwalla Valley and on Palo Verde Mesa could affect. As a result of consultation efforts, Native Americans identified no additional cultural resources relative to those analyzed in the SA/DEIS that could be affected by the project.

Thirteen tribes or related entities were identified and invited to consult on this project, including:

14. Ramona Band of Mission Indians
15. Torres-Martinez Desert Cahuilla Indians
16. Augustine Band of Cahuilla Mission Indians
17. Agua Caliente Band of Cahuilla Indians THPO
18. Morongo Band of Mission Indians
19. Twentynine Palms Band of Mission Indians
20. Fort Yuma Quechan Indian Tribe
21. Colorado River Indian Tribes
22. Chemehuevi Reservation
23. Colorado River Reservation
24. San Manuel Band of Mission Indians
25. Quechan Indian Tribe
26. Fort Mojave Indian Tribe

Adequacy of Data to Determine Impacts and Mitigations

Cultural resources within the Area of Potential Effects of the proposed action and alternatives have been identified and are discussed in PA/FEIS Section 3.4, *Cultural Resources*, Section 4.4, *Impacts on Cultural Resources*, and Appendix H, *Programmatic Agreement*. Palen Dry Lake ACEC is approximately 0.5 mile from the project site; no cultural resources within this ACEC are within the Area of Potential Effect. Class III cultural resource inventories of the proposed action, including the solar plant site, transmission lines and other areas of disturbance have been completed.

Impacts, including construction-related impacts, on cultural resources that would be adversely affected by the proposed action and alternatives are analyzed in PA/FEIS Section 4.4, *Impacts to Cultural Resources*. All impacts to cultural resources will be addressed through implementation of the approved PA.

Existing information is not sufficient to determine the boundaries of a potential Prehistoric Trails Network Cultural Landscape or the archaeological sites that would contribute to such a landscape, such as the Halchidhoma Trail. The same is true for a potential Desert Training Center/ California-Arizona Maneuver Area Cultural Landscape; although the Desert Training Center California-Arizona Maneuver Area (DTC/CAMA) is described and considered in the PA. Archaeological sites within the Area of Potential Effect that might contribute to these potential landscapes have been identified.

5.5.2.12 Public Health and Safety

Commenters and Comments Addressed

Commenter	Comments
Center for Biological Diversity	3-008
California Unions for Renewable Energy (CURE)	6-133, 6-134, 6-135, 6-137, 6-138, 6-139, 6-140, 6-141, 6-142, 6-143, 6-215, 6-216, 6-218, 6-220, 6-221, 6-222, 6-224, 6-225, 6-226, 6-227, 6-228, 6-229, 6-234

Summary of Issues Raised

1. ***Unexploded Ordnance Risk:*** Potential Risk and Effects of Unexploded Ordnance (UXO) and Hazardous Debris

2. ***HTF Risk:*** Risk of Release Heat Transfer Fluid (HTF) and Components and Waste Classification

Responses

Potential Risk and Effects of Unexploded Ordnance (UXO) and Hazardous Debris

Issues concerning risks to public health and safety associated with dermal contact and ingestion of contaminated soils are discussed in PA/FEIS Section 4.12.2, *Hazardous Materials*, and PA/FEIS Section 4.12.3, *Waste Management*. The possibility of soil contamination in connection with UXO also is analyzed in Section 4.11.4, *Unexploded Ordnance (UXO)*. As discussed in PA/FEIS Section 3.12, *Public Health and Safety Resources*, a Phase I Environmental Site Assessment for the project site was conducted in 2009. The Phase I identified no evidence of Recognized Environmental Conditions at the project site and did not indicate the presence of UXO. Thus, a Phase II investigation was not recommended. Nonetheless, mitigation measures are recommended to address UXO-related impacts. See PA/FEIS Section 4.11.4.4, *Summary of Mitigation Measures*.

Risk of Release Heat Transfer Fluid (HTF) and Components

Potential impacts related to HTF spills and contamination associated with the proposed land treatment units are addressed in PA/FEIS Section 4.11, *Impacts to Public Health and Safety*, and Section 4.19, *Impacts to Water Resources*. Section 4.11, *Impacts to Public Health and Safety,* also addresses roadway safety impacts associated with transportation of various materials, including HTF.

Transport vehicles carrying hazardous materials to and from the project site would be required to follow federal and State regulations governing proper containment vessels and vehicles, including appropriate identification of the nature of the contents. Additionally, the Applicant would be required to develop and implement a Safety Management Plan for the delivery of hazardous materials. These requirements would remain in place for the entire duration of the project.

Specific engineering drawings and design specifications for the project are not available for public review. However, a sufficient number of isolation valves would be installed that could be activated manually, remotely or automatically to limit the volume of a spill of HTF to 1,250 gallons – this is a 650 gallon increase from the amount stated in the SA/DEIS and the maximum[3] amount that could be lost if there were a catastrophic break in a HTF pipe in the solar field. Considering that the proposed action analyzed in the PA/FEIS also includes two on-site land treatment units (LTUs) whereas the SA/DEIS considered only one, the increase in the maximum amount of HTF that could be spilled does not constitute a substantial change in the proposed action under NEPA: the type of impacts that could result from an HTF spill (as analyzed in the SA/DEIS) are the same regardless of the amount spilled, and the capacity for treatment of any spill has been increased proportionally Further, pursuant to Mitigation Measure WASTE-7, an approved Operation Waste Management Plan would identify treatment methods and companies providing treatment services. It is assumed that this plan would include provisions for the management of the free standing liquids that could follow a spill.

Comments reference past HTF spills at the Luz Solar Energy Generating Stations (SEGS). The SEGS site is operated by a different solar energy purveyor than the Applicant, was constructed over 20 years ago, and used different design specifications and older technologies (CEC, 2010). Thus, it is not a comparable project to the project and does not serve as an accurate indicator for HTF spill potential at the project site. Thus, this comment does not have a bearing on the adequacy of the analysis of potential impacts of the project. Further, the comment has provided no credible information to suggest that the estimated annual amount of HTF-contaminated soil for the project is vastly underestimated. However, the properties of Therminol and the record of its use at a comparable project, Solar Electric Generating Stations 8 and 9 at Harper Lake, California, have been reviewed and assessed. Past leaks, spills and fires involving HTF were examined and discussed in preparation of this PA/FEIS (CEC, 2010). Most leaks in existing solar power plants release very small amounts of HTF. The results of the assessment indicated that the placement of additional isolation valves in the HTF pipe loops throughout the solar array, as would be required through the implementation of Mitigation Measure HAZ-4, would substantially add to the safety and operational integrity of the entire system and prevent large quantity spills of HTF.

Benzene. Therminol breaks down when heated to the temperatures associated with a solar energy generation system and, consequently, emit Volatile Organic Compounds (VOCs) that contain toxic HTF decomposition products, which include benzene. Impacts of the release of these decompositions products are addressed in PA/FEIS Section 4.11.2, *Hazardous Materials* (see, e.g., 4.11.2.2, *Discussion of Direct and Indirect Impacts*). A health risk assessment was prepared for the project based on 137 pounds of VOC emissions per MW per year. Because benzene is the most toxic of the potential breakdown products as well as the most likely compound to be emitted due to

[3] The maximum amount that could be lost if a catastrophic break in a HTF pipe in the solar field were to occur is calculated based on engineering and efficiency factors provided by the Applicant, including the size of the solar array pipe loops as well as an effort to avoid placing too many valves in the pipes, since valves create friction and turbulence that could disrupt the flow of the HTF.

its chemistry, the operational health risk assessment conservatively assumed that 99% of the increase in VOC emissions would be comprised of benzene to ensure that the health risk estimates were not underestimated. Health risks to workers resulting from exposure to benzene and other HTF constituent elements were found to be below significance thresholds. Thus, mitigation for these effects is not required. However, implementation of Mitigation Measure WORKER SAFETY-2 would minimize workers' exposure to HTF constituent elements and ensure proper handling of those elements. Plans implemented under Mitigation Measure HAZ-2 also would be provided to Riverside County of Environmental Health and Riverside County Fire Department.

The SA/DEIS and PA/FEIS recognize that HTF, including benzene and other breakdown products, could contaminate soil and groundwater. For example, the proposed action has included at least one on-site land treatment unit to bioremediate or land farm soil contaminated from releases of HTF since it was proposed (as analyzed in the PA/FEIS, it includes two LTUs). Each LTU would be designed in accordance with Colorado River Basin Regional Water Quality Control Board (RWQCB) requirements, which adequately would address water quality concerns, and the California Department of Toxic Substance Control (DTSC) would require site-specific data to provide/confirm a classification of the waste resulting from the LTUs. As required under WASTE-8, samples of HTF-contaminated "shall be analyzed in accordance with USEPA Method 8015 *or other method to be reviewed and approved by DTSC*" (emphasis added). This recommended mitigation measure, which honors DTSC's expertise over the subject matter, ensures that the appropriate analytical methodology would be required.

Waste Classification. Pursuant to Mitigation Measure WASTE-7, the approved Operation Waste Management Plan would identify waste testing methods for the project to ensure correct classification of contaminants. The threshold for hazardous contamination of soil with HTF is determined on a case-by-case basis by DTSC. Such determinations typically are based on site conditions as well as a historical pattern of HTF discharges at the site. In the absence of a historical pattern of HTF discharges at the site, it is assumed that HTF-contaminated soils with concentrations ≥10,000 milligrams of HTF per kilogram of soil would be considered hazardous. This is based on the 1995 DTSC determination that a 10,000 milligram per kilogram concentration of HTF would be assumed hazardous for the SEGS III-VI at Kramer Junction project. This determination, however, is subject to change once a history of discharges has been established. At that time the Applicant would petition DTSC for its concurrence on a standardized waste classification for HTF contaminated soils generated at the facility (22 CCR 66260.200(d)). Section 66260.200(f) of Title 22 of the California Code of Regulations places the responsibility of determining whether a waste must be classified as hazardous on the generator of that waste. Therefore, the project owner would have the duty to assess the waste classification for HTF-impacted soils at the project facility in consultation with the Energy Commission, BLM, DTSC and the RWQCB.

5.5.3 Individual Responses

NEPA requires all substantive comments - whether environmental or procedural in nature - to be addressed and attached to the Final EIS (40 CFR 1503.4(b)). This section 5.5.3 provides a response to each of the individual comments received on the SA/DEIS. Where a comment is addressed as part of a Common Response, the individual response provided in this section refers the reader to the applicable Common Response in PA/FEIS Section 5.5.2.

5.5.3.1 Letter 1 – Responses to Comments from Joshua Tree National Park

1-01 The BLM acknowledges and appreciates the comment.

1-02 BLM appreciates the Park Service's support in connection with the proposed action.

1-03 Pursuant to Section 6.9.2.1 of BLM's NEPA Handbook, this comment does not meet the criteria for a substantive comment; consequently, BLM is unable to provide a substantive response.

1-04 See Response to Comment 1-03.

1-05 Cumulative impacts to water resources, including those relating to groundwater extraction, are analyzed in PA/FEIS Section 4.19.3, *Cumulative Impacts*. See also, Common Response 5.5.2.10. Impacts to scenic views and other aesthetic resources are analyzed in Section 4.18, *Impacts on Visual Resources*. As shown by a comparison of Section 4.18.3 (relating to visual resources) and Section 4.19.3 (relating to water resources), the geographic scope of the cumulative effects analysis varies by resource: for visual resources, it consists of potential shared viewsheds along the I-10 corridor (where visual impacts could be synergistic) and locations from which a viewer could see the proposed action along with views of other projects (where visual impacts could be additive). See also PA/FEIS Figure 3.19-3, *Project Study Area and Viewshed*. While there is some cross-over with the watershed boundary, the viewshed boundary and watershed boundary are not coterminous. Impacts of the project on park visitors' experiences are addressed in Section 4.18, *Impacts on Visual Resources*.

1-06 Quantification of impacts is provided in the PA/FEIS where possible to avoid the use of more subjective terms. Where quantification is not possible, qualitative analysis is provided. Since the term "significant" has different meanings under NEPA and CEQA, the BLM recognizes that some confusion may have arisen in the SA/DEIS, which was prepared jointly under NEPA and CEQA, and has endeavored to correct this in the PA/FEIS, which was prepared under NEPA alone. For example, "significance criteria" are a creature of CEQA. By comparison, under NEPA, significance is defined in terms of context and intensity (40 CRF 1502.2). To help agency decision-makers and members of the public understand how a resource or issue will be affected, the analysis in PA/FEIS Chapter 4, *Environmental Consequences* focuses on the context, intensity and duration of the effects most likely to result from implementation of the project. For specifics about the analysis in the PA/FEIS of impacts to Water Resources, see Common Response 5.5.2.10.

1-07 Reference to "a significant percentage of the total amount of groundwater in storage" has been removed in this PA/FEIS.

1-08 See Common Response 5.5.2.10.

1-09 See Common Response 5.5.2.2.

1-10 Whether the incremental impact of a project will be "cumulatively considerable" is a State-law specific CEQA consideration evaluated by the Energy Commission for the project. Because such conclusions are not contemplated in the NEPA context, the BLM has removed references to "cumulatively considerable" and "less than cumulatively considerable" throughout the PA/FEIS.

1-11 See Common Response 5.5.2.10.

1-12 See Common Response 5.5.2.10.

1-13 See Common Response 5.5.2.10.

1-14 See Common Response 5.5.2.10.

1-15 Additional discussion about individual and cumulative impacts to groundwater levels has been provided in PA/FEIS Section 4.19, *Impacts on Water Resources*. See also, Common Response 5.5.2.10.

1-16 See Common Response 5.5.2.10.

1-17 See Common Response 5.5.2.10.

1-18 The adequacy of recommended mitigation measures to control fugitive dust are addressed in PA/FEIS Section 4.2, *Impacts on Air Resources*, and in Common Response 5.5.2.9, *Air Quality*.

1-19 See Response to Comment 1-18, including Common Response 5.5.2.9.

1-20 PA/FEIS Section 4.18, *Impacts on Visual Resources*, analyzes project-related impacts associated with fugitive dust, including cumulative impacts and impacts on park visitors. The Chuckwalla Valley is naturally an area of active wind erosion and sand transport, and the project will disrupt active transport of sand by wind through placement of wind fences and wind interference by project facilities (e.g. "wind shadow effect"). The effect could cause areas on the windward side of the project to experience additional sand deposition, and areas on the leeward side to experience additional erosion. The presence of the project disrupts active sand transport, but would not substantially add to the total amount of visible dust on windy days, especially as seen from Joshua Tree National Park. See Response to Comment 1-21 addressing the project's visibility from park areas.

1-21 The current viewshed is described in PA/FEIS Section 3.19, *Visual Resources*. Potential visual impacts of the project from Joshua Tree National Park is discussed in PA/FEIS Section 4.18, *Impacts on Visual Resources*. Several figures referenced in that section illustrate the visual disturbance resulting from the project. For example, PA/FEIS Figure 3.19-3 shows the viewshed affected by the project along with an overlay illustrating the boundaries of Joshua Tree National Park. In addition, PA/FEIS Figures 4.18-6 and 4.18-7 simulate the project in views along the boundary of the park, at the foot of the Coxcomb Mountains. The analysis concludes that the visual impact viewed by Joshua Tree National Park visitors would be minor because (1) the areas of the park from which the project would be visible is limited, (2) where visible, the project would lie in the distant background and constitute a small portion of any scenic overlooks, and (3) the eastern portions of the park lack visitor-serving facilities and appear to be seldom visited.

1-22 Impacts associated with nighttime lighting are evaluated in PA/FEIS Section 4.18, *Impacts on Visual Resources.* The agencies concluded in the SA/DEIS that night lighting impacts could be addressed adequately through the implementation of mitigation measure VIS-3. No further mitigation measures are recommended in the PA/FEIS to address impacts related to nighttime lighting.

1-23 See Common Response 5.5.2.7.

1-24 See Response to Comment 1-03.

5.5.3.2 Letter 2 – Responses to Comments from Brendan Hughes

2-01 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), comments like this one, which merely express favor for an alternative without providing additional data or information relevant to the environmental analysis, do not meet the criteria necessary for a "substantive comment" to which a response is merited.

2-02 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

2-03 See Response to Comment 2-02. Nonetheless, PA/FEIS Section 4.18.5 acknowledges that the project would have a residual impact to visual resources after implementation of the recommended mitigation measures.

2-04 See Response to Comment 2-02; nonetheless, Common Response 5.5.2.5 responds to comments concerning alternatives.

2-05 See Response to Comment 2-02; nonetheless, Common Response 5.5.2.7 addresses comments concerning biological resources.

2-06 See Response to Comment 2-05.

2-07 See Response to Comment 2-05.

2-08 See Response to Comment 2-05.

2-09 Impacts of the proposed action and alternatives to visual resources as it relates to visitors' experiences (including from Joshua Tree National Park and other key observation points) are analyzed in PA/FEIS Section 4.18, *Impacts on Visual Resources*. As indicated in PA/FEIS Section 4.18.6, the project would cause the following unavoidable adverse impacts: (i) visual impacts to surrounding viewer groups (all KOPs) from sunlight reflected off of the parabolic mirrors (glare); (ii) visual impacts due to the general level of visual contrast of the project in the landscape, and non-conformance with Interim VRM Class III objectives; and (iii) unavoidable and adverse cumulative impacts for travelers along I-10 and dispersed recreational users in the McCoy, Big Maria, and Little Maria Mountains and wilderness.

2-10 The CEC approved the project on December 15, 2010. Comments recommending that the CEC take one course or another in connection with this project are moot. Concerning comments about alternatives considered by the BLM, see Common Response 5.5.2.5.

2-11 See Response to Comment 2-01.

5.5.3.3 Letter 3 – Responses to Comments from Center for Biological Diversity

3-01 Climate change and greenhouse gas emissions are addressed in PA/FEIS Section 3.3, *Global Climate Change*, and Section 4.3, *Impacts on Global Climate Change*. Concerning biological resources, see Common Response 5.5.2.7.

3-02 Components of the proposed action and connected actions identified in the comment are described in PA/FEIS Chapter 2, *Proposed Action and Alternatives*. The biological resources that comprise the affected environment (including those mentioned in the comment) are discussed in Section 3.18, *Vegetation Resources*, and Section 3.23, *Wildlife Resources*. Direct, indirect and cumulative impacts on such resources are analyzed in PA/FEIS Section 4.17, *Impacts on Vegetation Resources*, Section 4.21, *Impacts on Wildlife Resources*, and Appendix I, *Biological Resource-related Cumulative Impacts*. See also, Common Response 5.5.2.7. The reasonableness of the range of alternatives considered in the PA/FEIS is addressed in Common Response 5.5.2.5.

3-03 See Common Response 5.5.2.1.

3-04 See Common Response 5.5.2.5. Final decisions regarding the status of lands within the application area of the project will be determined in the ROD.

3-05 See Common Response 5.5.2.5.

3-06 The relationship between proposed action and the Solar PEIS as well as with existing land use plans is discussed in PA/FEIS Section 1.3, *Relationship of Proposed Action to BLM Policies, Plans, and Programs, and LUP Conformance Determination*, and in Common Response 5.5.2.1.

3-07 Concerning supplementation/recirculation, see Common Response 5.5.2.6. Concerning the range of alternatives analyzed in the PA/FEIS, see Common Response 5.5.2.5.

3-08 Comments concerning each of these resource and issue areas identified in this comment will be addressed as they are presented in the letter.

3-09 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, the BLM's Administrative Record contains all of the materials relied upon by the BLM in considering whether to approve the requested right of way.

3-10 Information about the proposed CDCA Plan Amendment is provided in PA/FEIS Section 1.3.2, *Land Use Plan Conformance and Consistency*, including a description of the CDCA Plan, an explanation of the need for a CDCA Plan Amendment, statement of the proposed Plan Amendment, description of the plan amendment process, and the criteria that the BLM will evaluate as part of its decision-making process. See also, Common Response 5.5.2.1.

3-11 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), comments like this one, which do not question, with reasonable basis, the accuracy or adequacy of information in the EIS, present new information relevant to the analysis or reasonable alternatives that were not considered and do not cause changes or revisions in any of the alternatives, do not meet the criteria necessary for a "substantive comment" to which a response is merited. Nonetheless, no NECO Plan amendments are proposed as part of the proposed action or any of the alternatives. See the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO Plan) subsection of Common Response 5.5.2.1.

3-12 Concerning the relationship between the proposed action and existing, applicable land use planning documents, see Common Response 5.5.2.1.

3-13 See Response to Comment 3-11.

3-14 See Response to Comment 3-11.

3-15 See Response to Comment 3-11.

3-16 See Response to Comment 3-11.

3-17 See Response to Comment 3-11.

3-18 See Response to Comment 3-11.

3-19 See Response to Comment 3-11.

3-20 See Response to Comment 3-11.

3-21 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

3-22 See Response to Comment 3-21.

3-23 See Response to Comment 3-21.

3-24 See Response to Comment 3-21.

3-25 See Response to Comment 3-11.

3-26 See Common Response 5.5.2.1 and Common Response 5.5.2.2.

3-27 Concerning consistency with the CDCA Plan, see Common Response 5.5.2.1. Concerning consistency with NEPA, see Common Response 5.5.2.2. Comments concerning the reasonableness of the range of alternatives considered in the PA/FEIS are addressed in Common Response 5.5.2.5.

3-28 A Land Use Plan Amendment consistency analysis is provided in PA/FEIS Section 4.8.7. See also Common Response 5.5.2.1.

3-29 See Common Response 5.5.2.1.

3-30 As noted in Response to Comment 3-28, a Land Use Plan Amendment consistency analysis is provided in PA/FEIS Section 4.8.7. Concerning consistency with FLPMA, see Common Response 5.5.2.2. Impacts concerning sand transport corridors, dunes and related habitat values (as well as other biological resources issues), are addressed in Common Response 5.5.2.7.

3-31 Off-highway vehicle (OHV) use in the NECO portion of the CDCA is described and analyzed in PA/FEIS Section 3.17, *Transportation and Public Access*, and Section 4.16, *Impacts on Transportation and Public Access*. Unauthorized OHV travel is a law enforcement issue monitored by BLM law enforcement officers.

3-32 Connected actions are described in PA/FEIS Section 2.3, *Connected Actions*. Related impacts are analyzed in Section 4.1.7, *Incorporation of the Analysis of the Red Bluff Substation Project by Reference*, and, for the transmission line relocation, throughout Chapter 4, *Environmental Consequences*. The cumulative scenario, which includes the Solar PEIS, is described in PA/FEIS Section 4.1.1.

3-33 Construction of a new gen-tie line and construction of the proposed Red Bluff Substation are identified in PA/FEIS Section 2.3, *Connected Actions,* as connected actions. As noted in the Response to Comment 3-32, impacts associated with the connected actions are analyzed in the PA/FEIS. Concerning components of the Red Bluff Substation Project, see PA/FEIS Section 2.3, *Connected Actions*, and Section 4.1.7, *Incorporation of the Analysis of the Red Bluff Substation Project by Reference*. Concerning consistency with master plans (specifically Solar PEIS), see PA/FEIS Section 1.3.1 and Common Response 5.5.2.1. The BLM is not "piecemealing" its compliance with NEPA, but rather is engaged in staged decision making. The unavailability of data regarding the connected actions identified by the commenter and the draft status of the Solar PEIS combine to render staged decision making and NEPA analysis for these components the most effective approach. Appropriate NEPA analysis will accompany each stage of the decision making.

3-34 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, see Common Response 5.5.2.2 concerning consistency with FLPMA, and Common Response 5.5.2.3 concerning the adequacy of data relied upon in the PA/FEIS.

3-35 Concerning consistency with NEPA and FLPMA, see Common Response 5.5.2.2; concerning the adequacy of data relied upon, see Common Response 5.5.2.3; concerning supplementation/recirculation, see Common Response 5.5.2.6. Concerning environmental analysis of the Red Bluff Substation proposed by Southern California Edison, see Response to Comment 3-33.

3-36 See Common Response 5.5.2.6.

3-37 Concerning consistency with existing land use plans, see Common Response 5.5.2.1; comments concerning consistency with FLMA are addressed in Common Response 5.5.2.2; comments concerning the adequacy of data relied upon are addressed in Common Response 5.5.2.3. Impacts of the proposed action and alternatives on resources and issues are analyzed throughout PA/FEIS Chapter 4, *Environmental Consequences*. The Environmental Setting in Chapter 3, *Affected Environment,* identifies the existing conditions of the project area and therefore acts as the inventory of the resources for analysis.

3-38 Concerning adequacy of data relied upon, see Common Response 5.5.2.3. Concerning supplementation/recirculation, see Common Response 5.5.2.6. The comment provides no basis to conclude that any information or data that is unavailable or that will be developed in accordance with the recommended mitigation measures is "essential for a reasoned choice among alternatives." Further, the PA/FEIS does assume a worst case scenario when necessary information is lacking or uncertainty remains. See, for example, Section 4.19.4, which recommends mitigation measures the implementation of which would entirely avoid adverse impacts on the Colorado River even though evidence indicates that wells drawing groundwater for project use would not induce flow from the

Colorado River. See also Common Response 5.5.2.12, which explains that the health risk assessment prepared for the project conservatively assumes that 99% of the increase in VOC emissions would be comprised of benzene, which is the most toxic of the potential breakdown products to ensure that the health risk estimates were not underestimated.

3-39 Comments concerning the purpose and need are addressed in Common Response 5.5.2.4.

3-40 Comments concerning the purpose and need are addressed in Common Response 5.5.2.4. Compliance with NEPA is addressed in Common Response 5.5.2.2.

3-41 Global climate change and greenhouse gas emissions are addressed in PA/FEIS Section 3.3, *Global Climate Change*, and Section 4.3, *Impacts on Global Climate Change*, as well as in Common Response 5.5.2.8. Concerning biological resources and direct, indirect and cumulative impacts on them, see PA/FEIS Sections 3.18, *Vegetation Resources;* 3.23, *Wildlife Resources;* 4.17 *Impacts on Vegetation Resources*; and 4.21, *Impacts on Wildlife Resources*; see also, PA/FEIS Appendix I and Common Response 5.5.2.7.

3-42 Baseline (pre-project) conditions are described for all resource and issue areas in PA/FEIS Chapter 3, *Affected Environment*. See, e.g., PA/FEIS Section 3.18, *Vegetation Resources*, which discusses stabilized and partially stabilized desert dunes, which provide unique habitats that often support rare plants such as Harwood's milk-vetch (a rare plant), and Section 3.23, *Wildlife Resources*, which discusses the range and habitat of the golden eagle. Concerning adequacy of data relied upon, see Common Response 5.5.2.3. Concerning supplementation and recirculation, see Common Response 5.5.2.6. Concerning biological resources (plant and wildlife surveys, specifically), see Common Response 5.5.2.7.

3-43 See Common Response 5.5.2.3.

3-44 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. As a fundamental matter, the BLM notes that the Applicant is entitled to a presumption of compliance with applicable law and would be subject to enforcement for breach of its legal obligations in connection with implementation of the proposed action. Accordingly, it is not necessary to affirmatively establish compliance with LORS in the PA/FEIS. Supplementation/recirculation of an EIS is not required under these circumstances.

3-45 The PA/FEIS relies on the most current data and other information available as of the time of its drafting, including Spring 2010 special status plant survey results that were completed subsequent to the SA/DEIS. Comments concerning the adequacy of the data relied upon in the PA/FEIS, see Common Response 5.5.2.3.

3-46 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, PA/FEIS Section 4.21, *Impacts on Wildlife Resources*, identifies three Multi-Species WHMAs located in the general Project vicinity:

Big Maria Mountains WHMA, Palen-Ford WHMA, and the DWMA Continuity WHMA (which provides connectivity between the Chuckwalla DWMA/ACEC south of I-10 and the Palen-Ford WHMA north of I-10 in the immediate Project vicinity). It further acknowledges that the proposed action could impede wildlife movement in these corridors and obstruct connectivity for wide ranging wildlife such as burro deer, kit fox, coyotes, and badgers, and on a population level could impede gene flow for desert tortoises. Impacts relating to these areas also are analyzed in PA/FEIS Section 4.17, *Impacts on Vegetation*.

3-47 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

3-48 See Common Response 5.5.2.7.

3-49 Concerning issues relating to the Tortoise Relocation/Translocation Plan required by BIO-10, see Common Response 5.5.2.3 and Common Response 5.5.2.7.

3-50 Concerning consistency with NEPA, see Common Response 5.5.2.2. Concerning the analysis of impacts to desert tortoise and the mitigation measures recommended to address such impacts, see PA/FEIS Section 4.21, *Impacts on Wildlife Resources,* and Appendix I as well as Common Response 5.5.2.7.

3-51 See Common Response 5.5.2.7.

3-52 See Response to Comment 3-49.

3-53 As explained in Section 6.8.4 of the BLM's NEPA Handbook, mitigation measures are measures that could reduce or avoid adverse impacts of a proposed action. As defined in the CEQ regulations (40 CFR 1508.20), mitigation measures can be recommended to avoid an impact altogether by not taking a certain action or parts of an action; minimize an impact by limiting the degree of magnitude of the action and its implementation; rectify an impact by repairing, rehabilitation, or restoring the affected environment; reduce or eliminate an impact over time through preservation and maintenance operations during the life of the action; or compensate for an impact by replacing or providing substitute resources or environments. Existing conditions relating to the absence of bighorn sheep and connectivity are not an impact of the proposed action for which it would be appropriate to recommend that mitigation measures be implemented. Further, as discussed in PA/FEIS Section 4.21, *Impacts on Wildlife Resources,* and Appendix I (relating to cumulative impacts), the project would not directly affect habitat within any NECO connectivity corridors or WHMAs, and would not conflict with Desert Bighorn Sheep Conservation goals and objectives outlined in the NECO. In addition, the project site does not represent large direct or indirect impacts to bighorn sheep habitat connectivity or foraging. See also, Common Response 5.5.2.7.

3-54 Concerning impacts of the proposed action and alternatives related to the sand transport corridor, sand dune habitat and the Mojave fringe-toed lizard, see PA/FEIS Sections 3.15

and 4.14 (regarding soil resources), PA/FEIS Sections 3.18 and 4.17 (regarding vegetation and habitats), PA/FEIS Sections 3.23 and 4.21 (regarding wildlife resources) and Appendix I (regarding cumulative impacts to biological resources). See also Common Response 5.5.2.7.

3-55 See Common Response 5.5.2.7.

3-56 See Common Response 5.5.2.7.

3-57 Comments concerning the adequacy of data relied upon are addressed in Common Response 5.5.2.3. Concerning supplementation/recirculation, see Common Response 5.5.2.6.

3-58 Concerning adequacy of data relied upon, see Common Response 5.5.2.3. Concerning avian species in the affected environment and impacts to such species (including from collision and electrocution), see PA/FEIS Sections 3.23 and 4.21 and Appendix I. See also, Common Response 5.5.2.7. Concerning consistency with NEPA, see Common Response 5.5.2.2. Concerning consistency with other laws and the Applicant's entitlement to a presumption of compliance, see Response to Comment 3-44.

3-59 The proposed evaporation ponds are described in PA/FEIS Chapter 2, *Proposed Action and Alternatives*. Evaporation pond-related impacts to wildlife species are analyzed in PA/FEIS Section 4.21, *Impacts on Wildlife Resources*, and Appendix I; such impacts to aviation safety are addressed in PA/FEIS Section 4.11.7, *Traffic and Transportation Safety*.

3-60 See Response to Comment 3-59.

3-61 The requirements of Executive Order 13186 are described in PA/FEIS Appendix C, Applicable Laws, Regulations, Policies, Executive Orders. Concerning the Applicant's entitlement to a presumption of compliance with applicable laws, see Response to Comment 3-44. Migratory birds and impacts of the proposed action and alternatives on such species are addressed in Common Response 5.5.2.7, *Biological Resources*. Supplementation and recirculation are addressed in Common Response 5.5.2.6; however supplementation is not required under the circumstances suggested by this comment.

3-62 See Common Response 5.5.2.7, *Biological Resources*.

3-63 See Common Response 5.5.2.7, *Biological Resources*, and Common Response 5.5.2.3, *Adequacy of Data Relied Upon*.

3-64 See Common Response 5.5.2.7, *Biological Resources*.

3-65 See Common Response 5.5.2.7, *Biological Resources*.

3-66 Site soils are described in PA/FEIS Section 3.15, *Soils Resources*, and analyzed in Section 4.14, *Impacts on Soils Resources*. Desert ecosystems and impacts to them are described in PA/FEIS Sections 3.18 and 4.17 (vegetation resources), Sections 3.23 and 4.21 (wildlife resources) and Appendix I.

3-67 Air impacts, including fugitive dust control, are analyzed in PA/FEIS Section 4.2, *Impacts on Air Resources*. See also, Common Response 5.5.2.9.

3-68 Sand transport corridors and dune habitats and ecosystems are described and analyzed in PA/FEIS Sections 3.18 and 4.17 (vegetation resources), Sections 3.23 and 4.21 (wildlife resources) and Appendix I. See, for example, PA/FEIS Section 4.17.2, which considers the direct and indirect impacts of the proposed action on sand dunes and sand dune-dependent insect species, as well as PA/FEIS Section 4.21.2, which considers the impacts of nighttime lighting on insects. Concerning biological resources, see Common Response 5.5.2.7.

3-69 BLM's financial guarantee requirements (43 CFR 3809.500-3809.551) are independent of its environmental review requirements; information about the bond will be provided with the Record of Decision for the proposed action. Concerning the adequacy of the information relied on in the PA/FEIS, see Common Response 5.5.2.3, *Adequacy of Data Relied Upon*; comments related to supplementation/recirculation are addressed in Common Response 5.5.2.6, *Supplementation/Recirculation*.

3-70 Fire in desert ecosystems is addressed in various sections of the PA/FEIS, including Sections 3.22, *Wildland Fire Ecology*; 4.17, *Impacts on Vegetation Resources*; and 4.20, *Impacts on Wildland Fire Ecology*. Fire prevention also is addressed in PA/FEIS Section 4.11.8, *Worker Safety and Fire Protection*. Fire risks would be addressed, for example, by implementation of BIO-14, *Weed Management Plan*, TLSN-3, *Transmission Line Distance from Combustible Material*, and by the Construction Fire Prevention Plan that would be required as part of WORKER SAFETY-1. The full text of these mitigation measures is set forth in PA/FEIS Appendix B.

3-71 Detailed discussions of mitigation measures are provided throughout PA/FEIS Chapter 4, *Environmental Consequences*, and in Appendix B. Where the implementation of mitigation measures is expected to avoid impacts, the discussion so states (see, e.g., PA/FEIS Section 4.19.4 in connection with SOIL&WATER-14, SOIL&WATER-15 and SOIL&WATER-18). Alternatively, where adverse conditions are expected to remain after recommended mitigation measures are implemented, this too is explained (see, e.g., 4.19.5 regarding water quality and drainage and flooding). Concerning consistency with NEPA generally, see Common Response 5.5.2.2, *Consistency of the PA/FEIS with NEPA and FLPMA.*

3-72 See Common Response 5.5.2.3, *Adequacy of the Data Relied Upon;* Common Response 5.5.2.6, *Supplementation/Recirculation;* and Common Response 5.5.2.2, *Consistency with NEPA.*

3-73 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, see PA/FEIS Sections 3.15 and 4.14 concerning soil resources and PA/FEIS Sections 4.17 and 4.21 concerning sand transport. See also, Common Response 5.5.2.10, *Water Resources*.

3-74 See Common Response 5.5.2.10, *Water Resources*.

3-75 See Common Response 5.5.2.10, *Water Resources*.

3-76 The Secretary of the Department of the Interior and other officers of the United States are directed by the California Desert Protection Act (§ 410aaa-76(b)) to take all steps necessary to protect the water rights reserved for wilderness areas, including those identified in the comment. As analyzed in PA/FEIS Section 4.19, *Impacts on Water Resources*, and discussed in Common Response 5.5.2.10, *Water Resources*, the BLM is taking necessary steps to protect groundwater levels.

3-77 As noted in the comment, no express reservation of water rights has been made under Public Water Reserve 107 in connection with any of the public lands in the CDCA. Because no waters in the project area come within the ambit of this law, the proposed action would have no effect on water rights reserved under it. Public Water Reserve 107 does not provide for the reservation of water rights without some affirmative act to initiate the reservation: federal water rights are not reserved merely because water is present on federal lands. Additionally, PWR 107 is really reflective of the need to allow for surface water flow, not particular to ground water. As indicated in PA/FEIS Section 4.19.5, a relatively minor degree of residual groundwater level reduction would occur as a result of the project even with the implementation of recommended mitigation measures. Nonetheless, the proposed action would not cause an unavoidable adverse impact on water supplies (see PA/FEIS Section 4.19.6). See also, Common Response 5.5.2.10, *Water Resources*.

3-78 The PA/FEIS analyzed impacts of the proposed action and alternatives, including how the incremental impacts of the project could combine with the incremental impacts of other projects in the cumulative scenario. The geographic area evaluated for this purpose consisted of the Chuckwalla Valley Groundwater Basin (CVGB), where various project impacts' impacts to groundwater could be additive, synergistic or countervailing, and, for surface waters, the area within the watershed boundary. See also, Common Response 5.5.2.10.

3-79 The ROW grant applicant under the BLM's consideration does not provide for the creation or alienation of, in the words of the commenter, "any potential water rights that could arguably be created from use of groundwater by the proposed project" within the ROW. There is insufficient detail about a potential right that someone may argue could be created to allow for meaningful evaluation in the PA/FEIS of any environmental impacts that could flow from that affected right. Such an analysis would require unreasonable forecasting. See also, Common Response 5.5.2.10, *Water Resources*.

3-80 As stated in PA/FEIS Section 5.1.2, the evaluation for jurisdictional waters that was performed on the site determined that the ephemeral drainages did not to conform to the requirements for designation as jurisdictional waters of the U.S., and discussions with the USACOE indicated that the drainages would not be considered jurisdictional waters of the U.S. The indicated reference to laws, ordinances, regulations, and standards has been removed from the PA/FEIS.

3-81 See Common Response 5.5.2.8, *Climate Change/Greenhouse Gases*.

3-82 See Common Response 5.5.2.8, *Climate Change/Greenhouse Gases*.

3-83 See Common Response 5.5.2.9, *Climate Change/Greenhouse Gases*.

3-84 See Common Response 5.5.2.8, *Climate Change/Greenhouse Gases*.

3-85 See Common Response 5.5.2.8, *Climate Change/Greenhouse Gases*.

3-86 See Common Response 5.5.2.2 concerning consistency of the PA/FEIS with NEPA; see also, Common Response 5.5.2.3 concerning the adequacy of the data relied upon, including data about plant communities.

3-87 The comment does not suggest how the analysis fails to consider reasonably foreseeable impacts in the context of the cumulative impacts analysis, thereby depriving the BLM of any particular basis to respond. As indicated in Common Response 5.5.2.2, *Consistency of the PA/FEIS with NEPA and FLPMA*, the PA/FEIS considers cumulative impacts on a resource by resource basis, within geographic areas appropriately tailored to each, throughout Chapter 4, *Environmental Consequences*. The BLM believes this analysis to be adequate under NEPA.

3-88 The comment provides no reasonable basis to question the adequacy of, methodology for, or assumptions used for the analysis of impacts to the identified resources. Direct, indirect and cumulative impacts on biological resources are discussed and analyzed in PA/FEIS Sections 3.18 and 4.17 (vegetation), 3.23 and 4.21 (wildlife resources), 3.15 and 4.14 (soils, including dune ecosystems), and Appendix I. Concerning consistency with NEPA, see Common Response 5.5.2.2, *Consistency of the PA/FEIS with NEPA and FLPMA*,. Concerning adequacy of data relied upon, see Common Response 5.5.2.3.

3-89 Concerning the purpose and need, see Common Response 5.5.2.4, *Purpose and Need*. Concerning the adequacy of the range of alternatives, see Common Response 5.5.2.5, *Alternatives*.

3-90 See Common Response 5.5.2.5, *Alternatives*.

3-91 See Common Response 5.5.2.5, *Alternatives*.

3-92 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, see Common Response 5.5.2.5, *Alternatives*.

3-93 See Common Response 5.5.2.5, *Alternatives*.

3-94 See Common Response 5.5.2.5, *Alternatives*.

3-95 Off-site alternatives and alternatives that would reduce impacts to dune ecosystems and other biological resources are analyzed in the PA/FEIS (see Common Response 5.5.2.7, *Biological Resources*). Concerning the range of alternatives considered, see Common Response 5.5.2.5, *Alternatives*. Supplementation/recirculation is not required under the circumstances presented in this comment (see Common Response 5.5.2.6, *Supplementation/Recirculation*).

3-96 Comments about purpose and need are addressed in Common Response 5.5.2.4, *Purpose and Need*. Comments about the range of alternatives considered are addressed in Common Response 5.5.2.5, *Alternatives*.

3-97 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook, this is not a substantive comment.

3-98 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook, this is not a substantive comment. Nonetheless, concerning supplementation/recirculation, see Common Response 5.5.2.6, *Supplementation/Recirculation*.

5.5.3.4 Letter 4 – Responses to Comments from California/Nevada Desert Energy Committee of the Sierra Club (Sierra Club)

4-01 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook, this is not a substantive comment. Nonetheless, comments about the range of alternatives considered, including off-site alternatives, are addressed in Common Response 5.5.2.5, *Alternatives*.

4-02 The affected environment is described on a resource-by-resource basis in Chapter 3, *Affected Environment* (see, e.g., PA/FEIS Section 3.18, *Vegetation Resources*, which describes natural communities on the site and in the project area, including the sand transport system). Impacts of the proposed action and alternatives are analyzed throughout Chapter 4, *Environmental Consequences* (see, e.g., 4.21, *Wildlife Resources*, which evaluates impacts on movement and habitat connectivity of desert tortoise and other wildlife. See also, Common Response 5.5.2.7, *Biological Resources*. The comment provides no reasonable basis to question the accuracy of information in the EIS or the adequacy of, methodology for, or assumptions used for the analysis of impacts.

4-03 Comments concerning consistency of the PA/FEIS with NEPA are addressed in Common Response 5.5.2.2, *Consistency of the PA/FEIS with NEPA and FLPMA*; concerning alternatives, see Common Response 5.5.2.5, *Alternatives*. Comments concerning the adequacy of the data relied upon are addressed in Common Response 5.5.2.3, *Adequacy of Data Relied Upon*. Direct, indirect and cumulative impacts to species (including the desert tortoise, and Mojave fringe-toed lizard) are discussed in Common Response

5.5.2.7, *Biological Resources*, and analyzed in PA/FEIS Sections 3.23, *Wildlife Resources*; 4.21, *Impacts on Wildlife Resources*, and Appendix I.

The PA/FEIS for the project provides no basis for the BLM to draw any conclusions or make any decisions concerning the Calico Project. Calico Solar LLC/Tessera Solar's proposed Calico Solar Project was approved last Fall. To the extent that the commenter's remaining comments relate to the Calico project, the BLM declines to respond to them because they are moot and because they are not substantive with respect to the proposed action (see Section 6.9.2.1 of the BLM NEPA Handbook). Because it appears from the citations provided in the letter that the commenter may have intended for the comments to relate to the project and not to the Calico project, the following responses are provided with respect to the project. Furthermore, comments relating specifically to CEQA are not addressed in this response because claimed deficiencies with respect to CEQA compliance are inapposite to the BLM's consideration of the proposed action.

4-04 Comments concerning the adequacy of data relied upon are addressed in Common Response 5.5.2.3, *Adequacy of Data Relied Upon*.

4-05 See Common Response 5.5.2.7, *Biological Resources*.

4-06 See Common Response 5.5.2.7, *Biological Resources*.

4-07 See Common Response 5.5.2.7, *Biological Resources*.

4-08 See Common Response 5.5.2.7, *Biological Resources*.

4-09 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook, this is not a substantive comment. Nonetheless, see Common Response 5.5.2.7, *Biological Resources*.

4-10 See Common Response 5.5.2.7, *Biological Resources*.

4-11 Comments concerning alternatives considered are addressed in Common Response 5.5.2.5, *Alternatives*. Concerning impacts to Mojave fringe-toed lizard and other wildlife resources, see PA/FEIS Sections 3.23, 4.21, Appendix I, and Common Response 5.5.2.7, each concerning wildlife resources and impacts to them.

4-12 See Response to Comment 4-11.

4-13 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook, this is not a substantive comment. Nonetheless, comments concerning alternatives are addressed in Common Response 5.5.2.5, *Alternatives*; supplementation and recirculation are addressed in Common Response 5.5.2.6, *Supplementation/Recirculation*.

4-14 Concerning adequacy of data relied upon, see Common Response 5.5.2.3, *Adequacy of Data Relied Upon*. Concerning biological resources such as the desert kit fox and American badger, see Common Response 5.5.2.7, *Biological Resources*.

4-15 See Common Response 5.5.2.3, *Adequacy of Data Relied Upon*, and 5.5.2.7, *Biological Resources*.

4-16 Comments about the cumulative impacts analysis and concerning consistency with NEPA generally are addressed in Common Response 5.5.2.2, *Consistency of the PA/FEIS with NEPA and FLPMA*,. Concerning adequacy of data relied upon, see Common Response 5.5.2.3, *Adequacy of Data Relied Upon*.

4-17 See Response to Comment 4-16.Concerning cumulative impacts to biological resources, see PA/FEIS Sections 4.17 (*Vegetation Resources*), 4.21 (*Wildlife Resources*), Appendix I, and Common Response 5.5.2.7 (*Biological Resources*).

4-18 Concerning the adequacy of the data relied upon, see Common Response 5.5.2.3. Concerning consistency with NEPA and FLPMA, see Common Response 5.5.2.2. Concerning consistency with plans and policies (including the NECO Plan), see Common Response 5.5.2.1.

4-19 See Response to Comment 4-18 and Response to Comment 3-11.

4-20 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook, this is not a substantive comment.

4-21 Concerning alternatives, see Common Response 5.5.2.5. Concerning purpose and need, see Common Response 5.5.2.4.

4-22 See Common Response 5.5.2.4.

4-23 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook, this is not a substantive comment. Nonetheless, comments concerning consistency with NEPA and FLPMA are addressed in Common Response 5.5.2.2.

4-24 Comments concerning supplementation/recirculation are addressed in Common Response 5.5.2.6. Comments concerning consistency of the proposed action and alternatives with the CDCA Plan, NECO Plan and other plans are addressed in Common Response 5.5.2.1.

4-25 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook, this is not a substantive comment.

5.5.3.5 Letter 5 – Responses to Comments from The Wilderness Society

5-01 See Common Response 5.5.2.1.

5-02 See Common Response 5.5.2.1.

5-03 See Common Response 5.5.2.1 and, concerning the consistency of “fast track” review of the proposed action with NEPA, see Common Response 5.5.2.2. Furthermore, on February 8, 2011, Secretary Salazar announced multiple initiatives designed to encourage rapid and responsible development of renewable energy on public lands. This policy guidance provides clarity and guidance to stakeholders, including developers and agency employees, about smart siting and effective mitigation for renewable energy projects. See, for example, National Environmental Policy Act Compliance for Utility-Scale Renewable Energy Right-of-Way Authorizations (Instruction Memorandum 2011-59), Solar and Wind Energy Applications – Due Diligence (Instruction Memorandum 2011-60) and Solar and Wind Energy Applications – Pre-Application and Screening (Instruction Memorandum 2011-61).

5-04 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

5-05 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

5-06 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook). Nonetheless, see Common Response 5.5.2.7 (*Biological Resources*) and Common Response 5.5.2.10 (*Water Resources*).

5-07 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

5-08 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook). Regardless, the BLM has considered alternatives that would reduce impacts of the proposed action to the sand transport corridor and MFTL habitat. For example, Reconfigured Alternative 2 would reduce impacts to the sand dune habitat and the Mojave fringe-toed lizard in the northeastern portion of the site and reduce impacts to the sand transport corridor along the northern and northeastern portions of the site. See Figures 2-7 (reconfigured Alternative 2 Option 1) and 2-8 (Reconfigured Alternative 2 Option 2).

5-09 See Common Response 5.5.2.7.

5-10 See Common Responses 5.5.2.5 (*Alternatives*) and 5.5.2.7 (*Biological Resources*).

5-11 As explained in PA/FEIS Section 2.3, *Connected Actions*, the Red Bluff Substation and associated gen-tie proposed by Southern California Edison are connected actions and not a part of the proposed action. Analysis of environmental impacts of the Red Bluff Substation Project are analyzed in Appendix E.

5-12 See Common Response 5.5.2.10.

5-13 See Common Response 5.5.2.11.

5-14 See Common Response 5.5.2.11.

5-15 The NHPA Section 106 process for the PSPP concluded when a PA was entered into for the project on September 21, 2010. See Common Response 5.5.2.11.

5-16 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook, this is not a substantive comment. Nonetheless, comments concerning consistency with NEPA are addressed in Common Response 5.5.2.2; comments concerning the purpose and need for the proposed action are addressed in Common Response 5.5.2.4; and comments concerning the alternatives considered are addressed in Common Response 5.5.2.5.

5-17 Concerning adequacy of data relied upon, see Common Response 5.5.2.3. Concerning supplementation/recirculation, see Common Response 5.5.2.6.

5-18 See Common Response 5.5.2.8.

5-19 Concerning purpose and need, see Common Response 5.5.2.4. Concerning supplementation/recirculation, see Common Response 5.5.2.6.

5-20 Comments concerning alternatives are addressed in Common Response 5.5.2.5. See also Response to Comment 5-08.

5-21 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

5-22 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook). Nonetheless, alternatives are described in PA/FEIS Section 2.4, *Alternatives Development and Screening Process*, and analyzed on a resource-by-resource basis throughout Chapter 4, *Environmental Consequences*. See also, Common Response 5.5.2.5, *Alternatives*.

5-23 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook). Nonetheless, comments regarding biological resources, including desert tortoise, are addressed in Common Response 5.5.2.7.

5-24 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook). Nonetheless, see the Response to Comments 5-08, concerning reduced impacts to Mojave fringe-toed lizard, its habitat, and the sand transport corridor; and Common Response 5.5.2.7, which addressed comments concerning biological resources. Alternatives reconfiguring disturbance area boundaries to avoid or reduce impacts that were developed after the release of the SA/DEIS have been analyzed fully (see PA/FEIS Chapter 4, *Environmental Consequences*) and made available to the public (see, e.g., the CEC's September 2010 Revised Staff Assessment for the project, December 2010 Commission Decision).

5-25 Comments concerning alternatives are addressed in Common Response 5.5.2.5.

5-26 See Response to Comment 5-11.

5-27 Concerning consistency of the cumulative impacts analysis for the proposed action and alternatives with NEPA, see Common Response 5.5.2.2. Quantitative information is provided where available. See, for example, the analysis of cumulative impacts related to water resources, including PA/FEIS Table 4.19-6, *Foreseeable Projects and Anticipated Water Use*. See also, the analysis of cumulative impacts to wildlife resources, including Table 4.21-2, *Cumulative Impacts to Selected Wildlife Resources from the PSPP*, and various tables provided in Appendix I, quantifying cumulative effects to desert tortoise habitat, bighorn sheep WHMAs and connectivity corridors, special-status species habitat (including MFTL, American badger, kit fox, burrowing owl, Harwood's milk vetch, etc.), and other resources). The Red Bluff Substation and relocation of the transmission line (described in PA/FEIS Section 2.3, *Connected Actions*) are considered in the context of the cumulative scenario. See, for example, PA/FEIS Section 4.1.4 (*Cumulative Scenario Approach*) and Section 4.6.3 (cumulative impacts related to lands and realty).

5-28 Concerning consistency of the cumulative impacts assessment in the PA/FEIS with NEPA and FLPMA, see Common Response 5.5.2.2. Concerning biological resources, see Common Response 5.5.2.7.

5-29 See Common Response 5.5.2.8.

5-30 Concerning adequacy of data relied upon, see Common Response 5.5.2.3. Concerning supplementation/recirculation, see Common Response 5.5.2.6. Concerning biological resources, see Common Response 5.5.2.7.

5-31 Concerning consistency with NEPA and FLPMA, see Common Response 5.5.2.2. Concerning supplementation/recirculation, see Common Response 5.5.2.6. Concerning the availability of data that has become available following the issuance of the SA/DEIS, see Response to Comment 5-24. The BLM recognizes that the PA/FEIS provides additional information and analysis relative to the SA/DEIS. This is consistent with NEPA. See, for example, Section 6.9.2.2 of the BLM NEPA Handbook, which summarizes the CEQ regulations (40 CFR 1503.4) identifying several options for responding to substantive comments, including: modifying one or more of the alternatives as requested; developing and evaluating suggested alternatives; and supplementing, improving, or modifying the analysis; among others.

5-32 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

5.5.3.6 Letter 6 – Responses to Comments from California Unions for Renewable Energy (CURE)

6-001 Comments concerning consistency of the PA/FEIS with NEPA are addressed in Common Response 5.5.2.2. Because the PA/FEIS is been prepared as a stand-alone NEPA document, the substantive requirements of CEQA do not govern its legal adequacy and the BLM may approve the requested ROW grant and/or the CDCA Plan amendment based on compliance of the PA/FEIS with NEPA.

6-002 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook). Nonetheless, comments concerning consistency of the PA/FEIS with NEPA are addressed in Common Response 5.5.2.2.

6-003 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook). Nonetheless, comments concerning consistency of the PA/FEIS with NEPA are addressed in Common Response 5.5.2.2, and comments suggesting supplementation/ recirculation are addressed in Common Response 5.5.2.6.

6-004 Concerning adequacy of data relied upon, see Common Response 5.5.2.3. Concerning the range of alternatives, see Common Response 5.5.2.5.

Southern California Edison's proposed Red Bluff Substation Project, including gen-tie, telecommunications and telemetry infrastructure, and distribution to provide light and power, are described in PA/FEIS Section 2.3, *Connected Actions*. See also, Appendix E, where the analysis of environmental impacts associated with the Red Bluff Substation Project is summarized and incorporated by reference from the EIS being prepared for the Desert Sunlight Solar Farm project.

The actual length of the transmission line necessary to connect the project to the planned Red Bluff Substation will depend on which of the possible locations ultimately is selected for the substation. Impacts associated with the linear facilities proposed to support the solar plant for the project, including the transmission line, are described in PA/FEIS Section 2.2, *Proposed Action*, and Section 2.4.3, *Alternatives Considered*. Impacts related to the linear facilities are analyzed throughout Chapter 4, *Environmental Consequences*. See, for example, PA/FEIS Section 4.4, *Impacts on Cultural Resources*, Section 4.6, *Impacts on Lands and Realty*, Section 4.8, *Impacts on Multiple Use Classes*, and 4.18, *Impacts on Visual Resources*.

6-005 Mitigation Measures are identified in the PA/FEIS where they may be used to avoid or reduce adverse impacts, regardless of whether such impacts are "significant" as that term is used under NEPA (40 CFR 1502.2(b)). The implementation of mitigation measures with the intent of reducing an impact below a level of significance is specific to CEQA and not relevant in the NEPA context. Recommended mitigation measures provide selection criteria for compensation lands. See, for example, BIO-12, *Desert Tortoise Compensatory Mitigation*, which establishes that such lands shall be: (i) within the Colorado Desert Recovery Unit, (ii) prioritized near larger blocks of lands that are either already protected or planned for protection, such as DWMAs or which could feasibly be protected long-term; (iii) connected to lands with desert tortoise habitat equal to or better quality than the project site; and (iv) meet other specified criteria. Accordingly, the PA/FEIS does describe the locations of acceptable compensation habitat. Impacts that may be caused by habitat enhancement associated with implementation of the mitigation measures, if outside the scope of analysis in the PA/FEIS would require supplemental analysis under NEPA. See also, Common Response 5.5.2.7, *Biological Resources*.

6-006 Comments concerning alternatives are addressed in Common Response 5.5.2.5.

6-007 See Response to Comment 6-004.

6-008 Concerning the adequacy of the information relied upon, see Common Response 5.5.2.3. Comments concerning consistency of the PA/FEIS with NEPA are addressed in Common Response 5.5.2.2. Comments concerning purpose and need and alternatives are addressed in Common Response 5.5.2.4 and Common Response 5.5.2.5, respectively. Comments suggesting supplementation/recirculation are addressed in Common Response 5.5.2.6.

6-009 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-010 The PA/FEIS provides quantitative information where available, including with respect to acreage. Where distinctions are intended, they are reflected in the acreage identified. See, for example, PA/FEIS Table 2-1, *General Project Dimensions*. Generally speaking, the proposed action requests a right-of-way (ROW) area of approximately 5,200 acres, of which the project would disturb approximately 4,024 acres. By comparison, the overall disturbance area for Reconfigured Alternative 2 Option 1 would be approximately 4,365 acres and, for Option 2, would be approximately 4,330 acres.

6-011 The introductory paragraph of PA/FEIS Chapter 2, *Proposed Action and Alternatives*, identifies the disturbance area of the proposed action as encompassing approximately 4,024 acres, expressly including access roads and the transmission line that will connect the solar plant site to Southern California Edison's proposed Red Bluff Substation. The BLM has addressed the concern expressed in this comment by expressly including access roads and the transmission line in the area of disturbance and, thereafter, by analyzing impacts associated with the area of disturbance throughout PA/FEIS Chapter 4, *Environmental Consequences*. See also, Response to Comment 6-004.

6-012 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook). Nonetheless, see Responses to Comments 6-010 and 6-011 concerning quantification of disturbance in the PA/FEIS.

6-013 As discussed in PA/FEIS Section 4.14.2, *Discussion of Direct and Indirect Impacts*, the total earthwork including excavation for foundations and underground systems and a total cut and fill volume of approximately 4.5 million cubic yards.

6-014 As explained in Response to Comment 6-011, access roads and the transmission line connecting the project to the proposed Red Bluff Substation are described and associated impacts are analyzed in the PA/FEIS. The evaporation ponds and concrete batch plant are described in PA/FEIS Sections 2.2.3, *Power Plant Civil/Structural Features*, and 2.2.4, *Construction*, respectively. Associated impacts are analyzed throughout PA/FEIS Chapter 4, *Environmental Consequences*. For example, impacts associated with the evaporation ponds are evaluated in PA/FEIS Section 4.11, *Impacts on Public Health and Safety*, Section 4.19, *Impacts on Water Resources*, and Section 4.21, *Impacts on Wildlife*

Resources. Concerning impacts related to the concrete batch plant, see, for example, PA/FEIS Section 4.2, *Impacts on Air Resources*, Section 4.3, *Impacts on Global Climate Change*, and Section 4.11, *Impacts on Public Health and Safety*. Drainage facilities for the site are described in PA/FEIS Section 2.2, *Proposed Action*. Impacts associated with these facilities are analyzed, for example, in PA/FEIS Section 4.19, *Impacts on Water Resources*, and Section 4.17, *Impacts on Vegetation Resources*, among other sections. See also, Common Response 5.5.2.2.

6-015 Comments suggesting supplementation/recirculation are addressed in Common Response 5.5.2.6.

6-016 See Common Response 5.5.2.2.

6-017 See Response to Comment 6-014.

6-018 See Response to Comment 6-014 and Common Response 5.5.2.6. Comments concerning biological resources are addressed in Common Response 5.5.2.7.

6-019 See Response to Comment 6-014 and Common Response 5.5.2.2; see also Common Response 5.5.2.6.

6-020 Concerning consistency with NEPA, see Common Response 5.5.2.2. Concerning supplementation/recirculation, see Common Response 5.5.2.6.

6-021 Concerning air quality, see Common Response 5.5.2.9. See also, Response to Comment 6-014.

6-022 Concerning water resources, see Common Response 5.5.2.10. See also, Response to Comment 6-014.

6-023 Concerning cultural resources, see Common Response 5.5.2.11. See also, Response to Comment 6-014.

6-024 Concerning biological resources, see Common Response 5.5.2.7. See also, Response to Comment 6-014.

6-025 Concerning consistency of the PA/FEIS with NEPA, see Common Response 5.5.2.2. See also, Response to Comment 6-014.

6-026 Concerning biological resources (vegetation and wildlife), see Common Response 5.5.2.7. Concerning water resources (including groundwater), see Common Response 5.5.2.10.

6-027 Baseline information is detailed on a resource-by-resource basis throughout PA/FEIS Chapter 3, *Affected Environment* (see, e.g., PA/FEIS Section 3.18, *Vegetation Resources*, and Section 3.23, *Wildlife Resources*). Concerning adequacy of data relied upon, see

Common Response 5.5.2.3. Comments suggesting supplementation/recirculation are addressed in Common Response 5.5.2.6.

6-028 Concerning consistency with NEPA, see Common Response 5.5.2.2. Potential effects resulting from closure and decommissioning are evaluated throughout PA/FEIS Chapter 4, *Environmental Consequences* (see, e.g., PA/FEIS Section 4.2, *Impacts to Air Quality*, Section 4.12, *Public Health and Safety*, and Section 4.21, *Impacts to Wildlife Resources*). The possibility of residual impacts after implementation of mitigation measures and of unavoidable adverse impacts also is considered in each resource section.

6-029 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-030 The PA/FEIS has been prepared in accordance with NEPA. Although the SA/DEIS was prepared as a joint CEQA/NEPA document, the CEC prepared a stand-alone, CEQA-specific Revised Staff Assessment and Commission Decision. Because the PA/FEIS is been prepared as a stand-alone NEPA document, the substantive requirements of CEQA do not govern its legal adequacy. See, Common Response 5.5.2.2.

6-031 See Response to Comment 6-030.

6-032 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-033 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook). Nonetheless, comments concerning consistency with NEPA are addressed in Common Response 5.5.2.2; comments concerning biological resources are addressed in Common Response 5.5.2.7; comments concerning cultural resources are addressed in Common Response 5.5.2.11; and comments suggesting supplementation/recirculation are addressed in Common Response 5.5.2.6. See also PA/FEIS Section 4.11 concerning analysis of impacts associated with transmission line safety and nuisance as well as hazards.

6-034 See Response to Comment 6-024.

6-035 See Common Responses 5.5.2.7 (*Biological Resources*) and 5.5.2.6 (*Supplementation/Recirculation*).

6-036 See Common Response 5.5.2.7.

6-037 See Common Responses 5.5.2.3 (*Adequacy of Data Relied Upon*) and 5.5.2.7 (*Biological Resources*).

6-038 PA/FEIS Section 4.21, *Impacts on Wildlife Resources*, the transmission line and other project structures as additional sources of predator perching sites. See also, Common Response 5.5.2.7.

6-039 These impacts are considered in PA/FEIS Section 4.21, *Impacts on Wildlife Resources*, and Section 4.17, *Impacts on Vegetation Resources*. See also, Common Response 5.5.2.7.

6-040 See Common Response 5.5.2.7.

6-041 See Common Response 5.5.2.7.

6-042 Given the generality of the comment, only a general reply is possible: See Common Response 5.5.2.7.

6-043 See Common Responses 5.5.2.5 (*Alternatives*) and 5.5.2.2, concerning consistency of the PA/FEIS with NEPA.

6-044 See Common Response 5.5.2.7 and PA/FEIS Sections 3.23, 4.21 and Appendix I.

6-045 See Common Responses 5.5.2.3 (*Adequacy of Data Relied Upon*) and 5.5.2.7 (*Biological Resources*).

6-046 See Common Response 5.5.2.7.

60-47 See Common Response 5.5.2.7 and Response to Comment 6-014.

6-048 See Common Response 5.5.2.7.

6-049 Concerning consistency with NEPA, see Common Response 5.5.2.2. Concerning biological resources, see Common Response 5.5.2.7.

6-050 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-051 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-052 See Common Response 5.5.2.7.

6-053 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-054 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-055 See Common Responses 5.5.2.6 (*Supplementation/Recirculation*) and 5.5.2.7 (*Biological Resources*) as well as Response to Comment 6-014.

6-056 See Common Responses 5.5.2.2 (*Consistency of the PA/FEIS with NEPA*). 5.5.2.3 (*Adequacy of Information Relied Upon*), and 5.5.2.7 (*Biological Resources*).

6-057 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook). Nonetheless, see Common Responses 5.5.2.2 (*Consistency of the PA/FEIS with NEPA*) and 5.5.2.7 (*Biological Resources*).

6-058 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-059 See Common Response 5.5.2.7.

6-060 See Common Responses 5.5.2.3 (*Adequacy of Data Relied Upon*) and 5.5.2.7 (*Biological Resources*).It is for the wildlife agencies with resource-specific jurisdiction over eagles to determine whether take authorization is required; such a determination is not required by NEPA to be made in the PA/FEIS.

6-061 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-062 See Common Response 5.5.2.7 (*Biological Resources*) and Response to Comment 6-014.

6-063 State jurisdictional waters are not relevant to the FEIS. Concerning biological resources, see Common Response 5.5.2.7.

6-064 See Common Response 5.5.2.7.

6-065 See Common Response 5.5.2.7.

6-066 See Common Response 5.5.2.7.

6-067 See Common Responses 5.5.2.3 (*Adequacy of the Information Relied Upon*), 5.5.2.6 (*Supplementation/Recirculation*) and 5.5.2.7 (*Biological Resources*). See also, Response to Comment 6-011.

6-068 See Common Response 5.5.2.7 (*Biological Resources*) and Response to Comment 6-014.

6-069 See Common Responses 5.5.2.3 (*Adequacy of the Information Relied Upon*) and 5.5.2.7 (*Biological Resources*).

6-070 See Common Response 5.5.2.7.

6-071 See Common Response 5.5.2.7.

6-072 See Common Response 5.5.2.7 as well as PA/FEIS Sections 4.17 (concerning vegetation), 4.21 (concerning wildlife) and Appendix I (concerning cumulative impacts related to biological resources).

6-073 See Response to Comment 6-072 and Response to Comment 6-014.

6-074 See Common Responses 5.5.2.2 (*Consistency of the PA/FEIS with NEPA*) and 5.5.2.7 (*Biological Resources*).

6-075 See Common Responses 5.5.2.7 (*Biological Resources*) and 5.5.2.6 (*Supplementation/Recirculation*).

6-076 As indicated in the comment, the Draft Biological Assessment for the project was prepared pursuant to the ESA. Compliance or non-compliance with the requirements of that statute would be independent of consistency of the PA/FEIS with NEPA. Further, the

USFWS and not BLM would have enforcement jurisdiction with respect to the ESA. Accordingly, this is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-077 Disclosure of consultation with wildlife agencies and potential take authorization from such agencies is not relevant to a determination of whether the PA/FEIS is consistent with of NEPA (see Common Response 5.5.2.2).

6-078 See Response to Comment 6-077.

6-079 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-080 See Response to Comment 6-077.

6-081 See Response to Comment 6-077.

6-082 Impacts to wildlife resources from construction-related noise and nighttime lighting are analyzed in PA/FEIS Section 4.21, *Impacts to Wildlife Resources*.

6-083 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-084 Concerning the adequacy of mitigation measures, see Common Response 5.5.2.2 (*Consistency of the PA/FEIS with NEPA*). See also, Common Response 5.5.2.7 (*Biological Resources*).

6-085 See Common Response 5.5.2.5.

6-086 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-087 If implementation of the recommended mitigation measure would entail significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its effects (40 CFR 1502.9(c)(1)(ii)) or constitute a substantial change to the proposed action that is relevant to environmental concerns (40 CFR 1502.9(c)(1)(i)), supplementation would be required. However, impacts such as those identified in the comment are addressed in PA/FEIS Section 4.21.

6-088 See Common Response 5.5.2.7.

6-089 See Common Response 5.5.2.7.

6-090 See Common Response 5.5.2.7.

6-091 Concerning consistency with NEPA, see Common Response 5.5.2.2. Concerning biological resources and “significance,” see Common Response 5.5.2.7.

6-092 See Common Responses 5.5.2.3 (*Adequacy of the Data Relied Upon*) and 5.5.2.7 (*Biological Resources*).

6-093 See Common Response 5.5.2.7.

6-094 See Common Response 5.5.2.7.

6-095 See Common Response 5.5.2.7

6-096 See Common Response 5.5.2.7. Also, impacts associated with HTF are analyzed in PA/FEIS Section 4.19, *Impacts to Water Resources*, and 4.11.2, *Hazardous Materials*.

6-097 See Common Response 5.5.2.7.

6-098 Herbicide use and associated risk is evaluated in PA/FEIS Section 4.17, *Vegetation Resources*; see also, Common Response 5.5.2.7.

6-099 See Response to Comment 6-021, including Common Response 5.5.2.9.

6-100 See Response to Comment 6-014 and Common Response 5.5.2.10, *Water Resources*.

6-101 See Response to Comment 6-014. Further, PA/FEIS Tables 4.2-3 and 4.2-4 include data rows for emissions that would occur due to construction of the transmission line and associated access roads. Operation of the transmission line and access roads would result in no direct emissions.

6-102 See Common Response 5.5.2.9 (*Air Quality*).

6-103 See Common Response 5.5.2.9 (*Air Quality*).

6-104 As discussed in Section 4.2 of the PA/FEIS, the inputs for the air dispersion model included meteorological data, such as wind speed and other atmospheric conditions, and site elevation. For the project, the meteorological data used as input to the model included hourly wind speeds and directions measured at the Blythe Airport meteorological station during 2002 through 2004. The data from Blythe Airport indicate that the highest annual wind direction frequencies are from the south through the southwest. However, as disclosed in Section 3.2, a more westerly wind direction is expected at the site due to local topography. Given the proximity of the Blythe Airport to the project site, this data is a reasonable input to the model and accurately indicates that that the worst-case scenario impacts would occur in the vicinity of Unit #1

6-105 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-106 See Common Response 5.5.2.9 (*Air Quality*).

6-107 See Common Response 5.5.2.9 (*Air Quality*).

6-108 See Common Response 5.5.2.9 (Air Quality).

6-109 See Common Response 5.5.2.9 (*Air Quality*).

6-110 See Common Response 5.5.2.9 (*Air Quality*).

6-111 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-112 See Common Response 5.5.2.9 (*Air Quality*).

6-113 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-114 See Common Response 5.5.2.9 (*Air Quality*).

6-115 See Common Response 5.5.2.9 (*Air Quality*).

6-116 See Common Response 5.5.2.9 (*Air Quality*).

6-117 Concerning consistency with plans, see Common Response 5.5.2.1. Concerning consistency with NEPA (cumulative) and FLPMA, see Common Response 5.5.2.2. Concerning biological resources, see Common Response 5.5.2.7.

6-118 As discussed in PA/FEIS Section 3.9, *Multiple Use Classes*, the project site is designated as Multiple-Use Class M (Moderate Use) in the CDCA Plan, as amended. The Multiple Use Class (MUC) Guidelines in Table 1 of the CDCA Plan state that solar electrical generation facilities may be allowed in MUC Limited (L), Moderate (M), and Intensive (I) areas after NEPA requirements are met and the CDCA Plan is properly amended. MUC M is based on a controlled balance between higher-intensity use and protection of public lands. The CDCA Plan states that "electrical generation plants may be allowed" within the Moderate Use designation. Specifically, solar electrical generating facilities "may be allowed after NEPA requirements are met." The published SA/DEIS did correctly state that the project is wholly with the Moderate (M) MUC designated in the CDCA as amended (see Section C. 6, Land Use, Recreation and Wilderness). While the chapter describing the alternatives in the SA/DEIS incorrectly stated the MUC was Limited (L), this has been corrected in the PA/FEIS.

6-119 PA/FEIS Section 3.16, *Special Designations*, and Section 4.15, *Impacts on Special Designations*, describe the proximity of all special designation areas to the project and the impacts to each of the ACECs in close proximity. The Palen Dry Lake ACEC is located approximately 0.5 mile northeast of the project site. The Chuckwalla Valley Dune Thicket ACEC is located approximately 17 miles southeast of the site.

6-120 The PA/FEIS fully analyzes the direct, indirect, and cumulative impacts to land and realty uses, recreation and special designation areas such as wilderness, wilderness study areas and back country byways in PA./FEIR Sections 4.05, 4.12 and 4.15.1 through 4.15.3, respectively. See also, Response to Comment 6-014.

6-121 See Response to Comment 6-118.

6-122 Concerning consistency with master plans, see Common Response 5.5.2.1. Concerning biological resources, see Common Response 5.5.2.7.

6-123 See Common Response 5.5.2.2.

6-124 See Common Response 5.5.2.7.

6-125 See Common Responses 5.5.2.1 (*Consistency of the Proposed Action with the CDCA Plan, NECO Plan and other Plans*) and 5.5.2.7 (*Biological Resources*).

6-126 "Substantial evidence" is required to support environmental conclusions under CEQA. As noted above, CEQA does not govern the legal adequacy of the PA/FEIS. See Common Response 5.5.2.11 (*Cultural Resources*).

6-127 See Common Response 5.5.2.11.

6-128 See Common Response 5.5.2.11.

6-129 See Common Response 5.5.2.11.

6-130 See Common Response 5.5.2.11.

6-131 See Common Response 5.5.2.11.

6-132 See Common Response 5.5.2.11.

6-133 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook). Nonetheless, comments concerning public health and safety are addressed in Common Response 5.5.2.12.

6-134 See Common Response 5.5.2.12.

6-135 See Common Response 5.5.2.12.

6-136 On December 1, 2010, the South Coast Air Quality Management District (SCAQMD) issued a Final Determination of Compliance for the project. In preparing its final determination, the SCAQMD estimated toxic air contaminant (TAC) emissions for normal operations of each emissions unit, which include the auxiliary boilers, emergency fire water pump and generator engines, and HTF ullage system vent.

As the SCAQMD explained, TAC emissions from the auxiliary boilers were estimated based on EPA AP-42 emission factors for natural gas combustion. TAC emissions from the emergency fire water pump and generator engines were quantified for routine testing and maintenance operation, which will be no more than one hour per day, 50 hours per year, per engine. Emissions are not calculated for emergency use. The TAC emissions were characterized as aggregate particulate emissions (diesel particulate matter [DPM]) from diesel-fired engines. The DPM emissions are assumed to be equal to the PM10 emissions. The total uncontrolled TAC emissions from the HTF ullage tank vent were estimated based on data provided by an existing solar thermal parabolic trough plant and extrapolated to account for HTF system size. HTF is composed of approximately 75 percent diphenyl ether and 25 percent biphenyl. For this application, because both of these compounds contain benzene rings, it was conservatively assumed that the HTF breakdown products would consist primarily (approximately 99 percent) of benzene. Controlled emissions were calculated based on the use of two carbon adsorption canisters in series with an overall control efficiency of 98 percent. Determination was considered in preparing the PA/FEIS. Concerns of the SCAQMD with respect to its subject matter expertise, including TACs, have been addressed in the environmental review for this project to the satisfaction of the agency. The toxic emissions (benzene) due to fugitives is assumed to be 1% of the total fugitive emissions or 0.01(19,186 lb/yr) = 191.86 lb/yr. Since there are two ullage systems, the toxic emissions per system are (191.86 lb/yr)/2 = 96 lb/yr. The toxic emissions per ullage system = 300 lb/yr(0.99) = 297 lb/yr. Therefore, the total benzene emissions from a single ullage system (including fugitives) are 96 lb/yr + 297 lb/yr = 393 lb/yr. Table 17 of the SCAQMD's Final Determination of Compliance, which lists the breakdown of the TAC emissions for each permit unit, is reproduced here for the commenter's convenience.

6-137 See Common Response 5.5.2.12.

6-138 See Common Response 5.5.2.12.

6-139 See Common Responses 5.5.2.12 (*Public Health and Safety*) and 5.5.2.6 (*Supplementation/Recirculation*).

6-140 See Common Response 5.5.2.12.

6-141 See Common Response 5.5.2.12.

6-142 See Common Response 5.5.2.12.

6-143 See Common Response 5.5.2.10.

6-144 See Common Responses 5.5.2.5 (*Alternatives*) and 5.5.2.10 (*Water Resources*).

6-145 See Common Response 5.5.2.5 (*Alternatives*). Impacts related to wildlife habitat are addressed in PA/FEIS Sections 4.17 (*Impacts to Vegetation Resources*) and 4.21 (*Impacts to Wildlife Resources*) as well as Appendix I, concerning cumulative impacts to biological resources.

TABLE 17
SCAQMD FINAL DETERMINATION OF COMPLIANCE

Pollutant	Auxiliary Boiler		Fire Water Pump		Generator		Ullage System		
	Hourly lb/hr	Annual lb/yr	Hourly lb/hr	Annual lb/yr	Hourly lb/hr	Annual lb/yr	Hourly (R1) lb/hr	Hourly (R2) lb/hr	Annual lb/yr
7, 12-Dimethylbenz (a) anthracene	5.49E-07	9.47E-04							
Acenaphthene	6.18E-08	1.07E-04							
Acenaphthylene	6.18E-08	1.42E-04							
Anthracene	8.24E-08	1.42E-04							
Benz (a) anthracene	6.18E-08	1.07E-04							
Benzene	7.21E-05	1.24E-01					3.75+01	7.50E-01	3.90E+02
Benzo (a) pyrene	4.12E-08	7.01E-05							
Benzo (b) fluoranthene	6.18E-08	1.07E-05							
Benzo (g, h, i) perylene	4.12E-08	7.01E-05							
Benzo (k) fluoranthene	6.18E-08	1.07E-05							
Biphenyl	0.00E+00	--					3.75E-03	7.50E-05	3.00E-02
Chrysene	6.18E-08	1.07E-04							
Dibenz (a, h) anthracene	4.12E-08	7.01E-05							
Dichlorobenzene	4.12E-05	7.01E-02							
Diesel Particulate Matter	0.00E+00	--	9.91E-02	4.96E+00	9.65E-01	4.38E+01			
Fluoranthene	1.03E-07	1.78E-04							
Formaldehyde	2.57E-03	4.44E+00							
Hexane	6.18E-02	1.07E-02							
Indeno (1, 2, 3-cd) pyrene	6.18E-08	1.01E-03							
Naphthalene	2.09E-05	3.61E+02							
Phenanthrene	5.83E-07	1.01E-03							
Pyrene	1.72E-07	2.96E-04							
Toluene	1.17E-04	2.01E-01							
Total for Single System	6.46E-02	1.11E+02	9.91E-02	4.96	9.91E-02	4.83	37.5	0.75	393
Total for Both Systems	1.29E-01	2.23E+02	1.98E-01	9.92	1.98E-01	9.66	75.00	1.50	786

6-146 Project cut and fill would be balanced within the site, with no net import or export of material. The vast majority of project grading and excavation would occur in the solar plant ROW, with only relatively minor excavation needed for installation of gen-tie facilities (e.g., at the locations of monopoles). Mitigation Measure SOIL&WATER-11 relates to channel erosion protection. It specifies that soil cement bank protection shall be provided in specified circumstances, and prohibits some other methods of channel stabilization, such as dumped riprap, gabions, and bio-stabilization measures based on these methods' incompatibility with biological resources in the area.

6-147 See Common Response 5.5.2.10.

6-148 See Common Response 5.5.2.10.

6-149 See Common Response 5.5.2.10.

6-150 The Applicant filed a Streambed Alteration Agreement (SAA) with the California Department of Fish & Game in November 2009 for the purposes of altering the terrain and installing channels. This application currently is being reviewed. Compliance with the provisions of the SAA issued for the project would be required by State law as well as SOIL&WATER-12.

6-151 See Common Response 5.5.2.10 and Response to Comment 6-022. Also, the commenter appears to assume that the Applicant intends to further develop groundwater resources in the vicinity of the project. This assumption is unfounded. No such evidence has been identified.

6-152 See Common Response 5.5.2.10.

6-153 See Common Response 5.5.2.10.

6-154 See Common Response 5.5.2.10.

6-155 See Common Response 5.5.2.10.

6-156 See Common Response 5.5.2.10.

6-157 See Common Response 5.5.2.10.

6-158 See Common Response 5.5.2.4.

6-159 See Common Response 5.5.2.5; see also, Response to Comment 6-011.

6-160 See Common Response 5.5.2.5.

6-161 See Common Response 5.5.2.5.

6-162 See Common Response 5.5.2.5.

6-163 See Common Response 5.5.2.5.

6-164 See Common Response 5.5.2.5.

6-165 See Common Response 5.5.2.5.

6-166 See Common Response 5.5.2.5.

6-167 Concerning consistency with NEPA, see Common Response 5.5.2.2. Concerning adequacy of data relied upon, see Common Response 5.5.2.3. Concerning alternatives, se Common Response 5.5.2.5. Comments about supplementation/recirculation are addressed in Common Response 5.5.2.6.

6-168 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-169 See Common Response 5.5.2.7.

6-170 See Common Response 5.5.2.7.

6-171 See Common Responses 5.5.2.3 (Adequacy of Data Relied Upon), 5.5.2.6 (*Supplementation/Recirculation*), and 5.5.2.7 (*Biological Resources*).

6-172 See Common Response 5.5.2.7.

6-173 See Common Response 5.5.2.7.

6-174 See Common Response 5.5.2.7.

6-175 See Common Response 5.5.2.7.

6-176 See Common Response 5.5.2.7.

6-177 See Common Response 5.5.2.7.

6-178 See Common Response 5.5.2.7.

6-179 See Common Response 5.5.2.7.

6-180 See Common Response 5.5.2.7.

6-181 See Common Response 5.5.2.7.

6-182 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook). Nonetheless, see Common Response 5.5.2.7.

6-183 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-184 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook). Nonetheless, see Common Response 5.5.2.7.

6-185 See Common Response 5.5.2.7.

6-186 See Common Response 5.5.2.7.

6-187 See Common Response 5.5.2.7.

6-188 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-189 See Common Response 5.5.2.7.

6-190 See Common Response 5.5.2.7.

6-191 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-192 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-193 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook). As noted above, CEQA does not govern the legal adequacy of the PA/FEIS.

6-194 See Common Response 5.5.2.7.

6-195 Concerning alternatives, see Common Response 5.5.2.5. Concerning biological resources, see Common Response 5.5.2.7.

6-196 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-197 See Common Responses 5.5.2.7 (*Biological Resources*) and 5.5.2.5 (*Alternatives*).

6-198 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook). Nonetheless, see Common Response 5.5.2.7.

6-199 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-200 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook). Nonetheless, see Common Response 5.5.2.7.

6-201 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook). Nonetheless, see Common Response 5.5.2.7.

6-202 See Common Response 5.5.2.7

6-203 See Common Response 5.5.2.7.

6-204 See Common Response 5.5.2.7.

6-205 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-206 See Common Response 5.5.2.7.

6-207 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook). Nonetheless, see Common Response 5.5.2.7.

6-208 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-209 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-210 See Common Response 5.5.2.5.

6-211 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-212 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-213 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-214 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-215 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-216 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook).

6-217 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook). Nonetheless, see Common Response 5.5.2.7.

6-218 See Common Response 5.5.2.12.

6-219 See Common Response 5.5.2.12. Because the requested information has been provided in the PA/FEIS, supplementation and recirculation are not required (see Common Response 5.5.2.6).

6-220 See Common Response 5.5.2.12.

6-221 See Common Response 5.5.2.12.

6-222 See Common Response 5.5.2.12.

6-223 See Common Response 5.5.2.12.

6-224 See Common Response 5.5.2.12.

6-225 See Common Response 5.5.2.12.

6-226 See Common Response 5.5.2.12.

6-227 See Common Response 5.5.2.12.

6-228 See Common Response 5.5.2.12.

6-229 See Common Response 5.5.2.12.

6-230 See Common Response 5.5.2.12.

6-231 The Colorado River Basin Regional Water Board and State Water Board worked with the CEC on the development of CEC's conditions of certification for the project. CEC Conditions of Certification are recommended as mitigation measures throughout PA/FEIS Chapter 4, *Environmental Consequences*, to address direct, indirect and cumulative impacts of the proposed action and alternatives on the quality of the human environment. They are set forth in full in PA/FEIS Appendix B. Because permit requirements for compliance with water quality laws and regulations were drafted and incorporated into the CEC's approval of the project to mitigate potential water quality impacts, no further action is required of the BLM to ensure this result for the project.

6-232 See Common Response 5.5.2.12.

6-233 See Common Response 5.5.2.12.

6-234 See Common Response 5.5.2.12.

5.5.3.7 Letter 7 – Responses to Comments from Western Watershed Project

7-01 Comments concerning alternatives are addressed in Common Response 5.5.2.5.

7-02 Comments concerning desert tortoise and other biological resources are addressed in Common Response 5.5.2.7.

7-03 Comments concerning consistency of the proposed action and alternatives with the CDCA Plan, NECO Plan and other planning documents are addressed in Common Response 5.5.2.1.

7-04 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook). Nonetheless, comments concerning global climate change are addressed in Common Response 5.5.2.8.

7-05 See Common Response 5.5.2.7.

7-06 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook). Nonetheless, comments concerning the analysis of impacts to desert tortoise are addressed in Common Response 5.5.2.7, *Biological Resources*.

7-07 Comments concerning biological resources are addressed in Common Response 5.5.2.7. Comments concerning consistency of the proposed action with NEPA and FLPMA are addressed in Common Response 5.5.2.2.

7-08 See Response to Comment 7-07. CEQA significance determinations are not relevant in the NEPA context; thus, no revisions were made to explain how recommended mitigation measures would reduce impacts to sand transport to a less-than-significant level. Instead, quantification of impacts is provided where possible, qualitative assessments are provided where quantification is not possible, and mitigation measures are identified where they may be used to avoid or reduce adverse impacts, regardless of whether such impacts are “significant” as that term is used under NEPA (40 CFR 1502.2(b)). Comments suggesting supplementation/recirculation are addressed in Common Response 5.5.2.6.

7-09 See Common Response 5.5.2.10.

5.5.3.8 Letter 8 – Responses to Comments from Metropolitan Water District of Southern California

8-01 This is not a substantive comment (see Section 6.9.2.1 of the BLM NEPA Handbook). Nonetheless, comments concerning water resources, such as Colorado River water, are addressed in Common Response 5.5.2.10.

8-02 The solar field would be installed on BLM land where Metropolitan Water District (MWD) does not currently own, operate, or manage any facilities. Additionally, a preliminary review of siting alignments and available information regarding the location of Metropolitan’s facilities indicated that the development of the project is not be expected to place any facilities on or across facilities owned, operated or managed by MWD. In the event that project facilities are installed across an existing MWD facility, acquisition of proper permits and coordination with MWD would ensure that potential impacts are minimized.

8-03 BLM is not aware of, nor does the comment offer, any potential impacts within the purview of NEPA that could result to MWD’s transmission system (reliability, operations or safety) due to implementation of the project. Concerning transmission line safety and nuisance more generally, see PA/FEIS Section 4.11.6.

8-04 See Common Response 5.5.2.10.

8-05 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, the BLM notes that the language quoted relates to SOIL&WATER-14, *Mitigation of Impacts to the Palo Verde Mesa*

Groundwater Basin, and that the foreclosure of the quoted opportunities does not preclude the effectiveness of SOIL&WATER-14: as stated in the mitigation measure, other proposed mitigation activities may be determined to be acceptable. See also, Common Response 5.5.2.10, *Water Resources*.

8-06 See Common Response 5.5.2.10.

5.5.3.9 Letter 9 – Intentionally Left Blank

Intentionally left blank.

5.5.3.10 Letter 10 – Responses to Comments from Environmental Protection Agency

10-01 Considering the reasonableness of the range of alternatives, see Common Response 5.5.2.5. Further, the time required to prepare an EIS ranges depending on the complexity of the issues involved and the types and magnitude of improvements proposed, and can take as much as 24-36 months or more. The BLM identified certain "fast-track" projects for which the companies involved demonstrated to the BLM that they had made sufficient progress to formally start the environmental review and public participation process. The project is one such project. The Applicant submitted a ROW application to the BLM and filed an application for certification with the Energy Commission. The environmental review process, including opportunities for public participation, commenced immediately. Like all renewable energy projects proposed for BLM-managed lands, the project has received the full extent of environmental review required by NEPA and has included the same opportunities for public involvement as are required for all other land-use decision making by the BLM.

10-02 Concerning potential impact to water resources, including downstream flows, see Common Response 5.5.2.10, *Water Resources*.

10-03 Concerning use of existing draining channels and/or natural features instead of proposed concrete-lined channels, see Common Response 5.5.2.10.

10-04 Concerning a finalized drainage plan see Common Response 5.5.2.10.

10-05 Concerning potential impacts to wildlife and drainage systems, see Common Response 5.5.2.7 (wildlife); see also, Common Response 5.5.2.10 (drainage).

10-06 Impacts and mitigation measures concerning biological resources are analyzed in PA/FEIS Sections 4.17 (vegetation) and 4.21 (wildlife). Concerning compensatory mitigation, see Common Response 5.5.2.7.

10-07 All mitigation commitments required by the BLM will be included in the ROD.

10-08 Concerning groundwater mitigation, see Common Response 5.5.2.10.

10-09 The project is not proposed within the Palo Verde Mesa Groundwater Basin; therefore, the requested basin balance analysis is not relevant to this project.

10-10 Concerning impacts to groundwater, see Common Response 5.5.2.10.

10-11 Concerning impacts to groundwater recharged by the Colorado River, see Common Response 5.5.2.10.

10-12 Concerning necessary project water entitlements see Common Response 5.5.2.10.

10-13 Concerning the need for the proposed action, see Common Response 5.5.2.4. Concerning climate change, see Common Response 5.5.2.8. Concerning the adequacy of the data relied upon, see Common Response 5.5.2.3.

This comment also questions the adequacy of the PA/FEIS's assessment of cumulative impacts. A cumulative impact is "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. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." 40 C.F.R. § 1508.7. The PA/FEIS considers the potential for incremental impacts resulting from construction, operation and maintenance, and closure and decommissioning of the project to cause or contribute to a cumulative effect in each of the issue areas for which the project could cause an impact.

The Ninth Circuit requires federal agencies to "catalogue" and provide useful analysis of past, present, and future projects and to provide some quantified or detailed information because, in its absence, the public cannot be assured that the agencies have taken the requisite "hard look." The PA/FEIS for the project not only catalogues cumulative projects, but also provides quantified and detailed information about them. See, e.g., Table 4.1-1, *Cumulative Scenario*. On an issue-by-issue basis, PA/FEIS Chapter 4, *Environmental Consequences,* identifies the geographic and temporal scope of the cumulative impacts analysis area, provides a basis for the boundaries of each, identifies existing conditions within each cumulative impacts assessment area, identifies the direct and indirect effects of the proposed action and alternatives, and identifies past, present and reasonably foreseeable future actions making up the cumulative scenario. See, for example, PA/FEIS Section 4.21.3 (discussion of cumulative impacts on wildlife resources), Table 4.21-2, *Cumulative Impacts to Selected Wildlife Resources from the PSPP*. The several renewable energy (solar and wind) projects being considered by the BLM's California Desert District are identified in Table 4.1-2, including the number of projects, acreage and total megawatts under consideration in the Palm Springs, Barstow, El Centro, Needles, and Ridgecrest Field Offices. Renewable energy projects on state and private lands are identified in Table 4.1-3. Also part of the cumulative scenario, existing projects along the I-10 corridor in eastern Riverside County are identified in Table 4.1-4 and future foreseeable projects in this area are identified in Table 4.1-5. The PA/FEIS's analysis of cumulative impacts is adequate. See also Common Response 5.5.2.2, concerning NEPA compliance generally.

10-14 Concerning the purpose and need and range of alternatives, see Common Responses 5.5.2.4 and 5.5.2.5, respectively.

10-15 The question requests a description of BLM's authority to adopt a "modified" project design or alternate site on BLM land, to deny an application, or to select another ROW application submitted by the same applicant or its corporate owner. A ROW grant is an authorization to use a specific piece of public land for a certain project, such as a transmission line, road, pipeline, or communication site. A ROW grant authorizes rights and privileges for a specific use of the land for a specific period of time. Generally, a BLM ROW is granted for a term appropriate for the life of the project. The BLM's ROW grants are authorized by Title V of FLPMA (43 U.S.C. 1761-1771) and the implementing regulations set forth at 43 CFR part 1600. Pursuant to 43USC 1764(j), "The Secretary. . . shall grant, issue, or renew a right-of-way under this subchapter only when he is satisfied that the applicant has the technical and financial capability to construct the project for which the right-of-way is requested, and in accord with the requirements of this subchapter."

BLM's authority includes the power to modify a project design subject to a ROW application, or to deny the application, to the extent that the application does not reflect certain statutorily-required terms and conditions. For example, terms and conditions are imposed to carry out the purposes of FLPMA; minimize damage to scenic and aesthetic values and fish and wildlife habitat, and otherwise protect the environment; require compliance with applicable air and water quality standards; and require compliance with State standards for public health and safety, environmental protection, and siting, construction, operation and maintenance if such standards are more stringent than applicable Federal standards (43 USC 1765). BLM also may impose terms and conditions to the extent that it deems them necessary to protect Federal property and economic interests; manage efficiently the lands that would be subject to the ROW and protect the other lawful users of the lands adjacent to or traversed by the ROW; protect lives and property; protect the interests of individuals living in the general area traversed by the ROW who rely on the fish, wildlife, and other biotic resources of the area for subsistence purposes; require location of the ROW along a route that will cause least damage to the environment, taking into consideration feasibility and other relevant factors; and otherwise protect the public interest in the lands traversed by the right-of-way or adjacent thereto (43 USC 1765).

Individual ROW applications are considered separately; thus, two applications submitted by the same applicant or its corporate owner would be considered independently based on the independent merit of each. A decision whether to grant one of the applications would be made independently of whether to grant the other.

10-16 The cumulative scenario is discussed in FEIS Section 4.1. The cumulative impacts analysis in Chapter 4, *Environmental Consequences*, conservatively assumes that all projects within the cumulative scenario will proceed, including renewable energy projects. Any effort to further refine how many of renewable energy applications received by BLM are likely to proceed would be speculative and would not contribute to the understanding of the potential impacts of the project on the human environment. Concerning the Solar PEIS and the DRECP process, see Common Response 5.5.2.1.

10-17 The Power purchase agreements are sensitive documents between the Applicant and the power purchaser. BLM does not require detailed information regarding the specifics of that agreement, only that there is an outlet or recipient of the power generated. The size of the project, in megawatts produced and acres utilized, can be evaluated by the public to determine the trade-off between resources. This information can be found in the PA/FEIS in Chapter 2, *Proposed Action and Alternatives*.

10-18 Concerning site selection, see PA/FEIS Section 2.4.3, *Alternatives Considered but Eliminated From Detailed Analysis*. Concerning the reasonableness of the range of alternatives considered, see Common Response 5.5.2.5. The comment suggests that BLM should compare proposed renewable energy projects one with another. The BLM does consider each project that is proposed in the context of other past, present, and reasonably foreseeable future projects as part of the cumulative impacts analysis. See, e.g., PA/FEIS Chapter 4, *Environmental Consequences*.

10-19 Concerning site selection, see PA/FEIS Section 2.4.3, *Alternatives Considered but Eliminated From Detailed Analysis*. Concerning purpose and need, see Common Response 5.5.2.4. Additionally, BLM in the purpose and need for the project is responding to the Applicant's request for a ROW under Title V of FLPMA.

10-20 Concerning alternatives, see Common Response 5.5.2.5.

10-21 Concerning alternatives, see Common Response 5.5.2.5. The BLM does not require the preparation of a cost benefit analysis or a fiscal impact statement. These are more typically done by the applicants prior to considering the use of public lands for projects. Additionally, reviewing such information would not affect the size and scope of the project, or its impacts, nor would it improve the analysis of the alternatives in such a manner as to make one more feasible than another.

10-22 Concerning the suggestion that the DRECP is relevant to the BLM's consideration of the proposed action and alternatives, see Common Response 5.5.2.1.

10-23 Concerning climate change, See PA/FEIS Sections 3.3 and 4.3 Affected Environment and Impacts to Global Climate Change respectively; see also Common Response 5.5.2.8.

10-24 See Response to Comment 10-23.

10-25 Concerning incorporation of climate change monitoring, see PA/FEIS Sections 4.3 *Impacts to Global Climate Change*, Section 4.17, *Impacts on Vegetation*, and Section 4.21, *Impacts on Wildlife*.

10-26 Concerning climate change, See PA/FEIS Sections 3.3 and 4.3; see also Common Response 5.5.2.8.

10-27 All areas in the SA/DEIS that indicated undetermined technical areas have since been revised and appropriate mitigation has been provided in the PA/FEIS. Please see each technical section in Chapter 4, *Environmental Consequences,* for the proposed mitigation. The Energy Commission's Conditions of Certification are located in Appendix B.

10-28 Concerning cultural resources, see Common Response 5.5.2.11. Concerning the adequacy of data relied upon, see Common Response 5.5.2.3.

10-29 The social and economic analysis in the PA/FEIS (see Sections 3.14, 4.13) assesses the cumulative impact expected if all 13 identified solar projects proceed with construction between 2011 and 2016. The cumulative analysis also included the additional construction impacts associated with construction of the Blythe Airport Solar project and another six non-solar projects currently planned on BLM land within eastern Riverside County.

The cumulative analysis uses the same approach as impact analysis of the project's construction impacts on the social and economic conditions for both the local study area (Blythe, California; Ehrenberg, Arizona; and Quartzite, Arizona) and the regional study area (eastern Riverside County from Palm Springs to Blythe). Specifically, the PA/FEIS impact analysis assesses the projected construction worker labor need and the regional labor force supply of adequately qualified and potential trainable workers to determine the likely magnitude of in-migration that may be expected to the local and regional study area.

The analysis estimates the amount of growth expected to occur based on the demand for housing from construction and operations workers by evaluating the supply of suitable housing to meet the temporary housing demand of project construction and operations workers. Given the region's relatively high unemployment rates it is expected that the majority of future construction and operations workers would live within the regional study area. Any workers attracted to work at any of the construction sites may be expected to seek temporary housing (i.e., for weekly commuting) and would maintain their existing primary residence in western Riverside County, San Bernardino or elsewhere.

Based on the current housing vacancy rates and availability of local hotel/motel accommodations in the local and regional study area, there is considerable potential availability for suitable temporary housing or accommodations within the existing housing stock and motel/hotel facilities especially if workers are willing to share accommodations. As a result, it is not expected that any new housing or hotel/motel growth would occur as a result of the planned solar projects.

The vicinity of the project site currently lacks any transit operations that would be suitable for these projects' construction workers. Construction of the project is scheduled to overlap with the construction schedules of three other projects in the area, two solar energy generation parabolic trough projects and one photovoltaic project. These three projects plus the project would result in approximately 3,623 workers traveling on I-10 to their work sites at the same time. The overlapping construction schedules of these projects would result in cumulatively considerable impacts to I-10 as well as to local streets, highways, and intersections in the vicinity of the project site. However, implementation of Construction and Operations Traffic (TRANS-4), provided in PA/FEIS Section 4.16, would ensure that a Traffic Control Plan is developed and implemented to address traffic issues related to movement of workers, vehicles, and materials, including arrival and departure schedules and designated workforce and delivery routes. The BLM elects not to require the Applicant to make additional provisions.

5.6 Administrative Remedies

BLM and the Environmental Protection Agency's Office of Federal Activities (EPA) will publish separate NOAs for the Proposed Plan Amendment/Final EIS in the Federal Register when the document is ready to be released to the public. The NOA (published by the EPA in the Federal Register) will initiate a 30-day protest period on the proposed CDCA Plan Amendment to the Director of the BLM in accordance with 43 CFR 1610.5-2.

Following resolution of any protests BLM then may publish an Approved Plan Amendment and a Record of Decision (ROD) on the Project Application. Publication and release of the ROD will serve as public notice of BLM's decision on the Project Application which is appealable in accordance with 43 CFR Part 4.

5.7 List of Preparers

Though individuals have primary responsibility for preparing sections of the Propose PA/FEIS, the document is an interdisciplinary team effort. In addition, internal review of the document occurs throughout preparation. Specialists at the BLM's Field Office, State Office, and Washington Office review the analysis and supply information, as well as provide document preparation oversight. Contributions by individual preparers may be subject to revision by other BLM specialists and by management during internal review.

TABLE 5-2
LIST OF PREPARERS

BLM – Palm Spring-South Coast Field Office and California Desert District Office		
Name	*Job Title/ Primary Responsibility*	*Office Location*
Holly Roberts	Associate Field Director	Palm Springs South Coast Field Office
Allison Shaffer	Project Manager, Realty Specialist	Palm Springs South Coast Field Office
Jeffery Childers	Planning & Environmental Coordinator	Renewable Energy Coordinating Office (RECO), California Desert District Office
Chris Dalu	Archaeologist	Palm Springs South Coast Field Office
Greg Hill	Land Use Planner	Palm Springs South Coast Field Office
George Kline	RECO Archaeologist	Palm Springs South Coast Field Office
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Kim Marsden	Biologist	California Desert District Office
Mark Massar	Biologist	Palm Springs South Coast Field Office
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Environmental Science Associates and Sub-consultants		
Name	*Job Title*	*Primary Responsibility*
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Scott, Janna	Project Manager	Quality Assurance/Quality Control, Cumulative Effects
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Cordery, Ted	Biologist	Vegetation and Wildlife Resources, Wildland and Fire Ecology
Duverge, Dylan	Associate	Visual Resources
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Holst, Julie	Associate	Air Quality, Mineral Resources, Special Designations, Transportation and Public Access – OHV, Noise
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McCullough, Wes	GIS Analyst	Figures
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Stumpf, Gary	Cultural Resources Specialist	Cultural and Paleontological Resources
Taplin, Justin	Technical Associate	Soil and Mineral Resources
Teitel, Ron	Senior Graphics	Graphics

ACRONYMS AND ABBREVIATIONS

μg/m^3	micrograms per cubic meter
°F	degrees Fahrenheit
A	ampere (amp)
AAQS	ambient air quality standards
AB	Assembly Bill
AB 32	California Global Warming Solutions Act of 2006
ac	acres
ACC	air-cooled condenser
ACEC	Area of Critical Environmental Concern
ACHP	Advisory Council on Historic Preservation
ADT	Average Daily Traffic
AERMOD	AMS/EPA Regulatory Model
af or ac-ft	acre-feet
AFC	Application for Certification
afy or ac-ft/yr	acre-feet per year
AIChE	American Institute of Chemical Engineers
AIM	Aeronautical Information Manual
ALUC	Airport Land Use Commission
AM	Amplitude Modulated
AML	appropriate management level
AML	abandoned mined lands
AMPs	Allotment Management Plans
AMS	American Meteorological Society
amsl	above mean sea level
AMT	alternative minimum tax
ANSI	American National Standards Institute
AO	Authorized Officer
APCDs	Air Pollution Control Districts
APCO	Air Pollution Control Officer
APE	Area of Potential Effects
API	American Petroleum Institute
APLIC	Avian Power Line Interaction Committee

APN	Assessor's Parcel Number
APP	Avian Protection Plan
Applicant	Palo Verde Solar I
AQCMM	Air Quality Construction Mitigation Manager
AQCMP	Air Quality Construction Mitigation Plan
AQMD	Air Quality Management District
AQMP	Air Quality Management Plan
ARB	California Air Resources Board
ARPA	Archaeological Resources Protection Act of 1979
ASME	American Society for Material Engineering
AST	aboveground storage tank
ASTM	American Society for Testing Materials Standards
ATC	Authority to Construct
ATCC	Area of Traditional Cultural Concern
ATCM	Airborne Toxic Control Measure
ATV	all-terrain vehicle
AWEA	American Wind Energy Association
BA	Biological Assessment
BAAB	Blythe Army Air Base
BAAQMD	Bay Area Air Quality Management District
BACM	Best Available Control Measures
BACT	Best Available Control Technology
BCC	birds or conservation concern
bgs	below ground surface
bhp	brake-horsepower
BIL	basic impulse level
BIS	Department of Business Innovation & Skills
BLM	United States Bureau of Land Management
BMPs	best management practices
BO	Biological Opinion
BOR	Bureau of Reclamation
BRMIMP	Biological Resources Mitigation Implementation and Monitoring Plan
BSPP	Blythe Solar Power Plant
CAA	Clean Air Act
CAISO	California Independent System Operator
CAL FIRE	California Department of Forestry and Fire Protection
CalARP	California Accidental Release Program
CalEPA	California Environmental Protection Agency
Cal-IPC	California Invasive Plant Council
Cal-OSHA	California - Occupational Safety and Health Administration

CalPIF	California Partners in Flight
Caltrans	California State Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CAS	Chemical Abstracts Service
CATEF II	California Air Toxics Emission Factors
CBC	California Building Code
CBEA	California Biomass Energy Alliance
CBO	Conference of Building Officials
CBOC	California Burrowing Owl Consortium
CBSC	California Building Standards Code
CC	City Council
CCAA	California Clean Air Act
CCR	California Code of Regulations
CCS	cryptocrystalline silicate
CCTV	closed circuit television
CDCA	California Desert Conservation Area
CDCA Plan	California Desert Conservation Area Plan
CDD	California Desert District
CDE	California Department of Education
CDF	California Department of Forestry and Fire Protection
CDFA	California Department of Food and Agriculture
CDFG	California Department of Fish and Game
CDMG	California Division of Mines and Geology
CDPA	California Desert Protection Act of 1994
CEC	California Energy Commission
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESA	California Endangered Species Act
CFATS	Chemical Facility Anti-Terrorism Standard
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGS	California Geological Survey
CH_4	methane
Chamber of Commerce	Blythe Area Chamber of Commerce
CHP	California Highway Patrol
CHRIS	California Historical Resources Information System
CIWMA	California Integrated Waste Management Act of 1989
CIWMB	California Integrated Waste Management Board
CMUP	Comprehensive Management and Use Plan

CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNF	Cleveland National Forest
CNPS	California Native Plant Society
CNRA	California Natural Resources Agency
CO	carbon monoxide
CO_2	carbon dioxide
COC	Conditions of Certification
CPM	Compliance Project Manager
CPUC	California Public Utilities Commission
CRAM	California Rapid Assessment Method
CRBRWQCB	Colorado River Basin Regional Water Quality Control Board
CRHR	California Register of Historical Resources
CRS	Congressional Research Service
CSC	California Species of Special Concern
CSP	California State Parks
CTG	Combustion Turbine Generator
CTI	Cooling Technology Institute
CTTM	Comprehensive Travel and Transportation Management
CUPA	Certified Unified Program Authority
CURE	California Unions for Reliable Energy
CVBG	Chuckwalla Valley Groundwater Basin
CWA	Clean Water Act
cy	cubic yards
D	dynamic volt amp reactive
D	Delisted
dB	Decibel
dBA	A-weighted decibels
DCS	data (or distributed) control system
DDT	Dichloro-diphenyl-trichloroethane
DESCP	Drainage, Erosion, and Sedimentation Control Plan
DHS	Department of Homeland Security
DMG	Division of Mines and Geology (now called California Geological Survey)
DNA	Determination of NEPA Adequacy
DOC	California Department of Conservation
DOE	United States Department of Energy
DOI	United States Department of Interior
DOJ	United States Department of Justice
DOT	Department of Transportation
DPM	diesel particulate matter

DPR	Department of Parks and Recreation
DPR	Department of Pesticide Regulation
DPS	Distinct Population Segment
DPV1	Devers-Palo Verde No. 1 Transmission Line
DPV2	Devers-Palos Verde 2 Transmission Line
DRECP	California Desert Renewable Energy Conservation Plan
DRMP-A/DEIS	Draft Resource Management Plan-Amendment/Draft Environmental Impact Statement
DTC	Desert Training Center
DTC/C-AMA	George S. Patton's World War II Desert Training Center/California-Arizona Maneuver Area
DTCCL	Desert Training Center California-Arizona Area Cultural Landscape
DTRO	Desert Tortoise Recovery Office
DTSC	Department of Toxic Substances Control
DWMA	Desert Wildlife Management Area
DWR	California Department of Water Resources
E3	Energy and Environmental Economics, Inc.
EB	eastbound
EEMP	Equipment Emissions Mitigation Plan
EERE	Energy Efficiency and Renewable Energy
EFD	El Centro Fire Department
EFZ	Earthquake Fault Zone
EIC	Eastern Information Center
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EMF	Electric and Magnetic Field
EMS	Emergency Medical Services
EO	Executive Order
EPA	United States Environmental Protection Agency
EPAct 05	Energy Policy Act of 2005
EPRI	Electric Power Research Institute
EPS	Emission Performance Standard
ERC	Emission Reduction Credit
ESA	Endangered Species Act
ET	evapotranspiration
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FDOC	Final Determination of Compliance
FE	Federally listed as endangered
FEIR	Final Environmental Impact Report
FEIS	Final Environmental Impact Statement

FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FESA	Federal Endangered Species Act
FHWA or FHA	Federal Highway Administration
FLPMA	Federal Land Policy and Management Act
FM	Frequency Modulated
FMAP	Fire Management Activity Plan
FMMP	Farmland Mapping and Monitoring Program
FPPA	Farmland Protection Policy Act
fps	feet per second
FR	Federal Register
FSC	Field Supervisor Controller
ft	feet
ft^2/d	feet squared per day
FT	Federally listed as threatened
FTA	Federal Transit Administration
FTE	full time equivalent
FTHL	flat-tailed horned lizard
g	gravity
gal	gallon
GCC	Global Climate Change
GEA	Geothermal Energy Association
gen-tie	power transmission line
GHG	greenhouse gas
GIS	geographic information system
gpd	gallons per day
gpd/ft	gallons per day per foot
gpd/ft^2	gallons per day per square foot
gpm	gallons per minute
GSEP	Genesis Solar Energy Project
GSU	generator set-up transformer
GWh	gigawatt-hour
GWR	groundwater recharge
H_2S	hydrogen sulfide
HA	Herd Area
HABS	Historic American Building Survey
HAER	Historic American Engineering Record
HALS	Historic American Landscape Survey
HAP	Hazardous Air Pollutant
HARP	Hotspots Analysis Reporting Program

HAs	Herd Areas
HCE	heat collection element
HCM	Highway Capacity Manual
HDPE	high-density polyethylene
HEC-RAS	Hydrologic Engineering Center River Analysis System
HERO	high efficiency reverse osmosis
HFCs	hydrofluorocarbons
HI	Hazards Index or Chronic Hazards Index
HMAs	Herd Management Areas
HMBP	Hazardous Materials Business Plan
hp	horsepower
HP	high pressure
HPTP	Historic Properties Treatment Plan
HRA	Health Risk Assessment
HRP	Habitat Restoration Plan
HSC	Health and Safety Code
HTF	Heat Transfer Fluid
HUC	hydrologic unit code
HWSRMRA	Hazardous Waste Source Reduction and Management Review Act of 1989
Hz	Hertz
I-10	Interstate-10
ICAPCD	Imperial County Air Pollution Control District
ICC	Interagency Coordinating Committee
ICDTSC	Imperial County Department of Toxic Substances Control
IEEE	Institute of Electrical and Electronics Engineers
IEPR	Integrated Energy Policy Report
IID	Imperial Irrigation District
ILPP	Injury and Illness Prevention Program
in	inches
in/sec	inches per second
IND	Industrial Service Supply
INT	international
IP	intermediate pressure
ISCST	Industrial Source Complex Short Term
ISO	Independent System Operator
ITC	investment tax credit
IUSD	Imperial Unified School District
IVEDC	Imperial Valley Economic Development Corporation
IVRM	Interim Visual Resource Management
IVS	Imperial Valley Solar

K	erosion factor
kA	kilo-amps
KOPs	key observation points
kV	kilovolt
kVA	kilovolt-amperes
kVAR	kilovolt-ampere reactive
kW	kilowatt
kWe	kilowatt-electric
L_{90}	The A-weighted noise level that is exceeded 90 percent of the time during the measurement period.
LADWP	Los Angeles Department of Water and Power
lbs	pounds
lb/yr	pounds per year
L_{dn}	day-night average noise level
LDS	leachate detection system
LE	Land Evaluation
LEDPA	Least Environmentally Damaging Practicable Alternative
L_{eq}	equivalent continuous sound level
LESA	Land Evaluation and Site Assessment
LESA Model	Land Evaluation and Site Assessment Model
LID	Low Impact Development
LLC	Limited Liability Corporation
LORS	laws, ordinances, regulations, and standards
LOS	level of service
LP	low pressure
LRAs	Local Reliability Areas
LTU	Land Treatment Unit
LTVA	Long-Term Visitor Area
LUP	Land Use Plan
M6.0	earthquake of magnitude 6.0 or greater
Ma	million years ago
MA	management area
MACT	Maximum Available Control Technology
MBTA	Migratory Bird Treaty Act
MCE	Maximum Credible Earthquake
MCL	Maximum Contaminant Level
MCR	Monthly Compliance Report
MDAB	Mojave Desert Air Basin
MDAQMD	Mojave Desert Air Quality Management District
MEIR	maximum exposed individual resident
MEIW	maximum exposed individual worker

mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
mi	miles
ml	milliliters
ML	Measuring Location
mm	millimeters
MM	Modified Mercalli
MMBtu	1 million british thermal units
MND	Mitigated Negative Declaration
MOU	Memorandum of Understanding
mph	miles per hour
MPP	Mirror Positioning Plan
MRZ	Mineral Resource Zone
MSA	Metropolitan Statistical Area
msl	mean sea level
MT	metric ton
MTBF	mean time between failure
$MTCO_2e$	metric tons of carbon dioxide equivalent
MTPs	Master Title Plats
MTS	Metropolitan Transit System
MUC	Multiple-Use Class
MUC C	Multiple-Use Class Controlled
MUC I	Multiple-Use Class Intensive
MUC L	Multiple-Use Class Limited
MUC M	Multiple-Use Class Moderate
MUC U	Multiple-Use Class Unclassified
MUN	Municipal and Domestic Water Supply
MVA	megavolt-amperes
MVAR	megavolt-ampere reactive
MW	megawatts
Mw	Maximum Earthquake Magnitude
MWh	megawatt-hour
N/A	Not Applicable
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAHC	Native American Heritage Commission
NECO	Northern and Eastern Colorado Desert Coordinated Management Plan
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation

NESC	National Electrical Safety Code
NFP	National Fire Plan
NFPA	National Fire Protection Association
NFWF	National Fish and Wildlife Foundation
NHPA	National Historic Preservation Act
NIOSH	National Institute of Safety and Health
NLCS	National Landscape Conservation System
NMFS	National Marine Fisheries Service
NRCS	Natural Resources Conservation Service
NRHP or National Register	National Register of Historic Places
NO	nitric oxide
NO_2	nitrogen dioxide
NOA	Notice of Availability
NOI	Notice of Intent
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPS	United States National Park Service
NRC	National Research Council
NRCS	Natural Resources Conservation Service
NRDC	Natural Resources Defense Council
NSPS	New Source Performance Standard
NSR	New Source Review
NTP	Notice to Proceed
NWIS	National Water Information System
O&M	operations and maintenance
O_2	oxygen
O_3	ozone
OCA	Off-site Consequence Analysis
OCWGB	Ocotillo/Coyote Wells Groundwater Basin
OEHHA	Office of Environmental Health Hazard Assessment
OFA	Offer of Financial Assistance
OHV	off-highway vehicle
OII	Order Initiating an Informational
OLM	Ozone Limiting Method
OSHA	United States Occupational Safety and Health Administration
OTC	once-through cooling
PA	Programmatic Agreement
PA	Plan Amendment
PA/FEIS	Resource Management Plan Amendment/Final Environmental Impact Statement
PSSCFO	Palm Springs / South Coast Field Office

PALS	pre-acquisition liability survey
PBS	Peninsular bighorn sheep
PCA	Pest Control Advisor
PCU	power conversion unit
PDF	Portable Document Format
PDOC	Preliminary Determination of Compliance
PEIS	Programmatic Environmental Impact Statement
PFCs	perfluorocarbons
PGA	peak ground acceleration
PG&E	Pacific Gas and Electric Company
PL	Public Law
PM	particulate matter
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PMI	Point of Maximum Impact
POD	Plan of Development
PPA	Power Purchase Agreement
PPE	Personal Protective Equipment
ppm	parts per million
ppmv	parts per million by volume
ppmvd	parts per million by volume, dry
PQAD	Prehistoric Quarries Archaelogical District
PRC	Public Resources Code
PRIA	Public Rangelands Improvement Act of 1978
PRM	Paleontological Resource Monitors
PRMMP	Paleontological Resources Monitoring and Mitigation Plan
PRPA	Paleontologic Resources Preservation Act
PRS	Paleontological Resources Supervisor
PSA	Preliminary Staff Assessment
PSD	Prevention of Significant Deterioration
psi	pounds per square inch
PSPP	Palen Solar Power Project
PSSCFO	Palm Springs South Coast Field Office
PTNCL	Prehistoric Trails Network Cultural Landscape
PTO	Permit to Operate
PTZ	pan, tilt, and zoom
PV	photovoltaic
PVC	polyvinyl chloride
PVID	Palo Verde Irrigation District
PVMGB	Palo Verde Mesa Groundwater Basin

PVVGB	Palo Verde Valley Groundwater Basin
PVVTA	Palo Verde Valley Transit Agency
PYFC	Potential Fossil Yield Classification
QFER	Quarterly Fuel and Energy Report
R	Rare
RACM	Reasonably Available Control Measures
RACT	Reasonably Available Control Technology
RCALUC	Riverside County Airport Land Use Commission
RCFD	Riverside County Fire Department
RCRA	Resource Conservation and Recovery Act
REAT	Renewable Energy Action Team
REC I	Water Contact Recreation
REC II	Non-contact Water Recreation
Recovery Act	American Recovery and Reinvestment Act of 2009, P.L. 111-5
RECs	Recognized Environmental Conditions
REF	Renewable Electricity Future
RELs	Reference Exposure Levels
RETI	Renewable Energy Transmission Initiative
RFI	radio frequency interference
RMP	Resource Management Plan
RMPA	Resource Management Plan Amendment
RO	reverse osmosis
ROD	Record of Decision
ROG	reactive organic gases
ROW	right-of-way
ROWD	Report of Waste Discharge
RPS	Renewables Portfolio Standard
RQ	reportable quantity
RSA	Revised Staff Assessment
RTP	Regional Transportation Plan
RUSLE2	Revised Universal Soil Loss Equation
RV	recreational vehicle
RWQCB	Regional Water Quality Control Board
S	Sensitive
SAC	Science Advisory Committee
SA/DEIS	Staff Assessment/Draft Environmental Impact Statement
SAP	Sampling and Analysis Plan
SARA Title III	Superfund Amendments and Reauthorization Act of 1986
SC	sediment control
SCA	Solar Collector Assembly

SCADA	supervisory control and data acquisition
SCAG	Southern California Association of Governments
SCCWRP	Southern California Coastal Water Research Project
SCE	Southern California Edison
SCEC	Southern California Earthquake Center
scf	standard cubic feet
scfh	standard cubic feet of hydrogen per hour
SCG	Southern California Gas Company
SCPBRG	Santa Cruz Predatory Bird Research Group
SCWD	Seeley County Water District
SDAR	San Diego and Arizona Railroad
SDG&E	San Diego Gas and Electric Company
SE	State listed as endangered
SES	Stirling Energy Systems
SESA	Solar Energy Study Area
sf	square feet
SF_6	sulfur hexafluoride
SFP	State fully protected
SHPO	State Historic Preservation Officer
SIC	Southeastern Information Center
SIP	State Implementation Plan
SLF	Sacred Lands File
SLRU	Sensitivity Level Rating Units
SO_2	sulfur dioxide
SO_4	sulfate
SOPs	standard operating procedures
SO_X	sulfur oxides
SPCC	Spill Prevention Control and Countermeasures
SPRR	Southern Pacific Railroad
sq mi	square miles
SQRUs	Scenic Quality Rating Units
SR-111	State Route 111
SR-98	State Route 98
SRA	Safety Risk Assessment
SRA	State Responsibility Area
SRP	Scientific Review Panel
SS	soil stabilization
SSAB	Salton Sea Air Basin
SSAB	Salton Sea Air Basin
ST	State listed as threatened

STG	steam turbine-generator
SVP	Society of Vertebrate Paleontology
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
SWWTP	Seeley Wastewater Treatment Plant
TAC	Toxic Air Contaminants
T-BACT	Best Available Control Technology for Toxics
TC	tracking control
TDS	Total Dissolved Solids
TGA	Taylor Grazing Act
TMDLs	Total Maximum Daily Loads
TNW	traditional navigable water
tpy	tons per year
UBC	Uniform Building Code
UDI	undocumented immigrants
µg/L	micrograms per Liter
$\mu g/m^3$	micrograms per cubic meter
URS	URS Corporation
US	United States
USACE	United States Army Corps of Engineers
USBR	United States Bureau of Reclamation
USC	United States Code
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USLE	Universal Soil Loss Equation
UXO	unexploded ordnance
UV	ultraviolet
V	volts
VAC	volts alternating current
VAR	volt-ampere reactive
VdB	velocity decibel
VDE	Visible Dust Emission
VHA	Lavic Lake volcanic hazard area
VMT	vehicle miles traveled
VOCs	volatile organic compounds
VRI	Visual Resource Inventory

VRM	Visual Resource Management
W	watts
WAs	Wilderness Areas
WAPA	Western Area Power Administration
WB	westbound
WDR	Waste Discharge Requirement
WE	wind erosion
WEAP	Worker Environmental Awareness Program
WEC	World Energy Council
WECC	Western Electricity Coordinating Council
WECO	Western Colorado Desert Routes of Travel Designations
WEPS	Wind Erosion Prediction System
WHMA	Wildlife Habitat Management Area
WILD	Wildlife Habitat
WIU	Wilderness Inventory Unit
WL	Watch List
WRCC	Western Regional Climate Center
WSA	Wilderness Study Area
WSS	Web Soil Survey
WTE	Wave & Tidal Energy
ybp	years before present
YDMP	Yuha Desert Management Plan
yr	year
ZOI	zone of influence

GLOSSARY OF TERMS

A

Adjacent: Defined by ASTM E1527-00 as any real property the border of which is contiguous or partially contiguous with that of the Site or would be contiguous or partially contiguous with that of the Site but for a street, road, or other public thoroughfare separating them.

Air Basin: A regional area defined for state air quality management purposes based on considerations that include topographic features that influence meteorology and pollutant transport patterns, and political jurisdiction boundaries that influence the design and implementation of air quality management programs.

Air Quality Control Region: A regional area defined for federal air quality management purposes based on considerations that include topographic features that influence meteorology and pollutant transport patterns, and political jurisdiction boundaries that influence the design and implementation of air quality management programs.

Alluvium: a fine-grained fertile soil consisting of mud, silt, and sand deposited by flowing water on flood plains, in river beds, and in estuaries.

Alluvial Fan: Fan shaped material of water deposited material.

Ambient Air Quality Standards: A combination of air pollutant concentrations, exposure durations, and exposure frequencies that are established as thresholds above which adverse impacts to public health and welfare may be expected. Ambient air quality standards are set on a national level by the U.S. Environmental Protection Agency. Ambient air quality standards are set on a state level by public health or environmental protection agencies as authorized by state law.

Ambient Air: Outdoor air in locations accessible to the general public.

Archaeological district: A significant concentration, linkage, or continuity of sites, buildings, or features important in history or prehistory. There can be discontiguous districts composed of resources that are not in close proximity to one another

Area of Critical Environmental Concern (ACEC): A designated area on public lands where special management attention is required: (1) to protect and prevent irreparable damage to fish and wildlife; (2) to protect important historic, cultural, or scenic values, or other natural systems or processes; or (3) to protect life and safety from natural hazards.

Attainment Area: An area that has air quality as good as or better than a national or state ambient air quality standard. A single geographic area may be an attainment area for one pollutant and a non-attainment area for others.

B

Basic Elements: The four design elements (form, line, color, and texture), which determine how the character of a landscape is perceived.

Bioremediation: The use of biological agents, such as bacteria or plants, to remove or neutralize contaminants, as in polluted soil or water.

C

Calcareous Substrates: Substances, often of a chalky composition, containing, or resembling calcium carbonate.

Cancer: A class of diseases characterized by uncontrolled growth of somatic cells. Cancers are typically caused by one of three mechanisms: chemically induced mutations or other changes to cellular DNA; radiation induced damage to cellular chromosomes; or viral infections that introduce new DNA into cells.

Carbon Monoxide (CO): A colorless, odorless gas that is toxic because it reduces the oxygen-carrying capacity of the blood.

Characteristic: A distinguishing trait, feature, or quality.

Characteristic Landscape: The established landscape within an area being viewed. This does not necessarily mean a naturalistic character. It could refer to an agricultural setting, an urban landscape, a primarily natural environment, or a combination of these types.

Climate: A statistical description of daily, seasonal, or annual weather conditions based on recent or long-term weather data. Climate descriptions typically emphasize average, maximum, and minimum conditions for temperature, precipitation, humidity, wind, cloud cover, and sunlight intensity patterns; statistics on the frequency and intensity of tornado, hurricane, or other severe storm events may also be included.

Community Noise Equivalent Level (CNEL): A 24-hour average noise level rating with a 5 dB penalty factor applied to evening noise levels and a 10 dB penalty factor applied to nighttime noise levels. The CNEL value is very similar to the Day-Night Average Sound Level (Ldn) value, but includes an additional weighting factor for noise during evening hours.

Contrast: Opposition or unlikeness of different forms, lines, colors, or textures in a landscape.

Contrast Rating: A method of analyzing the potential visual impacts of proposed management activities.

Cretaceous: In geologic history the third and final period of the Mesozoic era, from 144 million to 65 million years ago, during which extensive marine chalk beds formed.

Criteria Pollutant: An air pollutant for which there is a national ambient air quality standard (carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, inhalable particulate matter, fine particulate matter, or airborne lead particles).

Critical Habitat: Habitat designated by the US Fish and Wildlife Service under Section 4 of the Endangered Species Act and under the following criteria: 1) specific areas within the geographical area occupied by the species at the time it is listed, on which are found those physical or biological features essential to the conservation of the species and that may require special management of protection; or 2) specific areas outside the geographical area by the species at the time it is listed but that are considered essential to the conservation of the species.

Cultural Landscape: A geographic area, including both natural and cultural resources, associated with a historic event, activity, group, or person; or, a geographic area that has been assigned cultural or social meaning by associated cultural groups.

Cultural Modification: Any man-caused change in the land form, water form, vegetation, or the addition of a structure which creates a visual contrast in the basic elements (form, line, color, texture) of the naturalistic character of a landscape.

Cultural Resource: A location of human activity, occupation, or use identifiable through field inventory, historical documentation, or oral evidence. Cultural resources include archaeological and historical sites, structures, buildings, objects, artifacts, works of art, architecture, and natural features that were important in past human events. They may consist of physical remains or areas where significant human events occurred, even though evidence of the events no longer remains. And they may include definite locations of traditional, cultural, or religious importance to specified social or cultural groups.

Cultural Resource Data: Cultural resource information embodied in material remains such as artifacts, features, organic materials, and other remnants of past activities. An important aspect of data is context, a concept that refers to the relationships among these types of materials and the situations in which they are found.

Cultural Resource Data Recovery: The professional application of scientific techniques of controlled observation, collection, excavation, and/or removal of physical remains, including analysis, interpretation, explanation, and preservation of recovered remains and associated records in an appropriate curatorial facility used as a means of protection. Data recovery may sometimes employ professional collection of such data as oral histories, genealogies, folklore, and related information to portray the social significance of the affected resources. Such data recovery is sometimes used as a measure to mitigate the adverse impacts of a ground-disturbing project or activity.

Cultural Resource Integrity: The condition of a cultural property, its capacity to yield scientific data, and its ability to convey its historical significance. Integrity may reflect the authenticity of a property's historic identity, evidenced by the survival or physical characteristics that existed during its historic or prehistoric period, or its expression of the aesthetic or historic sense of a particular period of time.

Cultural Resource Inventory (Survey): A descriptive listing and documentation, including photographs and maps of cultural resources. Included in an inventory are the processes of locating, identifying, and recording sites, structures, buildings, objects, and districts through library and archival research, information from persons knowledgeable about cultural resources, and on-the-ground surveys of varying intensity.

Class I: A professionally prepared study that compiles, analyzes, and synthesizes all available data on an area's cultural resources. Information sources for this study include published and unpublished documents, BLM inventory records, institutional site files, and state and National Register files. Class I inventories may have prehistoric, historic, and ethnological and sociological elements. These inventories are periodically updated to include new data from other studies and Class II and III inventories.

Class II: A professionally conducted, statistically based sample survey designed to describe the probable density, diversity, and distribution of cultural properties in a large area. This survey is achieved by projecting the results of an intensive survey carried out over limited parts of the target area. Within individual sample units, survey aims, methods, and intensities are the same as those applied in Class III inventories. To improve statistical reliability, Class II inventories may be conducted in several phases with different sample designs.

Class III: A professionally conducted intensive survey of an entire target area aimed at locating and recording all visible cultural properties. In a Class III survey, trained observers commonly conduct systematic inspections by walking a series of close interval parallel transects until they have thoroughly examined an area.

Cultural Resource Values: The irreplaceable qualities that are embodied in cultural resources, such as scientific information about prehistory and history, cultural significance to Native Americans and other groups, and the potential to enhance public education and enjoyment of the Nation's rich cultural heritage.

Cultural Site: A physical location of past human activities or events, more commonly referred to as an archaeological site or a historic property. Such sites vary greatly in size and range from the location of a single cultural resource object to a cluster of cultural resource structures with associated objects and features.

D

Day/Night Average Sound Level (Ldn): A 24-hour average noise level rating with a 10 dB penalty factor applied to nighttime noise levels. The Ldn value is very similar to the CNEL value, but does not include any weighting factor for noise during evening hours.

Decibel (dB): A generic term for measurement units based on the logarithm of the ratio between a measured value and a reference value. Decibel scales are most commonly associated with acoustics (using air pressure fluctuation data); but decibel scales sometimes are used for ground-borne vibrations or various electronic signal measurements.

Desert Pavement: A surface covering of closely packed rock fragments of pebble or cobble size found on desert soils.

Desert Wildlife Management Area (DWMA): areas established in the NECO Plan to address the recovery of the desert tortoise. They are intended to be areas where viable desert tortoise populations can be maintained (Category I habitat).

Distance Zones: A subdivision of the landscape as viewed from an observer position. The subdivision (zones) includes foreground-middleground, background, and seldom seen.

E

Enhancement: A management action designed to improve visual quality.

Equivalent Average Sound Pressure Level (Leq): The decibel level of a constant noise source that would have the same total acoustical energy over the same time interval as the actual time-varying noise condition being measured or estimated. Leq values must be associated with an explicit or implicit averaging time in order to have practical meaning.

Ethnohistoric Resources: Areas used by Native Americans following exploration and settlement by non-Native Americans. Sites or artifacts of particular significance to modern Native Americans are often kept secret by those groups to protect the sites from disturbance, looting, overuse, or other defamations.

Excavation: The scientific examination of an archaeological site through layer-by-layer removal and study of the contents within prescribed surface units, e.g. square meters.

F

Fluvial: Of, relating to, or occurring in a river.

Form: The mass or shape of an object or objects which appear unified, such as a vegetative opening in a forest, a cliff formation, or a water tank.

G

Geomorphic Province: Naturally defined geologic regions that display a distinct landscape or landform.

Greenhouse Gas: A gaseous compound that absorbs infrared radiation and re-radiates a portion of hat back toward the earth’s surface, thus trapping heat and warming the earth’s atmosphere.

H

Habitat: A specific set of physical conditions that surround a single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and living space.

Hazardous Air Pollutant (HAP): Air pollutants which have been specifically designated by relevant federal or state authorities as being hazardous to human health. Most HAP compounds are designated due to concerns related to: carcinogenic, mutagenic, or teratogenic properties; severe acute toxic effects; or ionizing radiation released during radioactive decay processes.

Hertz (Hz): A standard unit for describing acoustical frequencies measured as the number of air pressure fluctuation cycles per second. For most people, the audible range of acoustical frequencies is from 20 Hz to 20,000 Hz.

Historical Site: A location that was used or occupied after the arrival of Europeans in North America (ca. A.D. 1492). Such sites may consist of physical remains at archaeological sites or areas where significant human events occurred, even though evidence of the events no longer remains. They may have been used by people of either European or Native American descent.

Holocene: Of, denoting, or formed in the second and most recent epoch of the Quaternary period, which began 10 000 years ago at the end of the Pleistocene.

Hydrocarbons: Any organic compound containing only carbon and hydrogen, such as the alkanes, alkenes, alkynes, terpenes, and arenes.

I

Igneous: Rock, such as granite and basalt that has solidified from a molten or partially molten state.

Indian Tribe: Any American Indian group in the United States that the Secretary of the Interior recognizes as possessing tribal status (listed periodically in the Federal Register).

Indigenous: Being of native origin (such as indigenous peoples or indigenous cultural features).

Interdisciplinary Team: A group of individuals with different training, representing the physical sciences, social sciences, and environmental design arts, assembled to solve a problem or perform a task. The members of the team proceed to a solution with frequent interaction so that each discipline may provide insights to any stage of the problem and disciplines may combine to provide new solutions.

Invasive Species: An exotic species whose introduction does or is likely to cause economic or environmental harm or harm to human health (Executive Order 13122, 2/3/99).

Isolate: Non-linear, isolated archaeological features without associated artifacts.

K

Key Observation Point (KOP): One or a series of points on a travel route or at a use area or a potential use area, where the view of a management activity would be most revealing.

L

Landscape Character: The arrangement of a particular landscape as formed by the variety and intensity of the landscape features and the four basic elements of form, line, color, and texture. These factors give the area a distinctive quality which distinguishes it from its immediate surroundings.

Landscape Features: The land and water form, vegetation, and structures which compose the characteristic landscape.

Leasable Minerals: Minerals whose extraction from federally managed land requires a lease and the payment of royalties. Leasable minerals include coal, oil and gas, oil shale and tar sands potash, phosphate, sodium, and geothermal steam.

Line: The path, real or imagined, that the eye follows when perceiving abrupt differences in form, color, or texture. Within landscapes, lines may be found as ridges, skylines, structures, changes in vegetative types, or individual trees and branches.

Locatable Minerals: Minerals subject to exploration, development, and disposal by staking mining claims as authorized by the Mining Law of 1872, as amended. This includes deposits of gold, silver, and other uncommon minerals not subject to lease or sale.

M

Maintenance Area: An area that currently meets federal ambient air quality standards but which was previously designated as a nonattainment area. Federal agency actions occurring in a maintenance area are still subject to Clean Air Act conformity review requirements.

Management Activity: A surface disturbing activity undertaken on the landscape for the purpose of harvesting, traversing, transporting, protecting, changing, replenishing, or otherwise using resources.

Memorandum of Understanding (MOU): A written but noncontractual agreement between two or more agencies or other parties to take a certain course of action.

Mineral Material Disposal: The sale of sand, gravel, decorative rock, or other materials defined in 43 CFR 3600.

Mining Claim: A mining claim is a selected parcel of Federal Land, valuable for a specific mineral deposit or deposits, for which a right of possession has been asserted under the General Mining Law. This right is restricted to the development and extraction of a mineral deposit. The rights granted by a mining claim protect against a challenge by the United States and other claimants only after the discovery of a valuable mineral deposit. The two types of mining claims are lode and placer. In addition, mill sites and tunnel sites may be located to provide support facilities for lode and placer mining.

Mitigation: Mitigation includes: (a) Avoiding the impacts altogether by not taking an action or parts of an action, (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation, (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment, (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action, (e) Compensating for the impact by replacing or providing substitute resources or environments (40 CFR 1508.20).

N

National Pollutant Discharge Elimination System (NPDES): The NPDES permit program has been delegated in California to the State Water Resources Control Board. These sections of the CWA require that an applicant for a federal license or permit that allows activities resulting in a discharge to waters of the United States must obtain a State certification that the discharge complies with other provisions of the Clean Water Act.

National Register District: A group of significant archaeological, historical, or architectural sites, within a defined geographic area, that is listed on the National Register of Historic Places. See National Register of Historic Places.

National Register of Historic Places: The official list, established by the National Historic Preservation Act, of the Nation's cultural resources worthy of preservation. The National Register lists archeological, historic, and architectural properties (i.e. districts, sites, buildings, structures, and objects) nominated for their local, state, or national significance by state and federal agencies and approved by the National Register Staff. The National Park Service maintains the National Register. Also see National Historic Preservation Act.

National Scenic Trail: One of the three categories of national trails defined in the National Trails System Act of 1968 that can only be established by act of Congress and are administered by federal agencies, although part or all of their land base may be owned and managed by others. National Scenic Trails are existing regional and local trails recognized by either the Secretary of Agriculture or the Secretary of the Interior upon application.

Native American: Indigenous peoples of the western hemisphere.

Nitric Oxide (NO): A colorless toxic gas formed primarily by combustion processes that oxidize atmospheric nitrogen gas or nitrogen compounds found in the fuel. A precursor of ozone, nitrogen dioxide, numerous types of photochemically generated nitrate particles (including PAN), and atmospheric nitrous and nitric acids. Most nitric oxide formed by combustion processes is converted into nitrogen dioxide by subsequent oxidation in the atmosphere over a period that may range from several hours to a few days.

Nitrogen Dioxide (NO2): A toxic reddish gas formed by oxidation of nitric oxide. Nitrogen dioxide is a strong respiratory and eye irritant. Most nitric oxide formed by combustion processes is converted into nitrogen dioxide by subsequent oxidation in the atmosphere. Nitrogen dioxide is a criteria pollutant in its own right, and is a precursor of ozone, numerous types of photochemically generated nitrate particles (including PAN), and atmospheric nitrous and nitric acids.

Nitrogen Oxides (NOx): A group term meaning the combination of nitric oxide and nitrogen dioxide; other trace oxides of nitrogen may also be included in instrument-based NOx measurements. A precursor of ozone, photochemically generated nitrate particles (including PAN), and atmospheric nitrous and nitric acids.

Non-native Species: See Invasive Species and Noxious Weed.

Noxious Weed: According to the Federal Noxious Weed Act (PL 93-629), a weed that causes disease or has other adverse effects on man or his environment and therefore is detrimental to the agricultural and commerce of the United States and to the public health.

Nonattainment Area: An area that does not meet a federal or state ambient air quality standard. Federal agency actions occurring in a federal nonattainment area are subject to Clean Air Act conformity review requirements.

O

Off-Highway Vehicle (OHV): Any vehicle capable of or designed for travel on or immediately over land, water, or other natural terrain, deriving motive power from any source other than muscle. OHVs exclude: 1) any non-amphibious registered motorboat; 2), any fire, emergency, or law enforcement vehicle while being used for official or emergency purposes; 3) any vehicle whose use is expressly authorized by a permit, lease, license, agreement, or contract issued by an authorized officer or otherwise approved; 4) vehicles in official use; and 5) any combat or combat support vehicle when used in times of national defense emergencies.

Organic Compounds: Compounds of carbon containing hydrogen and possibly other elements (such as oxygen, sulfur, or nitrogen). Major subgroups of organic compounds include hydrocarbons, alcohols, aldehydes, carboxylic acids, esters, ethers, and ketones. Organic compounds do not include crystalline or amorphous forms of elemental carbon (graphite, diamond, carbon black, etc.), the simple oxides of carbon (carbon monoxide and carbon dioxide), metallic carbides, or metallic carbonates.

Overdraft condition: A condition in which the total volume of water being extracted from the groundwater basin would be greater than the total recharge provided to the basin.

Ozone (O3): A compound consisting of three oxygen atoms. Ozone is a major constituent of photochemical smog that is formed primarily through chemical reactions in the atmosphere involving reactive organic compounds, nitrogen oxides, and ultraviolet light. Ozone is a toxic chemical that damages various types of plant and animal tissues and which causes chemical oxidation damage to various materials. Ozone is a respiratory irritant, and appears to increase susceptibility to respiratory infections. A natural layer of ozone in the upper atmosphere absorbs high energy ultraviolet radiation, reducing the intensity and spectrum of ultraviolet light that reaches the earth's surface.

P

Paleontological Resources (Fossils): The physical remains of plants and animals preserved in soils and sedimentary rock formations. Paleontological resources are for understanding past environments, environmental change, and the evolution of life.

Paleontology: A science dealing with the life forms of past geological periods as known from fossil remains.

Paleozoic Era: An era of geologic time (600 million to 280 million years ago) between the Late Precambrian and the Mesozoic eras and comprising the Cambrian, Ordovician, Silurian, Devonian, Missippian, Pennsylvanian, and Permian periods.

Particulate Matter: Solid or liquid material having size, shape, and density characteristics that allow the material to remain suspended in the atmosphere for more than a few minutes. Particulate matter can be characterized by chemical characteristics, physical form, or aerodynamic properties. Categories based on aerodynamic properties are commonly described as being size categories, although physical size is not used to define the categories. Many components of suspended particulate matter are respiratory irritants. Some components (such as crystalline or fibrous minerals) are primarily physical irritants. Other components are chemical irritants (such as sulfates, nitrates, and various organic chemicals). Suspended particulate matter also can contain compounds (such as heavy metals and various organic compounds) that are systemic toxins or necrotic agents. Suspended particulate matter or compounds adsorbed on the surface of particles can also be carcinogenic or mutagenic chemicals.

Peak Particle Velocity: A measure of ground-borne vibrations. Physical movement distances are typically measured in thousandths of an inch, and occur over a tiny fraction of a second. But the normal convention for presenting that data is to convert it into units of inches per second.

Petroglyph: Pictures, symbols, or other art work pecked, carved, or incised on natural rock surfaces.

pH (parts hydrogen): The logarithm of the reciprocal of hydrogen-ion concentration in gram atoms per liter.

Physiographic Province: An extensive portion of the landscape normally encompassing many hundreds of square miles, which portrays similar qualities of soil, rock, slope, and vegetation of the same geomorphic origin (Fenneman 1946; Sahrhaftig 1975).

Pleistocene (Ice Age): An epoch in the Quarternary period of geologic history lasting from 1.8 million to 10,000 years ago. The Pleistocene was an epoch of multiple glaciation, during which continental glaciers covered nearly one fifth of the earth’s land.

Pliocene: The Pliocene Epoch is the period in the geologic timescale that extends from 5.332 million to 2.588 million years before present.

PM_{10} (inhalable particulate matter): A fractional sampling of suspended particulate matter that approximates the extent to which suspended particles with aerodynamic equivalent diameters smaller than 50 microns penetrate to the lower respiratory tract (tracheo-bronchial airways and alveoli in the lungs). In a regulatory context, PM_{10} is any suspended particulate matter collected by a certified sampling device having a 50 percent collection efficiency for particles with aerodynamic equivalent diameters of 9.5-10.5 microns and an maximum aerodynamic diameter collection limit less than 50 microns. Collection efficiencies are greater than 50 percent for particles with aerodynamic diameters smaller than 10 microns and less than 50 percent for particles with aerodynamic diameters larger than 10 microns.

$PM_{2.5}$ (fine particulate matter): A fractional sampling of suspended particulate matter that approximates the extent to which suspended particles with aerodynamic equivalent diameters smaller than 6 microns penetrate into the alveoli in the lungs. In a regulatory context, $PM_{2.5}$ is any suspended particulate matter collected by a certified sampling device having a 50 percent collection efficiency for particles with aerodynamic equivalent diameters of 2.0-2.5 microns and an maximum aerodynamic diameter collection limit less than 6 microns. Collection efficiencies are greater than 50 percent for particles with aerodynamic diameters smaller than 2.5 microns and less than 50 percent for particles with aerodynamic diameters larger than 2.5 microns.

Precursor: A compound or category of pollutant that undergoes chemical reactions in the atmosphere to produce or catalyze the production of another type of air pollutant.

Prehistoric: Refers to the period wherein American Indian cultural activities took place before written records and not yet influenced by contact with nonnative culture(s).

Programmatic Agreement (PA): A document that details the terms of a formal, legally binding agreement between one party and other state and/or federal agencies. A PA establishes a process for consultation, review, and compliance with one or more federal laws, most often with those federal laws concerning historic preservation.

Protocol Agreement (Protocol): A modified version of the NPA, adapted to the unique requirements of managing cultural resources on public lands in California, and is used as the primary management guidance for BLM offices in the state.

Q

Quaternary Age: The most recent of the three periods of the Cenozoic Era in the geologic time scale of the ICS. It follows the Tertiary Period, spanning 2.588 ± 0.005 million years ago to the present. The Quaternary includes two geologic epochs: the Pleistocene and the Holocene Epochs.

R

Rehabilitation: A management alternative and/or practice which restores landscapes to a desired scenic quality.

Restoration (Cultural Resource): The process of accurately reestablishing the form and details of a property or portion of a property together with its setting, as it appeared in a particular period of time. Restoration may involve removing later work that is not in itself significant and replacing missing original work. Also see Stabilization (Cultural Resource).

Riparian: Situated on or pertaining to the bank of a river, stream, or other body of water. Normally describes plants of all types that grow rooted in the water table or sub-irrigation zone of streams, ponds, and springs.

Road: A linear route declared a road by the owner, managed for use by low-clearance vehicles having four or more wheels, and maintained for regular and continuous use.

Route: “Routes” represents a group or set of roads, trails, and primitive roads that represents less than 100% of the BLM transportation system. Generically, components of the transportation system are described as routes.

S

Saleable Minerals: Common variety minerals on the public lands, such as sand and gravel, which are used mainly for construction and are disposed by sales or special permits to local governments. See also Mineral Materials.

Scale: The proportionate size relationship between an object and the surroundings in which the object is placed.

Scenery: The aggregate of features that give character to a landscape.

Scenic Area: An area whose landscape character exhibits a high degree of variety and harmony among the basic elements which results in a pleasant landscape to view.

Scenic Quality: The relative worth of a landscape from a visual perception point of view.

Scenic Quality Evaluation Key Factors: The seven factors (land form, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications) used to evaluate the scenic quality of a landscape.

Scenic Quality Ratings: The relative scenic quality (A, B, or C) assigned a landscape by applying the scenic quality evaluation key factors; scenic quality A being the highest rating, B a moderate rating, and C the lowest rating.

Scenic Values: See Scenic Quality and Scenic Quality Ratings.

Secretary of the Interior: The U.S. Department of the Interior is in charge of the nation's internal affairs. The Secretary serves on the President's cabinet and appoints citizens to the National Park Foundation board.

Sedimentary Rocks: Rocks, such as sandstone, limestone, and shale, that are formed from sediments or transported fragments deposited in water.

Sensitivity Levels: Measures (e.g., high, medium, and low) of public concern for scenic quality.

Shaft: See Mine Shaft.

Special Status Species: Federal- or state-listed species, candidate or proposed species for listing, or species otherwise considered sensitive or threatened by state and federal agencies.

State Historic Preservation Office (SHPO): The official within and authorized by each state at the request of the Secretary of the Interior to act as liaison for the National Historic Preservation Act. Also see National Historic Preservation Act.

State Implementation Plan (SIP): Legally enforceable plans adopted by states and submitted to EPA for approval, which identify the actions and programs to be undertaken by the State and its subdivisions to achieve and maintain national ambient air quality standards in a time frame mandated by the Clean Air Act.

State Water Resources Control Board (SWRCB): Created in 1967, joint authority of water allocation and water quality protection enables the State Water Board to provide comprehensive protection for California's waters. The mission of the nine Regional Boards is to develop and enforce water quality objectives and implementation plans that will best protect the State's waters, recognizing local differences in climate, topography, geology and hydrology.

Subsurface: Of or pertaining to rock or mineral deposits which generally are found below the ground surface.

Sulfur Dioxide (SO2): A pungent, colorless, and toxic oxide of sulfur formed primarily by the combustion of fossil fuels. It is a respiratory irritant, especially for asthmatics. A criteria pollutant in its own right, and a precursor of sulfate particles and atmospheric sulfuric acid.

T

Taphonomy: The study of the processes by which animal bones and shells and plant and other fossil remains are transformed after deposition.

Tertiary: The Tertiary Period marks the beginning of the Cenozoic Era. It began 65 million years ago and lasted more than 63 million years, until 1.8 million years ago. The Tertiary is made up of 5 epochs: the Paleocene Epoch, the Eocene Epoch, the Oligocene Epoch, the Miocene Epoch, and the Pliocene Epoch.

Texture: The visual manifestations of the interplay of light and shadow created by the variations in the surface of an object or landscape.

Toxic: Poisonous. Exerting an adverse physiological effect on the normal functioning of an organism's tissues or organs through chemical or biochemical mechanisms following physical contact or absorption.

Traditional Cultural Properties: Areas associated with the cultural practices or beliefs of a living community. These sites are rooted in the community’s history and are important in maintaining cultural identity.

Trail: A linear route managed for human-powered, stock, or off-highway vehicle forms of transportation or for historical or heritage values. Trails are not generally managed for use by four-wheel drive or high-clearance vehicles.

V

Vandalism (Cultural Resource): Malicious damage or the unauthorized collecting, excavating, or defacing of cultural resources. Section 6 of the Archaeological Resources Protection Act states that "no person may excavate, remove, damage, or otherwise alter or deface any archaeological resource located on public lands or Indian lands…unless such activity is pursuant to a permit issued under section 4 of this Act."

Variables: Factors influencing visual perception including distance, angle of observation, time, size or scale, season of the year, light, and atmospheric conditions.

Variety: The state or quality of being varied and having the absence of monotony or sameness.

Vehicle Miles Traveled (VMT): The cumulative amount of vehicle travel within a specified or implied geographical area over a given period of time.

Viewshed: The landscape that can be directly seen under favorable atmospheric conditions, from a viewpoint or along a transportation corridor. Protection, rehabilitation, or enhancement is desirable and possible.

Visual Contrast: See Contrast.

Visual Quality: See Scenic Quality.

Visual Resources: The visible physical features on a landscape (e.g., land, water, vegetation, animals, structures, and other features).

Visual Resource Management Classes: Categories assigned to public lands based on scenic quality, sensitivity level, and distance zones. There are four classes. Each class has an objective which prescribes the amount of change allowed in the characteristic landscape.

Visual Resource Management (VRM): The inventory and planning actions taken to identify visual values and to establish objectives for managing those values; and the management actions taken to achieve the visual management objectives.

Visual Values: See Scenic Quality.

W

Wetlands: Permanently wet or intermittently water-covered areas, such as swamps, marshes, bogs, potholes, swales, and glades.

Wilderness Area: An area formally designated by Congress as part of the National Wilderness Preservation System as defined in the Wilderness Act of 1964 (78 Stat.891), Section 2(c).

Wilderness Study Area: A roadless area or island that has been inventoried and found to have wilderness characteristics as described in section 603 of FLPMA and section 2(c) of the Wilderness Act of 1964 (78 Stat. 891). Source for both of these is BLM's IMP and Guidelines for Lands Under Wilderness Review (December 1979).

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Organization of the References

A number of document available through the California Energy Commission's permitting process were used as primary references in preparing this PA/FEIS. These include the March 2010 Staff Assessment/ Draft Environmental Impact Statement; September 1, 2010 Revised Staff Assessment, Part I; September 16, 2010 Revised Staff Assessment, Part II; and December 2010 Commission Decision. The SA/DEIS is incorporated by reference in this PA/FEIS. Other references used in the preparation of this PA/FEIS are organized in this section as follows:

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The authors of this PA/FEIS relied upon a number of documents that were generated as part of the CEC Permitting Process. These references are listed below by topical area/environmental parameter.

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These are additional references that were used by the PA/FEIS authors as primary sources of information for the analyses provided in the PA/FEIS.

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INDEX